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研究課題名(和文) Effects of Technology Enhanced Learning Materials and Engagement Factors on Learning Outcomes and Motivation in SLA

研究課題名(英文) Effects of Technology Enhanced Learning Materials and Engagement Factors on Learning Outcomes and Motivation in SLA

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研究成果の概要(和文)：このプロジェクトの目的は、TED Talksより選出された学術的な項目についてのNew Academic Word List (NAWL)語彙の習得におけるComputer Assisted Language Learning (CALL)学習方法の3つの水準の効果を測ることです。この実験は反復測定法をとっています。参加者は2-3週間連続で合計5つのセッションを受けることとなります。データは1週間ごとに5つのセッション中に収集されます。

研究成果の概要(英文)：The purpose of this study is to empirically measure the relative effectiveness of CALL vocabulary learning apps which include images, and those which include L2, on the acquisition and retention of target vocabulary items. The results showed that participants achieved significantly higher Immediate Vocabulary Gains using the Image app compared to the control app. However, the immediate gain results suggest that there was no significant difference between using the KWIC app, or the L2 definition app, and the control app. Also, the delayed results show no significant difference in vocabulary gain between any of the experimental apps and the control app. Only the app based on images had significantly more effect on improving vocabulary gains compared to the control treatment, and that this effect was not retained until the delayed post-test.

研究分野：Vocabulary Learning and Computers (CALL)

 キーワード：Vocabulary Acquisition Multimodal Input CALL Deliberate Word Study New Academic Word List
TED Talks New Academic Word List Images

1. 研究開始当初の背景

Overwhelming advances in digital technology during the last two decades have greatly facilitated the process of globalization and interconnectedness of modern societies. Many teachers and researchers believe that this same technology can also dramatically expedite language learning through Computer Assisted Language Learning (CALL) materials (Gee & Hayes, 2011). However, empirical studies in support of this assertion still remain somewhat illusive, and teachers can lack the support of a theoretical framework when deciding which CALL applications to use. This lack of pedagogy in conjunction with the allure of many technology applications can often result in unrealistic expectations being placed on technology innovations (Gartner, 2018). Although the influence of CALL is felt throughout most aspects of language teaching and learning, a particularly strong influence has been in the field of L2 vocabulary study.

With English firmly established as the global lingua franca, and ubiquitous use in academic discourse, it is clear that Japanese university students would benefit greatly from a high level of English ability. English vocabulary acquisition plays a fundamental role in any improvement in language ability. Research indicates that an individual must know at least 95% of the words in a given written or spoken text in order to understand it (Hsueh-Chao & Nation, 2000; Staehr, 2009). Adolphs and Schmitt (2003) found that 3,000 word families covered 95% of the items in the CANCODE (Carter, 1996) spoken corpus and therefore concluded that vocabulary knowledge in the region of 3,000 word families is required to understand spoken discourse. The acquisition of so

many words represents a formidable task for students. The emergence of CALL vocabulary study applications may provide an answer, at least in part. However, despite the widespread use of digitized vocabulary study applications among many students and teachers at Japanese universities, the comparative effectiveness of these apps remains under-researched (Nation and Webb, 2011).

2. 研究の目的

The purpose of this study is to empirically measure the relative effectiveness of CALL vocabulary learning apps which include images, and those which include L2, on the acquisition and retention of target vocabulary items. A 2003 study by Yeh & Wang showed that the use of images in deliberate vocabulary study can be more effective than only L2. Three apps were developed by the researchers for the purpose of this study. Two of the apps utilized English (L2) in the form of word context, and word definition. The third app was non-linguistic in that it utilized only images. Participants underwent all three experimental treatments and one control treatment. For each treatment, a pre-test indicated how many of the target words were already known to each participant, and a post-test (administered directly after using the app) indicated how many items had been learned due to the treatment. A delayed post-test (delivered two to four days after treatment) measured the rate of attrition of this learning. The results demonstrate the relative effectiveness of the three applications in promoting deliberate vocabulary acquisition.

3. 研究の方法

The participants were 138 native Japanese, English language undergraduate students at three different universities in Japan. Ages ranged from 18 to 27 years old, with 59 male and 79 female participants. All participants had received formal English instruction for at least seven years. A total of 16 classes participated in the research, taught by six teachers, and four different campuses.

As part of this research project, an online research tool was developed by the researchers (Ashcroft & Raine, 2017). This tool delivered all treatment conditions and collected all research data. The experiment was designed to measure the relative vocabulary gains resulting from student interaction with three computer applications designed especially for the purposes of this research. Twenty vocabulary items for each app were taken from the scripts of four different Technology, Entertainment and Design (TED, 2018) videos, with all the selected items appearing in the New Academic Word List (New Academic Word List, 2018). Three sets of 20 words were used with each of the apps, and the remaining set was used for the control treatment pre- and post-tests. Vocabulary gain was calculated from four sets of pre-post, identical 20-item receptive vocabulary measures. The experiment was conducted over a period of between two and three weeks, comprising of five 90-minute sessions. In the first four sessions, students studied using one of the three apps, or the control app, all administered through the online research tool in a supervised and controlled setting. The order of the apps was assigned at random for each participant in an attempt to

remove any possible sequencing effect. Each of the apps contained a 10-minute receptive and a 10-minute productive stage. At each implementation of the 90-minute sessions, the receptive stage came before the more challenging productive stage.

Three vocabulary-learning apps were developed for the purposes of the present study. The first used a Key Word in Context (KWIC) format. The user was shown a KWIC with the key/target word omitted. The student then had to choose the correct answer from a selection of four possible items, three of which were generated from a bank of distractors. In the productive stage of all three apps, the student was required to input the target word from their memory. The second app used images. The student was shown an image and had to choose the correct answer, again from four alternatives. In the third app, the user was shown a word definition in English, and then had to select his or her answer. The final treatment was the control, which involved a short text gap-fill exercise. None of the vocabulary in the control activity was in any way related to the content of any of the four TED videos, or the four groups of target words.

During the first session, students were required to register with the research tool website, creating a username and password, and providing various biodata. Ten multiple choice comprehension questions for the first video were then shown to the student, with instructions to read through the questions, but not answer them. The student then watched one of the four TED Talk videos, selected at random. This order was saved to the website, so the app remembered which videos need to be administered during the subsequent sessions, for each participant. The video was shown

only once. After the video, the student was again shown the ten comprehension questions and required to answer them.

In the next stage, the participant took the vocabulary the pre-test which was administered online using the research tool. The test contained 20 items; one for each of the target vocabulary items. Each test item began with the target L2 prompt, followed by a choice of four Japanese words (one correct answer and three distractors). The items in the pre-test corresponded to the items taken from the TED Talk just watched by the student. After the pre-test, the student was redirected to the app and Treatment 1 was administered. Like the videos, the treatments were also administered in random order to avoid distortion of the results due to disparities of difficulties of the target vocabulary items. The words studied using the app matched the same set of 20 words from the TED Talk, and from the pre-test. Students used the app for a total of 20 minutes: 10 minutes for the receptive layer, and 10 minutes for the more challenging productive layer. After the app activity, the participant was directed to the post-test. The post-test was identical to the pre-test, however the order of items in the pre- and post-tests was randomized. The student then logged out and the session was finished. Sessions two to four followed the same format, except for registration. Session five included no experimental treatment, only the delayed post-test for the treatment administered in session four.

4. 研究成果

Two one-way within-subjects analyses of variance (ANOVA) were conducted with the factor being Study Mode, of which

there were four levels (KWIC, Image, L2 and Control), and the dependent variables being Immediate Vocabulary Gain and Delayed Vocabulary Gain. The results for the ANOVA showed a significant Study Mode effect, Wilks' $\Lambda = .91$, $F(3, 135) = 4.68$, $p < .05$. Immediate Gains using the 3 apps ($M = .43$, $SD = 2.26$) were significantly higher than for the control activity ($M = .02$, $SD = 1.92$). However, there was no significant main effect of Study Mode on Delayed Vocabulary Gain. Wilks' $\Lambda = .97$, $F(3, 135) = 1.53$, $p > .05$. Delayed Gains using the three apps ($M = .59$, $SD = 2.14$) were not significantly higher than for the control activity ($M = .45$, $SD = 1.9$).

In order to determine which of the study modes significantly influenced vocabulary gains, simple comparisons were calculated for each experimental study mode and the control study mode. Participants achieved significantly higher Immediate Vocabulary Gains using the Image app ($M = .65$, $SD = 1.87$) compared to the control app ($M = .02$, $SD = 1.92$), $t(138) = 4.71$, $p < .05$. However, the immediate gain results suggest that there was no significant difference between using the KWIC app ($M = -.05$, $SD = 1.89$), $t(138) = -1.35$, $p > .05$, or the L2 definition app ($M = .70$, $SD = 2.72$), $t(138) = -2.46$, $p > .05$, and the control app. Also, the delayed results show no significant difference in vocabulary gain between any of the experimental apps and the control app.

The results show that only the app based on images had significantly more effect on improving vocabulary gains compared to the control treatment, and that this effect was not retained until the delayed post-test. The KWIC and L2 definition apps showed no significant improvement in vocabulary gains

compared to the control treatment either immediately after treatment nor for the delayed measure. The results of this study seem to point to the pivotal role which images play in L2 vocabulary acquisition. More specifically, it may be that non-linguistic cues in deliberate vocabulary acquisition can bridge the gap between items in the L1 lexicon and their L2 counterparts. In contrast, apps grounded in L2, such as the KWIC and L2 definition apps in the present study, may have decreased effectiveness because they fail to facilitate the mapping of the L2 lexicon onto established L1 schema in this way.

5. 主な発表論文等

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