

英単語学習への間隔反復法導入に向けた教育学的戦略 Pedagogical Strategies for Introducing Spaced Repetition for English Vocabulary Study

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要旨

1880年代以降、計画的学習に関する調査により、分散効果が着実に実証されてきた。また、L2（第二言語）の語彙を定期的に復習することで、長期的記憶定着率が向上することが明らかになってきた。学習セッション計画に間隔反復のコンセプトとメソッドを取り入れた後、自立英語コースの3つのセクションに属する学生たちに、間隔反復のメソッドにしたがい、6週間、単語を勉強するように指示した。学生たちが自分たちの体験を基に書き記したレポートは、学習セッションの最終課題に関するレポートの一部として収集した。間隔反復メソッドに対する学生たちの回答は、メソッドに対しての態度と自己評価の両方の観点で、概ね肯定的だった。否定的回答の主題分析を行うことで、間隔反復メソッドの技術的実行、動機づけの問題、リーディング力・リスニング力向上方法の有効性に関する懸念といった潜在的問題を学生たちが克服できるように支援するための教育学的戦略の基礎が形成される。

Abstract

The spacing effect has consistently been demonstrated in research on deliberate learning since the 1880s and scheduled review of L2 vocabulary items has been shown to improve long-term retention. After introducing the concept and methods for organizing study sessions, students in three sections of the Independent English course were assigned to use the method to study vocabulary over a six-week period. Students' reports documenting and reflecting on their experiences were collected as part of the report on the final project. Answers reported generally positive responses to the method in terms of both attitude toward the method and self-evaluation. Thematic analysis of negative responses form the basis for pedagogical strategies to help students overcome potential difficulties with technical implementation of the method, issues of motivation, and concerns about the effectiveness of the method for improving reading and listening skills.

1. Background

The spacing effect—"one of the oldest and most reliable findings in research on human learning" (Carpenter, et. al., 2012)—describes the benefits studying items repeatedly at

particular intervals as opposed to cramming items in a single session provides to long-term retention. Ebbinghaus's (1964,1885) Forgetting Curve described the rate of forgetting deliberately learned items and the increased recall that results from scheduling purposeful retrieval of those items from memory to coincide with the time at which they are most likely to begin to decay. While the mechanisms are still not completely understood and the ideal schedule remains elusive (Pavlik & Anderson, 2005), studies have shown that spaced repetition (sometimes referred to as spaced retrieval) of items for study produced marked improvement in long-term retention (Karpicke & Bauernschmidt, 2011, Cepeda, et. al., 2006).

Recent advances in Spaced Repetition Software (SRS) mean that there are numerous tools students can use for deliberate vocabulary learning (Frank, 2016). These applications, some of which are available for free, use algorithms to determine the intervals at which to present individual items for study. Users input the information for the front and back of each card. During subsequent study sessions, each time an item is presented, users respond to a prompt to evaluate how well they remembered the item. Based on users' self-evaluation, the application determines when each item will next be presented.

2. Methods

For this study, the basic principles of spaced repetition were introduced in three sections of the required Independent English course for first-year students. Enrollment stood at 37 students in the Level 1 (Advanced) course (average TOEFL score=563), 36 in the Level 2 (Advanced) course (average TOEFL score=535), and 37 in the Level 5 (Intermediate) course (average TOEFL score=484) included in this study. Because Independent English is part of the unified curriculum, syllabus and grading criteria are determined by the university. The stated purpose of the course in the official syllabus is

to introduce students to different learning approaches in English so that they become able to continue their studies in an effective manner in future years even after their formal education has finished. Students will experience different study methods in the areas of reading, listening, and vocabulary.

Which methods are introduced is at the discretion of individual instructors. The final grade is assigned based on in-class performance and completion of homework over the fifteen-week course (80%) and the design and completion of an independent final project (20%). After a unified orientation in the first class session, instructors are directed to spend three sessions introducing methods for improving English reading skills and three sessions on methods for improving English listening skills. Another three class sessions are reserved for presentations given in English by non-Japanese Teaching Assistants. The final five classes are used for the execution and evaluation of the final project.

In the three courses in this study, one week of instruction was used to introduce the concept of the Forgetting Curve and the method of spaced repetition for vocabulary study via a podcast produced for English-speaking university students about basic study skills (Frank, 2016). In class, students read and discussed a version of the transcript from the podcast that had been edited for length and were assigned to watch the full video as homework. Additionally, they were required to set up a system for studying vocabulary words following the recommendations in the podcast by either making paper drill cards or signing up for one of the recommended web-based applications. Initially, students were instructed to continue using the method for six weeks. Thereafter, students were counseled to include the method as

an element of their final project. For the final project, students were given two options: to focus on improving a particular skill (reading or listening) or to focus on a topic of their choosing by gathering relevant reading and listening materials. Eighty-two students opted to focus on a particular skill and 24 chose a particular topic. Topics and methods were vetted through a process of completing a “Project Proposal” form prepared by the instructor and receiving approval after adequately responding to feedback given both in writing and verbally over a three-week period. Progress was then monitored over the final five weeks of the course.

As part of the evaluation of the final project, students answered the open-ended question, “In your own words, what is spaced repetition? How does it work? Did you try it? Why or why not?” in written English outside of class. Answers to the open-ended question were categorized using descriptive coding (Saldaña, 2016) at the first stage and thematic analysis (Braun & Clarke, 2012) at the second.

3. Results and Discussion

Initial coding showed that of the 105 final project reports submitted, seven students left the question blank, three wrote about a different topic, and 13 indicated they had not tried to study using spaced repetition methods at any point during the semester. Of the remaining 82 answers, 21 reported having tried it but did not provide any evaluation of the method, 41 tried it and indicated that it had worked, 11 wrote that they tried it and it had not worked, and nine indicated that they had tried the method prior to entering university.

This study analyzes the answers that reported an attempt at the method that produced unsatisfactory results. Three areas of complaints were identified—reports of philosophical concerns (i.e., the expression of belief that the method would not produce effects on the students’ larger objective for the final project), technical difficulties with implementation of the method, and motivational issues. To form pedagogical strategies for future courses, an attempt is made to answer specific complaints that certain students submitted by using research from the fields of SLA and TESOL. For each complaint, at least one contrasting student response which commented in a positive way on the same aspect of the method is presented. A conclusion is drawn for each case from an educational standpoint and recommendations are made regarding anticipating and addressing such concerns in future classroom settings.

3-1. Philosophical Concerns

Some students who opted to focus on learning about a topic through English reported they had not tried the method because they saw no connection between learning lists of vocabulary and attaining their goals. A representative comment was “I didn’t use this method because my aim is understanding the subject ‘what is diplomacy,’ and because I cannot spend much time for English so I cannot spare time memorizing words.” It seems that these students rejected the method outright because it did not fit their learning philosophy. Furthermore, some of them voiced objections to memorizing words out of context. One student wrote, “I believe memorizing new words needed understanding the network on meanings and origin of these words.”

In these comments, students were, in fact, echoing scholarly criticism of deliberate vocabulary learning. The appropriateness of rote memorization of vocabulary words was challenged by Krashen (1989) who purported that deliberate learning did not lead to language knowledge. Since then, however, multiple studies have demonstrated the insufficiency of reliance on teaching and learning strategies that are centered around meaning-focused input and limited to the incidental, contextual acquisition of vocabulary (Elgort, 2011). Nation and Newton (2002) advocated for language-focused instruction, where focus is drawn to language items within the larger linguistic system but recommended that it be limited to approximately a fourth of class time in Listening and Speaking courses.

In contrast to the doubt expressed by the students above, among students who had indicated the method had worked, some reported that their deliberate vocabulary study using spaced repetition resulted in improvements in reading, listening, and speaking skills. Gains were reported in reading fluency and improved ability to recognize previously studied words when encountered in natural contexts. One student wrote, "...I become able to listen to the sound (words) that I could not listen before." This is consistent with Nation's (2002) findings that language-focused instruction heightens consciousness of items thereby increasing the likelihood they will be noticed during subsequent encounters.

These comments revealed that the students in these courses can be expected to have a nuanced view of their own learning processes and goals which may lead them to reject the method. In future semesters, the benefits of deliberate vocabulary learning specific to EFL should be presented in the initial class to supplement the content of the podcast (Frank, 2016) which explains the basic function of the Forgetting Curve and the benefits of spaced repetition within the learning process in general. Specifically, students should be told the benefits of vocabulary learning for reading fluency, consciousness-raising preparation for listening, and more efficient recall of vocabulary in speaking. It should be stressed to the students who choose the option of learning about a topic through English that deliberate learning of vocabulary is an element of learning across subjects and languages and not simply a tool for test preparation.

3-2. Problems with Implementation

A few students described issues they had encountered with the need to make decisions when implementing the method. Especially in the highest-level course, students reported trouble choosing what words to study, indicating that they had either chosen inappropriate words that were too easily remembered or an inappropriate number of words which resulted in a prolonged study process and decreased motivation. Other students wrote about the difficulty determining the schedule of study sessions. One student mentioned that it was "a bother to study at a decided time."

These comments approach the debate at the core of research on spaced repetition. Despite over a century of experimentation, researchers have still not concluded what the ideal spacing schedule is. One meta-analysis study of 317 experiments on the spacing effect showed that

spaced (vs. massed) learning of items consistently shows benefits, regardless of retention interval, and learning benefits increase with increased time lags between learning presentations. On the other hand, it seems clear that once the interval between learning sessions reaches some relatively long amount of

time, further increases either have no effect upon or decrease memory as measured in a later test. (Cepeda, et. al., 2006, p. 371).

If experts cannot agree on the optimal schedule, it follows that students would struggle to independently determine how much and how often to study. In contrast, students in this study who had utilized a web-based application wrote mostly positive reflections. A good example is one student's evaluation of the Anki application, "it is useful for me because it selects words automatically." From a pedagogical standpoint, strongly advocating use of an application when introducing the method seems to be the easiest way to address students' potential struggles.

3-3. Motivational Issues

While a number of students reported that they were motivated to try the method after learning about it in class, with some indicating that the results they observed during the initial assignment prompted them to incorporate it in their proposal for the final project, others expressed various sources of a lack of motivation to try the method at all. One student remarked, "Since I know that I will forget some time soon, I think it stopped me from trying to remember the words." Others complained about the amount of time that it requires, predicted boredom, and cited a weak ability to concentrate as a deterrent.

Motivation is a perennial topic in EFL. For the specific issues listed above, special attention should be given to explaining that forgetting is a natural part of the learning process. The whole enterprise of spaced repetition is to find the optimal, most efficient schedule of review. Done consistently, spaced repetition should result in faster learning and fewer total hours spent studying (Frank, 2016). Students may benefit from hearing the testimonies of peers, a majority of which in this study commented that spaced repetition produced faster, better results than previously used methods. While some students saw the process as taking too much of their free time, others appreciated that applications and word cards could be accessed anywhere for short, focused study sessions.

4. Conclusion

This study found that fully half of students expressed satisfaction with spaced repetition methods and using web-based applications for deliberate study of English vocabulary items. Additionally, some students experienced gains in other skills as a result of using the method during the semester. Thematic analysis of the complaints of students who either did not try the method or reported they tried it and it did not work revealed three areas to address in future courses—philosophical concerns, potential problems at the implementation level, and motivational issues. These issues should be taken seriously and preempted by the teacher to the extent possible to assist students' understanding of this valuable, transferable strategy for deliberate learning.

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