

## 【Practice article】

# T.O.O.L.S. for Efficient Language Acquisition

## Advantages of Spaced Learning & Flashcards

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### Abstract

This paper gives a summary of a classroom instruction “T.O.O.L.S. for efficient language acquisition” to teach students 5 crucial elements of efficient language acquisition, and presents the results of a research project of how spaced learning with short increments and the use of flashcards can increase the efficiency of language acquisition.

Keywords: spaced learning, flashcards, language acquisition, efficiency, self-motivation

### Introduction

In Leonard Bloomberg's words, the acquisition of language “is doubtless the greatest intellectual feat any of us is ever required to perform”, (Language, 1933), and it is a feat that many people need or want to accomplish more than once. Having studied six foreign languages extensively myself, personally experiencing countless different teaching styles and using various methods to study, I know many of the challenges that second language learners face.

Efficient language acquisition can be defined as studying language in the best possible manner with the least waste of time and effort. While in these modern times students have the possibility to use many electronic and internet-based tools, many students seem to lack the skill or knowledge to use those tools in the most efficient way.

During the first class of every semester, whenever I have students that I have never taught before, I tell the students that as important as WHAT they study is HOW they study, and a part of my instruction is “T.O.O.L.S. for efficient language acquisition”. T.O.O.L.S. is an acronym for Try, Objective, Often, Little by Little and Stamina. It is a description of 5 crucial elements, not in any particular order of importance, for efficient self-motivated language acquisition.

Two aspects of T.O.O.L.S. involve spaced learning, a topic that has seen plenty of research, for example by Paul Kelley who showed in his research project that spaced learning greatly improves efficiency (Kelley, 2016). However, while Kelley studied students during a Biology course, through T.O.O.L.S. I try to stimulate students to utilize the countless short increments of free time in their day to improve their English language acquisition. In order to see whether the students would benefit from spaced learning during these short time periods, in the order of 1 to 2.5 minutes, I did a research project among 244 first and second year students.

The aim of this paper is not only to explain T.O.O.L.S., which students can use as a guideline for efficient self-motivated language acquisition, but also to show the results of a study of how the spaced learning and the use of flashcards greatly affect a language learners' efficiency. The aim of this study is to show students simple and effective ways to greatly increase their study efficiency. My research shows that students studying exactly the same content, reach very different results depending on their method of study. It compares "regular", non-spaced learning with spaced learning, as well as comparing study with word lists with study with the use of flashcards.

### **T.o.o.l.s - Try**

As David Kolb wrote, "learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p.38). In Kolb's learning process he describes the four-stage cycle of learning, comprised of concrete experience (having an experience), reflective observation (reflecting on the experience), abstract conceptualization (learning from the experience) and active experimentation (trying out what you have learned). Although it does not matter in which stage of the cycle is entered, learning only occurs if all stages are executed. (Kolb, 1974)

While experimenting or trying is crucial in the learning process, most EFL teachers in Japan have experienced the anxiety of students. The students exhibit a fear of real or anticipated speaking, because students are worried about making mistakes, which is an inherent part of experimenting.

Not only should teachers try to create a classroom setting that is less formal, where students are less anxious to speak and less worried to be punished for mistakes they make, but students should be encouraged that it is okay to actually make mistakes. Only students who try and challenge themselves will improve their language proficiency.

### **t.o.o.l.s. – Objective**

As Stephen R. Covey wrote in "The 7 habits of highly effective people" as habit 2: "Begin with end in mind". As for setting one's goal, it is important to distinguish long-term goals, or

core goals, and short-term goals, also known as proximal goals. While core goals, such as wanting “to become an English teacher”, “to be able to speak with foreigners”, “to travel to foreign countries”, are what drives the student to study English, proximal goals are important in deciding how fast, if ever, and with how much effort one’s core goal is reached. Proximal goals are the steps that need to be taken to reach the distant core goal, and without concrete proximal goals, for most students their core goal will be nothing more than a distant dream. Setting proximal goals forces a student to think about the way and methods to reach one’s core goal.

It is important for students to set realistic, obtainable, concrete and quantifiable proximal goals, because they are not merely measuring points for their progress, but also reaching one’s proximal goals on a regular, daily or weekly basis, keeps students from getting demotivated. Especially when studying a foreign language, it is easy to get demotivated because no matter how many years one has studied, there is always a level of frustration of “still not being able to understand”, partly because the more one understands, the higher one’s expectations become. Unless one takes level tests, it is very difficult to measure one’s language proficiency or progress by oneself.

The following goals are examples of possible concrete, quantifiable proximal goals:

- read one news article a day about a topic of one’s interest.
- learn to sing one English song a week.
- read ten pages of a book a week.
- learn five new words a day.
- practice vocabulary flashcards 6 times a day.
- write at least five sentences or thirty words in one’s diary each day.
- add 10 new words to one’s Anki flashcard application completed list.
- listen to an NHK English broadcast at least four times a week.
- watch a movie or TV show in English once a week.
- use English (speaking, reading, writing, or listening) at least five times a day, for at least two minutes each time.

It is obvious that depending on the specific proximal goal, its frequency and its level of difficulty, the student’s progress will vary, but it is better to set some proximal goal than none at all. Students should also be encouraged to choose a combination of proximal goals, or several different goals at once. Just practicing flashcards on a daily basis is less interesting and effective, than reading a book and watching a TV show, in combination with the use of flashcards.

#### **t.o.O.l.s. – Often**

Especially in language acquisition, where one has to master a huge amount of information, i.e. vocabulary and grammar, increasing the frequency of study (or language use) while maintaining the total amount of study time is more efficient than just increasing the overall amount of study time. As the results of my research project below show, students who studied vocabulary during a total of 10 minutes, spread over six short (1.5-minute and 2.5-minute) increments with 4-minute breaks in between, scored much higher on tests than students who studied for one single 10-minute period. Therefore, students should be encouraged to study/use English not (just) more, but more often.

### **t.o.o.L.s. – Little by little**

Many ESL learners would find it impossible, or undesirable to free up one hour a day to study or use English. However, many people should be able to find five or more one- or two-minute slots in a day. Just like Facebook's aim and strength is not to replace people's existing activities, or try to get people to give up their current hobbies in favor of Facebook, it catches people in their free moments, the "empty moments in between activities", and then tries to keep them using Facebook for as long as possible. Although competing with easily accessible entertainment like Facebook and the like has not made it any easier, getting ESL learners to recognize and use those free, "empty" moments efficiently is a powerful tool in language acquisition. It is not about creating time by replacing other fun or necessary activities, it is about making the students aware of the (many) empty moments in their daily schedule that they could use to study, practice or use English.

ESL learners need to be made aware that not only are they more likely to find five empty 2-minute periods in their daily schedule than one 10-minute empty period, but also that, as my research shows, studying vocabulary in several short increments instead of one longer period can lead to a better result (higher efficiency). Many students might have the misconception that using or studying English for only 2 minutes at a time is not benefitting their English acquisition.

To make efficient use of those short slots of time in people's busy lives, thorough preparation is crucial. The material that one plans to use should be ready at hand, for example a (copied) page of a magazine or flashcards in one's pocket, a book in one's (hand)bag, or even better, a digital version of it on one's mobile phone. Mobile phones and tablet computers have made it much easier to access study material instantly. One can easily carry and instantly access books, newspapers, flashcards, TV series and movies, and have a multitude of supporting websites and applications, like dictionaries, websites that explain grammar, etcetera. A few examples of the many available applications that minimize preparation time and maximize efficiency for ESL learners are Anki, Busuu, Livemocha.

### **t.o.o.l.S. = Stamina**

I often tell my students “Do not STUDY English……, but USE English”. Few people truly enjoy studying, especially the extensive study over many continuous years that is necessary to gain proficiency in any language. Therefore, the “S” in T.O.O.L.S. does not stand for Study but for Stamina. Stamina is the ability to sustain prolonged physical or mental effort, and while things like getting enough sleep, eating healthy food, regular exercise, and removing distractions can improve one`s stamina to study longer, maintaining one`s stamina to continue for years has additional requirements.

One powerful way to maintain the will to keep studying is finding ways to enjoy USING the language. If students enjoy reading (comic) books, they should try to read (comic) books in English. If they are interested in reading in their native language about for example bikes, cats, or travelling, then they should try to read about those topics in English. If they love karaoke, then they should challenge themselves and try English songs. If they enjoy watching movies, they should try to watch movies in English.

### **Research project**

Research question: Is spaced learning using 1.5 to 2.5-minute periods more effective than non-spaced, continuous learning, and to what extent does the use of flashcards in a spaced-learning setting further enhance language acquisition.

### **Participants**

180 first-year and 64 second-year students from the department of education, engineering and regional studies at Gifu University participated in this research project. The participants were students of Monday first and second period (education department, first year students), Tuesday first and second period (engineering department, first year students), Wednesday first and second period (regional studies department, first year students) and Thursday fourth and fifth period (engineering department, second year students).

### **Time and location**

The research took place during regular class hours during a 3-week period in May and June of 2017, with the actual tests taking place during 8 days in the second and third week.

### **Method and sequence of research**

1. During week 1, all participants in the research project were shown of list of 100 English

- words, and they were asked to not only mark the words that they knew or thought they knew, but also describe its meaning in Japanese or English. To give all the participants the same starting point, during the tests only words that none of the students knew were used. The students were not told of the purpose of indicating which words they knew, so they had no incentive to pretend not to know certain words. Using made-up (fake) words was considered, but since both the study time and test time was during the students' valuable class time, it was preferable to have this research project actually contribute to their vocabulary knowledge.
2. Of the original list of 100 words, 53 words remained that none of the students had indicated to know. Two lists of each 20 words were comprised to be used during the tests.
  3. The participants were divided in two groups, group 1 (G1), the control group, and group 2 (G2). Every test day, G1 and G2 were members of the same department. The members of G1 and G2 were switched in week 3, the second week of testing, meaning that students who were in the control group during the first week of testing were not during the second week, and vice versa.
  4. Tests 1,2 and 3 took place during week 2, the last week of May, and test 4 and 5 during week 3, the first week of June.

### **The Tests**

15 different tests were undertaken. Each of the tests consisted of 3 parts: Study Time (ST), Rest Time (RT) and Exam Time (ET).

Test 1 (T10): ST of 10 minutes, RT of 30 minutes, ET of 3 minutes.

Test 2 (T10-6x): 6 times ST consisting of 5 cycles of (ST of 1.5 minutes + RT of 4 minutes) and 1 ST of 2.5 minutes, RT of 30 minutes, ET of 3 minutes.

Test 3 (T5-5x): 5 times ST consisting of 4 cycles of (ST of 1 minute + RT of 4 minutes) and ST of 1 minute, RT of 30 minutes, ET of 3 minutes.

Test 4 (T10Flash): ST of 10 minutes (with use of flashcards), RT of 30 minutes, ET of 3 minutes.

Test 5 (T10-6xFlasjh): 6 times ST consisting of 5 cycles of (ST of 1.5 minutes + RT of 4 minutes) and 1 ST of 2.5 minutes (with use of flashcards), RT of 30 minutes, ET of 3 minutes.

All participants received the same instruction before each test. During ST they had to study 20 English words and their Japanese meanings. During RT they had to participate in regular class activities. During the ET they had to write the English word for each of the Japanese meanings. All tests had the same Exam Time of 3 minutes. All tests but test T5-5x had the same total amount of Study Time of 10 minutes. Test T5-5x's ST was only 5 minutes.

Test T5-5x, T10-6x, and T10-6xFlash were “spaced learning sessions”, with 5 or 6 (short) periods of Study Time followed by Rest Time.

Before the Study Time of Test T10, T5-5x and T10-6x the students were provided with one a4-sized paper with a list of 20 English words and their Japanese meanings. Before the Study Time of Test T10Flash and T10-6xFlash the students used 20 provided flashcards with one each flashcard one word and its Japanese meaning.

At the end of the Study Time, all study material, the list of words, flashcards and any paper used for practice, was handed in.

During Rest Time, students had to actively participate in class activities, which depending on the day and class, varying from conversation to reading exercises.

### **Research results:**

Participants’ scores showed a wide variation, varying from perfect scores of 20 correct answers out of 20 (100%) to only 2 out of 20 (10%), despite the fact that the conditions, materials and time frame were the same for all participants (within the same group).

Of the 31 participants that took T5-5x, the average score was 7.3 correct answers/words (out of 20), an average score of 36.5%. Only 19%, or 6 students out of 31 taking this test passed, scoring 12 correct answers or more. See table. 1, 2 and 3.

Of the 115 participants that took T10, the average score was 9.5 correct answers/words (out of 20), an average score of 47.5%. 33% of the students taking this test passed, scoring 12 correct answers or more.

The 86 participants that took T10-6x scored better, an average of 12.3 correct answers, an average score of 61.5%. 58% of the students taking this test passed, scoring 12 correct answers or more.

During the second week of testing, all 234 participants used flashcards to study. Of all the 118 participants that took T10Flash, the average score was 13.1 correct answers (out of 20), an average score of 65.5%. 61% of the students taking this test passed.

The 116 students that took T10-6xFlash scored even better, an average of 14.3 correct answers, or an average score of 71.5%. 80% of the students passed.

Table 1. Average score for each test by test day, and average score of all participants.

Average score (out of 20 words)	Monday	Tuesday	Wednesday	Thursday	average of all participants
T5-5x				7.3	7.3
T10	9.3	12.5	7.9	7.6	9.5
T10-6x	10.5	13.5	13.4		12.3
T10Flash	12.5	13.7	12.8	12.8	13.1
T10-6xFlash	15.8	15.3	13.4	13.5	14.3

Table 2. Average score in percentage (20 correct answers = 100%) for each test by test day, and average score of all participants.

Average score in percentage (20 correct =100%):	Monday	Tuesday	Wednesday	Thursday	Average of all participants
T5-5x				36.5%	36.5%
T10	46.5%	62.5%	39.5%	38.0%	47.5%
T10-6x	52.5%	67.5%	67.0%		61.5%
T10Flash	62.5%	68.5%	64.0%	64%	65.5%
T10-6xFlash	79.0%	76.5%	67.0%	67.5%	71.5%

Table 3. Percentage of participants failing, scoring 11 correct answers or less, per test by test day, and average of all participants failing.

percentage of participants failing	Monday	Tuesday	Wednesday	Thursday	Average of all participants failing
T5-5x				80%	80%
T10	61%	45%	83%	77%	67%
T10-6x	58%	33%	35%		42%
T10Flash	41%	24%	50%	39%	39%
T10-6xFlash	10%	13%	29%	29%	20%

### Discussion of results:

As for spaced learning, comparing T10 to T10-6x, showing participants scoring 28% higher in the spaced learning test, and T10Flash to T10-6xFlash, showing participants scoring 8% higher in the space learning test, one can conclude that even practicing spaced learning in short 1.5-minute increments shows a substantial increase in efficiency.

As for the use of flashcards, comparing T10 to T10Flash, showing participants scoring 38% higher with the use of flashcards, and T10-6x to T10-6xFlash, showing participants scoring 16% higher with the use of flashcards, one can conclude that the use of flashcards shows a substantial increase in efficiency as well.

Combining spaced learning with the use of flashcards (T10-6xFlash) shows an increase in performance of 51% compared to non-spaced learning without the use of flashcards.

Looking at the percentage of participants failing the tests, the benefits of spaced learning and use of flashcards appear to be even more dramatic, from 67% of the participants failing test T10 to just 20% of the participants failing test T10-6xFlash.

The poor results of the spaced learning test T5-5x (average score of 37.5% and 80% of the participants failing) could have several causes. It could be that the total amount of Study Time

(5 minutes as opposed to 10 minutes for the other tests) was the major factor. It could also be that the one-minute Study time periods were too short, causing too much stress and anxiety. It could also be a combination of these or other factors. There is not enough information to draw any conclusions on the base of this test T5-5x. Further research would be required.

Further research into which method of study the students used, followed by instruction about proper study methods its advised.

Also further research will be required to see whether a higher test score also means a higher level of retention over a longer period of time.

Although in my opinion the format of the research project, studying vocabulary words followed by a test, was not unusual, and a format that the participants had most likely prior experience with, the possibility that participants scored better in the second week of exams than in the first week because the participants were getting used to the format can not be excluded. Doing the same research project in reversed order, with a completely different group of participants could exclude that possibility.

Both in the first week and in de second week of testing there was a number of participants who had a score of 100% (8 in the first, 9 in the second week of testing, or representing 3.4% and 3.7% of all participants). It is impossible to tell whether those participants (if they were the same students) actually improved or not, and if they improved, how much. To get more accurate information of how much all participants performed, it would be better to increase the number of words in each test to such a number that none of the participants could get a perfect 100% score.

There were no participants who scored 0%, so one can conclude that if any participants performed worse during any of the consecutive tests that it is reflected in the results.

An interesting fact is that the Thursday-class participants, which are second-year students of the Engineering department, scored lower on all tests than the Tuesday-class participants, which are first-year students of the same Engineering department. The cause for this discrepancy falls outside of the scope of this research.

## **Conclusion**

Spaced learning with short 1.5 to 2.5-minute increments of study time are a very effective way to increase efficiency in language acquisition, especially in combination with the use of flashcards. Language learners should be encouraged to make spaced learning and the use of flashcards part of their daily routine, both in a classroom setting as well as in their private lives.

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