

HOW HAS THE DEFERENCE AFFECTED THE RETENTION? TWO EMPIRICAL STUDIES ON ELECTRONIC DICTIONARIES

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1. Background

With the development of digital technology, types of learners' dictionaries have been diversified during the last two decades. Digitized dictionaries such as those on CD-ROM and the Web have become widespread (e.g., Aust, Kelley, & Roby, 1993). Particularly, with the advent of hand-held electronic dictionaries (henceforth ED), the number of ED users has been rapidly expanding in Japan (Yagi, 2004).

Recently, some empirical studies have been conducted to compare learners' look-up behavior in using ED with that of printed dictionaries (henceforth PD) (e.g., Koyama & Takeuchi, 2003, 2004, in press; Osaki, Ochiai, Iso, & Aizawa, 2003; Shizuka, 2003). These studies focused mainly on the time for word retrieval, the number of looked-up words retained, and the learners' impressions of the dictionaries. Nevertheless, due to the differences in the research design and the subjects' proficiency levels among these studies, there was only a partial agreement among them, when we attempted to determine which types of dictionaries were effective for EFL learning.

2. Research Question

Although it has been assumed that dictionaries are indispensable for EFL learning, what kind of roles do they play? Some studies indicated that the use of dictionary during a reading activity could have a beneficial effect on vocabulary learning (e.g., Hulstijn, Hollander, & Greidanus, 1996; Knight, 1994; Luppescu and Day, 1993). Based on this perspective, we focused on how the difference in ED and PD has affected the vocabulary learning in the present study. For this purpose, we attempted to explore the differences in learners' look-up behavior and the retention of looked-up words between ED and PD, and thus two experiments under different conditions were conducted.

3. Experiment 1

3.1 Purpose

In Experiment 1, the difference in the retention of the words EFL learners had consulted a week before was examined.

3.2 Subjects

Subjects in the first experiment were 18 undergraduate students at a large-scale university. According to the result of a 45-item cloze test given to them in advance, their English proficiency levels were considered to be intermediate.

3.3 Materials Used

Two types of learners' dictionaries were used in Experiment 1. One was *Taishukan's Genius English-Japanese Dictionary* (3rd edition), which is one of the most popular PD in Japan. CASIO EX-word XD-R8100, which included an electronic version of the same *Taishukan's Genius English-Japanese Dictionary*, was used as ED.

As reading materials, texts A and B were selected from an English-reading textbook designed for college students. The readability of both texts was considered to be approximately the same level (Flesch-Kincaid Grade Level: Text A = 6.8, Text B = 6.4).

3.4 Procedure

First, subjects were told to summarize the texts (Texts A or B) without a dictionary. Next, they were instructed to answer the word quizzes (Quizzes A or B). These quizzes consisted of several sentences which included the eight target words and phrases from each assigned text. In these quizzes, the subjects were asked to write word meanings appropriate to the contexts by using the designated dictionaries. They were permitted to look up any words other than the target words in the dictionaries while answering the quizzes. This was because we gave the subjects enough information about the target words, so that they could select suitable definitions for them from the dictionaries.

All the subjects repeated this process twice with a different text and a different type of dictionary. This meant that if Subject #1 was assigned Text A with PD and Text B with ED, Subject #2 performed Text A with ED and Text B with PD (See Figure 1 below).

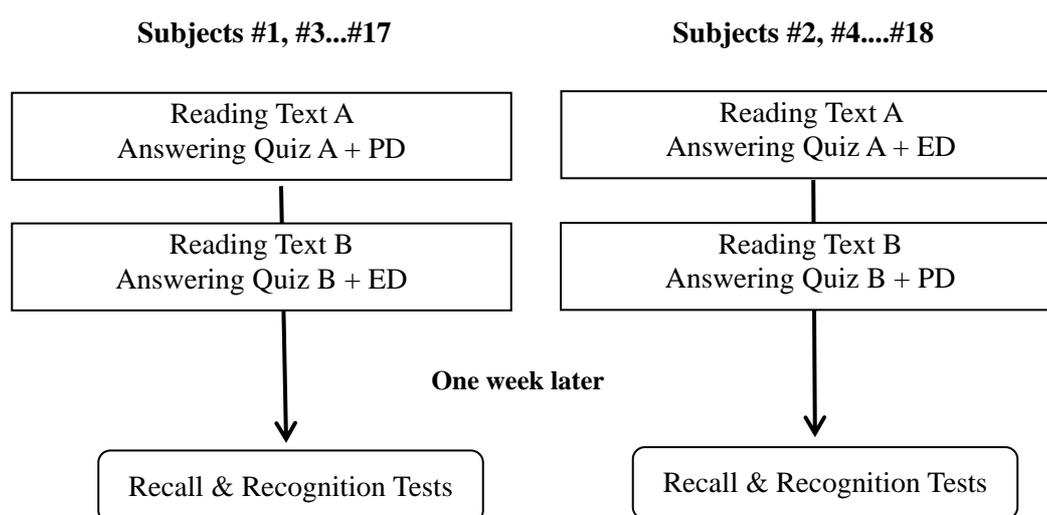


Figure 1: Procedure of Experiment 1

Seven days after the treatment, two different tests were conducted without advanced notice. These tests were carried out to investigate the retention of words subjects had looked up in a dictionary. In the first test (Recall Test), the subjects were asked to recall words they had consulted a week before. In the second test (Recognition Test), the subjects were given the texts which they had read a week before, and were requested to circle the words they thought they actually looked up in a dictionary.

3.5 Results

The results of the recall and recognition tests were shown in Table 1. “Rate of Recall” and “Rate of Recognition” were calculated by dividing the number of words recalled or recognized by the number of words they had consulted. The responses of the recall task, in which our subjects wrote either spellings or their Japanese meanings of the words they had looked up in a dictionary a week before, were given a point if their answers were correct. Minor misspellings were disregarded in scoring. In grading the recognition task, one point was given if the subjects could circle the words they had actually looked up in a dictionary.

Table 1. Descriptive Statistics: Retention of Words

<i>Condition</i>	Rate of Recall	Rate of Recognition
<i>PD</i>	6.1	50.0
<i>ED</i>	5.2	37.8

(Unit: %)

As Table 1 shows, the differences of each mean value between PD and ED conditions were especially larger in “Rate of Recognition.” This difference was proved statistically by the results of Wilcoxon signed-ranks test as shown in Table 2. This indicates that the words looked up with PD resulted in better retention than those with ED.

Table 2. Results of Statistical Analysis: Retention of Words

	Rate of Recall	Rate of Recognition
<i>z</i>	.460	2.359*

* $p < .05$

4. Experiment 2

4.1 Purpose

In the second experiment, we explored the difference in the retention of the words immediately after EFL learners looked up in a dictionary.

4.2 Subjects

Subjects in Experiment 2 were 33 undergraduate students at the same university as Experiment 1. Before the experiment, the same cloze test used in the first experiment was

administered. They were also asked about their daily dictionary use beforehand. On the basis of the scores of the cloze test, their English proficiency level was considered to be intermediate.

4.3 Materials Used

The same PD in the first experiment was also used in the second experiment, and CASIO EX-word XD-R9000 was used as a hand-held electronic version, which included the same edition of PD. The text used in Experiment 2 was selected from the pre-1st grade test of STEP.¹ According to the readability of the text (Flesch-Kincaid Grade Level: 11.1), it was considered to be relatively difficult for our subjects.

4.4 Procedure

The subjects were divided into two groups (ED and PD Groups) with approximately the same proficiency based on the result of the cloze test (Mann-Whitney $U = 92.500$, ns). Their daily dictionary use was counterbalanced in both groups as well. Subjects in ED Group were given an abridged version of the users' manual and were provided enough time to get used to ED before the experiment. The data collection procedure is summarized in Figure 2 below.

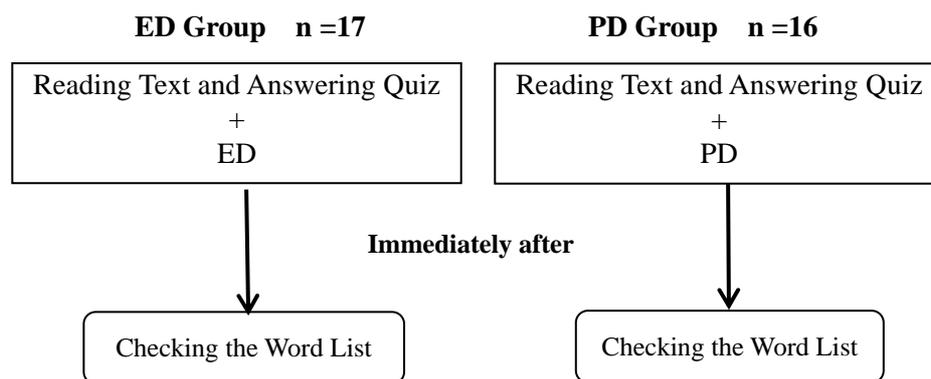


Figure. 2: Procedure of Experiment 2

Each group was assigned a reading comprehension task with the designated dictionaries. Subjects were instructed to read the text and to take a quiz (Quiz), which consisted of six questions with four multiple-options each. Neither time constraint nor target words to be looked up were set to the subjects during the session. They were asked to circle the looked-up words in the text while reading.

To measure the subjects' retention of the looked-up words, a word check list was distributed to them immediately after the task. This list was composed of all the words in the text excluding the words they should have already learned in a junior high school.² The subjects were asked to mark the words they thought they had actually looked up during the task.

4.5 Results

The descriptive statistics are provided in Table 3. “Looked-up Words” means the total number of words the subjects looked up during the task. “Time Needed” in the table shows the time the subjects needed to read the texts and to answer the quiz by using a dictionary. This was self-measured and reported by the subjects. “Rate of Recognition” indicates the retention of the looked up words. This was calculated by in the same manner as used in Experiment 1.

Table 3: Descriptive Statistics

<i>Group</i>	Looked-up Words	Time Needed	Rate of Recognition (%)
<i>PD</i>	12.56	22'63"	16.97
<i>ED</i>	21.18	11'71"	17.03

As can be seen in Tables 4, there existed significant differences in “Looked-up Words” and “Time Needed” between the ED and the PD groups at $p < .01$, which means that the ED group looked up more words than the PD group did in a briefer period. *U*-values in the table demonstrate, however, no significant difference was found in “Rate of Recognition”.

These findings indicate that our subjects obtained almost the same retention under either condition, even though they looked up more words in a shorter time in ED condition.

Table 4: Results of Statistical Analysis

	Looked-up Words	Time Needed	Rate of Recognition
<i>U</i>	65.000**	46.000**	135.500

** $p < .01$

5. Discussion and Conclusions

Experiment 1 shows that the looked-up words in PD condition were retained slightly better than those in ED condition. On the other hand, the results in Experiment 2 show that the number of the looked-up words retained did not differ in either condition, in contrast to the larger number of the look-ups in ED condition. At the same time, ED could reduce the time for reading, compared with PD. To summarize these findings, when learners use ED in comprehending texts, their look-up frequency seems to increase and time for comprehending texts seems to reduce. However, the retention of the looked-up words appears not to differ widely in either condition. Putting it in another way, higher look-up frequency induced by ED does not necessarily produce a corresponding beneficial effect on the retention of the looked-up words.

In light of these findings, it is possible that, although ED will enhance learners' look-up frequency, it does not guarantee the same degree of retention as PD dose. Thus, learners and teachers should pay attention to the characteristics of ED, and consider how its advantages could be applied appropriately to EFL learning.

Notes

1. STEP represents “The Society for Testing English Proficiency, Inc.”. This test has been extensively adopted to examine EFL learners’ proficiency in Japan.
2. This is based on the word list composed of all the vocabulary which is adopted in the authorized text books of Japanese junior high schools (middle schools). These words were supposed to be learned by our subjects by the time of the experiment, and thus we excluded them from the vocabulary lists used in Experiment 2.

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