

# Vocabulary Learning Outside of the Classroom: Institutional Use of a Spaced Repetition Vocabulary Learning App

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## Abstract

The Global Teaching Institute (GTI) at Tokyo International University (TIU) was founded in 2013 with 10 faculty members and now in 2022 has 55 faculty members. In order to provide students with similar learning opportunities while improving and supplementing their general English vocabulary, the writers of the present paper, decided in phases, from small beta-runs in 2013 and 2014 to implement vocabulary learning app assignments institutionally for all English-major first- and second-year students. The spaced repetition learning app that has been utilized is WordEngine. This paper will provide an overview of the rationale and implementation as well as an introduction to WordEngine.

**Keywords:** vocabulary, spaced repetition, WordEngine, curriculum

David Wilkins (1972), the British linguist, stated, “while without grammar little can be conveyed, without vocabulary nothing can be conveyed” (pp. 110–111). Vocabulary is thus the main building block of communication. One can communicate by pointing, of course, but pointing and saying a word is more effective. Uttering a grammatically flawless sentence, obviously, would be best, but it is not required to get one’s meaning across. In *Vocabulary Myths: Applying Second Language Research to Classroom Teaching*, Folse (2004) noted the myth that a foreign or second language (L2) vocabulary is not as important as grammar or facets of the target language. He then proceeds to debunk this myth. Having a large vocabulary is not an end in itself, but serves as the foundation for reading, writing, speaking, and listening (Nation, 1994). As Folse (2004) suggested, having a larger vocabulary to work with lends itself to a virtuous cycle of sorts where learners whose vocabulary base is larger can then leverage that foundation to learn even more words.

In this paper, the focus will be on the institutional and student vocabulary building needs and constraints of Tokyo International University (TIU) first- and second-year English-major students. An overview of the institution (Global Teaching Institute [GTI]), the vocabulary app that is used by the aforementioned students, a summary of the app, and past data on the vocabulary-building benefits will be provided.

## **1 Literature Review**

The vocabulary app that TIU utilized is based on the spaced repetition technique. This technique, which involves using flashcards, introduces learners to newly presented and more difficult words, while previously practiced and less difficult words (as defined by the system as having been sufficiently learned) are not displayed as often. Why employ such a tactic? Medina (2018) suggested that the best method to remembering is to repeatedly expose yourself to the information you are trying to learn at timed intervals. Learning, he wrote, happens best when new information is gradually added as opposed to cramming it all in at one time. Smolen et al. (2016) noted that for various types of learning, spaced training, more than other forms of training that utilized short or no intervals, leads to more powerful memory development. They also wrote about how spaced learning research has recently started to reveal the foundational cellular and molecular mechanisms behind this memory development. In a study focusing on vocabulary learning with young English as a Foreign Language (EFL) learners, Lotfolahi and Salehi (2017) found that “spaced practice produced better long-term retention than massed practice” (p. 1). They concluded by stating that this spaced repetition approach offers “a pedagogically powerful approach for learning vocabulary” (p. 1).

## **2 Global Teaching Institute Implementation of the Vocabulary App in its Curriculum**

### **2.1 Overview**

The GTI is an institution that is closely tied to TIU’s School of Language Communication (SLC), which houses the TIU English Department. There are, at present, approximately 240 students enrolled in each year of the program. While the GTI faculty also teaches students in other departments at the university, the majority of lessons are conducted with the English majors. The GTI includes outside-of-the-classroom mandatory facets in each of the skill courses we offer; an extensive reading program is part of our reading courses, weekly conversation practice with a faculty member or student staff, and writing or tutoring sessions in our Academic Advising center. Thus, compulsory activities were already in place for the other three skills, as noted above, and therefore we decided to have the WordEngine app vocabulary part of the listening course. To complement the extensive reading, writing, and listening programs already in place, vocabulary training became a mandatory activity in courses that focused on listening skills. The rationale for placing vocabulary training in the listening portion of the curriculum was institutional-needs-based, rather than a curriculum-based decision. Having outside-of-the-classroom opportunities to nurture speaking, reading, and writing, the directors and curriculum heads of the institute recognized that the foundational building block of vocabulary is crucial for our students’ language development; thus, a means of providing this practice for focused vocabulary training was sought out.

The focus on vocabulary practice within listening skill-based courses can be traced back to the first year of the GTI in 2013. That year, a member

of the first cohort of instructors proposed using WordEngine in his classes after attending an academic conference. WordEngine is a bilingual (Japanese and English) vocabulary learning application for smartphones and computers. At that time, 40 students in the SLC trial-ran the application making it the first time an application was used as part of the course curriculum. Another instructor also adopted WordEngine the following year, so that approximately 100 students in the SLC actively used the application. In 2015, seven instructors used WordEngine with 220 registered SLC student users. In that year, the GTI decided to have students sign up and use the TOEIC course portion of the WordEngine app. In the 6 years between 2015 and 2020, more instructors adopted WordEngine; in 2018 the GTI directors, along with the GTI curriculum team, designated using the app as a mandatory activity in compulsory listening skill-based courses, not only for English majors but also for a course designated for students majoring in International Relations (IR) and Business Economics (BE). In 2021, 549 TIU students were registered users of Word Engine, which included first- and second-year English majors and IR and BE majors.

The aforementioned student body is now required to complete 350 correct answers on the WordEngine app per week. From 2013 to 2018, the correct response requirement was set at 300 words, and from 2019 the target was raised to 350. This requirement makes up 10% of the final grade for the course. Since becoming a mandatory activity, faculty members have provided workshops and shared materials with each other to help onboard new instructors to the program. Today, a robust training orientation is provided by mentor instructors and curriculum committee members to ensure that faculty have the tools needed to implement the vocabulary training program.

Faculty and student understanding of the benefits of vocabulary practice can be seen in the variety of approaches and activities faculty take when implementing the vocabulary quizzes. Since the majority of faculty in the GTI use WordEngine, activities and resources can be shared easily through an online database or in-service workshops. One example of a creative approach to incorporate WordEngine is through an activity called the “WordEngine Skit Project” (Armand, 2018). In this project, students in pairs or small groups create a script using a set number of words from the WordEngine quizzes. Finally, they perform the skit and audience members note the specific words from the quizzes. This activity illustrates how vocabulary activities can be incorporated into class projects. In this example, WordEngine is not limited to outside of the classroom. Some instructors collaborated to organize semester-long tournaments where the class with the highest average correct TOEIC word responses per student would be the winner. In addition, WordEngine, the app developer, has sponsored Challenge tournaments. These types of friendly competition also motivate students. Managing student use and monitoring their progress is made easy through the app. Instructors are provided with a weekly summary of student progress (see Appendix A for sample). Easy-to-read reports, including charts and graphics, aid the instructor in following weekly progress and end-of-the-semester totals. The instructor then takes this data and utilizes it in their grading.

## 2.2 WordEngine

WordEngine is a bilingual (Japanese and English) vocabulary learning application. After a student signs up, the student will initially take a 12-minute vocabulary diagnostic (V-Check) test that has two types of questions: visual and aural. This diagnostic identifies which words a student already knows and frequently used words they are missing from over 13,000 base words which, according to the app developers, covers about 99% of all spoken and written English vocabulary (Cihi, 2020). With this diagnostic data, the app provides students with a personally tailored list of the most frequently occurring words they do not know (Browne & Culligan, 2008; as cited in Cihi [2020]). In addition to the basic vocabulary diagnostic, the app also reports on a student's vocabulary foundation for proficiency tests, such as Test of English as a Foreign Language (TOEFL), Test of English for International Communication (TOEIC) and International English Language Testing System (IELTS), and subsequently tracks the student's progress.

The app gives each student a personalized set of flashcards with “three types of paired-associate learning tasks: visual, aural, and contextual” (Cihi, 2020, p. 7). As much as possible, the app defines and teaches new and unknown vocabulary using only definitions with words the student should already know. Distractors are matched by part of speech and are generally more difficult than the words being taught, and random at each review so as to reduce distractor recognition. WordEngine's digital flashcards have been independently researched and shown to be faster and more effective than: intensive reading, extensive reading, words lists, and paper flashcards (McLean et al., 2013). Research has also demonstrated that Japanese university students achieve statistically significant gains using the WordEngine app, when measured using the Vocabulary Size Test (Nation & Beglar, 2007) and when compared to intensive reading, extensive reading, words lists, and paper flashcards (McLean et al., 2013).

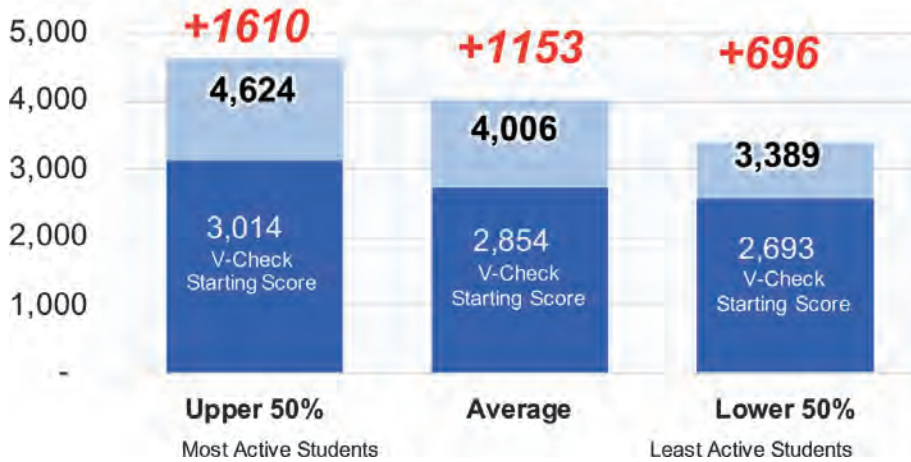
## 3 Results

Since the adoption of WordEngine in 2013 to the present, 3,180 students have signed up for accounts and have used the app as part of their course activities. Data provided by WordEngine for the academic year of 2021 for active users (April 2021 to March 2022) showed that with a weekly study goal of 350 words, the average TIU student increased their vocabulary size by 1,153 new words above their starting average size of 2,854 words—a 40% increase in 1 year as indicated in Figure 1.

After 11 years of formal and supplementary education, the average 2021 student had acquired 2,930 words (a pace roughly equivalent to 266 words per academic year). For our average learner, as measured by the app's algorithm, learning 1,153 new words in 1 year with the WordEngine direct study approach is 4.2 times faster than prior years ( $266 \times 4.21 = 1,153$ ) when we had set 300 as the correct response requirement. When the weekly goal was set at 300 correct responses, as it was prior to 2019, the average student increased their vocabulary size by about 885 words per school year. In the first semester of the 2022 academic year (April to July), the average student had already increased their vocabulary by 495 words (see Figure 2).

## Vocabulary Increase

Average New Words Learned Per Student From April 2021 to April 2022

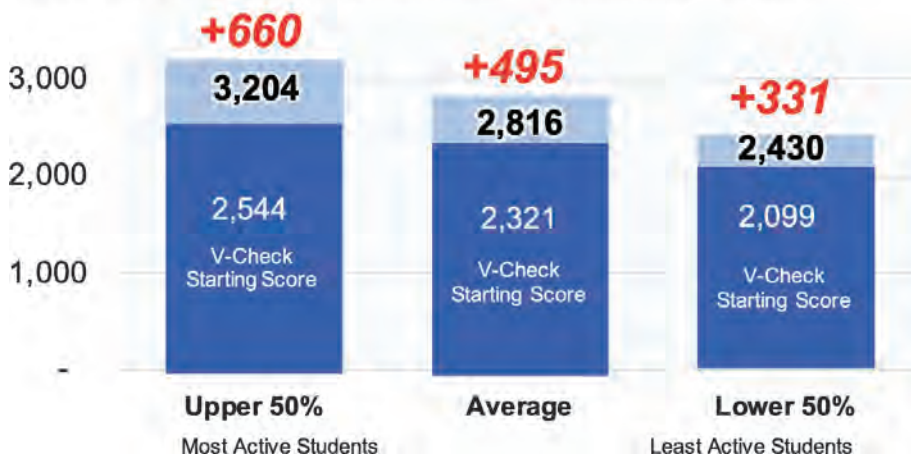


Source: Adapted from Cihî, G. (2020).

Figure 1. 2021 Academic Year Student Report: All Registered Users.

## Vocabulary Increase Since V-Check

Average New Words Learned Per Student From V-Check to end of July 2022

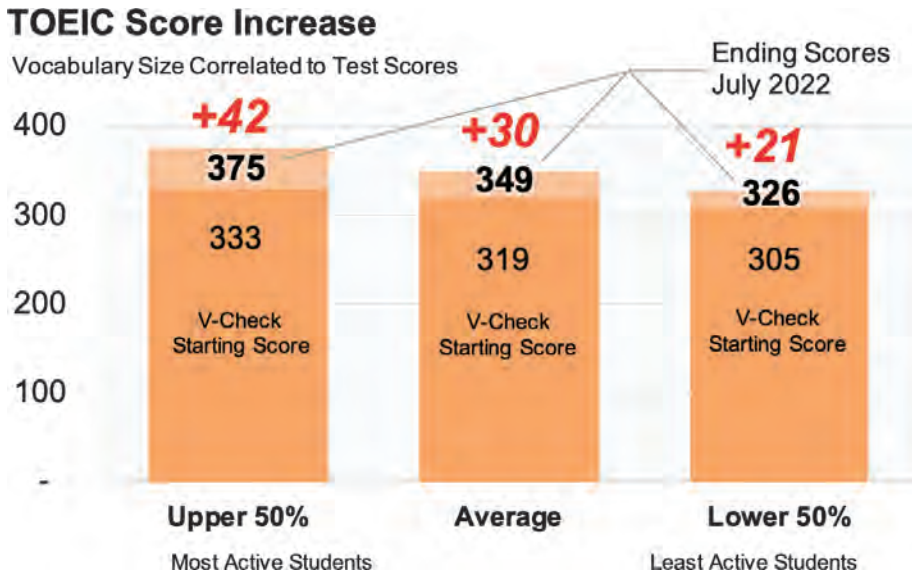


Source: Adapted from Cihî, G. (2020).

Figure 2. Spring 2022 First-Year Student Report.

Included in the progress report provided by WordEngine are descriptive data points highlighting how increased app use could lead to higher TOEIC gains. The relationship between app use and TOEIC score gains is determined by the correlation of V-Check scores and a database of 7,000 actual TOEIC scores. The correlation,  $r = 0.81$ , is the basis for the estimated scores provided (Cihî, personal communication, September 17, 2022).





Source: Adapted from Cihl, G. (2020).  
 Figure 3. Spring 2022 Report of TOEIC Score Increase for First-Year Students.

Our university encourages students to take the TOEIC test as it is often required when students search for jobs post-graduation. Students who had an average increase in new words using the app were able to increase their TOEIC score by 30 points as noted in Figure 3.

#### 4 Discussion

The use of a vocabulary app for students to practice outside of the classroom has the potential for various benefits and drawbacks as evidenced by the experiences at TIU presented in this report. As our institute encourages students with mandatory activities to develop their language skills outside of the classroom in various ways (e.g., weekly conversation practice in our English Plaza facility, extensive reading word targets per semester, and tutoring in our Academic Advising facility), having a means of fostering their vocabulary growth has been part of our overall curriculum goals. The descriptive data we have points to this vocabulary intervention being somewhat effective.

There are a number of advantages of utilizing an app for vocabulary practice. First, there are limitations to how much vocabulary exposure students receive in the classroom. Even with the various opportunities available for our students at TIU in the GTI to engage with English outside of the classroom, given that students are surrounded by Japanese in their everyday lives they require more chances to encounter a variety of words. WordEngine provides the students with an opportunity for such encounters. Second, WordEngine is designed in such a way that students are practicing at a level that is appropriate for their English proficiency level. WordEngine developers have “controlled the degree of uncertainty

for each study task...[The app algorithmically] controls the ratio of lexical uncertainty....to promote sustained motivation (Cihi, 2020, p. 6). Third, team or class competition is motivating, as evidenced anecdotally by a faculty member who stated, my students learned thousands of new words, and the Team Challenge program transformed the experience from independent self-study to a team effort where students pull together and motivate each other” (Cihi, 2020, p. 8). In addition, students can use the app whenever and wherever they want, which is truly a boon for students with long commutes.

In our institutional use of WordEngine, we have a few areas to improve on. First, while the weekly goal for students is 350 correct responses, the vocabulary learned in the app is not directly or necessarily related to the vocabulary that students are learning in the classroom or other outside-the-classroom activities. A wider range of activities is an area for improvement, such as those conducted by Armand (2018) that reinforce or bridge the in-class vocabulary learned with the app. While gains are made, as measured by the app’s algorithm, providing students with a more robust environment for using the learned vocabulary would make the practice richer. In addition, the directors of the institute allow faculty some freedom in implementing various elements of the curriculum; while this vocabulary training app is a mandatory facet of the overall curriculum, the directors of the program, until now, have only requested data annually with the overall numbers, and so day-to-day checking and monitoring is in the hands of individual instructors. Without wanting to be “Big Brother,” this has its benefits as faculty have autonomy, while from an institutional perspective, gaps in objectives and outcomes could occur.

## **Conflict of interest**

We have no known conflict of interest to disclose.

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## Appendix A

Sample of weekly email that instructor receives providing an update on students' progress

Weekly Report

Start Date: 2022/05/09 00:00

End Date: 2022/05/15 24:00

Login Email ID: xxxxxxxx@abc.com (this is instructor's email)

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WordEngine

Group 1 (NOTE: This instructor has two groups of students using the app.)

Weekly Goal 350 Correct Responses (CR)

6 Yes 2 No (75.0% Hit Rate, that is, Did the student reach the target of at least 350 correct responses this week?)

273 Avg CR per student

Hit:	Name/Login ID	Minutes	Correct Responses
Yes:	Student 1	50	407
Yes:	Student 2	57	367
Yes:	Student 3	31	360
Yes:	Student 4	43	352
Yes:	Student 5	37	351
Yes:	Student 6	76	351
No:	Student 7	0	0
No:	Student 8	0	0