A Comparative Study of Teaching L2 Vocabulary with and without Illustrations to Virtual EFL Learners

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ABSTRACT

Second language learning research suggests that visual aids and illustrations have the potential to enhance proficiency and retention of vocabulary terms in a foreign language. This study builds off of this literature by studying Native English speakers learning of Polish words using images versus no images. This quantitative study compares the effectiveness of 2 learning methods within groups that studied 10 vocabulary terms in Polish: (1) participants studying with virtual flashcards with illustrations, and (2) participants studying with virtual flashcards without illustrations. After a 10-minute virtual tutorial, participants were asked to fill out a Google form that measured their vocabulary retention. They were then asked to fill out the same Google form after 5 days.

Review of Literature

"According to the U.S. Census Bureau, 21.6% of the U.S. population speak a language other than English at home" (Gration). With that being said, vocabulary learning, more specifically second language vocabulary learning, is common in the United States. Second language vocabulary is taught through various techniques. This paper will cover a very common learning technique for vocabulary: flashcard use. In addition, underlying factors that may contribute to the retainment of vocabulary will be mentioned and studied.

Flashcard Use

One method of teaching vocabulary is through the use of flashcards. "Flashcards give your brain a very quick way to check if you got the answer correct. Grading your own work is an act of self-reflection which deepens memory. They also help you engage in active recall which teaches your brain to remember a term, concept, or process without context clues" (Sienkiewicz, 2019). Flashcards are an extremely effective and versatile studying tool, making it a popular method of study among students, specifically high-school students. Nevertheless, the design of flashcards has an impact on its effectiveness for memory recall and retainment of material. A study was conducted to evaluate whether there is a difference in its effectiveness between self-designed (student) designed vs. teacher designed flashcards. Results from the study highlighted that the use of teacher-designed flashcards was the most effective method for vocabulary learning out of the three study methods: (1) learning vocabulary without flashcards, (2) learning vocabulary with teacher-designed flashcards, and (3) learning vocabulary with self-designed flashcards (Dodigovic, 2013). With these results in mind, the research that will be conducted in this paper will provide participants with pre-made flashcards, similar to the teacher-designed flashcards mentioned before, to maximize the retainment of vocabulary that will be assessed later on in the post-tests.

Use of Visuals

A supplemental method of study is by utilizing illustrations and pictures. Scholars that choose to incorporate pictures into their flashcards commonly believe that illustrations will enhance their retainment of study material. Illustrations are most beneficial for visual learners. In fact, 65% of the human population are visual learners. This may explain why study material in conjunction with pictures is more appealing rather than the use of independent text.

Visual teaching, a type of learning style in which students prefer to use images, graphics, colors, and maps to communicate ideas, has been shown to have benefits for scholars. For instance, a study compared teaching vocabulary through still-pictures versus audio-visual aids to 30 young Iranian English-First-Language (EFL) learners. After ten sessions, a post-test was administered to both groups to analyze the effect of the 2 teaching techniques. The obtained results from the study rejected the null hypothesis, and through analysis of mean and standard deviations, there was a significant difference between the group that was taught with still-pictures and the one which were taught with audiovisual aids. The study concluded that still-pictures were more effective than audio-visual aids in teaching foreign vocabulary to the 30 Iranian EFL participants (Mansourza-deh, 2014).

Another study used the application of visual vocabulary for 60 English-Second-Language (ESL) students' vocabulary learning. Students were divided into two groups: (1) Control group: 30 students who received nine sessions of regular English lessons and learned targeted vocabulary indirectly, and (2) Experimental group: 30 students who were presented with the Visual Vocabulary and learned the targeted vocabulary through Visual Vocabulary worksheets and drawing pictures related to each vocabulary word. Results from the study revealed that both the control and experimental groups improved significantly in their scores in their post-test when compared to their scores from the pre-test. The mean difference between the two groups was 15.62, confirming the effectiveness of visual vocabulary methodology for understanding target words rather than teaching through regular English lessons (Tahir, Mohd Haniff Mohd, 2020).

The two studies mentioned have demonstrated that the use of visuals enhance retainment and memory recall of vocabulary, specifically vocabulary of a foreign language. The study that will be conducted in this paper will further confirm and assess the use of illustrations for EFL learners that will be taught vocabulary of a foreign language, also known as L2 vocabulary learning.

L2 Vocabulary Learning

"Second language (L2) vocabulary acquisition is the process by which people learn vocabulary in another language after the acquisition of the first language (L1, also called "native language")" (Wu X., 2012). When it comes to learning vocabulary in a foreign language, it is almost always certain that a translation between the two languages will be used. Translation can further your language acquisition as: (1) translating between languages can reveal their structural differences, as well as any similarities they may share such as vocabulary or word order, (2) the translation method is ideal for helping learners realize how different languages can convey a message in vastly different ways, (3) translation is fantastic at engaging 'both parts' of your brain; your native and target languages. It forces you to become accustomed to switching between your languages at a moment's notice, which strengthens your linguistic abilities" (Be Translated, 2020).

When studying L2 vocabulary, translation is oftentimes paired with flashcards, providing an effective method for L2 learning. A study assessed foreign vocabulary understanding using mobile-assisted programs of different language learning approaches. Seventy-eight high school students were categorized into 3 groups: (1) no L1 translation, (2) L1 translation before, and (3) L1 translation after. Participants learned twelve Spanish words through a virtual tutorial video. Results from the study revealed that L1 translation vocabulary learning

was more beneficial than without L1 translation for long-term memory of L2 vocabulary, confirming that the use of translations enhances L2 vocabulary learning (Li, Mingye, 2021).

Another study analyzed the use of translation in digital flashcards versus traditional flashcards on L2 vocabulary learning for a group of Japanese students of lower proficiency levels in English. The findings of the study concluded that Japanese students of lower levels of English proficiency have significantly higher vocabulary learning gains when using digital flashcards compared to paper flashcards. Japanese students with relatively higher levels of English proficiency performed equally well in both methods when assessing vocabulary retainment (Ashcroft, Cvitkovic, Praver, 2016). Thus, it can be concluded from this study that digital flashcards are most effective for those at lower proficiency levels of the target language than those at higher proficiency levels. The participants of the study that will be conducted in this paper will be individuals who were not exposed to the target language before or at low proficiency levels to maximize the effectiveness of digital flashcards.

Virtual Instruction

With today's times still in the middle of a pandemic, the way people learn is changing, so it's important to understand how students learn new vocabulary in a virtual learning world. Within the past two years, the COVID-19 pandemic (SARS-CoV-2) has immensely affected the method of study for several scholars in the United States. Most students had to endure online instruction as many schools turned to virtual learning to minimize the spread of the virus. The transition to online instruction meant an increase in usage of technology and digital study methods. "Even before COVID-19, there was already high growth and adoption in education technology…Whether it is language apps, virtual tutoring, video conferencing tools, or online learning software, there has been a significant surge in usage since COVID-19" (World Economic Forum, 2020). Many of these online learning platforms aimed to use strategies that were effective in in-person settings and would translate into a remote learning world. Some of these methods include flashcard use. The virtual learning platform that will be used in this study will be digital flashcards and virtual tutorials.

Conclusion

Implications results from studies that involved virtual learning settings and the use of digital flashcards and illustrations for second language learning have all influenced the design of this study. However, these studies did not address and study a population that was previously mentioned before. In addition, they did not study the gap between digital flashcards, L2 learning, and the use of translations and illustrations, which this study will seek to do.

The study will aim to answer the following questions: (1) Does the use of images on flashcards impact vocabulary retainment? (2) Which group had the greatest mean average of correct responses immediately after viewing the video? (3) Which group had the greatest mean average of correct responses after 5 days? (4) Does time affect the retainment of L2 vocabulary for both groups?

Methods

Participants

The research sample included 30 participants who were selected from Union County, New Jersey with no prior knowledge of the Polish language. Participants were divided randomly into two groups, each one included 15 participants.

Instrumentation

The instruments used in this study were Google Slides presentations, Google Forms assessments, Google Spreadsheet and the application Stata. The first two Google Forms that were sent out included a pre-recorded virtual tutorial video of a Google Slides presentation. One Google Form included a video with a voiceover of the Polish and English translation of a Google Slides presentation without illustrations. The other included the same but with related illustrations to the targeted foreign vocabulary word. Two Google Forms were sent out five days later, both serving as an achievement test at the end of the study. The application Stata was used to perform the quantitative analysis necessary to analyze scores after the post-assessment responses were recorded.

Table 1. A list of the vocabulary terms with their Polish and English translation that participants studied via virtual flashcards.

Polish Translation	English Translation
Buty	Shoes
Dom	House
Kolacja	Dinner
Kot	Cat
Krzesło	Chair
Pies	Dog
Rodzina	Family
Ryba	Fish
Stół	Table
Śniadanie	Breakfast

Procedure

Through word of mouth, I recruited 31 participants. They were sent a Google Forms document that contained a link to a 10-minute video with instructions. Both groups received a link to a Google Form that included two sections. The first section included a tutorial video that used 10 basic everyday Polish vocabulary words. The flashcards on the Google Slides were flipped every 5 seconds, giving each word 10 seconds at a time. A voice-over was embedded within the video, giving participants an audio-aid for the foreign word's pronunciation. The second section of the form included 10 drop-down questions, with each question stating a vocabulary in its Polish translation. Participants were instructed to match the correct English translation to the Polish translation of each vocabulary word. Their assessment was scored, and they were informed that they would be given a follow-up assessment in five days. Five days after they completed the first assessment, a second link was sent out, containing the same assessment with questions in randomized, mixed order. E-mail addresses were used to keep track of participants' scores in both attempts. After each participant's response was recorded, they were sent a $5 Starbucks gift-card via email.

The control group received the Google Form that included the virtual tutorial without illustrations, while the experimental group received a link to a Google Form that included a tutorial video with illustrations. Once the data were collected, several t-tests were conducted through Stata to examine the differences between groups.

Results

Of the 31 participants, only 28 completed both assessments and were included in the results. For participants who completed both, t-tests were run to assess differences. The descriptive statistics of scores collected immediately after viewing tutorials for both groups are shown in Table 2.

Table 2. Descriptive Statistics of score 1, by (picture).

Group	Obs	Mean	Std. err.	Std. dev.	[95% conf.	interval]
No Picture	13	8.615385	.537545	1.938146	7.444175	9.786595
Picture	15	9.266667	.3002644	1.162919	8.622664	9.91067
Combined	28	8.964286	.297619	1.574852	8.353622	9.57495
diff		-.6512821	.5945657		-1.873429	.5708652

t = -1.0954   Degrees of freedom = 26   Ha: diff ! = 0   Pr (|T| > |t|) = 0.2834

Table 3. The descriptive statistics of scores collected 5 days after viewing tutorials for both groups.

Group	Obs	Mean	Std. err.	Std. dev.	[95% conf.	interval]
No Picture	13	6.384615	.895419	3.228479	4.433665	8.335566
Picture	15	7.466667	.7228691	2.79966	5.916267	9.017067
Combined	28	6.964286	.566905	2.99978	5.801093	8.127479
diff		-1.082051	1.138764		-3.422813	1.258711

t = -0.9502   Degrees of freedom = 26   Ha: diff ! = 0   Pr (|T| > |t|) = 0.3508

Table 4. Descriptive Statistics of Paired t test (score 1 = score 2).

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf.	interval]
score1	28	8.964286	.297619	1.574852	8.353622	9.57495
score2	28	6.964286	.566905	2.99978	5.801093	8.127479
diff	28	2	.4714045	2.494438	1.032758	2.967242

t = 4.2426   Degrees of freedom = 27   Ha: mean (diff) ! = 0   Pr (|T| > |t|) = 0.0002

Table 5. Descriptive Statistics of Paired t test of Control Group.

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf.	interval]
score1 score2	13 13	8.615385 6.384615	.537545 .895419	1.928146 3.228479	7.444175 4.433665	9.786595 8.335566
diff	13	2.230769	.8634594	3.113247	.3494528	4.112086

t = 2.5835   Degrees of freedom = 12   Ha: mean (diff) ! = 0   Pr (|T| > |t|) = 0.0239

Table 6. Descriptive Statistics of Paired t-test of Experimental Group.

Variable	Obs	Mean	Std. err.	Std. dev.	[95% conf.	interval]
score1 score2	15 15	9.266667 7.466667	.3002644 .7228691	1.162919 2.79966	8.622664 5.916267	9.91067 9.017067
diff	15	1.8	.4898979	1.897367	.7492734	2.850727

t = 3.6742   Degrees of freedom = 14   Ha: mean (diff) ! = 0   Pr (|T| > |t|) = 0.0025

Discussion

The research results revealed the effect of illustrations and time for L2 vocabulary learning through digital flashcards from both the treated and untreated groups.

Table 2 indicates the descriptive statistics of the first score that was collected for both groups immediately after viewing the virtual tutorial. According to Table 2, there was no significant difference in score 1 between the control group (M = 8.615385, SD = 1.938146) and experimental group (M = 9.266667, SD = 1.162919); t(26) = -1.0954, p = 0.05. The p-value for this test was calculated to be 0.2834, which is greater than 0.05. Therefore, the use of illustrations on digital flashcards did not have a significant effect on the score 1 results alone for both groups.

Table 3 shows the descriptive statistics of the second score that was collected 5 days after viewing the tutorial video. According to Table 3, there was no significant difference in score 2 between the control group (M = 6.384615, SD = 3.228479) and experimental group (M = 7.466667, SD = 2.79966); t(26) = -0.9502, p = 0.05. The p-value for this test was calculated to be 0.3508, which is greater than 0.05. Therefore, the use of illustrations on digital flashcards did not have a significant effect on the score 2 results alone for both groups.

Table 4 depicts the descriptive statistics of the paired t-test that compared score 1 to score 2 for both groups combined. According to Table 4, there was a significant difference in the comparison of both scores; score 1 (M = 8.964286, SD = 1.574852) and score 2 (M = 6.964286, SD = 2.99978); t(27) = 4.2426, p = 0.05. The p-value for this paired t-test was calculated to be 0.0002, which is less than 0.05.

Table 5 shows the descriptive statistics of the paired t-test that compared score 1 to score 2 for the control group only. According to Table 5, there was a significant difference in the comparison of both scores; score 1 (M = 8.615385, SD = 1.938146) and score 2 (M = 6.384615, SD = 3.228479); t(12) = 2.5835, p = 0.05. The p-value for this paired t-test was calculated to be 0.0239, which is less than 0.05.

Table 6 depicts the descriptive statistics of the paired t-test that compared score 1 to score 2 for the experimental group only. According to Table 6, there was a significant difference in the comparison of both

scores; score 1 (M = 9.266667, SD = 1.162919) and score 2 (M = 7.466667, SD 2.79966); t(14) = 3.6742, p = 0.05. The p-value for this paired t-test was calculated to be 0.0025, which is less than 0.05.

Conclusion

The research results revealed the effect of the use of images on digital flashcards for L2 vocabulary learning for a longer period of time; in this study, the period of time was five days Tables 2 and 3 revealed that there was no significant difference between scores of both groups, underling that there is no statistical significance of the use of illustrations affecting score results when looking at each score separately. However, it must be emphasized that the mean difference in tables 2 and 3 had increased. This may suggest that time played a role and affected the results of the second score results. As more time goes by, a greater mean difference is predicted among the two groups. When participants are exposed to digital flashcards with illustrations and are expected to be assessed, score results are relatively high. However, after 5 days and when they are expected to retest again without illustrations, a more drastic change of score may occur than those who had previously studied digital flashcards without illustrations.

Although the first two tests showed no significant difference, the paired t-test did so. Table 4 revealed a significant difference when combining both groups and comparing each participant's two scores. The calculated p-value of 0.0002 suggests that there is a relationship between time and vocabulary retainment for both groups. It can be concluded from Table 4 that second language vocabulary retainment diminishes over the 5 day time period.

The last two tests look at the extent of time's effect on second language vocabulary retainment. The paired t-test for the control group only showed to have a calculated p-value of 0.0239 while the experimental group p-value was 0.0025. Thus, it can be concluded that time had affected the retainment of vocabulary for both groups; furthermore, time had a greater impact on test results from the experimental group as 0.0025 is more statistically significant than 0.0239.

Limitations

Although this study had revealed the role of time and illustrations for flashcard use for second language vocabulary learning, the paper studied a small sample size. Thus, it sets limitations for the results of the study, and a much bigger sample size would be necessary to be able to detect a statistically significant difference between the relationship of second language vocabulary learning and flashcards with illustrations.

Acknowledgments

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