КОНСУЛЬТАЦИИ

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THE ACQUISITON OF FOREIGN LANGUAGE VOCABULARY: DOES SPACING EFFECT MATTER?

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Abstract. *Introduction.* Research that investigated effective strategies for learning foreign language vocabulary revealed that long spacing facilitates learning more than short or no spacing. This phenomenon is known as distributed practice effect.

Aim. The present study *aimed* to examine the effect of spaced instruction on vocabulary learning and retention among Saudi EFL learners.

Methodology and research methods. The sample of this study includes 30 English major students at King Khalid University. The students were divided into two groups (15 students for the massed instruction group and 15 students for the spaced instruction group). Both groups were taught 20 new words which were selected based on the results of the Vocabulary Size Test by Nation P., Beglar D. In the condition of massed class, the target words were taught in 45-minute weekly session (lasted for two weeks). In the condition of spaced class, 45 minutes were distributed into three 15-minutes session presented throughout the week at intervals with two intervening days between each session (lasted for two weeks). Both groups received a post-test after eight weeks of training, while the delayed post-test was administered three weeks later (week 11).

Results. The results of the study revealed that there was statistically significant difference between the massed and spaced instruction groups on both post-test and delayed post-test in favor to the spaced instruction group.

Scientific novelty. The present study makes several contributions to the body of literature. First, it adds to the relatively small amount of research on the spacing effect on the acquisition of foreign language vocabulary. Second, it is one of the very few studies that have been conducted in the Arab world, more specifically in the Saudi context. Finally, the study provides better understanding of the importance of spacing in learning foreign language vocabulary among Arab learners.

Practical significance. In the light of the obtained results, several recommendations have been provided for EFL practitioners and curriculum designers. This study suggests that EFL practitioners should consider spaced learning as beneficial teaching strategy, and to synthesise it in the educational materials.

Keywords: vocabulary learning, massed instruction, spaced instruction, distributed practice effect, EFL learners.

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МЕТОД ИНТЕРВАЛЬНЫХ ПОВТОРЕНИЙ ПРИ ИЗУЧЕНИИ ЛЕКСИКИ ИНОСТРАННОГО ЯЗЫКА

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Аннотация. *Введение.* Работы, в которых исследовались эффективные стратегии изучения лексики на иностранном языке, показали, что длительный интервал повторения освоенной ранее лексики облегчает обучение больше, чем короткий интервал повторения или его отсутствие. Данное явление известно как метод интервального повторения.

Цель настоящей работы состояла в исследовании влияния интервального повторения на обучение лексике и способности запоминания лексических единиц среди студентов, изучающих английский как иностранный (EFL) в Саудовской Аравии.

Методология и методы исследования. Выборка этого исследования включает 30 студентов, изучающих английский язык в Университете короля Халида. Учащиеся были разделены на две группы по 15 студентов: группа массового обучения и интервального обучения. Обе группы обучили 20 новым словам, которые были выбраны по результатам теста на уровень лексики (Nation P., Beglar D). В условиях традиционного занятия целевая лексика изучались в течение 45 минут еженедельно в течение двух недель. В группе с интервальным обучением 45 минут распределялись на три 15-минутных занятия в течение недели с двумя промежуточными днями между каждым занятием в течение двух недель. Обе группы получали пост-тест после восьми недель тренировок, в то время как отложенный пост-тест проводился после 11 недель.

Результаты. Результаты исследования показали, что было статистически значимое различие между массовой и интервальной группами обучения как после пост-теста, так и после отложенного пост-теста в пользу группы с интервальным обучением.

Научная новизна. Во-первых, это исследование дополняет относительно небольшой объем исследований, которые изучают влияние интервалов на освоение лексики иностранного языка. Во-вторых, это одно из немногих исследований, проведенных в арабском мире, в частности, в саудовском контексте. Наконец, исследование позволяет лучше понять важность интервалов в изучении лексики на иностранном языке среди арабских учащихся.

Практическая значимость. С учетом полученных результатов для специалистов-практиков и разработчиков учебных программ EFL было представлено несколько рекомендаций. Это исследование предполагает, что преподаватели EFL должны рассматривать интервальное обучение как полезную стратегию преподавания и использовать данную методику в учебных материалах.

Ключевые слова: обучение лексике; массовое обучение; интервальное обучение; метод распределенной практики; студенты, изучающие английский как иностранный.

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EL MÉTODO DE LA REPETICIÓN ESPACIADA AL ESTUDIAR EL VOCABULARIO DE UNA LENGUA EXTRANJERA

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Abstracto. *Introducción.* Los trabajos, en los que se han estudiado estrategias efectivas para el aprendizaje del vocabulario en una lengua extranjera, han demostrado que un intervalo largo de repetición del vocabulario previamente dominado facilita más el aprendizaje que un intervalo corto de repetición o su ausencia. Este fenómeno se conoce como método de repetición espaciada.

Objetivo. El objetivo de este trabajo ha sido investigar el efecto de la repetición espaciada en el aprendizaje y la retención de vocabulario entre estudiantes de inglés como lengua extranjera (ILE) en Arabia Saudita.

Metodología, métodos y procesos de investigación. La muestra de este estudio incluye a 30 estudiantes que estudian inglés en la Universidad Rey Halid. Los estudiantes se dividieron en dos grupos de 15 estudiantes: Un grupo de aprendizaje masivo y un grupo de aprendizaje por intervalos. Ambos grupos aprendieron 20 palabras nuevas, que fueron seleccionadas con base en los resultados de una prueba de vocabulario (Nation P., Beglar D). En las condiciones de una clase tradicional, el vocabulario estimado se estudió durante 45 minutos a la semana durante dos semanas. En el grupo de entrenamiento por intervalos, los 45 minutos se dividieron en tres sesiones de 15 minutos durante la semana, con dos días entre cada sesión durante dos semanas. Ambos grupos recibieron una prueba posterior después de ocho semanas de entrenamiento, mientras que se realizó una prueba posterior diferida después de 11 semanas.

Resultados. Los resultados del estudio mostraron que hubo una diferencia estadísticamente significativa entre los grupos de entrenamiento masivo y espaciada tanto después de la evaluación como después de la evaluación diferida a favor del grupo de entrenamiento por intervalos.

Novedad científica. En primer lugar, este estudio complementa el cuerpo de investigación relativamente pequeño que examina el efecto del espacio en la adquisición de vocabulario en lenguas extranjeras. En segundo lugar, este es uno de los pocos estudios realizados en el mundo árabe, en particular en el contexto saudita. Finalmente, el estudio proporciona una mejor comprensión de la importancia de los intervalos en el aprendizaje de vocabulario de lenguas extranjeras entre los estudiantes árabes.

Signifcado práctico. Con base en los hallazgos, se hicieron varias recomendaciones a los profesionales de ILE y a quienes desarrollan planes de estudios. Este estudio sugiere que los educadores de ILE deberían considerar el aprendizaje espaciado como una estrategia de enseñanza útil y utilizar esta técnica en los materiales didácticos.

Palabras claves: Enseñanza del vocabulario; educación en masa; aprendizaje de intervalo; método de práctica distribuida; estudiantes que apren den inglés como lengua extranjera ILE.

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Introduction

The English language is considered as a basic element for public growth in several fields such as education, tourism, politics, commerce, technology, science, etc. In Saudi Arabia, learning English is obligatory at schools, and it starts from the

first grade of primary education, enduring to the third grade of secondary education [2]. In addition, most universities in Saudi Arabia offer undergraduate programmes in the English language, and other majors are being offered with English as a medium of instruction such as engineering and medical programmes [3]. Nonetheless, the vocabulary knowledge of Saudi EFL learners has raised a question mark, whether in school or tertiary education [3, 4]. According to Nation [5], vocabulary knowledge is an extremely important predictor of language learning success, and EFL learners are required to know about 3.000 word families to understand the target language. Laufer and Nation [6] emphasised the adequate knowledge of vocabulary to boost the learners' success in learning a second/foreign language. Nagy and Scott [7] indicated that learning foreign language vocabulary could be challenging as it involves learning semantic features, syntactic structure, words' connotations, and synonyms and antonyms. The process of learning new vocabulary by children could include experiential learning, memorising, and using words repeatedly [3].

The evaluation of learning outcomes relies heavily on the variation of teaching methodologies such as the distributed instruction [8]. Several studies have sought to examine the effect of distributed instruction on learning outcomes [9–12]. Carpenter and colleagues [13] pointed out that most students and teachers are solicitous about the study timing to maximise adjournment of previously learned materials, as well as improve learning outcomes. Similarly, many EFL learners and teachers in the field of language learning are unsure whether introducing study materials over several sessions produces better learning compared to learning through one session [8].

The body of literature in the field of second/foreign language teaching and learning [9–12, 16] emphasised the extreme importance of exposing learners to recurrent and orderly examples of linguistic structures. However, the question whether the recurrent input should be massed or spaced needs further investigations. Segalowitz [17] pointed out that linguistic structures are improved when the items are repeated in a spaced sequence as opposed to an intensified or massed presentation. There was plenty of research works that showed the positive effect of spaced instruction in cognitive psychology. However, very few studies have investigated the effect of spaced presentation of instructional materials on learning and teaching second/foreign language [9–13].

The studies conducted to investigate the effect of spaced instruction on teaching and learning English language have come up with divergent conclusions. Such studies have focused on English language skills/grammar, but scarce studies have been conducted to examine the preponderance of spaced instruction on vocabulary learning in (EFL) classroom context. Therefore, Namaziandost [8] recommended further research to offer more insights about the spaced versus massed instruction on vocabulary learning. It is worth mentioning that foreign language teachers face some challenges while teaching vocabulary to their students. Firstly, the students seem to be unable to retrieve the learned vocabulary even after weeks, months, or years of vocabulary instruction. Secondly, foreign language teachers devote much time to teach new vocabulary to students, however, students find it difficult to retain

the newly learned vocabulary. Finally, the most challenging issue faced by teachers is how to provoke a long-term memory of words to be available for users in the future [18]. In a similar vein, Cameron [19] pointed out that learners need to be exposed to memorising activities when they encounter new words. She added that learners need to keep reviewing those new words at intervals.

The effect of spaced learning has been a vigorous area of research in the field of cognitive psychology. Cepeda and colleagues [20] consider spaced learning/effect as a memory enhancement when learning episodes occur over longer intervals rather than being concentrated in one single session. Goosens and colleagues [21] argued that there are two types of repetitions in spaced learning (i.e. retrieval and restudy practice). They added that retrieval practice has a positive effect on enhancing learner's memory than restudy practice, whereas retrieval practice embraces testing whereby learner's memory becomes more reinforced. From the points mentioned above, it is apparent that research about the effect of spaced learning on the acquisition of new vocabulary in EFL classroom is markedly rare. Therefore, the present study aims at providing better understanding about the impact of spaced learning on vocabulary acquisition in the EFL classroom. The objectives of the present study could be addressed by providing answers to the following questions:

1. Does spacing practice have a significant effect on student's acquisition of foreign language vocabulary?
2. Is there statistically significant difference in recalling and retaining English vocabulary among Saudi EFL learners?

Literature Review

The Importance of Vocabulary in Language Learning

Vocabulary is the main element of learning language because the ability to use a language depends on the vocabulary size that the learner has [22]. In spite of the importance of vocabulary in language learning, it lacks attention in the body of literature on second language acquisition during the past century. Milton [23] indicated the major reasons of such as lack of attention. First, traditional teaching methods such as Grammar Translation Method or Audio-lingual method view vocabulary as a secondary element in language learning. The focus of traditional teaching methods is on how to acquire systems and rules of a language (i.e. phonological, syntactic, and grammatical rules) with very little attention to vocabulary. In fact, language systems and rules govern vocabulary; however, these rules can develop independently no matter how many words are used to form them [23].

The second reason is attributed to the prevalent belief of many foreign language learners and teachers that the limited vocabulary size would not hinder language proficiency. Milton [23] argued that some teachers and textbook designers continue to believe that learning only 850 words is sufficient for communicating in English. Indeed, this approach concerned with the number of words that learners

need to express themselves only, and it is not applicable to receptive skills such as reading, where learners do not have the ability to control the number of words that he/she receives in a text [2]. As a result, this approach contradicts [24] suggestion that learners need to know approximately 9.000-word families in order to read authentic and non-specialized texts such as research articles, news, and novels. The third reason stems from the belief that big vocabulary size is retained through unintentional learning, unlike intentional vocabulary learning where a limited amount of vocabulary is retained [25]. Consequently, teaching vocabulary is worthless because students are expected to learn more vocabulary through undeliberate exposure to the language [2].

On the other hand, several studies stressed the importance and the effective role of Communicative Language Teaching (CLT) method to enhance learners' competency in learning a second or foreign language. Savignon [26] pointed out that the pivotal role of CLT is to develop the functional language abilities of learners through involving them communicative activities. Richard [27] indicated that CLT method is a collection of assumptions about the nature of language instruction and learning. It specifies the nature of the material to be taught. According to Nation [28], CLT is one of the most effective methods to teach vocabulary. They attributed the effectiveness of CLT due to its potential to link the targeted learning materials to real life context. The teaching procedures of CLT involve presenting the topic to the students, instruct learners on how to transfer information about the topic, provide students with the visual aids that suit the teaching topic, give examples to learners on how to transfer information and ask them to give their own examples, give some tips and advice on how to develop their vocabulary through transfer information, and finally ask learners about their experience of what they have learned. Based on the previous discussion, the present study agrees that CLT is the most effective teaching method to be used in teaching language skills, and vocabulary is not an exception. Communicative language teaching provides learners with a clear and evident benefit; they can utilise the abilities they have learned to communicate in their target language. CLT is not about learning for the sake of learning; it has a specific and measurable goal in mind. Students become effective communicators who can use appropriate vocabulary and sentence structure in a variety of real-life scenarios.

Vocabulary Acquisition

The acquisition of L2 vocabulary takes different forms. Some learners prefer to learn the meaning of new vocabulary through memorisation and translation into their first language. This form could be challenging to many learners because the translation of proverbs, idioms, and jokes may be unsuitable or incongruent to the learner's native culture [29]. The nonequivalence of translation causes disruption in the learning of new L2 vocabulary. Oxford and Crookall [30] argued that intentional learning tasks must be de-emphasised but not ignored and replace it with incidental vocabulary learning through context. On the other hand, Hulstijn [31] emphasised

the importance of intentional technique in learning vocabulary; he defined it as a learning way in which the learners are informed about what they are going to learn. Elgort and Nation [32] pointed out that activities such as notebooks, word lists, and word cards are useful in vocabulary learning.

In a similar vein, Schmitt [33] emphasised the importance of explicit instruction in learning the characteristics of vocabulary, and he pointed out that deliberate learning of vocabulary provides learning with the opportunity to notice those characteristics while focusing on the message and the meaning. In summary, deliberate vocabulary learning accelerates the process of lexical development because of the focused memorisation and repetition [34]. According to Schmidt's [35] noticing hypothesis, there is a distinction between input and intake in language learning in that input must be changed to intake that is noticed and consciously registered before language learning can be said to have occurred.

That is to say, noticing the features of second language and concentrating on them play a vital role in learning a new language. This hypothesis is considered the basis of intentional vocabulary learning. The idea of intentional vocabulary learning received a variety of definitions. The most prominent definition has been provided by Hulstijn [31], who defined it as a learning method in which the learner is aware of what he/she is learning. The tasks of such learning are done based upon the target vocabulary. Several studies on the impact of intentional vocabulary learning have been conducted. Elgort and Nation [32] mentioned in their study that some techniques such as having notebooks, writing wordlists, and using word cards are useful in learning new vocabulary. Huang [33] concluded that intentional vocabulary learning accelerates learners' lexical development through focused repetition or memorisation strategies that can be completed individually in a short period of time.

On the other hand, incidental vocabulary learning involves incidental acquisition of vocabulary within meaningful content or context. The incidental learning of vocabulary allows for longer retention of the newly learned words in cognitive process. However, the meaningful context must strictly be selected because learners may misinterpret it [36]. According to Schmitt, It stands to reason that the more a learner interacts with a new word, the more likely they are to remember it. [33]. Thus, incidental learning of vocabulary entails indirect attention to the new vocabulary, whilst new words can be learned jointly as another activity [37]. According to Hashemi and colleagues [38], receptive and productive vocabulary can be better acquired through interaction and the use of words in a productive form. Huckin and Coady [39] indicated some of the advantages of incidental vocabulary learning as follows:

a. Words are recognised through meaningful context.

b. Learners are exposed in both vocabulary acquisition and reading simultaneously.

c. Learners would have the opportunity to select the material they wish to learn.

The Distributed Practice Effect

Several laboratory-based studies have revealed differences between learners who study the same materials for the same period of time and the same number of learning occurrences, depending on the time distribution method used. This research has generally demonstrated that spaced-repeated learning leads to better long-term retrieval of learned materials; this type of effect is known as the distributed practice effect [10]. In addition, distributed practice contains learning episodes that are different in nature. Rowland [40] argued that learning episodes may consist of review practice and retrieval practice. Learners are exposed to the learned information in the review practice, while learners are required to recall the information they have learned. The studies conducted on distributed learning effect were based on a paired-associate paradigm, in which learners are requested to learn the association of two pieces of information such as L2 word and its meaning in the learner's first language. Some of these studies have investigated the spacing effect, and other studies have focused on lag effect on the learned materials. The spacing effect is viewed as the impact of massed learning episodes versus spaced ones [10]. Massed learning episodes entails two or more learning sessions of the same learning materials in a row, while spaced learning episodes involve two or more learning sessions that are separated in time. Li and DeKeyser [41] pointed out that drilling the same word in a row multiple times seems to be unusual. The lag effect, defined as the varying effect of spaced intervals to the exclusion of massed schedules, is of greater relevance for vocabulary learning.

Spacing Effect on Learning and Retention

The vast majority of studies, which investigated the effect of distributed learning on learning, can be traced back to the experimental psychology reports [42]. These reports include evidence from other fields, such as mathematics, neuroscience, genetics, and neurobiology. The effect of distributed learning for learners has been observed through a variety of materials such as motor skills, images, and word pairs. The distributed learning refers to the effect of time spacing between the repetition of any learning materials and how that affects the retention of the learned information in memory. The variance of temporal variance has been found effective in recalling and retaining the information before forgetting occurs [10]. This case has long been the interest of many researchers and leads to several hypotheses. Three of the resulted hypotheses allowed us to select suitable literature and to clarify the elements of distributed learning [43]. Edmonds and colleagues [10] provided a brief review for each of the dominated hypotheses. The first hypothesis is called encoding variability which indicates that the information is preserved when it has been amply encoded in memory. The ample encoding occurs when multiple references allow learners to access the learned information thereafter. This hypothesis suggests that longer inter-study intervals lead to an accurate memory outcome, because longer spacing intervals increase the probability of encountering

the new information in a variety of environments, hence enriching the memory with the associated information. The second hypothesis (deficient processing) states that quick review of information (masses interval) after the first encounter of information is insufficient to be stored in long-term memory. This is because the activation of new information is present in short-term memory. Consequently, less attention is given to the new information resulted in weak encoding of the new presentation.

In the case of short inter-study intervals, the retention of new information tends to be very high, and this gives the impression of successful learning; however, the retention level drops down very quickly. On the other hand, longer inter-study intervals involve deeper processing of information in which the information is no longer present in the short-term memory but in the long-term memory which, in turn, leads to better information retention. The study-phase retrieval hypothesis indicates that the repeated practice of information improves information retention especially if they are accompanied with reactivation of original memory. The hypothesis of study-phase retrieval explains the difference between short and long inter-study intervals. It states that the retrieval practice that takes place before forgetting a point is the most challenging phase, because memory trace seems to be weak at this point, but it leads to deeper processing and better subsequent retention. The retrieval practice that occurs too late-after forgetting the information- may result in starting over of learning process as it will not help in reinforcing the learned information.

The oft-cited study conducted by Cepeda et al. [20] asked the participants to learn facts in two various inter-study intervals (from 1 to 150 days). The main purpose of this study was to explore the memorized learning and prove that inter-study intervals should not be too short or too long. The study was extremely in a sense that it assumes no one single inter-study interval is most efficacious across all timescales; rather, it can be nuanced by the reciprocal relationship between inter-study interval and retention retrieval. The participants' retention interval was tested through different timescales: one week, one month, two months, or five months after the second episode of learning facts. The findings of the study showed that the most efficacious retention interval differ according to the timescale of inter-study interval: the participants with 1 day of inter-study interval performed best when they have been tested one week after the second learning episode. The longest retention retrieval was best performed with participants who had respected to three weeks of inter-study interval. Therefore, there is a strong connection between the periods of inter-study interval and retention retrieval; longer retention retrieval occurs with longer inter-study interval and vice versa.

Previous Studies

Recent research [2, 8, 12, 44, 45] has looked into the effect of spacing on vocabulary learning and/or retention. Al-Fotais [2] compared the effect of spaced and massed practice on vocabulary learning in an authentic tertiary classroom. The study's sample included 62 freshmen English majors from Taif University in

Saudi Arabia. The participants learned 30 words in massed learning and 30 words in spaced learning. The students in the massed group practised each word four times in a single session, while the students in the spaced group practised the same group of words once over the course of four sessions. Four weeks later, vocabulary tests were administered immediately following the intervention. The results revealed that the scores obtained from the massed condition were significantly lower than the scores obtained from the spaced condition. The findings also revealed that, whether they preferred it or not, spaced learning was more beneficial than massed learning.

Lotfolahi and Salehi [44] investigated the impact of different spaced learning schedules on the acquisition of English-Farsi word pairs among young Iranian EFL learners. This study included 28 elementary school students recruited from two different classrooms. In the massed condition, the students learned five word pairs in one session and five more word pairs a week later. Students in the spaced condition learned ten-word pairs in one session and then restudied the same words a week later. To extend the benefits of spaced practice, the researchers used tests with corrective feedback into different spacing schedules. That is, the students were taught to test each other on their vocabulary knowledge and provide feedback to one another. The students' retention of newly learned words was evaluated after one week and five weeks. The findings revealed that spaced practice outperformed massed practice in terms of long-term retention.

Nakata and Elgort [12] investigated the effect of massed and spaced practice on second language vocabulary learning through reading. This was tested on Japanese English speakers who encountered embedded vocabulary from 48 novels. Participants were given feedback on their newly acquired vocabulary in the form of Japanese translation equivalents and English synonyms. The post-test of semantic priming, meaning-form matching, and meaning recall was used to assess the effect of spaced distribution. The research findings revealed that spaced distribution outperformed massed distribution in both meaning-form matching and meaning recall. Nonetheless, the observation revealed that semantic priming occurred regardless of whether a word was encountered in a spaced or massed distribution.

Nakata and Suzuki [45] investigated the impact of massed and spaced learning on semantically related and unrelated word learning. This study included 133 Japanese university students, who learned 48 English-Japanese words in a massed and spaced learning environment. The learned words were divided equally into 24 related words and 24 unrelated words. The post-test findings revealed no statistically significant differences between spacing-related and unrelated words. Semantically related words were more likely to cause intervention errors than unrelated words. Furthermore, the findings revealed that spacing aided the learning of unrelated words more than related words, contradicting the researchers' hypothesis.

Namaziandost and colleagues [8] investigated the impact of both massed and spaced practice on vocabulary learning and retention. This study's sample consisted of 75 Iranian EFL learners who were randomly assigned to one of three groups: 25 for a control group, 25 for massed practice, and 25 for spaced practice.

The control group received no focused instruction on vocabulary learning, while the massed group received one intensive session on target vocabulary learning, while the spaced group received three teaching sessions at different time intervals, and all participants were retested after five weeks. The researchers administered a pre-vocabulary test to assess participant homogeneity and the same vocabulary test after the intervention to assess differences in vocabulary learning between groups. The results showed that the spaced practice group outperformed the other groups on both the post and delayed post-tests.

The review of previous research on massed and spaced learning has revealed inconsistent results and an uncertain picture of whether students should be exposed to spaced learning or not. Some of the studies [2] investigated the effect of spaced practice after post and delayed tests. Namaziandost and colleagues [8] studied spaced practice and its effect on vocabulary learning after immediate test only. The effect of spaced practice on learning vocabulary has been examined with different variables. Lotfolahi and Salehi [44] investigated the impact of spaced practice on learning English-Farsi pair words; learning vocabulary through reading [12]; learning semantically related and unrelated words [45]. The literature review showed very few studies that concerned with the effect of spaced practice on learning vocabulary in the Arab World.

Methods

Participants

The participants of this study contained 30 English major students at King Khalid University in Saudi Arabia. The participants have been chosen from two sections of the Morphology course, which was a fourth-year course (15 students from each section). The participants have been chosen based on the outcomes of vocabulary level test [1]. The ages of participants ranged from 20 to 24 with 21 mean age. All the participants were males because the educational system in Saudi Arabia is gender-segregated, and this system makes it difficult to recruit female students. In addition, most of the students received their formal English learning around the age of 10, and that means that they have at least 8 years of prior English study. The researcher divided the participants into two groups: massed instruction group (n = 15), and spaced instruction group (n = 15). The nature and the procedures of the study were explained to all participants, and they have been informed that the results of the study will be used for research purpose only.

Vocabulary Selection

The researcher used Vocabulary Size Test by Nation P., Beglar D. [1] to determine the students' vocabulary knowledge before teaching them the target vocabulary. The vocabulary level test by Nation P., Beglar D. [1] is a test containing 140 multiple choice questions about vocabulary. Each question asks about an English word and its meaning/definition in English as well. The test measures vocabulary size for 14.000-word families, in which 10 questions form 1000-word family level. The student's

overall score should be multiplied by 100 to obtain the level of their vocabulary size. The researcher administered the test to all students for two purposes: 1) to determine their vocabulary size and 2) to help in selecting the target vocabulary to be taught in this study. The students finished the test in approximately 90 minutes. The results of the vocabulary size test showed that the estimated vocabulary size of the students was 2025 words. Hence, the researcher decided to select 4000- and 5000-word level from the Vocabulary Size Test [1] as the results suggested that the students unlikely have been encountered with those words. Table 1 shows the selected words along with their meanings/definitions.

Table 1

The selected words from Vocabulary Size Test by Nation P. and Beglar D.

No.	Word	Meaning/Definition
1.	Lonesome	Lonely
2.	Strap	Strip of material for holding things together
3.	Soldier	Person in the army
4.	Restore	Made like new again
5.	Pave	Covered with a hard surface
6.	Rove	Traveling around
7.	Jug	A container commonly used to hold liquids
8.	Dash	Moved quickly
9.	Dinosaur	A fossil reptile lived an extremely long time ago
10.	Scrub	Rubbing it hard to clean it
11.	Crab	Sea creatures that walk sideways
12.	Latter	Last one
13.	Candid	Say what you really think
14.	Allege	Claimed it without proof
15.	Tummy	Stomach
16.	Quiz	Set of questions
17.	Input	information, power, etc. put into something
18.	Vocabulary	Words
19.	Remedy	Way to fix a problem
20.	Compound	Thing made of two or more parts

Teaching Techniques

Each of the selected word has been introduced to the students in written and spoken form with its L1 equivalent using flashcard papers. Next, the students memorised the selected words using four types of exercises (L2 definition multiple-choice task, a fill-in-the-space multiple choice task, L1–L2 translation task, and L2–L1 translation task. These four tasks were carefully selected in order to test the students' vocabulary knowledge after the end of treatment. The following tables 2–5 are examples on each of the selected tasks.

Table 2

Example on L2 definition multiple-choice task

Choose the best word that best represents the following definition.			
The information that are processed by any device.			
Dash	input	remedy	candid

Table 3

Example on fill in the space multiple-choice task

Fill in the space with the missing word from the choices given below.			
The experts provided some invaluable.....at the beginning of the project.			
Dash	input	remedy	candid

Table 4

Example on L2–L1 translation task

Translate the underlined word.	
الجملة	الترجمة
The experts provided some invaluable input at the beginning of the project.	قدم الخبراء بعض المدخلات القيمة عند بداية المشروع

Table 5

Example on L1–L2 translation task

Translate the underlined word.	
Sentence	Translation
لقد قدم الخبراء مدخلات ومعلومات جيدة عند بداية المشروع	The experts provided some invaluable input at the beginning of the project.

Both massed and spaced instruction groups were engaged in the treatment but in a different way. Both groups received the Vocabulary Size Test before the treatment. The main purpose for this test is to check the students' homogeneity in terms of vocabulary knowledge. The students in both groups have been given a general idea and brief introduction about the nature and purpose of the study, and the materials and activities they will receive during the treatment. The twenty new words were taught to both groups through massed and spaced instruction. The allocated time for teaching both groups was forty-five minutes. In the condition of massed class, the target words were taught in 45-minutes weekly session (lasted for two weeks). In the condition of spaced class, the 45 minutes were distributed into three 15-minutes session presented throughout the week at intervals with two intervening days between each session (lasted for two weeks). The researcher was eager to introduce the previously mentioned exercises for the target vocabulary to preserve the participants' interest. Both massed instruction group and spaced

instruction group received 45 minutes of instruction per week including introduction stage, vocabulary exercises, and feedback from the students. The present study was conducted across eight weeks (Table 6) to enable the students to learn 20 new English words.

Each weekly session, the massed instruction group learned 20 new words (45 minutes length). The spaced instruction group received 20 words per week, 7 words in the first (15-minute) session, 7 words in the second (15-minute) session, and 6 words in the third (15-minute) session (15 minutes length). After each learning session, the students in both groups have been given some activities to check their progress in learning the target vocabulary. These activities included L2 definition multiple-choice task, fill in the space multiple-choice task, L2-L1 translation task, and L1-L2 translation task. The post-test was given to the students in week 8 to compare the effectiveness of spaced teaching strategy on foreign language vocabulary acquisition between massed group and spaced group. The delayed test was administered to the students three weeks after the administration of post-test (week 11). The main purpose of the delayed test was to compare between both groups in terms of retaining the newly learned vocabulary.

Table 6

Procedures of the study

Week	1	2	3	4	5	6	7	8
Massed group	Pre-test	Introduction stage	Instruction (45 minutes)	Instruction (45 minutes)	Post-test	No instruction	No instruction	Delayed post-test
Spaced group	Pre-test	Introduction stage	Instruction (three sessions, 15 minutes for each)	Instruction (three sessions, 15 minutes for each)	Post-test	No instruction	No instruction	Delayed post-test

Results and Discussion

The current section presents the results of the tests used in this study. The obtained data were analyzed using IBM (SPSS) statistics. To compare the students' results on the previously mentioned tests, a paired samples t-test was used. Table 7 displays the students' vocabulary pretest results.

Table 7

Paired samples t-test for the students' results on the pre-test

Group	*N*	*M*	*SD*	*F*	*P*
Massed	15	9.20	1.97	.830	.838
Spaced	15	9.33	1.54		

* $p < .05$.

The descriptive statistics for both groups on the pre-test are shown in Table 7. The mean score of the massed group was (M = 9.20; SD = 1.97), while the mean score of the spaced group was (M = 9.33; SD = 1.54). This implies that the students in both groups performed nearly equally on the vocabulary pre-test. On the pre-test, there was no statistically significant difference between groups (P = .838; F = .830). Table 8 displays the statistics for the post-test results of the students. To compare the students' post-test results, a paired samples t-test was used.

Table 8

Paired samples t-test for the students' results on the post-test

Group	*N*	*M*	*SD*	*F*	*P*
Massed	15	11.60	1.95	.064	.000
Spaced	15	14.93	2.01		

* p < .05.

On the post-test, the mean score of the massed group was (M = 11.60; SD = 1.95), while the mean score of the spaced group was (M = 14.93; SD = 2.01). The post-test results revealed a statistically significant difference between the groups (P =.000; F =.064). Table 9 displays the statistics for students' delayed post-test results. To compare the students' delayed post-test results, a paired samples t-test was used once more.

Table 9

Paired samples t-test for the students' results on the delayed post-test

Group	*N*	*M*	*SD*	*F*	*P*
Massed	15	10.73	2.12	.278	.000
Spaced	15	13.60	1.76		

* p < .05.

The delayed post-test results showed that the massed group had a mean score of (M = 10.73; SD = 2.12), while the spaced group had a mean score of (M = 13.60; SD = 1.76). The delayed post-test results revealed a statistically significant difference between the groups (P = .000; F = .278).

The present research studied the effect of spaced instruction on learning and retaining second language vocabulary among EFL students. The results obtained from this study revealed that the spaced instruction group outperformed the massed instruction group in learning 20 new English words. The results demonstrated statistically significant differences between both groups on the post-test and retention test in favour of the spaced instruction group. The results indicated that words could be better memorized, recalled, and interpreted through spaced

distribution over weeks. In addition, there was a significant role of simplifying learning, doing exercises such as drills and varying the context of learning, and getting feedback from the students while learning new target vocabulary. On the contrary, the massed instruction group was not particularly interested in considering the new target vocabulary because it was presented concurrently with no spacing between learning sessions. The findings of the present study concur with the previous studies on this area of research [2, 12, 8, 44, 45] that corroborated the significant effect of spaced instruction in learning in general and in learning second language vocabulary in particular. It is worth mentioning that the previous studies included participants from different educational levels (i.e. school and university students). Furthermore, the participants' native languages were different (Arabic, Farsi, and Japanese), whereas the current study recruited university students whose native language is Arabic. Thus, the current study's findings clearly show that spaced instruction can be equally effective in learning second language vocabulary in any learning context.

Conclusion

The findings of the present study demonstrated that spaced instruction is an effective method to improve learning and retention. It also implies that learning vocabulary through spaced practice is not only useful for elementary school students, but also can be useful for adults at tertiary level. The findings complement previous studies that proved the positive effect of spaced practice on learning vocabulary and put an end to the idea that learners benefit from massive learning more than spaced one. Students learn better when they are given more time to rest, extra time to think and study [46]. In addition, spaced learning sessions provide better opportunities to reinforce learner's memory over time. It also strengthens the advancement of declarative knowledge and helps in achieving the learning outcomes at regular spaced sessions. Considering the findings of this study, several implications can be proposed for EFL practitioners. First, learners can be engaged to the process of learning through giving assignments and combined quizzes or tests to the materials they have already mastered. Second, teachers should authorise learners to extend critical control over their favoured metacognitive strategies. This can be accomplished by urging learners to set up their instruction timetable. Third, teachers could plan teaching tasks in the classroom based on a spread timetable to improve students' success. Finally, curriculum designers would integrate spaced instruction in the educational materials as one of the teaching methods, as it proved to have positive effect on the learner's long-memory. The present study has focused on the effect of spaced instruction on learning vocabulary, future research is recommended to study the effect of spaced instruction on improving other skills. It is also recommended to study the effect of spaced instruction including larger sample size with longer study intervals; this could provide deeper understanding about word-learning processes of learners.

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