

SPACED VOCABULARY ACQUISITION WHILE INCIDENTAL LISTENING BY ESL UNIVERSITY STUDENTS

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Based on a prior study by Zubenko and Shwedel (2019), the present study investigated the possible effects of repetition (repeated exposure) on the incidental acquisition and retention of 120 English target words by 51 Ukrainian-speaking ESL learners at a Ukrainian university. The hypothesis was that regular repetition of vocabulary while incidental listening would have a significant and positive effect on students' vocabulary acquisition and performance. The paper examines the results of the implementation of spaced repetition of L2 vocabulary strategy of the second-year students who were covering the same vocabulary they learned during the experiment in the previous year. 7 audio lessons were created for increasing the long-term retention of target vocabulary in the students' memory. Participants (N=51) were second-year Ukrainian university students majoring in English as a second language (ESL) at the age of 17-19. They were assigned to three groups, one experimental and two comparison. The optimal result based on the interval of repetitions influences the vocabulary recall and retention. Students who used the spaced L2 vocabulary acquisition strategy (SVAS) outperformed on the End-of-Experiment test 84,1 versus 80,6 for the Comparison group. The results prove that spaced L2 vocabulary acquisition strategy is an efficient part of enriching new vocabulary. The findings indicate that implications of this research are connected with the spaced vocabulary acquisition strategy as an effective tool for learning new lexical units by ESL learners while incidental listening to the audio dictionary lessons. Thus, the study results open up new possibilities for the teachers and learners to consider implementing audio dictionaries and similar tools as assets for efficient vocabulary learning.

Keywords: vocabulary acquisition; spaced learning; incidental listening; audio dictionary; ESL university students.

Introduction

According to the Program of English for Universities / Institutes of Foreign Philology (Program, 2001), at the end of the first year of study, students must use about 1500 English lexical units in oral and written communication. Each next year, the number of learned new English lexical units should increase by 1000 words. It means that students must learn at least 100 words per month. To achieve this objective, instructors focus on improving vocabulary acquisition through different input modes, including reading, writing, speaking, and listening. The logical task is to improve strategies and technologies for effective teaching of English vocabulary for youth and adults. Such strategies help direct learning of new words and facilitate vocabulary instruction.

The primary **goal** of this study was to examine the effects of spaced learning vocabulary while incidental listening on its acquisition among ESL university students.

Literature review

Vocabulary learning has been extensively studied by second language (L2) acquisition scholars in various aspects. In relation to the presented study, the scholarship in the following areas is discussed: (1) incidental L2 vocabulary learning; (2) effects of repetition on vocabulary knowledge; (3) spacing and second language acquisition; (4) spacing and retention.

Incidental L2 vocabulary learning

Incidental vocabulary acquisition is an approach to learning words, and it is described as a process when "learners incidentally gain knowledge of words in small increments, building upon their previous gains through repeated encounters until a word is known" (Webb, 2008, p. 232). The researchers examined L2 incidental vocabulary gain through different input modes: reading (Rott, 1999; Webb, 2007; Chen & Truscott, 2010; Liu & Todd, 2016), writing (Webb & Piasecki, 2018), communication tasks (Newton, 2013), and viewing (Montero Perez et al., 2014; Peters & Webb, 2018).

In addition, L2 incidental vocabulary learning was studied through listening (Brown et al., 2008; Vidal, 2011; van Zeeland & Schmitt, 2013). Vidal (2011) compared the effects of listening and reading on the incidental vocabulary acquisition. The results revealed that the reading subjects made greater vocabulary gains than the listening subjects for all 4 levels of proficiency analyzed. The earlier study by Brown, Waring, and Donkaewbua (2008) examined the rate of English vocabulary acquisition through three input modes of

reading, reading-while-listening, and listening to stories. The study findings demonstrated that “subjects picked up some words from their reading and listening experiences in this study, but far fewer words were picked up in the listening-only mode compared with the other two modes” (Brown et al., 2008, p. 154).

While both studies (Brown et al., 2008; Vidal, 2011) provided a comparative analysis of incidental vocabulary acquisition through reading and listening input modes, a more complete picture of vocabulary gains from listening was provided in the research by van Zeeland and Schmitt (2013). This study investigated L2 learners’ acquisition of 3 vocabulary knowledge dimensions (form recognition, grammar recognition, and meaning recall) in comparison with meaning-based vocabulary tests used in previous listening studies. According to the study results, learners started developing knowledge of a word (form and grammar recognition) long before they acquire the form-meaning link since knowledge of meaning seemed harder to acquire: “It appears that some types of knowledge (i.e. word form) are acquired relatively easily through L2 listening, while others (i.e. meaning) are not” (van Zeeland & Schmitt, 2013, p. 622). In addition, the study by Webb and Chang (2015) emphasized the role of listening used together with extensive reading arguing that “relatively large vocabulary learning gains may occur through reading and listening to multiple texts” (p. 29).

Future research with incidental vocabulary acquisition through listening is necessary to reveal how listening can contribute to effective vocabulary development among L2 learners.

Effects of repetition on vocabulary knowledge

Scholars in the field of word knowledge acquisition emphasize the role of repeated exposure to target words and study effects of such repetition on incidental vocabulary acquisition (Webb, 2007; Chen & Truscott, 2010; Heidari-Shahreza & Tavakoli, 2016). More specifically, Webb’s (2007) study examined how repetition influenced vocabulary acquisition through the number of times the participants, 121 students learning English as a foreign language (EFL) in Japan, encountered target words (TWs). The study findings revealed that repetition affects incidental vocabulary learning: “Learners who encounter an unknown word more times in informative contexts are able to demonstrate significantly larger gains in vocabulary knowledge types than learners who have fewer encounters with an unknown word” (Webb, 2007, p. 64). The study concludes that considerable vocabulary learning gains occur if learners meet unknown words ten times in context; however, “to develop full knowledge of a word more than ten repetitions may be needed” (p. 64).

Chen and Truscott (2010) based their research on Webb’s (2007) study and examined the impact of the number of repetitions with 72 freshmen at two Asian universities. In general, the results of this study supported Webb’s (2007) findings while demonstrating much higher ecological validity of the study. Later, based on Chen and Truscott’s (2010) study, Heidari-Shahreza and Tavakoli (2016) investigated the possible effects of repetition, as one of the factors, on incidental vocabulary acquisition among 90 Persian speaking EFL learners. The study findings indicated that, “in general, increasing the number of exposures to TWs (from one exposure to three or seven) facilitated learners’ development of vocabulary knowledge” (Heidari-Shahreza & Tavakoli, 2016, p. 29). These results concurred with the findings in the studies by Webb (2007) and Chen and Truscott (2010).

In brief, all three studies discussed in this section of the literature review investigated the effects of repetition on incidental vocabulary learning through reading. Further research addressing the effects of repetition through other input modes, including listening, may help determine how and which gains in vocabulary knowledge occur among L2 learners.

Spacing and second language acquisition

Scholars’ interests in L2 vocabulary learning have also been focused on how the temporal distribution of input might impact language development (Bahrick et al., 1993; Rogers, 2017; Rogers & Cheung, 2020; Nakata, 2008; Nakata, 2015; Nakata & Elgort, 2021). Spacing is defined as “the phenomenon of distributed learning conditions, that is when multiple learning episodes are spread over a longer period of time, resulting in better learning and retention than massed conditions, that is, when learning is concentrated into a single intensive session” (Rogers & Cheung, 2020, p. 616).

Nakata (2015) examined the effects of expanding and equal spacing on L2 vocabulary learning with 128 Japanese college students. The study results demonstrated a statistically significant advantage of expanding spacing over equal spacing: “expanding spacing increased learning by 4.6% - 8.5% relative to equal spacing on the receptive posttest” (Nakata, 2015, p. 702). In addition, in this study, the researcher compared the effects of massed (with items repeated 4 times in a row) and spaced (with items also repeated 4 times but after intervening trials of approximately 6 minutes) schedules on L2 vocabulary learning. Posttests conducted a week after the treatment showed that spaced learning was more than twice as effective as massed learning. Nakata and Elgort’s (2021) study examined the effects of spacing on contextual L2

vocabulary learning with Japanese speakers of English by comparing the impact of spaced and massed distributions. The study results showed an advantage of spaced over massed learning. However, since both explicit and tacit vocabulary knowledge was measured, the results revealed that “[a]lthough spaced distribution was significantly more effective than massed distribution on posttests measuring explicit knowledge (meaning-form matching and meaning recall), the present study demonstrated no significant advantage of spaced distribution for the acquisition of tacit knowledge” (Nakata & Elgort, 2021, p. 249). Thus, massing appeared to be as effective as spacing for the acquisition of tacit semantic knowledge.

The recent study by Rogers and Cheung (2020) examined the impact of input spacing on L2 vocabulary learning by 90 young L2 learners in a Hong Kong primary school in an authentic learning context using ecologically valid training procedures. Results of this study indicated that “shorter lags between learning episodes lead to better retention, as measured following a 4-week delay” in contrast to the findings of laboratory-based research conducted previously (p. 629). In other words, the study participants learned L2 vocabulary items presented in a spaced-short manner better than items presented in a spaced-long way. The authors call for more relevant research to investigate the effects of input spacing on the learning of L2 vocabulary.

Spacing and retention

Learning and retention are interconnected relating to the period of the starting of acquisition and vocabulary repetitions and referring to the period after rehearsals where retrievals from the memory occur. Scholars in this field (Cepeda et al., 2006) suggest planning the general organization of the spacing process first before delivering the learning sessions. The scholars concentrated on the effect of study-time intervals on the final retention and found out that there was a huge relationship between interstudy interval (ISI) and retention interval (RI). They realised that there was an importance to lead longitudinal studies to determine the effects of the relationship between the interstudy interval and the retention interval (RI/ISI) in long-term retention.

Skill-related language tasks guide learning but at the same time increase retention. The enhancing of intention depends on the spacing which leads to equivalent learning (Cepeda et al., 2006). Cepeda et al. (2008) gave participants the test of 32 facts across two sessions and after that provided a retention test. In the first learning session, facts were learnt only to one recall and in the second session, facts were studied twice with feedback. The spacing interval between the first and second session ranged from 0 to 105 days. The interval between the second sessions and retention test ranged between 7 and 350 days. The improvement of retention was shown as the spacing interval increased but then decreased. The optimal space was different depending on the retention delay, with the optimal interval being longer for longer retention delays. The researchers were really interested in finding the optimal RI/ISI combination which would resolve the best time to repeat information given at certain retention lags.

Namaziandost et al. (2020) emphasized the effect of massed and spaced instruction on vocabulary recall and retention. The research consisted of 75 participants selected based on the outcomes of an Oxford Quick Placement Test, from three classes among Iranian students. The participants were divided into massed and spaced distributed groups. Having two sessions with pre- and posttests, there was the conclusion that the spaced distribution group made more progress on the immediate posttest. Moreover, when evaluated on the 4-week-delayed posttest (retention test), the results revealed that the spaced group also significantly excelled the massed group in the delayed posttest. The findings suggest that spaced distribution instruction may positively improve EFL learners' long-term vocabulary learning.

As seen from the analyzed scholarship, while there has been extensive research addressing the areas of spaced vocabulary acquisition, retention, and effects of repetition in vocabulary learning, the majority of studies examine the rate of vocabulary acquisition through reading and activities related to this output. Considerably less attention has been paid to other inputs, including listening. This study fills in the current research gap by investigating the possible effects of spaced repetition on L2 vocabulary acquisition through incidental listening to audio dictionary lessons with the target vocabulary. So, the **hypothesis** was that regular repetition of vocabulary while incidental listening would have a significant and positive effect on students' vocabulary acquisition and performance.

Methods

In this research, the quantitative method was used. It involved the processes of collecting, analyzing, interpreting, and writing the results of a study.

Participants

The participants were 51 non-native speakers of English enrolled in an English proficiency program at a university in Ukraine, ranging in age from 18 to 19. In future, they will work as philologists, teachers,

translators, interpreters, etc. The participants were informed of the withdrawing possibility, with no other consequences on their status and they gave their informed consent for participating in the study. The participants were classified within the program as being at a pre-intermediate to intermediate level (B-1) according to the descriptions of CEFR standard and their scores on the course testing at the end of the term. At the beginning of the research, the average English proficiency of each group was assumed to be equal. Four teachers, the coauthors of this research, taught ESL in the experimental and controlled groups of the experiment at Petro Mohyla Black Sea National University.

Instruments and Procedure

The researchers have been running an experiment for two years. It was carried out in accordance with the plan of scientific work of the English philology department and was previously approved by an ethics committee. It was divided into two parts. The first part of this experiment was described in the research “Integrating mobile listening and physical activity to facilitate intentional and incidental vocabulary acquisition” by Zubenko and Shwedel (2019). The authors supported the hypothesis that students’ initial acquisition of vocabulary can be enhanced through incidental regular listening while physically active. At the result of the experiment students who repeated vocabulary regularly performed better on End-of-Unit test than students who did not repeat it and did not use audio vocabulary lessons.

The second part of the study was aimed at examining the results of spaced repetition of L2 vocabulary while incidental listening once a month during the next four months in the second year of study. For this part of the research, second-year students were covering the same vocabulary they learned during the experiment in the previous year. It was the fifth unit covered during their first academic year related to homes and apartments. For this unit 7 audio lessons were created by the first researcher. Lessons were kept short so that students could potentially listen and repeat an audio lesson multiple times on their walk to the dormitory or commute home. Students could access the lessons via the Telegram app on their mobile phones. The hypothesis was that further regular spaced repetition while incidental listening will increase the long-term retention of target vocabulary in the students’ memory. The rationale for this is because prior researches have revealed that even one-week spacing produced superior long-term retention compared to massed learning (Sobel et al., 2011; Zubenko & Shwedel, 2019).

During the first year of study “it was recommended to students that the number of repetitions of each audio vocabulary lesson (from 15 to 20 or more) should be distributed as follows: seven repetitions within the first week; four repetitions in the second week, three in the third, two in the fourth week, and the rest – at any interval in time. During the second year of study students had to repeat the target vocabulary once a month for four months. The general sequence of each lesson was presented in previous research (Zubenko & Shwedel, 2019). The procedure of the first and second parts of the study is shown in Figure 1.

Participants of the second part of the experiment ($N = 51$) were the same students who participated in the first part of this research, which were randomly assigned to three classes, one experimental and two comparison. The difference between the treatment groups was that the experimental group used the “integrating physical activity with listening to vocabulary lessons” strategy (Zubenko & Shwedel, 2019) during the first year of study and continued regular repetition (once a month) of the target L2 vocabulary during the first four months of the second year of study in addition to the traditional learning strategy. The rationale for this is because prior research has revealed that spaced L2 vocabulary acquisition is more useful (Rogers, 2017; Rogers & Cheung, 2020; Nakata, 2008; Nakata, 2015; Nakata & Elgort, 2021). Students had to repeat the target L2 vocabulary once a month at any time convenient for them on the way to the university or a shop, walking in the park or running in the stadium, etc., using “A Thematic Bilingual Audio Dictionary” on their mobile phones and pronounce it aloud. This dictionary was created to be studied by both first- and second-year students and covered vocabulary related to homes and apartments. Seven audio lessons were created. They covered topics such as “materials”, “opinions about housing arrangements”, etc. Each audio vocabulary lesson was about 2 to 8 minutes long. Lessons were kept short so that students could potentially listen and repeat an audio lesson multiple times on their walk to the dormitory or commute home. The repetition was performed in the following sequence: a new word and its phrases were pronounced in the students’ mother tongue and after a short pause their meaning in L2. In addition, the developed audio lessons were supplemented with the same lists of words and phrases only in the text format, so that students had the opportunity, if necessary, to visually see and read the words and expressions they heard. Students could access the lessons via the Telegram app on their mobile phones (t.me/audiodictionary2). The experimental task did not require the students to allocate any of their spare time specifically to this activity since it was to be part of their daily routine. The use of mobile phones allows them to perform listening to an unlimited number of times anywhere without causing fatigue or boredom.

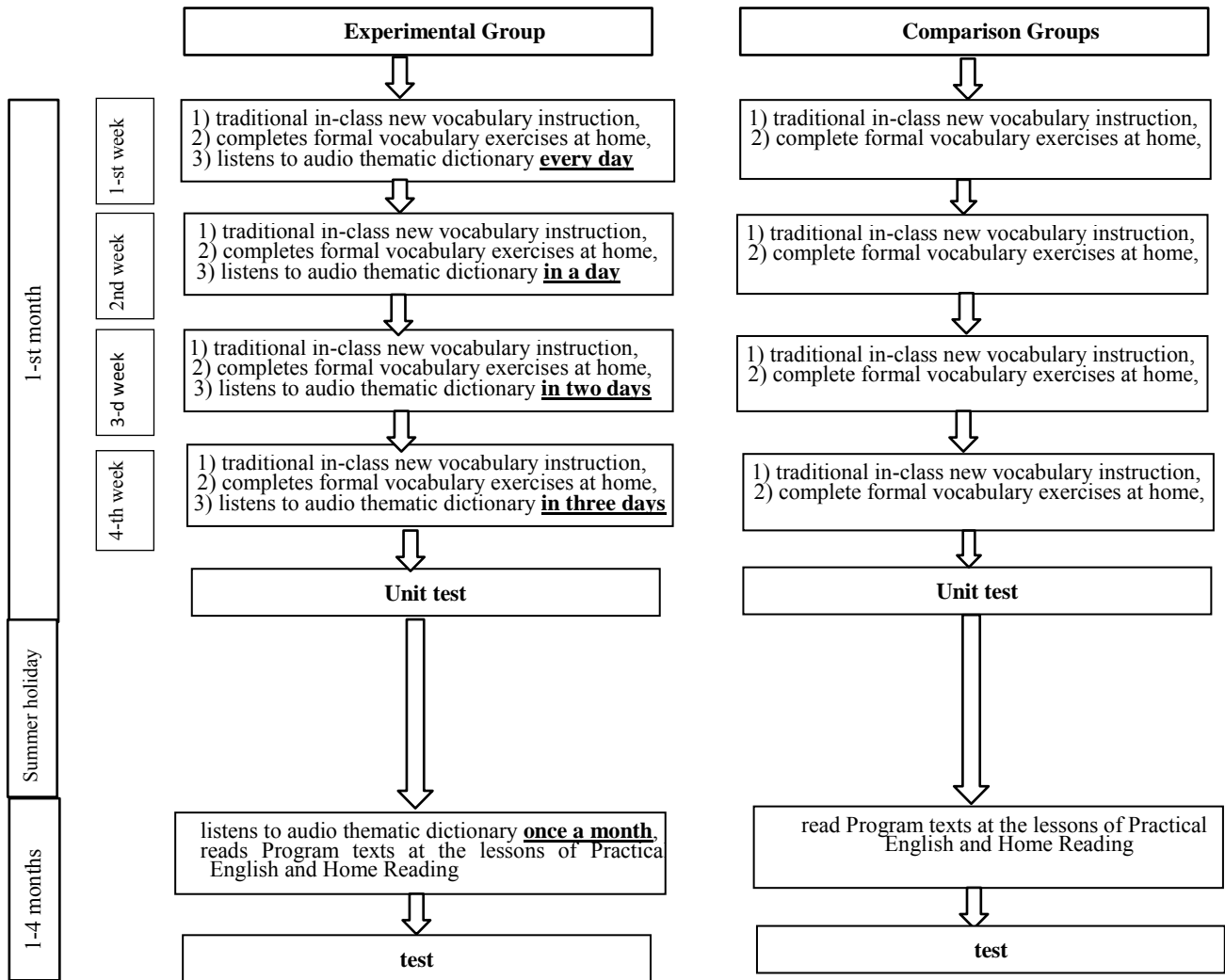


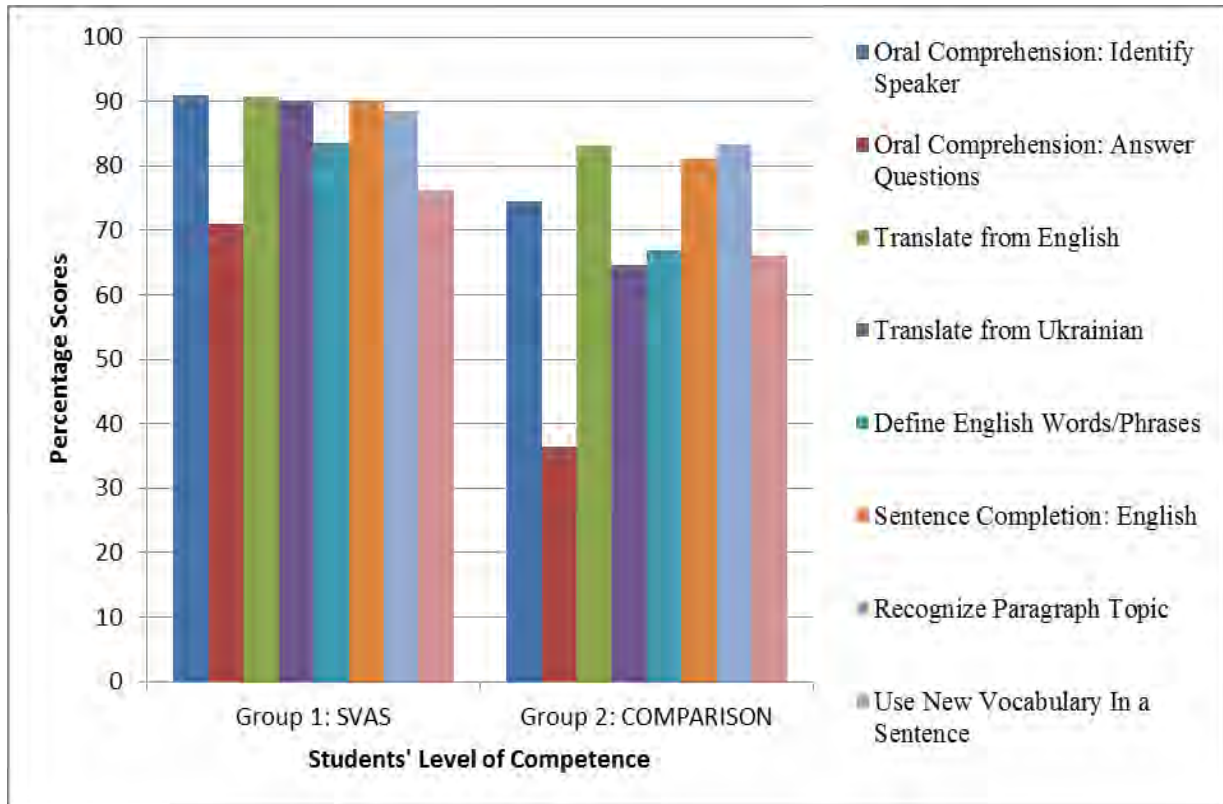
Figure 1. Procedure of the first and second parts of the study.

1. Spaced vocabulary acquisition strategy group: to retain in mind 120 topical words learned during the first part of the experiment students in the experimental group were instructed with the spaced L2 vocabulary acquisition strategy and asked to listen to every audio vocabulary lesson they had on the Telegram app once a month in any sequence beyond the classroom (e.g., while walking in the park, training in the gym or running in the stadium, on the way to the university or a shop, etc.) using their mobile phones and pronounce them aloud. In addition, the students were given the task to write out in their own dictionary the target vocabulary related to homes and apartments that they encountered in texts at Home Reading and Language Practice lessons.

2. Traditional strategy group: to retain in mind 120 topical words learned during the previous term students did not repeat the target L2 vocabulary once a month beyond the classroom, they only repeated it when they encountered the target L2 vocabulary in Home Reading texts or at Language Practice lessons (e.g. translating or defining the meaning of the words, sentence example, etc.). It is necessary to say that the Home Reading curriculum includes fiction texts from classic English and American writers, and target L2 vocabulary related to homes and apartments is encountered there very rare. The Language Practice curriculum in the first term includes such topics as “Leisure”, “Sports”, “Theater”, “Choosing a Career” and target L2 vocabulary related to homes and apartments is used there very rare too. Thus, the students of the control groups during their second year of study met the target vocabulary at the English classes very rarely that does not contribute to its retention in students’ memory.

Data Analysis

Hypothesis #2: Students who used the spaced L2 vocabulary acquisition strategy (SVAS) beyond the classroom will perform better on the End-of-Experiment test than students who do not use this strategy in learning target vocabulary. The End-of-Experiment results are presented in Graph # 1. Students in the SVAS group had a mean score of 84,1 versus 80,6 for the Comparison group. Results from a one-way ANOVA indicate that the test performance difference was statistically significant (see Table #1).



Graph 1. Experiment Beginning Percentage Scores Parallel

In accordance with the testees' results of the second stage of the experiment, represented in Graph #1, the students from Group 1: SVAS and Group 2: Comparison have different competence levels. The percentage scores taken from the rubrics of Oral Comprehension (Identify Speaker: 91% – 74,5%; Answer Questions: 71% – 36,5 %; Translate from Ukrainian: 90 % – 60,4 %; Define English Word/Phrases: 83,6 % – 66,9%) within the groups are rather different, because the students of Group 1: SVAS applied the educational approach worked out by the first researcher during the first year of studying English as a foreign language, whereas the Group 2 – did not.

Results

At the end of the second part of the experiment, a comparative analysis of the obtained data was made, utilizing students' percentage scores received in the first part and second part of the experiment. According to the results (see Graph # 1), the data of both the groups after carrying out the test significantly varied. Beyond the second part of the experiment term (see Table # 1), corresponding tests were given to both of the groups' members, and it was found out that the group 1: SVAS, that made use of the approach of space vocabulary acquisition while incidental listening during both of the experiment parts (during 1st and 2nd years of studying English), achieved much better results in contrast to the group 2: Comparison, that did not apply the proposed educational approach and followed a standard and currently accepted methodology offered by the postsecondary institution. Scrutinizing the data, it is no surprise at all that the former of the testees' group outperformed the latter one. In particular, pursuant to rubrics # 1a, 1b, 3, and 4 (see Table # 1), the group SVAS achieved the following percentage scores: 91.8%, 71.4 %, 90, and 83.6 % while the group 2: Comparison was less successful: 74.5%, 36.5%, 64.6%, and 66.9 % respectively. The average standard deviation (see Table 1, the rubric SD) of the assessment in the group 1: SVAS constitutes – 19.8, in the group 2: Comparison – 18.1. Apparently, the SVAS group got ahead of the Comparison group in all the rest of the above-shown rubrics.

Table 1. *End-of-Experiment Test Percentage Scores*

End-of-Experiment Test Components	Maximum of points	Group 1: SVAS			Group 2: Comparison		
		M	SD	n	M	SD	n
Overall Total Score	100	81.1	19.8	14	63.2	18.1	37
Total Score Minus Oral Comprehension Scores	70	58.3	10.3	14	49.5	14	37
1a. Oral Comprehension: Identify Speaker	7	91.8%	2.7%	14	74.5 %	5.1 %	37
1b. Oral Comprehension: Answer Questions	23	71.4%	11.9%	14	36.5 %	8.9 %	37
2. Translate from English	10	90.7%	3.5%	14	83.1 %	3.2 %	37
3. Translate from Ukrainian	10	90 %	1.2 %	14	64.6 %	5.6 %	37
4. Define English Words / Phrases	10	83.6%	4.6%	14	66.9 %	10.1 %	37
5a. Sentence Completion English	5	90 %	2.3%	14	81.1 %	9.1 %	37
5b. Recognize Paragraph Topic	5	88.6 %	2.9%	14	83.3 %	7.1 %	37
6. Use New Vocabulary In a Sentence	30	76.2%	4.6 %	14	66.1 %	5.4 %	37

Thus, the obtained results are quite well-spoken, as the outcomes emphasize the effectiveness of the implementation of the recommended approach of learning new lexemes to the process of language learning.

Discussion

The outcome of the investigation reveals that a spacing educational approach for studying a foreign language leads to more effective performance of lexemes memorizing and bearing in mind by students. The findings justify a so-called spacing effect, introduced into scientific discourse by Ebbinghaus (1885) (*Memory: A Contribution to Experimental Psychology*): “repetitions spaced in time tend to produce stronger memories than repetitions massed closer together in time” (p. 351).

According to Weinstein and Smith (2016), this approach helps students systemize information before taking examinations. In other words, there is no need for a binge studying for students if they were taught to apply a spaced learning technique in advance: for instance, it is far better to study in intervals / spaces during a couple of weeks and spend 7 hours in total than to pass 7 hours at a single sitting before the examination. However, it requires time management and organizational skills from trainees that might be a challenge in a way.

In Casebourne’s research (2015) it is stated that one-off teaching does not lead to information retention too, as the stage of forgetting inevitably comes soon afterwards. It corresponds with the idea of Ebbinghaus about the so-called ‘learning curve’ and ‘forgetting curve’ which are two interlinked processes of information systematization and retention. Therefore, in accordance with Casebourne and Ebbinghaus respectively, in order to store information efficiently one should not endeavour to learn something during a short period of time all at once, but make spaces in the process of learning to diminish the level of forgetting and simplify the process of posterior memorizing.

Introducing a spaced learning program demands presenting learners with the idea of a learning target, as well as explaining the peculiarities of this pedagogical approach (for example, explicating the importance of taking intervals in information storage and emphasizing the essence of presenting the same conceptions over and over again) (Toppino & Cohen, 2010). Importantly, the spaces between repetitions should be ‘tailored’ on the basis of the audience’s needs, priorities, and information content. Aside from that, the educational approach of spaced repetition of information may be quite effectively used in various other spheres dealing with the generalization of concepts and their retrieval.

Thus, the presented study is in accord with the increasing scope of empirical literature focusing on the advantages of spaced learning for educational purposes and the methodology development as well as usage of the very approach in practice. One of the assets of spaced learning ‘path’ is the discovery that it is not merely limited to memorizing and retrieval of some information, but also triggers the processes of acquisition and comprehension. According to conceptions of Bransford and Schwatz (1999), the spaced learning strategy is of value as it forwards the procedure of information synthesis outside a learning situation.

Conclusion

Therefore, the outcomes of the research prove that spaced L2 vocabulary acquisition strategy is an effective tool that helps second language learners (SLL) acquire new lexemes more efficiently and less stressfully at the same time. The captured data affirm the hypothesis that learners who applied the spaced L2 vocabulary acquisition strategy beyond the classroom, indeed, show better results than those who do not make use of this strategy in the process of boosting target vocabulary.

Since the students participating in the experiment in the future will probably work as translators or interpreters, the next step in their training will be to include in the curriculum of EFL listening to professional texts with as much target vocabulary as possible. Such training will help to create skills for recognizing target vocabulary in oral speech and, therefore, its use in professional communication.

The curriculum allocates only about a month to study 100-120 target lexemes. This is significantly very little for the retention of target vocabulary in memory and for mastering speech. A spaced learning strategy allows you to return to the covered topics and repeat them regularly. It might be worth thinking about including in the curriculum of the course “English as a Foreign Language” reiteration of the previously covered topics on a regular basis under the motto "one step forward – two steps back".

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