



## **Comparative Effect of Concept Mapping and Marginal Glossing on EFL Learners' Reading Comprehension and Vocabulary Retention**

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### **Abstract**

This study was an attempt to investigate the comparative effect of marginal glossing and concept mapping on EFL learners' reading comprehension and vocabulary retention. To fulfill the purpose of this study, 60 female students of Iranmehr Language School in Tehran were selected from among a total number of 110 based on their performance on the reading section of a mock IELTS General Module and a vocabulary test and were randomly assigned to two experimental groups. The mean scores of both groups on the reading comprehension posttests were compared through an independent samples *t*-test which led to the rejection of the null hypothesis thus concluding that there was a significant difference between the effect of concept mapping and marginal glossing on EFL learners' reading comprehension with the concept map group outperforming the marginal gloss group. For comparing the two groups' vocabulary retention, the results of the two groups on the vocabulary posttest and the vocabulary delayed posttest were compared through a Repeated Measures ANOVA.

**Keywords:** concept mapping, marginal glossing, EFL learners

### **INTRODUCTION**

Any individual who attempts to learn a foreign language for communicative purposes needs to acquire all the main four language skills, one of which is reading comprehension. Davis (2008) writes that undoubtedly students of any language need to be able to read in that language and grammatical structures and vocabulary can be learned easily through reading a lot. He further maintains that through reading, students can have better understanding of "the subtleties and shades of meaning carried by the use of a particular choice of word in a particular context" (Davis, 2008, p. 26).

Therefore, one of the logical ways of teaching vocabulary to students is by embedding vocabulary in reading texts. Pigada and Schmitt (2006) write that the studies which claim second language learners acquire vocabulary in small amount through reading used only

short texts and measured only the acquisition of meaning and did not credit partial learning of words. Thus, they investigated whether a reading program could enhance the knowledge of spelling, meaning, and grammatical characteristics of 133 words. The results showed that retention of knowledge of 65% of the target words was enhanced in some way. Spelling was strongly enhanced, even from a small number of exposures. Meaning and grammatical knowledge were also enhanced, but not to the same extent. Overall, the study indicated that more vocabulary acquisition and retention was possible from reading than what the previous studies had suggested. Similarly, Huckin and Coady (1999) indicated that “except for the first few thousand most common words, vocabulary learning dominantly occurs through reading, with the learner guessing at the meaning of unknown words”.

The relation between reading comprehension and vocabulary learning has a very interesting pattern. Not only reading is a source of learning vocabulary but also a large vocabulary is specifically predictive and reflective of high levels of reading achievement. According to Nation (2001), The Report of the National Reading Panel in 2000, for example, concluded that, “The importance of vocabulary knowledge has long been recognized in the development of reading skills. As early as 1924, researchers noted that growth in reading power relies on continuous growth in word knowledge”. Nation adds that acquiring lexicon of a language affects the process of learning that language and highly enhances communication in that language.

Based on what was mentioned above, teaching lexicon as a central part of the language teaching process has been investigated by different language teachers and researchers who have all been looking for approaches that can help the students learn the vocabulary content more effectively. According to Swan and Walter (1984, p. 84), “Vocabulary acquisition is the largest and most important task facing the language learner”. The range of vocabulary topics is vast, and several comprehensive texts give detailed overviews of the many different aspects involved in acquiring and teaching words in a foreign language (Huckin & Coady, 1997; Nation, 2001; Schmitt & McCarthy, 1997). Generally, knowing a word involves knowing its form and its meaning at the basic level. In deeper aspects, it means the ability to know its meaning, usage, word formation, and grammar; also acquisition of a word can lead to knowing it in case the students are able to remember the new words after some time intervals (Harmer, 1993).

## **LITERATURE REVIEW**

### **Marginal Glossing**

Probably the issue of marginal glossing started with the question to gloss or not to gloss. Although the concept of glossing dates back to the Middle Ages, it has been largely unexamined by researchers until late in this century. Recent literature on glossing has provoked a controversial debate--one that remains problematic even today in foreign language (FL) reading research. Traditionally, glosses provided a short definition or note in order to facilitate reading and comprehension processes for L2 learners. Nation (1983) defined glosses as short definitions; Pak (1986) refers to them as explanations of the

meanings of words. Typically located in the side or bottom margins, glosses are most often supplied for 'unfamiliar words', which may help to limit continual dictionary consultation that may hinder and interrupt the L2 reading comprehension process (Lyman-Hager & Davis, 1996). Despite the perpetual debate, glossing remains a common and acceptable aid for many foreign language text books (Davis, 1989). From the first question, "To gloss or not to gloss" emerges two opposing questions: (a) "Does glossing improve L2 reading comprehension?" and (b) "Does glossing hinder fluency in L2 reading?" (Lyman-Hager & Davis, 1996).

### **Effectiveness of Marginal Glossing**

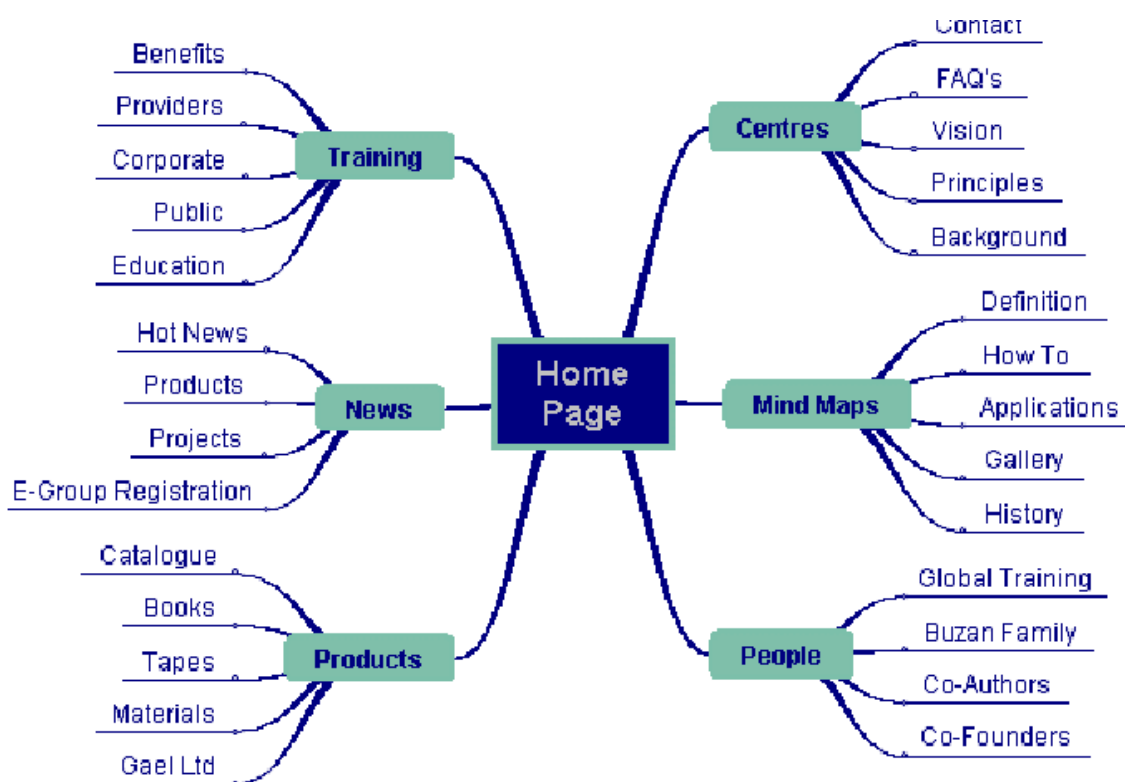
Much research has been done examining the effect of glossing on reading comprehension and vocabulary learning. The attempts have brought mixed results, some suggesting that glossing enhance reading comprehension and vocabulary learning (Davis, 1989; Jacobs, 1994; Hulstijn, Hollander, & Greidanus, 1996), and others indicate that glossing has little or no effect on reading comprehension (Johnson, 1982; Jacobs, DuFon, & Fong, 1994; Ko, 1995).

Quite recently, the focus has shifted from whether glossing has positive effect on reading comprehension and vocabulary learning to which type of glossing; L1 or L2 is more effective. Results showed that L1 and L2 gloss conditions were better than the no gloss condition and that the difference between L1 and L2 condition was not statistically significant.

### **Concept Mapping**

Mind Maps represent one method of classifying and representing information. One main concept is taken as starting point, and becomes the 'central word' or concept. A further five or 10 main ideas (also called child words) are then plotted around the central word, with links back to the central word. Another five or 10 ideas can be added to any one of these child words, creating an ever-growing network of concepts around the central one (Buzan 1989).

An example of how a mind map could be used to plot the different elements of a corporate website is given in Figure 1. The homepage is used as the central word in this example.



**Figure 1.** An example of a mind map

(Retrieved from: <http://www.graphic.org/desmap.html>)

A preliminary conclusion reached at this point is that mind mapping does not seem to be a usable alternative as the main vehicle for the knowledge repository. The material which is being envisaged as filling the repository will be covering a wide range of topics, and it is believed that a number of subtopics, not just one, will become evident as the size of the repository grows.

### Effectiveness of Concept Mapping

Sapir (1971, p. 12) considers a word meaning not as a symbol of a singular sensation, but as a symbol of a concept as he brilliantly showed this in his work and stated:

The world of our experience must be enormously simplified and generalized before it is possible to make a symbolic inventory of all our experiences of things and relations, and this inventory is imperative before we can convey ideas. The elements of language, the symbols that ticket off experience, must therefore be associated with whole groups, delimited classes, of experience rather than with a single experience themselves. Only so is communication possible, for the single experience lodges in an individual consciousness and is, strictly speaking, incommunicable.

Chang, Sung, and Chen (2002) found that incorporating concept mapping helps to improve text comprehension in fifth grade students. The idea of whether it is better for readers to be supplied with concept maps already constructed by experts versus students creating original concept maps was brought into question by Chang, Sung, and Chen

(2002). It has been stressed that for concept maps to be effective learning or reading comprehension tools, the process of creating these maps must be taught to the students in a manner that they can repeat the process on their own. It is important for students to understand the purpose of using concept maps to bolster the learning experience. If the students are unaware of the various methods or of the goal of this learning technique, then the experience of using them is lost on the untrained mind (Mikulecky, Clark, & Adams, 1989).

What can be gained from a teacher's perspective by incorporating concept maps into a science curriculum? The initial effort of adapting lesson plans is usually a deterrent, however, it has been observed that the effort often produces desirable results. Gahr (2003) only wanted to have fewer repetitive procedural questions regarding Chemistry laboratory exercises asked, but was pleasantly surprised when procedural questions were almost completely eliminated. It seems as though the introduction of a concept map that gives a visual reference as to how the classroom activities are to proceed is a wonderful tool to enable the teacher to observe the students at work rather than the students observing the teacher in a demonstration.

Ritchie and Volkl (2000) found that having sixth grade science students create concept maps before working on lab activities produced better "long-term retention" than using the concept map after the completion of the exercise. This research leads one to believe that by making important connections prior to actually doing any activity will lead to more complete understanding of the material. Thus the students will have really learned the concepts rather than just memorizing them. In addition to this, it has also been determined that concept mapping aides both teachers and students in converting scientific concepts into a framework for arranging textbook content in a manner that is visual and graphic. By incorporating this process into lesson plans, the teacher enables students to both "remember and categorize information". Teachers are better prepared to make connections between difficult scientific concepts that are understood by students with the use of concept maps (Guastello, Beasley, & Sinatra, 2000). Concept mapping has been demonstrated to help students make cross-curriculum connections to better enable them to understand their main field of learning. It was found that people pursuing a RN bachelor's degree in Australia had better knowledge and understanding of the nursing field after incorporating concept mapping into the curriculum to enable them to link concepts in science with concepts in nursing. These connections allowed the student nurses to gain a fuller understanding of how the two fields intertwine. By incorporating this learning procedure, the nurses were also better able to educate their patients about their various conditions (Wilkes, Cooper, Lewin, & Batts, 1999). This demonstrates how concept mapping can be an effective tool for the student as a learning enhancement and for the teacher as a tool for explanation and to promote understanding.

## **RESEARCH QUESTIONS AND HYPOTHESE**

To fulfill the purpose of this study, the following research questions were raised:

1. Is there any significant difference between the effect of using concept mapping and marginal glosses on EFL learners' reading comprehension?
2. Is there any significant difference between the effect of using concept mapping and marginal glosses on EFL learners' vocabulary retention?

In order to investigate the above mentioned research questions, the following research hypotheses were formulated:

H0<sub>1</sub>: There is no significant difference between the effect of using concept mapping and marginal glosses on EFL learners' reading comprehension.

H0<sub>2</sub>: There is no significant difference between the effect of using concept mapping and marginal glosses on EFL learners' vocabulary retention.

## METHOD

### Design

This study intended to investigate the comparative impact of marginal glosses and concept maps on the reading comprehension and vocabulary retention of EFL learners. This study consisted of two independent variables, concept mapping technique and marginal glosses and two dependent variables which were vocabulary retention and reading comprehension. The design to carry out the study was experimental with random assignment of the participants into the two comparison groups, the two tests for homogenizing the participants, different treatments in the two experimental groups, and two posttests. The variables of the study were as follows:

- Independent variable – marginal glosses, concept mapping technique
- Dependent variable – vocabulary retention, reading comprehension
- Control variable – Gender and the level of participants in terms of their vocabulary knowledge and reading comprehension.

### Participants

To accomplish the objectives of this study, 110 female students between the ages of 20-35 at the upper-intermediate level at Iranmehr School of Tehran were given the reading section of a mock General Module IELTS and 83 of them whose scores fell between one standard deviation below and above the mean score were chosen. Then a test of vocabulary based on the content that was taught to them in their preceding term was given to them to ensure the homogeneity of the participants in regard with their vocabulary knowledge. Based on the scores these 83 participants obtained on the vocabulary test, 60 students whose scores fell between one standard deviation above and below the mean were chosen as the final participants of the study. These participants were then randomly put into four groups of 15 students, each two served as one of the two experimental groups, the concept map group and the marginal gloss group. Prior to the actual administration, all the tests were piloted among 30 students with the same

language proficiency level and almost the same characteristics of the 83 participants who took the tests later.

## Procedure

For the purpose of achieving the goal of this study, four tests were used by the researcher: the reading section of a mock General Module IELTS for homogenizing the students, a test of vocabulary to make sure that the participants' level of vocabulary knowledge was as homogenous as possible, a reading comprehension posttest for comparing the two groups' reading comprehension and a vocabulary posttest according to the results of which the mean scores of the two groups could be compared. All the tests were piloted among a group of 30 learners with characteristics almost identical with those of the target group thereby calculating its reliability. Also Active Reading Book 3 was used for teaching reading comprehension in both groups; this book itself contained the marginal glosses regarding each text, but the concept maps were prepared by the researcher.

## Data Analysis

To scrutinize whether there was any significant difference between the effect of using concept mapping technique and marginal glosses on the EFL learners' reading comprehension and vocabulary retention, the details of the data analysis are presented and discussed below in a chronological order of participant selection first through the use of the reading section of an IELTS and then through the administration of a vocabulary test, and at last the administration of the posttests. The results of piloting each test are also provided before their main administration.

## RESULTS AND DISCUSSION

### Results of the Piloting of the IELTS Reading and the Vocabulary Test

First, the reading section of an IELTS general module which consisted of 40 items was piloted with 30 students who were at the upper-intermediate level, bearing almost the same characteristics as the target sample. As a result of conducting the item analysis, no item was found to be malfunctioning and the range of the item facility of these 40 items was 0.46-0.6. The facility indices are shown in Appendix B. Therefore, no item was deleted from the test. The reliability estimate of this test is represented in Table 1 below.

**Table 1.** Reliability estimate of the IELTS reading section – pilot study

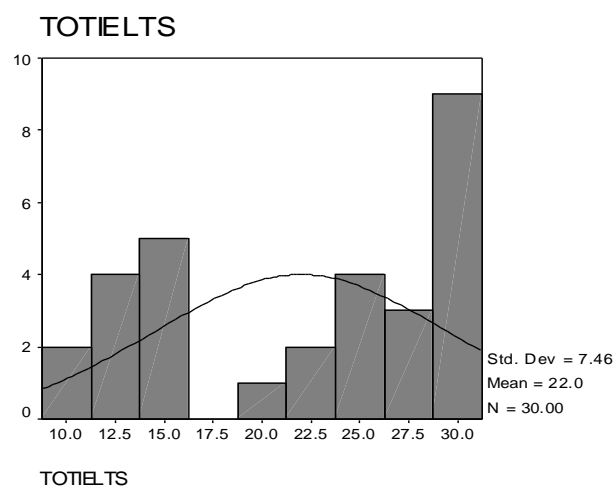
Number of participants	Number of items	Cronbach Alpha
30	40	0.84

As shown in Table 1, the Cronbach alpha came out to be 0.84 which is a high internal consistency. Table 2 below demonstrates the descriptive statistics of the pilot study of the reading test and Figure 2 delineates the distribution of the scores in the pilot study.

**Table 2.** Descriptive statistics for the IELTS reading section - pilot study

	N	Mean		SD
		Statistic	Std. Error	Statistic
Total IELTS	30	22	1.36	7.46

As it is demonstrated in Table 2 and graphically represented in Figure 2, the mean of the sample came out to be 22 and the standard deviation 7.46.



**Figure 2.** Distribution of scores on the IELTS reading section – pilot study

Then the vocabulary test that was made based on the vocabulary content of the preceding semester and which consisted of 30 multiple-choice items was piloted with the same 30 participants. Again all items benefited from an acceptable range of item facility (0.46-0.66) and none was omitted. The reliability estimate of this test as measured by Cronbach Alpha is reported in Table 3 below.

**Table 3.** Reliability estimate of the vocabulary test prior to the treatment (pilot study)

Number of participants	Number of items	Cronbach Alpha
30	30	0.73

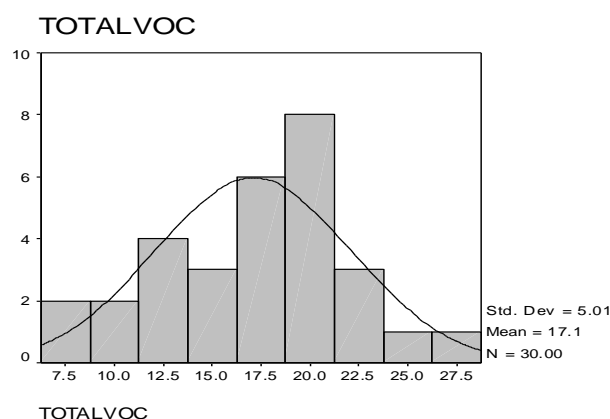
Table 4 shows the descriptive statistics for the pilot study of the vocabulary test prior to the treatment and Figure 3 depicts the distribution of the scores on this test.

**Table 4.** Descriptive statistics for the vocabulary test prior to the treatment (pilot study)

	N	Mean		SD
		Statistic	Std. Error	Statistic
Total Voc	30	17.1	0.91	5.01

As it is demonstrated in Table 4, the mean of the sample came out to be 17.1 and the standard deviation 5.01 on the vocabulary test.





**Figure 3.** Distribution of scores on the vocabulary test prior to the treatment (pilot study)

### Results of the Reading Posttest- Main Administration

When the treatment was over, the participants of both experimental groups took part in the three posttests (the reading posttest, the vocabulary posttest, and the delayed vocabulary posttest) which was the same vocabulary posttest taken again 15 days later. Table 5 demonstrates the descriptive statistics for the reading posttest of both experimental groups.

**Table 5.** Descriptive statistics for the IELTS reading posttest- main administration

Reading posttest	N	Mean		SD	Skewness	
		Statistic	Std. Error		Statistic	Std. Error
Concept map group	30	25.57	0.57	3.14	-0.49	0.43
Marginal Gloss group	30	22.07	0.58	3.19	-0.47	0.43

As demonstrated in Table 5, the mean of the concept map group came out to be higher than that of the marginal gloss group, 25.57 and 22.07, respectively. Both distribution of scores came out to be normally distributed as the skewness ratio for both distributions fell within the acceptable range of -1.96 to 1.96, that is -1.14 for the concept map group and -1.09 for marginal gloss group. However, the difference between the two groups' means had to be statistically tested which was done by means of an independent samples *t*-test reported in the following section.

### Testing the First Null Hypothesis

In order to test the null hypothesis that stated there was no significant difference between the effect of using concept mapping and marginal glosses on EFL learners' reading comprehension, the two obtained means by the two experimental groups had to be statistically tested by means of an independent samples *t*-test, the assumption for which was checked prior to its application. The assumption to run an independent samples *t*-test is normality of the distribution. As reported in the previous section both groups produced an acceptable normal distribution (Table 5) legitimizing running the *t*-test. Table 6 demonstrates the results of this test.

**Table 6.** Results of the independent samples *t*-test on the reading posttest

	F	Sig	t	Df	Sig (2 tailed)	Mean differences	Std. Error differences	95 % confidence lower	Interval upper
E V assumed	.084	.801	4.282	58	.000	3.50	.817	1.864	5.138
E V not assumed	.084	.801	4.282	57.981	.000	3.50	.817	1.864	5.138

As Table 6 demonstrates, the equality of variance was assumed ( $F = 0.06, p = 0.8 > 0.05$ ) and the difference between the two groups' means came out to be significant ( $t = 4.28, df = 58, p = 0.0005 < 0.05$ ). This indicated that the concept map group significantly outperformed the marginal gloss group on the reading posttest. Table 7 reports the measures of association (eta squared) and effect size (Cohen's *d*).

**Table 7.** Measures of association and effect size

	Eta	Eta Squared	Cohen's <i>d</i>
Reading posttest * Grouping	0.49	0.24	1.55

As demonstrated in Table 7, eta squared came out to be 0.24 meaning that grouping (treatment) accounted for 24% of the variability in the participants score on the reading test. Moreover, Cohen's *d* as the measure of the effect size came out to be 1.55 which is a large effect size according to Mackey and Gass (2005).

## CONCLUSION

Through the analysis of the results of the two posttests it became evident that the group being instructed through concept mapping techniques outperformed the group receiving the instruction by using marginal glosses with a very clear difference. As it was concluded from the statistical results conducted on the participants' scores on the posttest in the two groups which led to the safe rejection of the null hypotheses of this study, there was a significant difference between the effect of using concept mapping techniques and marginal glosses on EFL learners' reading comprehension and vocabulary retention. The difference between the concept map group and the marginal gloss group was even more significant on the second vocabulary posttest which was administered after a 15-day interval. This indicated that the concept map group not only achieved the vocabulary significantly better than the marginal gloss group but also retained the vocabulary for a longer period of time compared to the marginal gloss group.

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