# Effects of Glosses on Vocabulary Gain and Retention among Tertiary Level EFL Learners (July 2012)

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**ABSTRACT**

This paper reports on a study that aimed to investigate the effects of textual glosses on the lexical development of EFL learners. Given the importance of the English language for tertiary level study, it is necessary for EFL learners to read independently and to acquire the vocabulary they need for disciplinary study. Many studies have reported that a lack of extensive reading among L2 learners leads to lack of vocabulary. Several studies have also demonstrated that the use of authentic materials can promote vocabulary development. However, authentic materials often present many unfamiliar words and L2 learners often need to read efficiently without the use of a dictionary. Hence, researchers have argued whether the provision of marginal gloss can help L2 learners solve this problem. In the present quasi-experimental research, 76 EFL postgraduate students at UPM who had attained similar scores in a standardized reading test were divided into four groups randomly. They then attempted a pre-test, and read six authentic texts over a period of eight weeks under one of four conditions: L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss. After students had read the texts, immediate and delayed post-tests were administered to assess their gain and retention of 30 target words from the texts. The results revealed that participants in the experimental L1 gloss, L2 gloss, and L1 and L2 gloss groups had outperformed the subjects in the control (no gloss) group in vocabulary gain and vocabulary retention. The findings of this study will be beneficial for those who are interested in applying the related psycholinguistic theories in developing EFL

learners' vocabulary knowledge, particularly among tertiary level learners who could become more independent in their reading.

*Key Words*: Textual Gloss; Vocabulary Gain; Vocabulary Retention; Tertiary Level EFL Learners; Incidental Vocabulary Learning

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## I Introduction

Based on Cobb and Horst's (2001) study, vocabulary knowledge is considered the key ingredient in successful reading both the L1 (Freebody & Anderson, 1981) and L2 (Cooper, 1984). Paribakht and Wesche (1999) conducted a research to investigate the relationship between reading and incidental vocabulary acquisition. Their study demonstrated incidental acquisition of new target words through reading. Thus, vocabulary knowledge may be acquired as a by-product of reading comprehension.

Furthermore, the direct link between vocabulary and reading has been made in L2 research in that vocabulary enhances reading comprehension, and reading in turn increases vocabulary knowledge (Chall, 1987). It was reported that L2 learners are often not motivated to read (Day & Bamford, 1998) because they regard reading as an unpleasant and painful process and this often leads to a vicious cycle in which a lack of reading leads to a lack of vocabulary which in turn leads to poor reading skills. This aggravates the reading problem for L2 learners. It is also acknowledged that it is necessary for EFL/ESL learners to read efficiently without using a dictionary to enjoy reading and overcome the feeling of frustration by unknown words. As Kimberly (2011) notes in his study, "looking up the meanings of unknown words from a dictionary is really a torture" especially for reluctant readers.

It is also mentioned in the literature on ESL/EFL learning that one of the major factors in unsuccessful reading can be a lack of "noticing". In his Noticing Theory, Schmidt (1995) emphasizes that conscious attention is necessary for learning, and noticing is generally the first stage of learning. It is highly likely that during reading, the readers fail to pay attention to unknown words and vocabulary learning will then not occur. Many researchers (e.g., Yoshii,

2006; Nation, 2002) have referred to glossing as one of the most effective tools for increasing noticing that enhances vocabulary learning among ESL/EFL learners. Nation (2002, pp. 174-175) defines "gloss" as "a brief definition or synonym of unknown words provided in the text in the L1 or L2". According to Paribakht and Wesche (1999), Parry (1997), and Watanabe (1997), glossing is necessary since the problems arise in extensive reading which contains numerous unknown words. Thus, textual glosses are considered as valuable tools which facilitate reading in a foreign language (Watanabe, 1997). Using a gloss is easy and it minimizes the interruption of reading flow compared to using a dictionary that is time-consuming and interrupts the reading process (Ko, 2005; Nation, 2002). Glosses make reading a more autonomous activity for learners (Nation, 2002).

A number of researchers have investigated the effects of glossing on vocabulary learning (Poole, 2011; Yee, 2010; Fang, 2009; Lage, 2008, Yoshii, 2006; Loucky, 2005; Watanabe, 1997). Given the advantages of glossing for incidental vocabulary learning, the research questions of subsequent studies appear to have shifted from a focus on gloss effect to gloss type. However, the comparison of studies on the effects of L1 gloss and L2 gloss have brought rather inconsistent results; some have even revealed no differences between the two gloss types (Jacobs, Dufon, & Fong, 1994; Chen, 2002; Jacobs, 1994; Jacobs & Dufon, 1990) while others have reported the advantages of one gloss type over another gloss type (Xu, 2010; Yee, 2010; Cheng & Good, 2009; Fang, 2009; Lü et al. (2005, as cited in Hong, 2010) in vocabulary learning.

Jacobs and Dufon (1990) conducted a study to compare the differences, if any, between Spanish (L2) gloss and English (L1) gloss effects on vocabulary learning. The researchers reported no significant differences between the participating student groups. In another study by Jacobs (1994), the participants were asked to read an authentic glossed text in one of three forms: with L1 gloss, with L2 gloss, and without gloss. The results of this research indicated that both gloss groups performed significantly better than the control group, but no significant differences were reported between the two gloss conditions. In another study, Chen (2002) who compared the effect of L1 gloss and L2 gloss on vocabulary learning reported that the L2 gloss group outperformed the no gloss group, but the differences between L1 and L2 glosses were not

significant. Further, Jacobs et al. (1994) reported that their participant groups under L1 and L2 gloss conditions, respectively, outperformed the no gloss group; however, again no significant differences were shown between the two gloss conditions.

While the studies mentioned above have not revealed any differences between L1 gloss and L2 gloss conditions, some researchers have reported the advantages of one gloss type over other types; for example, Lü et al. (2005) examined the effects of Chinese and English glosses on incidental vocabulary learning. The results of this study revealed that the participants in the L1 gloss group significantly outperformed the subjects in L2 gloss group in the immediate post-test, but in the delayed test, the lower level participants in the Chinese gloss group performed better than those in the English gloss group. In another study, Yee (2010) reported that participants in the L1 gloss group significantly outperformed their counterparts in the L2 gloss group in both immediate and delayed post-tests. Further, Fang (2009) investigated the effects of L1 gloss and L2 gloss on incidental vocabulary learning among low proficiency EFL learners. The results of the study also indicated that L1 glosses are more useful than L2 glosses for short-term word acquisition while L2 glosses are more useful for long-term retention of vocabulary items. In a recent study, Xu (2010) combined L1 gloss and L2 glosses to compare the effects of L1 (Chinese) gloss, L2 (English) gloss, and the combination of L1 and L2 (Chinese and English) glosses. The results revealed that L1 and L2 gloss is probably the most useful type of glossing for enhancement of vocabulary gain and vocabulary retention, L1 (Chinese) gloss is the most useful gloss for vocabulary gain but it is the least useful for vocabulary retention, and L2 (English) gloss is the weakest gloss for enhancement of vocabulary gain. However, Xu's (2010) study suffered from the limited number of reading texts, small sample size, as well as limited time allocated for the reading activity. Xu recommended lengthening the research time span up to a long term with a larger number of participants in order to make the findings more generalizable.

Hence, in view of the lack of consistency in the results of the studies pertaining to L1 and L2 glosses, and that the effect of different textual glosses on vocabulary learning still remains as an open question that needs further investigation, the present researchers attempted to address the issues in the study reported here.

**Theoretical Framework**

The present study focused on psycholinguistic theories that are associated with the vocabulary gain and vocabulary retention of EFL learners, namely, the Noticing Hypothesis (Schmidt, 1995), Schema Theory (Anderson, 1984), and the Dual Coding Hypothesis (Paivio, 1991).

Schmidt (1995) developed the Noticing Hypothesis in which learners must "notice" critical features in utterances. Schmidt gives the definition of "noticing" as the subjective correlate of what psychologists call "attention" and notes that it is necessary to give intentional attention in order to learn language successfully. Accordingly, in the present study, the experiment provided different gloss types to attract the learners' attention to unfamiliar words and to facilitate their vocabulary learning.

Based on Schema Theory (Anderson, 1984), the knowledge system of the learner is activated by interactions with incoming stimuli in the learner's environment and, as Jacobs (1994) notes, the bottom-up approach to L2 reading can make use of marginal L1 glossing. Sousa (2005) states that Schema Theory affirms the significance of the role of prior knowledge in language learning. Reading teachers should apply techniques that activate the prior knowledge of the readers (p.53). Accordingly, it may be argued that the provision of the first language (L1) gloss in the present study finds support in Schema Theory (Anderson, 1984) since it activates the reader's prior knowledge and it facilitates vocabulary gain and retention.

As claimed in Paivio's (1991) Dual Coding Theory, two separate symbolic systems can help second language (L2) learners acquire language better. Paivio states that the two symbolic systems can interconnect and work independently in simultaneous fashion. This simultaneity can reinforce the retention of the processed information and facilitate cueing from one system to the other. Double –coding the information seems to work as a complement that gives the subject the opportunity to process the information twice which in turn can result in longer retention of the newly learned target words. Accordingly, in the present study, the participants had been provided with L1 and L2 glossed texts to maximize the possibility of dual information processing which could result in better text comprehension and longer retention of the newly learned target words.

**Research Questions**

The present study aimed to address the following questions:

1) How does the provision or non-provision of different types of textual gloss affect the vocabulary gain of EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions?

2) How does the provision or non-provision of different types of textual gloss affect the vocabulary retention of EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions?

**Research Hypotheses**

The researcher intends to test the following hypotheses:

**I) $H_0$:** There are no differences in vocabulary gain among EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions.

**$H_a$:** There are significant differences in vocabulary gain among EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions.

**II) $H_0$:** There are no differences in vocabulary retention among EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions.

**$H_a$:** There are significant differences in vocabulary retention among EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions.

## II Methodology

***Participants***

The participants were 76 tertiary level EFL learners at Universiti Putra Malaysia (UPM) in the Faculty of Modern Languages and Communication. These subjects were enrolled in TEP (Tertiary English Programme) classes since they could not meet the minimum English

requirement for graduate study at UPM, which is 550 in the paper-based TOEFL, 79/80 in the Internet-based TOEFL, or Band 6 in the IELTS Academic English. The participants' ages ranged from 20 to 45. They were 40 female and 36 male students. The subjects consisted of 13 prospective PhD and 63 master's degree students. To ensure that participants formed a homogeneous sample, a standardized reading test was administered prior to the study. Then a Kruskal-Wallis test was run to compare the mean scores of the four gloss groups. The results revealed that there were no significant differences in the mean scores of the four gloss groups.

Furthermore, to maintain the condition that the subjects had no knowledge about the selected target words, a vocabulary pre-test was conducted before the study and the results showed that the subjects were unfamiliar with the target words. Hence, it was assumed that these participants formed a homogenous sample for the intended experiment.

***Design***

The EFL learners read six reading texts under one of the four conditions: L1 gloss (Persian language), L2 gloss (English language), L1 and L2 gloss (Persian and English language), and no gloss (see Appendices A, B, C, and D). The participants in the three gloss groups were considered as the experimental groups and the subjects in no gloss group were assumed to be the control group in this study. After reading the texts, the participants were asked to answer the immediate post-test. Then, a delayed post-test was conducted five weeks after the post-test.

***Instrumentation***

The instrumentation of the study comprised six reading texts, a reading pre-test, a vocabulary pre-test, an immediate post-test, and a delayed post-test. These texts and tests are briefly discussed in this section.

**1) Reading Texts**

The six authentic texts used as treatment in the study were selected from articles on issues of general interest. The titles of the selected reading texts which were adapted from the Wikipedia Website are as follows:"*Study Abroad", "The Importance and Advantages of Learning a Second Language", "Modern Malaysia", "Culture of Malaysia", "Educational Technology",* and

*"Education in a Developing World"*. The level of difficulty, grade level, and appropriateness of the selected reading texts for the participants' reading level were checked by using the Flesch-Kincaid readability index calculator. The average grade levels of the selected texts ranged from 12.42 to 17.48 and the ease level of the selected texts ranged from 45.80 to 20.70. Flesch-Kincaid Grade Level index indicates a reading grade level based on the average number of syllables per word and the average number of the words per sentences (Palmer, 2003, p. 65). The percentage of the familiar words ranged from 96.69% to 98.23% in the present study and this fell within the percentage range claimed by Nation (2001) to facilitate the acquisition of unknown vocabularies through reading.

**2) Testing Materials**

**Reading Test:** The reading test was administered to make sure that the participants were in the same reading proficiency level and were from a homogeneous sample. It included 36 multiple-choice tests selected from a TOEFL (paper-based) examination after getting written permission from the ETS, Princeton, NJ.

**Vocabulary Pre-test:** The purpose of this pre-test was to ensure that the participants had little or no knowledge about the target words. It consisted of 30 multiple-choice tests which were used in the immediate and delayed post-tests. Only the order of the questions was changed to minimize the test effect.

**Immediate Post-test:** The purpose of the immediate post-test was to measure the participants' vocabulary gain.

**Delayed Post-test:** The purpose of the delayed post-test was to measure the subjects' vocabulary retention.

As for the reliability of the instruments, the internal consistency of the vocabulary pre-test, the immediate post-test, and the delayed post-test was calculated using the SPSS Version 18. during the pilot phase of the study. The reported Cronbach's Alpha (α) for the vocabulary pre-test (α=.950), for the immediate post-test (α=.950), and for the delayed post-test (α=.949) showed that they were highly reliable for use. To identify the content validity of the tests, professional opinion from reading teachers was obtained.

***Data Collection Procedure***

The study was conducted over a period of 13 weeks and was carried out during the students' regular reading classes on campus. The data collection procedures were administered as follows: in the first stage, after getting official permission from authorities and participants (who signed consent forms), the subjects were asked to fill out the background questionnaire. Then, a standardized reading test was conducted to ensure that the participants were at the same level of reading proficiency in the different research groups. The total number of 76 participants was divided into four equal groups of 19 persons each. Then, the vocabulary pre-test made up of 30 target words was given to the participants to measure their knowledge about the words in question. At the second stage, the four groups of participants were asked to read six reading texts under one of the four conditions: with L1 gloss, L2 gloss, L1 and L2 gloss, or without gloss, after which they were asked to write recall protocols in each reading session per week over the six following weeks. Then, they took an immediate post-test in the last session of treatment. In the next stage, a delayed post- test of 30 target words were administered five (5) weeks after the immediate post-test. As stated by Mitchell and Jolley (2009, p. 322), the measuring instrument for pre-test and post-test should be the same. Accordingly, the test items were the same as those in the pretest and the immediate post-test, but they were presented in a different order.

***Data Analysis***

All the tests were scored by considering one point for each correct answer and zero for each false answer. Both descriptive and inferential statistics were used. The vocabulary gain was calculated by the subtracting the pre-test score from immediate post test score and the vocabulary retention was calculated by subtracting the delayed post-test score from the immediate post test score. As the sample was less than 30 in each group, the non-parametric tests were utilizes for the analysis of data. First, a Wilcoxon Signed Ranked Test was conducted to test the significant differences in the participants' vocabulary gain and vocabulary retention scores. Then, the Kruskal-Wallis test was used to compare the differences between the vocabulary gain and vocabulary retention mean scores of four research groups. Once Kruskal-Wallis test results revealed significant differences, the Mann-Whitney test was run to indicate which groups were significantly different.

## III Results

### *A) Effects of Textual Glosses on Vocabulary Gain among Four Research Groups*

The first research question was how the provision or non-provision of different types of textual gloss affects the vocabulary gain of EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions. To find answer to the first research question, the researcher first provided the summary of descriptive statistics of pre-test and immediate post-test for four research groups that is presented in Table 1.

Table 1: Descriptive Statistics of Pre-test and Immediate Post-test for Four Research Groups

| Research Group | N | Mean | Std. Deviation | Median |
|---|---|---|---|---|
| Pretest L1Gloss | 19 | 6.2632 | 3.17704 | 5.0000 |
| Im post-test L1 Gloss | 19 | 11.7895 | 4.35353 | 10.0000 |
| Pretest L2 Gloss | 19 | 6.3158 | 3.91653 | 5.0000 |
| Im post-test L2 Gloss | 19 | 10.2105 | 4.67355 | 9.0000 |
| Pretest L1 & L2 Gloss | 19 | 6.2632 | 3.54091 | 5.0000 |
| Im post-test L1 & L2 Gloss | 19 | 13.5789 | 4.86844 | 12.0000 |
| Pretest No Gloss | 19 | 6.2632 | 2.94094 | 5.0000 |
| Impost-test No Gloss | 19 | 6.3158 | 3.05601 | 5.0000 |

As illustrated in Table 1, four research groups including L1 gloss *(M=6.26, Mdn=5.000)*, L2 gloss (*M= 6.31, Mdn=5.000*), L1 and L2 gloss *(M=6.26, Mdn=5.000*), and no gloss *(M=6.26, Mdn=5.000)* groups gained similar pretest scores. The results also revealed that there was an increase in vocabulary gain scores from pre-test "L1 gloss" *(M=6.26, Mdn=5.000)"*, "L2 gloss" (*M=6.31, Mdn=5.000*), and "L1 and L2 gloss" *(M=6.26, Mdn=5.000*)" groups to immediate post-test scores of "L1 gloss (*M=11.78, Mdn=10.000*), "L2 gloss" *(M=10.21, Mdn=9.000),* and "L1 and L2 gloss" *(M=13.57, Mdn=12.000)* groups*,* while no significant increase was shown in vocabulary gain in "no gloss" (control) group from pre-test *(M=6.26, Mdn=5.000)* to immediate post-test scores *(M=6.31, Mdn=5.000).*

Then, the researcher provided the descriptive statistics of the vocabulary gain achieved by L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss groups in Table 2. The vocabulary gain describes the short-term retention of the new target word as they measured by subtracting the pre-test score from immediate post-test score.

Table 2: Descriptive Statistics for Vocabulary Gain among Four Research Groups

| | N | Mean | Std. Deviation |
|---|---|---|---|
| L1 Gloss Voc. Gain | 19 | 5.5263 | 1.54087 |
| L2 Gloss Voc. Gain | 19 | 3.8947 | .99413 |
| L1 & L2 Gloss Voc. Gain | 19 | 7.3158 | 1.49267 |
| No Gloss Voc. Gain | 19 | .0526 | .22942 |
| Valid N (listwise) | 19 | | |

As illustrated in Table 2, the descriptive statistics of vocabulary gain of 76 participants in four groups shows that the L1 and L2 gloss group has the highest mean scores *(M=7.31, SD=1.49),* followed by L1 gloss group *(M=5.52, SD=1.54),* L2 gloss group *(M=3.89, SD=.99)* and no gloss group *(M=.05, SD=.22)* that has the lowest mean score. To sum up, all of the experimental groups outperformed the no gloss group (control group) in vocabulary gain.

**Wilcoxon Singed Rank Test**

As mentioned earlier, the vocabulary gain is calculated by the subtracting the pre-test score from immediate post test- score. Therefore, the Wilcoxon Singed Rank Test, that is the non-parametric equivalent of the paired samples t-test, was conducted to evaluate the effect of different gloss types on participants' vocabulary gain scores. The summary of the Wilcoxon Singed Rank Test results for the four research groups is presented in Table 3.

Table 3: The Summary of Wilcoxon Signed Ranks Test Results for Vocabulary Gain among Four Research Groups

| | Im post-test L1 Gloss - Pretest L1Gloss | Im post-test L2 Gloss - Pretest L2 Gloss | Im post-test L1 & L2 Gloss - Pretest L1 & L2 Gloss | Im post-test No Gloss - Pretest No Gloss |
|---|---|---|---|---|
| Z | -3.844[b] | -3.871[b] | -3.855[b] | -1.000[b] |
| Asymp. Sig. (2-tailed) | .000 | .000 | .000 | .317 |

b.Based on negative ranks.

As illustrated in Table 3, the Wilcoxon Signed Rank Test results revealed a significant difference between pre-test and immediate post-test scores in experimental groups (L1 gloss, L2 gloss, and L1 and L2 gloss), *z=-3.84, z=-3.87, z=-3.85, P=.000,* while the results showed no significant difference between pre-test and immediate post-test scores in no gloss (control) group, *z=-1.000, P=.317*.

## Kruskal-Wallis Test for Vocabulary Gain

A Kruskal-Wallis test was conducted to evaluate differences among four gloss conditions (L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss) on median change in vocabulary gain. The alpha level for all analyses was set at .05 for tests of significance. The subjects were divided into four groups including L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss. Furthermore, the Kruskal-Wallis test was conducted to test the following research hypothesis:

**I. $H_0$:** There are no differences in vocabulary gain among EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions.

**$H_a$:** There are significant differences in vocabulary gain among EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions.

**Decision:** $H_0$ is rejected and $H_a$ is supported.

**Justification:** The hypothesis test using Kruskal-Wallis test for vocabulary gain among four research groups revealed that the null hypothesis was rejected since the p-value (*P=.000)* is smaller than the interval confidence level (*α=0.05*)*, s*o the results suggests that there is a significant difference across different gloss conditions. It can be concluded that at least one of the means is significantly unequal compared to others.

The results of the Kruskal-Wallis test for vocabulary gain among four research groups are summarized in Table 4.

Table 4: Kruskal-Wallis for Vocabulary Gain among Four Research Groups

| | Vocabulary Gloss Group | N | Mean Rank |
|---|---|---|---|
| Vocabulary Gain | L1& L2 Gloss | 19 | 62.68 |
| | L1 Gloss | 19 | 48.26 |
| | L2 Gloss | 19 | 33.05 |
| | No Gloss | 19 | 10.00 |
| | Total | 76 | |

Test Statistics[a,b]

| | Vocabulary Gain |
|---|---|
| Chi-Square | 60.752 |
| Df | 3 |
| Asymp. Sig. | .000 |

a. Kruskal Wallis Test

b. Grouping Variable: Vocabulary Gloss Group

As depicted in Table 4, the results of Kruskal-Wallis for vocabulary gain indicated that there is a significant difference in the medians, $\chi_2$ (3, *N*=76) =60.75, *P=.000.* Because the overall test is

significant, pairwise comparisons among the four groups should be completed. First, a Kruskal-Wallis test was run to compare three gloss conditions. The results are presented in Table 5.

Table 5: Kruskal –Wallis Test for Vocabulary Gain among Three Gloss Groups

| | Vocabulary Gloss Group | N | Mean Rank |
|---|---|---|---|
| Vocabulary Gain | L1& L2 Gloss | 19 | 43.68 |
| | L1 Gloss | 19 | 29.26 |
| | L2 Gloss | 19 | 14.05 |
| | Total | 57 | |

Test Statistics[a,b]

| | Vocabulary Gain |
|---|---|
| Chi-Square | 31.064 |
| Df | 2 |
| Asymp. Sig. | .000 |

a. Kruskal Wallis Test
b. Grouping Variable: Vocabulary Gloss Group

As illustrated in Table 5, the results of the Kruskal-Wallis test revealed that the mean of vocabulary gain among three experimental groups (L1 gloss, L2 gloss, L1 and L2 gloss) was significantly different (*P=.000*). So, the pairwise comparisons using Mann-Whitney test was run to compare the four research groups, two by two.

The summary of Mann-Whitney tests among research groups are presented in Tables 6,7,8,9, 10, and 11.

The summary of Mann-Whitney tests for vocabulary gain between L1 and L2 gloss and no gloss group is presented in Table 6.

Table 6: Mann-Whitney Test for Vocabulary Gain between L1 and L2 Gloss and No Gloss Group

| | Vocabulary Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Vocabulary Gain | L1 & L2 Gloss | 19 | 24.87 | 472.50 | .002 |
| | No Gloss | 19 | 14.13 | 268.50 | |
| | Total | 38 | | | |

As illustrated in Table 6, the result of Mann-Whitney test showed that vocabulary gain mean between L1 and L2 gloss and L1 gloss was *P=.002* that was significantly different.

The summary of Mann-Whitney tests for vocabulary gain between L1 and L2 gloss and L2 gloss groups is presented in Table 7.

Table 7: Mann-Whitney Test for Vocabulary Gain between L1 and L2 Gloss and L2 Gloss Group

| | Vocabulary Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Vocabulary Gain | L1 & L2 Gloss | 19 | 28.82 | 547.50 | .000 |
| | L2 Gloss | 19 | 10.18 | 193.50 | |
| | Total | 38 | | | |

As depicted in Table 7 , the result of Mann-Whitney test showed that vocabulary gain mean between L1 and L2 gloss and L2 gloss was *P=.000* that was significantly different.

The summary of Mann-Whitney tests for vocabulary gain between L1 and L2 gloss and no gloss groups is presented in Table 8.

Table 8: Mann-Whitney Test for Vocabulary Gain between L1 and L2 Gloss and No Gloss Group

| Vocabulary Gain | Vocabulary Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| | L1 & L2 Gloss | 19 | 29.00 | 551.00 | .000 |
| | No Gloss | 19 | 10.00 | 190.00 | |
| | Total | 38 | | | |

As illustrated in Table 8, the result of Mann-Whitney test revealed that vocabulary gain mean between L1 and L2 gloss and no gloss was *P=.000* that was significantly different.

The summary of Mann-Whitney tests for vocabulary gain between L1 gloss and no gloss groups is presented in Table 9.

Table 9: Mann-Whitney Test for Vocabulary Gain between L1 Gloss and No Gloss Group

| Vocabulary Gain | Vocabulary Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| | L1 Gloss | 19 | 29.00 | 551.00 | .000 |
| | No Gloss | 19 | 10.00 | 190.00 | |
| | Total | 38 | | | |

As illustrated in Table 9, the result of Mann-Whitney test showed that vocabulary gain mean between L1 gloss and no gloss was *P=.000* that was significantly different.

The summary of Mann-Whitney tests for vocabulary gain between L2 gloss and no gloss groups is presented in Table 10.

Table 10: Mann-Whitney Test for Vocabulary Gain between L2 Gloss and No Gloss Group

| Vocabulary Gain | Vocabulary Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| | L2 Gloss | 19 | 29.00 | 551.00 | .000 |
| | No Gloss | 19 | 10.00 | 190.00 | |
| | Total | 38 | | | |

As illustrated in Table 10, the result of Mann-Whitney test showed that vocabulary gain mean between L2 gloss and no gloss was *P=.000* that was significantly different.

The summary of Mann-Whitney tests for vocabulary gain between L1 gloss and L2 gloss groups is presented in Table 11.

Table 11: Mann-Whitney Test for Vocabulary Gain between L1 Gloss and L2 Gloss Group

| Vocabulary Gain | Vocabulary Gloss Group | N | Mean Rank | Sum of Ranks | Asymp.Sig. (2-tailed) |
|---|---|---|---|---|---|
| | L1 Gloss | 19 | 25.13 | 477.50 | .001 |
| | L2 Gloss | 19 | 13.87 | 263.50 | |
| | Total | 38 | | | |

As illustrated in Table 11, the result of Mann-Whitney test showed that vocabulary gain mean between L2 gloss and no gloss was *P=.001* that was significantly different.

To sum up, the effects of different textual glosses among four research groups was calculated by Kruskal-Wallis Test. The results of this test revealed that the mean of treatment in four gloss groups was significant (*P=.000).* Furthermore, Kruskal-Wallis test indicated that the mean of treatment was significant (*P=.000*) between experimental groups (L1 gloss, L2 gloss, L1 and L2 gloss). Follow-up tests were conducted to evaluate pairwise differences among the four groups, controlling for Type I error across tests by using the Bonferroni approach. Mann-Whitney tests revealed that there were significant differences between L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions. Moreover, the results revealed that the highest mean rank belonged to L1 and L2 gloss, L1 gloss, L2 gloss, and no gloss conditions (*62.68, 48.26, 33.05, and 10.00*), respectively.

The results of vocabulary gain tests of four research groups are presented in Figure1.

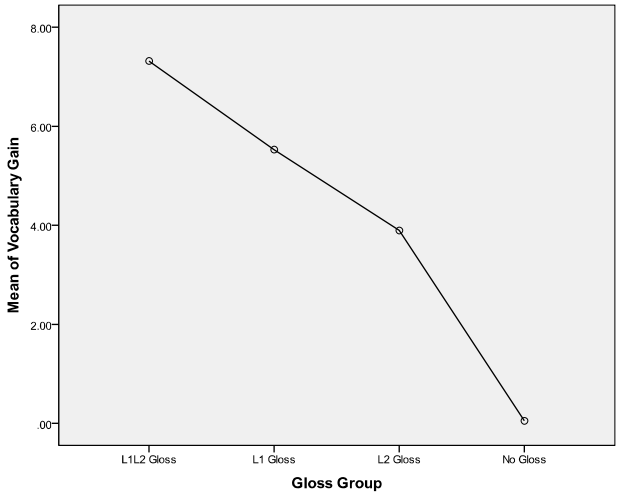

Figure 1: Results of Vocabulary Gain among Four Research Groups

As illustrated in Figure 1, the highest mean of vocabulary gain belongs to the L1 and L2 gloss group (*M=7.31, SD=1.49*), followed by the L1 gloss group (*M=5.52, SD=1.54)*, L2 gloss group (*M=3.89, SD=.99)*, and no gloss group (*M=.0526, SD=.22),* respectively.

As mentioned earlier, the vocabulary gain is measured by the subtraction of pre-test scores from immediate post- test scores. As illustrated in Figure 1, all participants in L1 and L2 gloss condition gain more target words than participants in L1gloss, L2 gloss, and no gloss conditions. Based on the Dual Coding Theory (Paivio, 1991), two separate symbolic systems help L2 learners acquire language better. Double coding the information seems to work as a complement that which gives the learner to process the information twice that can result in longer retention of the newly learnt target words. Accordingly, the provision of L1 and L2 gloss seems to maximize the possibility of dual information processing that resulted in better text comprehension and longer retention of the newly target words in the present study.

The results also revealed that participants in L1 gloss group outperformed the subjects in L2 and no gloss groups. Based on the Schema Theory (Anderson, 1984), the knowledge system of learners is activated by and interacts with incoming stimuli in learner's environment and as Jacobs (1994) points out the bottom-up approach to second language reading makes use of marginal L1 glossing. The provision of L1 gloss is supported by Schema Theory since it activate

reader's prior knowledge and it facilitates text comprehension and recalling the newly learnt target words. As the results show, the participants in the L1 gloss group retained more new words since they had associated with learner's first language that is relevant to their prior knowledge (Piaget, 1926).

Furthermore, the results show that all participants in gloss groups (experimental groups) outperformed the subjects in no gloss group (control group). Based on the Noticing Hypothesis (Schmidt, 1994), learners must notice critical features in utterances. Schmidt notes that many features of the L2 input may be not noticeable; thus, it is necessary to pay intentional attention to learn language successfully. Accordingly, in the present study, the provision of different gloss types that is supported by many researchers (e. g., Yoshii, 2006, Laufer and Shmueli, 1997, Watanabe, 1997) took learners attention to unknown words and facilitated their vocabulary learning and text comprehension.

The results also confirm the usefulness of employing the Input Hypothesis (Krashen, 1981) and Output Hypothesis (Swain, 1993) simultaneously that can enable L2 learners to reach deeper levels of processing and stronger memory traces (White, 1998; Izumi, 2002). In the present study, the researcher employed the combination of implicit and explicit approaches for vocabulary learning that is supported by Zimmerman (1994) and Paribakht and Wesche (1997).

### *B) Performance Differences among Research Groups on the Vocabulary Retention Test*

The second research question was how the provision or non-provision of different types of textual gloss affects the vocabulary retention of EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions. To find answer to the second research question, the researcher first provided the summary of descriptive statistics for pre-test and immediate post-test for four research groups that is presented in Table 12.

Table 12: Descriptive Statistics of Immediate post-test and Delayed Post-test for Four Research Groups

| Research Group | N | Mean | Std. Deviation | Median |
|---|---|---|---|---|
| Im post-testL1 Gloss | 19 | 11.7895 | 4.35353 | 10.0000 |
| Im post-test L2 Gloss | 19 | 10.2105 | 4.67355 | 9.0000 |
| Im post-test L1 & L2 Gloss | 19 | 13.5789 | 4.86844 | 12.0000 |
| Im post-test No Gloss | 19 | 6.3158 | 3.05601 | 5.0000 |

| | | | | |
|---|---|---|---|---|
| Del L1 Gloss | 19 | 9.8947 | 4.24126 | 8.0000 |
| Del L2 Gloss | 19 | 8.6316 | 4.58513 | 8.0000 |
| Del L1 & L2 Gloss | 19 | 11.3684 | 4.51184 | 9.0000 |
| Del No Gloss | 19 | 6.2632 | 3.12414 | 5.0000 |

As illustrated in Table 12, there was a decrease in vocabulary gain scores from the immediate post-test scores of "L1 gloss *(M=11.78, Mdn=10.000)"*, "L2 gloss" (*M=10.21, Mdn=9.000*), and "L1 and L2 gloss *(M=13.57, Mdn=12.000*)" groups to delayed post-test scores of " L1 gloss (*M=9.89, Mdn=8.000*), "L2 gloss" *(M=8.63, Mdn=8.000),* and "L1 and L2 gloss" *(M=11.36, Mdn=9.000),* while no significant decrease was shown in vocabulary gain in "no gloss" (control) condition from immediate post-test *(M= 6.31, Mdn=5.000)* to delayed post-test scores *(M=6.26, Mdn=5.000)* because the participants' vocabulary gain in no gloss condition was not significant.

Then, the researcher provided the descriptive statistics of the vocabulary retention achieved by L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss groups that is presented in Table 4.18. The vocabulary retention describes the long-term retention of the new target words as they measured by subtracting the delayed post-test score from the immediate post-test score.

Descriptive statistics for the vocabulary retention of four research groups is presented in Table 13.

Table 13: Descriptive Statistics for the Vocabulary Retention of the Four Research Groups

| | N | Mean | Std. Deviation |
|---|---|---|---|
| L1 Gloss Voc. Retention | 19 | 1.8947 | .3153 |
| L2 Gloss Voc. Retention | 19 | 1.5789 | .6924 |
| L1 & L2 gloss Voc. Retention | 19 | 2.2105 | 1.0316 |
| No gloss Voc. Retention | 19 | .0526 | .2294 |
| Valid N (listwise) | 19 | | |

As illustrated in Table 13, the descriptive statistics of vocabulary retention of 76 participants in four groups shows that the L1 and L2 gloss group has the highest mean scores *(M=2.21, SD=1.03)* followed by L1 gloss group *(M=1.89, SD=.31),* L2 gloss group *(M=1.57, SD=.69)* and the no gloss group *(M=.05, SD=.22*) that has the lowest mean score. To sum up, all of the participants in experimental groups outperformed the subjects in no gloss group (control group) in vocabulary retention.

**Wilcoxon Signed Rank Test**

The vocabulary retention is calculated by subtracting the delayed post-test score from the immediate post-test score. Therefore, a Wilcoxon Signed Rank Test, that is the non-parametric equivalent of the paired samples t-test, was conducted to evaluate the effect of different gloss types on participants' vocabulary retention scores. The summary of the for the Wilcoxon Signed Rank Test results for four research groups is presented in Table 14.

Table 14: The Summary of Wilcoxon Signed Ranks Test Results for Vocabulary Retention among Four Research Groups

| | Del post-test L1 Gloss - Im post-test L1 Gloss | Del post-test L2 Gloss - Impost-test L2 Gloss | Del post-test L1 & L2 Gloss - Im post-test L1 & L2 Gloss | Del post-test No Gloss - Im post-test No Gloss |
|---|---|---|---|---|
| Z | -4.185[c] | -3.827[c] | -4.013[c] | -1.000[c] |
| Asymp. Sig. (2-tailed) | .000 | .000 | .000 | .317 |

c. Based on positive ranks.

As depicted in Table 14, the results of Wilcoxon Signed Ranks Test showed a significant difference between immediate post-test and delayed post-test scores in experimental groups (L1 gloss, L2 gloss, and L1 and L2 gloss), *z= -4.18, z=-3.82, z=-4.01, p=.000,* while the results revealed that there was no significant difference between immediate post-test and delayed post-test scores in no gloss (control) group, *z=-1.000, P=.317*.

## A Kruskal-Wallis Test for Vocabulary Retention

A Kruskal-Wallis test was conducted to evaluate differences among the four gloss conditions (L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss) on median change in vocabulary retention. The alpha level for all analyses was set at .05 for tests of significance. The subjects were divided into four groups including L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss. Furthermore, the Kruskal-Wallis test was conducted to test the following research hypothesis:

### Hypothesis

**I. $H_0$:** There are no differences in vocabulary retention among EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions.

**$H_a$:** There are significant differences in vocabulary retention among EFL groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions.

**Decision:** $H_0$ is rejected and $H_a$ is supported.

**Justification:** The hypothesis test using the Kruskal-Wallis test for vocabulary retention among four research groups revealed that the null hypothesis was rejected since the p-value (*P=.000)* is smaller than the interval confidence level (*α=0.05*), *s*o the results suggests that there is a significant difference across different gloss conditions. It can be concluded that at least one of the means is significantly unequal compared to others.

The results of Kruskal-Wallis test for vocabulary retention among four research groups are summarized in Table 15.

Table 15: Kruskal-Wallis Test for Vocabulary Retention among Four Research Groups

| | Research Groups | N | Mean Rank |
|---|---|---|---|
| Vocabulary Retention | L1& L2 Gloss | 19 | 52.42 |
| | L1 Gloss | 19 | 48.71 |
| | L2 Gloss | 19 | 41.61 |
| | No Gloss | 19 | 11.26 |
| | Total | 76 | |

Test Statistics[a,b]

| | Vocabulary Retention |
|---|---|
| Chi-Square | 52.012 |
| Df | 3 |
| Asymp. Sig. | .000 |

a. Kruskal Wallis Test
b. Grouping Variable: Research Group

As illustrated in Table 15, the results of Kruskal-Wallis test for vocabulary retention indicated that there is a significant different in the medians, $\chi_2$ (3, *N* =76) = 52.01, *P=.000.* Because the overall test is significant, pairwise comparisons among the four groups should be completed. First, a Kruskal-Wallis test was run to compare three gloss conditions. The results are presented in Table 16.

Table 16: Kruskal-Wallis Test for Vocabulary Retention among Three Research Groups

| | Research Groups | N | Mean Rank |
|---|---|---|---|
| Vocabulary Retention | L1& L2 Gloss | 19 | 33.47 |
| | L1 Gloss | 19 | 29.76 |
| | L2 Gloss | 19 | 23.76 |
| | Total | 57 | |

Test Statistics[a,b]

| | Vocabulary Retention |
|---|---|
| Chi-Square | 6.163 |
| Df | 2 |
| Asymp. Sig. | .046 |

a. Kruskal Wallis Test
b. Grouping Variable: Research Groups

As illustrated in Table 16, the results of the Kruskal-Wallis test revealed that the mean of vocabulary retention in three experimental groups (L1 gloss, L2 gloss, L1 and L2 gloss) was significantly different (*P=.046).* So, the pairwise comparisons using Mann-Whitney test was run to compare the four research groups, two by two. The summary of Mann-Whitney tests is presented in Tables 17, 18, 19, 20, 21, and 22.

The summary of Mann-Whitney test for vocabulary retention between L1 and L2 gloss and L1 gloss group is presented in Table 17.

Table 17: Mann-Whitney Test for Vocabulary Retention between L1and L2 Gloss and L1 Gloss Group

| | Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Vocabulary Retention | L1 & L2 Gloss | 19 | 20.84 | 396.00 | .270 |
| | L1 Gloss | 19 | 18.16 | 345.00 | |
| | Total | 38 | | | |

As illustrated in Table 17, the result of Mann-Whitney test showed that vocabulary retention mean between L1 and L2 gloss and L1 gloss was *P=.27* that was not significantly different.
The summary of Mann-Whitney tests for vocabulary retention between L1 and L2 gloss and L2 gloss groups is presented in Table 18.

Table 18: Mann-Whitney Test for Vocabulary Retention between L1and L2 Gloss and L2 Gloss Group

| | Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Vocabulary Retention | L1 & L2 Gloss | 19 | 22.63 | 430.00 | .030 |
| | L2 Gloss | 19 | 16.37 | 311.00 | |
| | Total | 38 | | | |

As illustrated in Table 18, the result of Mann-Whitney test showed that vocabulary retention mean between L1 and L2 gloss and L2 gloss was *P=.03* that was significantly different.

The summary of Mann-Whitney tests for vocabulary retention between L1 and L2 gloss and no gloss groups is presented in Table 19.

Table 19: Mann-Whitney Test for Vocabulary Retention between L1and L2 Gloss and No Gloss Group

| | Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Vocabulary Retention | L1 & L2 Gloss | 19 | 28.95 | 550.00 | .000 |
| | No Gloss | 19 | 10.05 | 191.00 | |
| | Total | 38 | | | |

As illustrated in Table 19, the result of Mann-Whitney test showed that vocabulary retention mean between L1 and L2 gloss and no gloss was *P=.000* that was significantly different.

The summary of Mann-Whitney tests for vocabulary retention between L1 gloss and L2 gloss groups is presented in Table 20.

Table 20: Mann-Whitney Test for Vocabulary Retention between L1Gloss and L2 Gloss Group

| | Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Vocabulary Retention | L1 Gloss | 19 | 21.61 | 410.00 | .100 |
| | L2 Gloss | 19 | 17.39 | 330.00 | |
| | Total | 38 | | | |

As illustrated in Table 20, the result of Mann-Whitney test showed that vocabulary retention mean between L1 gloss and L2 gloss was *P=.100* that was not significantly different.

The summary of Mann-Whitney tests for vocabulary retention between L1 gloss and no gloss groups is presented in Table 21.

Table 21: Mann-Whitney Test for Vocabulary Retention between L1Gloss and No Gloss Group

| | Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Vocabulary Retention | L1 Gloss | 19 | 28.95 | 550.00 | .000 |
| | No Gloss | 19 | 10.05 | 191.00 | |
| | Total | 38 | | | |

As illustrated in Table 21, the result of Mann-Whitney test showed that vocabulary retention mean between L1 gloss no gloss was *P=.000* that was significantly different.

The summary of Mann-Whitney tests for vocabulary retention between L2 gloss and no gloss groups is presented in Table 22.

Table 22: Mann-Whitney Test for Vocabulary Retention between L2 Gloss and No Gloss Group

| | Gloss Group | N | Mean Rank | Sum of Ranks | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Vocabulary Retention | L2 Gloss | 19 | 27.84 | 529.00 | .000 |
| | No Gloss | 19 | 11.16 | 212.00 | |
| | Total | 38 | | | |

As illustrated in Table 22, the result of Mann-Whitney test showed that vocabulary retention mean between L2 gloss and no gloss was *P=.000* that was significantly different.

To sum up, the effects of different textual glosses in four groups was calculated by Kruskal-Wallis Test. The results of this test revealed that the mean of treatment in four gloss groups was significant (*P=.000*). Furthermore, the Kruskal-Wallis test for vocabulary retention indicated that the mean of treatment was significant (*P=.046*) between experimental groups (L1 gloss, L2 gloss, L1 and L2 gloss). Follow-up tests were conducted to evaluate pairwise differences among the four groups, controlling for Type I error across tests by using the Bonferroni approach. Mann-Whitney tests revealed that there was significant difference between experimental groups (L1 gloss, L2 gloss, L1 and L2 gloss) and no gloss conditions. The results also revealed that there was a significant difference between L1 and L2 gloss, L2 gloss, and no gloss *(P=.30 and P=.000*), but the difference between L1 and L2 gloss and L1 gloss (*P=.270*) condition was not significant. Moreover, the difference between L1 gloss and L2 gloss conditions *(P=.100)* was not significant.

Finally, the results revealed that the highest mean rank in vocabulary retention belonged to L1 and L2 gloss, L1 gloss, L2 gloss, and no gloss (*52.42, 48.71, 41.61, and 11.26*), respectively. The results of vocabulary retention tests of four research groups are presented in the Figure 2.

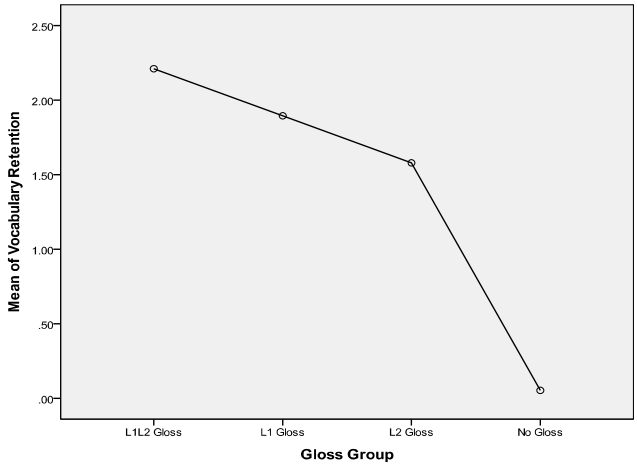


Figure 2: The Results of the Vocabulary Retention Test for Four Research Groups

As illustrated in Figure 2, the highest mean of vocabulary retention belongs to the L1 and L2 gloss group (*M=2.21, SD=1.03*) followed by the L1 gloss group (*M=1.89, SD=.31530)*, L2 gloss group (*M=1.5789, SD=.69)*, and no gloss group (*M=.05, SD=.22),* respectively.

As mentioned earlier, the vocabulary retention is measured by the subtraction of delayed post-test scores from immediate post- test scores. The better performance of participants in L1 and L2 gloss condition, confirms the Dual Coding Hypothesis (Paivio, 1971) according to which two separate symbolic systems help L2 learners acquire language better.

The research results also confirms Schema Theory (Anderson, 1984) based on it the provision of L1 glossed texts facilitates second language learning by activating the learner's prior knowledge. Furthermore, the better performance of participants in L1 gloss, L2 gloss, L1 and L2 gloss (experimental) groups compare to the subjects in no gloss (control) group confirmed the Noticing Hypothesis (Schmidt, 1994) in which it is necessary to pay intentional attention to the L2 input in order to learn language successfully. The results also confirm the usefulness if employing the Input Hypothesis (Krashen, 1981) and Output Hypothesis (Swain, 1993) simultaneously that can enable L2 learners to reach deeper levels of processing and stronger memory traces (White, 1998; Izumi, 2002). In the present study, the researcher employed the combination of implicit and explicit approaches for vocabulary learning that is supported by Zimmerman (1994) and Paribakht and Wesche (1997).

### *C) The Comparison of Vocabulary Gain and Retention among Four Research Groups*

The results of the pretest, immediate post-test, and delayed post- tests of four research groups are presented in the Figure 3:

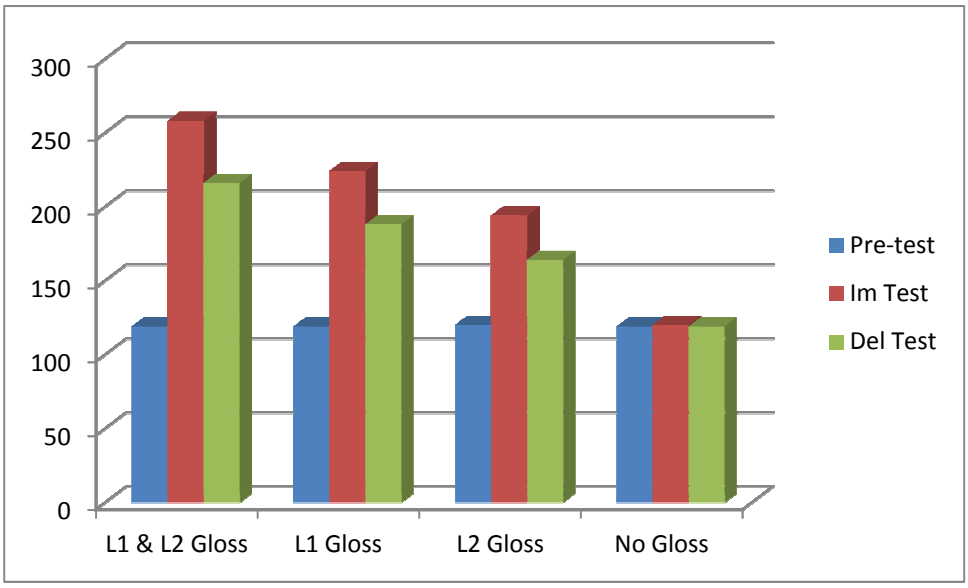


Figure 3: Pretest, Immediate and Delayed Post Tests Scores of Four Research Groups

As illustrated in Figure 3, the participants in four research groups started with similar pretests and had quite similar scores. Form the other tests administered, the participants in L1 and L2 gloss condition showed the highest performance in immediate and delayed post-tests, followed by their counterparts in L1 gloss, and L2 gloss conditions, respectively. The subjects in no gloss (control) group had the lowest performance in immediate and delayed post-tests. In other words, the participants in L1 and L2 gloss condition had the highest vocabulary gain and retention, followed by their counterparts in L1 gloss, and L2 gloss conditions, respectively. The control group consistently had the lowest vocabulary gain and retention. *Thus, the Null Hypotheses I and II, which proposed that there are no significant differences in vocabulary gain and vocabulary retention among groups reading under L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss conditions, are rejected.*

.

## IV Discussion

In answer to the first research question, the results revealed that there was a significant difference between L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss groups in vocabulary gain. Although,

the results were in contrast with previous studies that reported no difference between various gloss types (Jacobs, Dufon, & Fong, 1994; Chen, 2002; Jacobs, 1994; Jacobs & Dufon, 1990), they were in consistency with those studies (Xu, 2010; Yee, 2010; Cheng & Good, 2009; Fang, 2009; Lü et al. 2005) that found significant differences between glosses (Xu, 2010; Yee, 2010; Cheng & Good, 2009; Fang, 2009; Lü et al. 2005). All participants in the experimental groups outperformed the subjects in control group. Therefore, the present study reconfirmed the usefulness of glossing in incidental vocabulary learning (Yoshii, 2006; Cheng, 2005; Huang, 2003; Laufer & Shmueli, 1997; Watanabe, 1997; Jacobs et al., 1994). As mentioned earlier, all of the participants in L1 and L2 gloss condition gain more target words than participants in L1 gloss, L2 gloss, and no gloss conditions. The better performance of participants subjected to the L1 and L2 gloss condition in vocabulary gain confirmed the Dual Coding Hypothesis (Paivio, 1991) which emphasizes that two separate symbolic systems help L2 learners acquire language better. Accordingly, the provision of L1 and L2 gloss seems to maximize the possibility of dual information processing that resulted in better retention of the newly target words in the present study. The research results also confirmed the Schema Theory (Anderson, 1984) based on which, the provision of L1 glossed texts facilitates second language learning by activating the learner's prior knowledge. Furthermore, the better performance of participants in L1 gloss, L2 gloss, L1 and L2 gloss (experimental groups) compared to the subjects in no gloss (control) group confirmed the Noticing Hypothesis (Schmidt, 1995) in which it is necessary to pay intentional attention to the L2 input in order to learn language successfully.

In answer to the second research question, the results revealed that there was a significant difference between L1 gloss, L2 gloss, L1 and L2 gloss, and no gloss groups in vocabulary retention. These results also corresponded with previous studies (Xu, 2010; Yee, 2010; Cheng & Good, 2009; Fang, 2009; Lü et al. 2005). All the participants in the experimental groups outperformed the subjects in control group. Therefore, the present study also confirmed the usefulness of glossing in incidental vocabulary learning (Yoshii, 2006; Cheng, 2005; Huang, 2003; Laufer & Shmueli, 1997; Watanabe, 1997; Jacobs et al., 1994).

To sum up, the participants in experimental groups (L1 gloss, L2 gloss, and L1 and L2 gloss) had significantly better performance in both immediate and delayed post-tests than the subjects in the

no gloss (control) group. The combination of these results in the Figure 4 suggests that all participants in four research groups lost their vocabulary knowledge after five weeks.

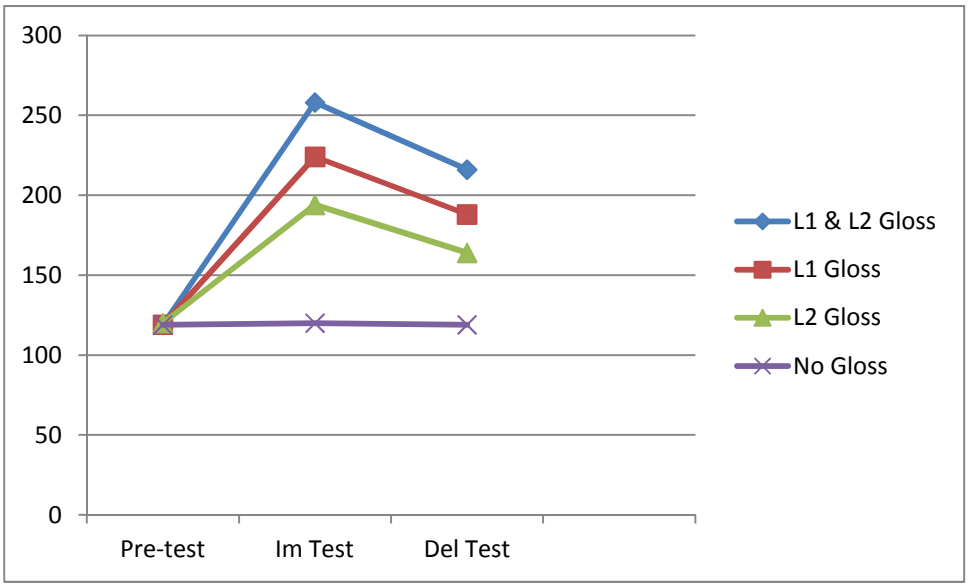


Figure 4: Pretest, Immediate and Delayed Post Tests Scores of Four Research Groups

It can be seen that participants in experimental groups who gained the most vocabulary knowledge, lost the least after five weeks, with the no gloss (control) group not losing any word knowledge which they had not gained earlier. However, those participants who gained more vocabularies had more vocabulary knowledge to lose. In fact, the vocabulary gain and retention of the participants in L1 and L2 gloss groups were the highest, followed by their counterparts in L1 gloss, L2 gloss, and no gloss groups, respectively. These results also confirmed the usefulness of glossing which is supported by a number of previous studies.

## V Conclusion

The present study compared the effects of various gloss types on vocabulary gain and retention of EFL learners. The results revealed that the combination of L1 and L2 gloss was the most effective in enhancing vocabulary gain and retention, followed by the use of L1 gloss, and L2 gloss. This research supports the Noticing Hypothesis, Schema Theory, and the Dual Coding Hypothesis. Specifically, the better performance of participants in L1 and L2 gloss groups was in support of the Dual Coding Hypothesis, the better performance of subjects in L1 gloss group

supported the Schema Theory, and the better performance of participants in the experimental groups compared to control group supported the Noticing Hypothesis. The findings confirmed the usefulness of glossing in vocabulary gain and retention.

The findings of the present study can have some implications in vocabulary learning. That there was a significant difference between gloss groups and control group suggests the usefulness of glosses in reading texts. Second or foreign language instructors should provide L2 learners with glossed texts and where possible, the students' own language should be used .In this way, the readers' attention is drawn to glosses and it will result in vocabulary learning. Furthermore, the provision of textual gloss types reduces the burden of looking up words in a dictionary and prevents ambiguity of meanings that L2 learners may face in having to choose meanings for unknown words in a particular context.

More research potential can be extracted from gloss study. In this study, the vocabulary gain and retention of the participants were measured by receptive tests. A combination of receptive and productive tests may lead to different results on gloss studies. In addition, this study investigated the effect of textual glosses on EFL learners' vocabulary gain and retention across expository texts. Other researchers can be conducted across other genres such as narrative or journalistic texts. This study utilized marginal glosses, future studies can examine the effect of single gloss or multiple-choice gloss at the foot of the page, or at the end of the texts to explore whether the gloss location has any effect on L2 vocabulary learning. Finally, researchers can examine the effects of glossing over a longer time using a larger sample with different proficiency levels. These suggestions would enhance further understanding of gloss use.

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**Appendix A: Sample of L1 Glossed Text**

During the 1970s and 80 rural poverty did **decline,** but **critics** of government's policy **contended** that this was mainly due to the growth of overall national **prosperity** (due in large part to the discovery of important oil and gas reserves) and migration of rural people to the cities rather than to state **intervention.**

| | |
|---|---|
| **to decline:** | رو به کاهش گذاشتن- تنزل یافتن |
| **critic:** | منتقد – انتقاد کننده |
| **to contend:** | بحث و مجا دله کردن |
| **intervention:** | مداخله کردن- دخالت کردن |
| **prosperity:** | موفقیت- خوش شانسی |

**Appendix B**: **Sample of L2 Glossed Text**

During the 1970s and 80 rural poverty did **decline,** but **critics** of government's policy **contended** that this was mainly due to the growth of overall national **prosperity** (due in large part to the discovery of important oil and gas reserves) and migration of rural people to the cities rather than to state **intervention.**

**to decline:** *to continue to become smaller, weaker, lower*
**critic:** *person who finds faults, points out mistakes*
**to contend:** *to argue, to struggle*
**prosperity:** *good fortune, successfulness*
**intervention:** *come between (others), interference*

**Appendix C: Sample of L1 and L2 glossed Text**

During the 1970s and 80 rural poverty did **decline,** but **critics** of government's policy **contended** that this was mainly due to the growth of overall national **prosperity** (due in large part to the discovery of important oil and gas reserves) and migration of rural people to the cities rather than to state **intervention.**

| | |
|---|---|
| **to decline**: *to continue to become smaller, weaker, lower* | رو به کاهش گذاشتن |
| **critic:** *person who finds faults, points out mistakes* | منتقد – انتقاد کننده |
| **to contend:** *to argue, to struggle* | بحث و مجا دله کردن |
| **prosperity:** *good fortune, successfulness* | موفقیت- خوش شانسی |
| **intervention:** *come between (others), interference* | مداخله کردن- دخالت کردن |

**Appendix D**: **Sample of Non- Glossed Text**

During the 1970s and 80 rural poverty did **decline,** but **critics** of government's policy **contended** that this was mainly due to the growth of overall national **prosperity** (due in large part to the discovery of important oil and gas reserves) and migration of rural people to the cities rather than to state **intervention.**

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