Analyses on Vocabulary Size Test Results at an Intensive English Program

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Abstract

Previous studies have shown that explicit vocabulary learning leads to vocabulary acquisition; however, the link between implicit vocabulary learning and vocabulary acquisition seems to be under-researched. It was unclear whether vocabulary development was positively or adversely affected by attending English classes and preparing for examinations. In order to address this issue, this research investigates the vocabulary size of 78 first-year university students in 2018. The vocabulary size was measured at the beginning and at the end of the school year using the Vocabulary Size Test (Nation & Beglar, 2007). It was found that students gained about 300 words on average through the year. The result shows that even though the students received limited explicit instruction on the vocabulary tested, they generally improved their English vocabulary over time. Their attendance rate and their scores in the review tests, however, were found to have no significant associations with the vocabulary gain.

Numerous studies illustrate the link between explicit vocabulary acquisition and academic achievement (e.g. Roche & Harrington, 2013). In order to achieve success in the intensive English program, it is necessary for learners to expand vocabulary by explicit learning as well as implicit acquisition for productive and receptive uses (Nation, 2008). Also, there are academic tasks useful to teachers and learners of English for the purpose of academic achievement (e.g. Nation, 2008; Nation & Webb, 2011) including improvement of vocabulary. Nevertheless, these studies have not fully examined what academic attitudes or experiences of the novice learners of English might have or go through for implicit vocabulary learning in the context of content-based instruction. An increasing number of Japanese universities have started using English as a medium of instruction (EMI) (Iino, 2019). Brown (2014) reported that at least 25% of Japanese universities provided some types of EMI courses, and the rate grew to 42% as of 2017 (MEXT, 2019). Reflecting this trend, implicit vocabulary learning and its impact on students have become a target of recent attention (e.g. Kubota, 1999; Yamamoto, 2016). It may be, then, naturally hypothesized that

students with good autonomous learning habits might well improve the academic results better than other types of students. There also arises a question whether it is the case unless the learning targets are specifically drawn attention to by the teacher in a content-based classroom.

The current study aims to explore academic English vocabulary gains of the first-year students before and after a one-year content-based academic English program at a university in Tokyo, Japan. Moreover, it compared the gains with two other dependent variables, namely attitude and achievement. Attendance was used as a proxy to measure attitude, and achievement was measured by tests.

Literature Review

Vocabulary Size Test

It has been claimed that foreign learners of English should be able to read and understand a regular textbook if the learner knows 2,000 high-frequency word families and 800 academic word families, the former of which accounts for 87% of a regular text for EFL university students and the latter 8% (Nation, 1990; Nonaka, 2004). Moreover, Coxhead's (2000) New Academic Word List includes 570 word-families worth for approximately 10% of the total word tokens in academic contents in addition to the basic 2000 most frequently used words. So far, in order to assess English vocabulary size of Japanese university students, numerous studies have used the Vocabulary Size Test (Nation & Beglar, 2007) and determined the correlations between students' vocabulary gain and other variables. There were studies on a significant relationship between learners' vocabulary knowledge and performance on an English proficiency test (e.g. Beglar & Hunt, 1999; Kanzaki, 2010; Kanzaki, 2015; Nation & Meara, 2002; Qian, 1999). Kanzaki (2015), for instance, compared 82 Japanese students' results of three parts of the Test of English for International Communication (TOEIC), the Vocabulary Levels Test, and the Vocabulary Size Test. The correlations of the results of each of the three parts in TOEIC (reading, listening, and speaking) and the results of vocabulary tests were calculated. There turned out to be a greater correlation between the results of vocabulary tests and those of the reading part of TOEIC than its listening part or speaking part. However, the focus of the past research has been placed neither on the non-explicit instruction, nor on the correlation between their vocabulary gain and students' attitudes toward class nor students' academic performance in the review test as a predictor of academic achievement.

Vocabulary Gain Through Limited Vocabulary Instruction

In an English program of content-based instruction, students are supplied not with instructions of the traditionally prevailing grammar-translation approach, but with discussion-based classes focusing on the subject content. Content-based instruction can be referred to as "the concurrent study of language and subject matter, with the form and sequence of language presentation dictated by content material" (Brinton, Snow, & Wesche, 1989, p. vii). Students get exposed to the language to learn through studying the subject, become interested in the content, figure out what is meant, and try to express his or her own opinions about it (Allen-Tamai, 2016). Through this process, students often look in the dictionary for unfamiliar words and try to figure out the meaning of a word or a sentence, but the main focus of the lesson is placed on comprehension of the content. In implicit vocabulary learning of a content-based class, an instructor may not generally draw attention to the vocabulary unfamiliar to students,

but vocabulary may be automatized through learners' active use of the language through class engagement such as discussion of the subjects.

There appears to be an ambiguity of past evidence on effects of implicit language learning in content-based contexts, but a topic was studied. Gierlinger and Wagner (2016) explored implicit vocabulary gain in a CLIL (Content and Language Integrated Learning) classroom. They had a project-based course carried out through implicit language instruction as well. Two groups of 22 Austrian students aged 13-14 were exposed to English for 5-6 months in comparison with three other control groups. The results of a *t*-test showed that there was only a slight increase in the vocabulary development in the CLIL group. Effects of CLIL on language gain were not so obvious, but there may be other factors such as teacher's word frequency.

Attendance and Vocabulary Development

According to Gardner (1983), learners who have positive attitudes toward the class and target language are likely to perform better and increase their L2 proficiency. Like this, many studies have been conducted to explore the link between class attendance or absenteeism and academic achievement of young L2 learners at primary and secondary levels. Few studies, however, have been conducted on the interaction between students' attendance and academic vocabulary development at the tertiary level.

A study on a similar topic (Landin & Pérez, 2015) discovered that pharmacy students' attendance and academic achievement were significantly correlated in a Spanish university. It showed that the more frequently a student attends class, the higher achievement the student is able to make. It should be noted that attendance may not be the sole predictor of students' performance. However, this was one of the few studies which confirmed the significant correlation between attendance and academic achievement at the tertiary level.

Then Landin and Pérez's study inspired us to hypothesize that the more frequently students attend classes, the more vocabulary they gain because they have more chances to utilize the words in class, resulting in further academic achievement.

Academic Achievement and Vocabulary Development

The relationship between vocabulary development and academic achievement at the tertiary level is currently under-explored as well. A great number of studies, however, delved into a topic comparable to this, including Roche and Harrington's (2013). In their study, Roche and Harrington examined bivariate correlations for language measures and academic performance in a university in Oman, where English is a medium of instruction. There were six components in their language measures: advanced word accuracy, advanced word response time, advanced word composite, basic word accuracy, basic word response time, and basic word composite. In terms of academic performance, they used a mock IELTS to measure academic writing skills and GPAs. The researchers found that among the six combinations between language measures and academic writing skills, four correlations were statistically significant from .35 to .51 with *p.* < .05, and that among the six combinations between language measures and GPAs, five were statistically significant from .27 to .43 with *p.* < .05. In sum, the students' language skills were found to be moderately correlated with their academic performance.

Based on the previous research, it can be hypothesized that there is a correlation between vocabulary gain and the score which students get in the mid-term and final exams titled Course-Wide Tests (hereinafter, CWTs).

Research Questions

Based on the discussions above, the following three research questions (RQs) are addressed in this study and it was hypothesized that all the questions would be answered in the affirmative.

RQ 1. Do students in an English program generally gain vocabulary during the first year, even though they receive limited explicit instructions on the vocabulary asked in the test?

RQ 2. Are the students who attend English classes frequently more likely to gain vocabulary?

RQ 3. Are the students who get better scores in CWTs more likely to gain vocabulary?

Method

Participants

The participants in this study were 125 first-year university students in a liberal arts university in Japan. Almost all the participants had a Japanese family name and were educated in Japanese schools. However, there were also some students who had family backgrounds outside Japan, such as Korea, India, and China. In terms of English proficiency level, 117 of the students in this study took the TOEFL ITP in April 2018, and their mean score was 457.13 (*SD* = 23.25). According to Educational Testing Service (2019), the mean score of TOEFL ITP of those who took the test in Japan in 2018 was 460. Considering that this test is mainly taken by those students who are thinking of studying in the United States or other English-speaking countries, and is used for streaming students at top-level universities in Japan, it can be said the English proficiency level of the participants in this study was higher than average university students in Japan.

All the students took a compulsory class called Reading and Content Analysis (RCA) and they met three times a week for 70 minutes with additional tutorial sessions. In RCA, students read articles based on themes such as education, social media, cultural differences, eugenics, ethics, and human security, and discussed the contents and analyzed the profound meanings of the texts. They discussed these topics in order to improve their analytical and critical thinking skills. In order to improve vocabulary, the lists which contain approximately 90 frequent words and phrases were distributed for self-study. Based on these lists, students were required to take several vocabulary quizzes. The participants were randomly divided into six classes, and each class had a different RCA teacher in each term. Since the three RCA instructors taught two classes per term, all the students had one RCA course taught by each of the three instructors in order to ensure similar treaments. In addition to RCA, all students took various classes conducted in English to develop writing, pronunciation, discussion and other skills.

Instruments

The commonly employed test to measure how many English words a learner knows is the Vocabulary Size Test developed by Nation and Beglar (2007). The PDF versions are available on Nation's website, and permission to use this test for research is not required. There are also some websites which offer tests based on the Vocabulary Size Test. In this study, the test from VocabularySize.com was employed. This vocabulary test has 140 multiple-choice items with 10 items from each 1000-word family level. In this test, students are required to choose one option from five. Students start off reading an example (See Figure 1), and they can see the tested words in a non-defining context in the test.

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write:
Please **write** it here.
- make words on paper
- cut into pieces
- make something better
- move to a new place
- わかりません

Figure 1. Example presented prior to the beginning of the test.

Beglar (2010) validated the Vocabulary Size Test with the data obtained from 19 native speakers of English and 178 native speakers of Japanese employing Rasch analysis. The findings indicated that the items in the test showed a high degree of unidimensionality with the model accounting for 86% of the variance and that the test is reliable with combinations of items showing Rasch reliability indices over .96. However, as Stewart (2014) points out, multiple-choice options in the Vocabulary Size Test can inflate estimates of vocabulary size, and employment of the Rasch model is insufficient to detect the proportion of scores that can derive from guessing. Thus, the scores obtained in this test should be interpreted with caution.

In addition to this vocabulary score, the correlations among its score, class attendance, and CWTs were investigated. For this study, each RCA instructor counted how many times participants were late for classes and absent from classes. As for CWTs, participants were required to take this test twice per term. In CWTs, there were three sections; (1) vocabulary, (2) text comprehension, and (3) application. CWTs were a multiple-choice test and participants totally took 45 minutes for each test.

Procedures

As a pre-test, participants took their first vocabulary test individually in the second week of April in 2018 in one of the RCA classes. Using their own laptop computer in a regular classroom or using a desk top computer in a computer room, they could take the test with their own pace, and most students spent around 40 minutes. Completing 140 items, participants could immediately receive their score. As a post test, in February 2019, using the same instrument, participants were tested individually in class, and they were allowed to take up to 60 minutes. Before taking this test, students were notified the objectives of this vocabulary test and RCA instructors emphasized that results of this test did not affect class grades.

Results

In order to answer the three Research Questions in this study, statistical analyses were conducted with SPSS Version 25 (IBM, 2018). The first Research Question was answered with a paired-samples *t*-test and the second and third Research Questions were answered with correlation coefficients. Among the 125 students in this study, 78 students took the vocabulary test both times, and only the data from those students will be used in the following analyses.

Descriptive Statistics

Before analyzing the data in inferential statistics, descriptive statistics were obtained and are shown in Table 1. The vocabulary size at the beginning of the year (vocab pre) was 6669 words on average among the 78 participants, and the average size at the end (vocab post) was 6967. Of the 78 participants, 51 had a larger size in the post-test than in the pre-test, six remained the same, and 21 had a smaller size. The vocabulary gain (gain) was calculated by subtracting the size at the beginning (vocab pre) from the size at the end (vocab post). On average, the participants gained 297 words with the maximum 2000 and the minimum -1600. In other words, the students improved their vocabulary level by approximately 300 words over one year on average. The student who improved most understood 2000 more words, and the student who improved least understood 1600 fewer words.

Table 1
Means, Standard Deviations, Minimum, and Maximum of Vocabulary Sizes (in Words), Attendance (in Percent) and Score (in Percent)

	M	SD	Minimum	Maximum
Vocab Pre	6669.23	814.53	4900	8900
Vocab Post	6966.67	934.01	4500	9900
Gain	297.44	728.71	-1600	2000
Attendance	94.41	7.63	61.67	100.00
Score	68.62	12.89	30.50	87.57

Note. n = 78

The rate of attendance over the year (attendance) was 94.41% on average with the maximum 100%, which means coming to all the classes, and the minimum 61.67%. Score indicates the percentage of correct answers in the six CWTs the students took over the year. The mean of score was 68.62% with the maximum 87.57% and the minimum 30.50%. It is necessary to be cautious of the rate of attendance and the outcomes it led to. Over 94% of attendance rate may look very high, but it was among those who took both of the vocabulary size tests. In other words, data of only the students who were serious about tests, attendance, and learning English in general may have been shown and analyzed in this research.

General Gain in Vocabulary

Research Question 1 of this study is, Do students in an English program generally gain vocabulary during the first year, even though they do not receive any explicit instructions on the vocabulary covered in the test? As previously shown, the students understood about 300 more words. To make it sure that this difference is statistically significant, however, a paired-samples *t*-test was conducted to compare the vocabulary size in April 2018 and in February 2019. As expected, there was a significant difference found in the scores for vocabulary size between April 2018 (*M* = 6669.23, *SD* = 814.53) and February 2019 (*M* = 6966.67, *SD* = 934.01); $t(77)= 3.58$, $p < .001$. As a result, the first research question was answered in the affirmative.

Relationships Between Vocabulary Gain and Other Factors

Research Question 2 of this study is, Are the students who attend English classes frequently more likely to gain vocabulary? Research Question 3 is, Are the students who get better scores in review tests more likely to gain vocabulary? It was hypothesized that both the questions would be answered in the affirmative. In order to answer these questions, correlations coefficients were investigated. Unfortunately, no significant correlation was found between gain (*M* = 297.44, *SD* = 728.21) and attendance (*M* = 94.41, *SD* = 7.63). In other words, it is impossible to say that the more frequently students came to class, the more vocabulary they gained. Thus, our second hypothesis was not supported. No significant correlation was found between gain and score (*M* = 68.62, *SD* = 12.89), either. In other words, it is impossible to say that the higher score the students gained, the more vocabulary they gained. Thus, our third hypothesis was not supported, either.

Discussion

In this research, it was found that the students generally improved their vocabulary, even though they had only a limited amount of explicit instruction on the academic words tested. The results are encouraging for the instructors who taught the students. All the instructors know that many English learners want to improve their vocabulary level but the learners have little knowledge on how to do so. Also, neither students nor teachers are sure whether the students can gain new vocabulary without any explicit instructions on vocabulary. Thus, the instructors can say that it is possible to learn new words by learning English in general.

However, the rate of gaining vocabulary turned out to not have relationships with frequency of attending English classes or with how well they did in CWTs. These results may not have been expected by the instructors. If attendance rate and CWTs have no associations with vocabulary gain, then their classes may not have contributed to the vocabulary gain much. At the same time, attention should be paid to the small sample size and the general high rate of attendance in this study. More data, especially from those who attend less frequently, may reveal an influence of attendance on vocabulary acquisition that was unseen in this study.

Conclusion

First-year students in an English program took the Vocabulary Size Test (Nation & Beglar, 2007) at the beginning and at the end of the program. Quantitative analyses were conducted to examine whether the students generally improved their vocabulary and whether the improvements were associated with other factors, such as attendance and review tests. The comparison revealed that the students gained significantly more vocabulary over the course of a year, but no relationship was found between the vocabulary gain and other factors, such as attendance and CWT scores.

In future research, it may be possible to construct a more complex model which measures more factors to predict vocabulary gain, such as experience in living overseas prior to coming to university and participation in a study abroad program. In addition, in order to

investigate more factors in a complex model statistically, the sample size should be increased, too.

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