CHAPTER FOUR

RESULTS

The purposes of this study were: (1) to determine whether a CAI program resulted in better vocabulary acquisition and/or long-term retention than printed text, and (2) to compare vocabulary acquisition and vocabulary retention of students who used a CAI program and those who used a printed text.

This chapter discusses the findings of this study in three main parts: the comparison of vocabulary acquisition and vocabulary retention between the experimental group and the control group, the rate of vocabulary retention of the control group, and the rate of retention of the experimental group.

Vocabulary Acquisition

The first part reported the findings from the three immediate vocabulary test in both the experimental group and the control group. The data were divided into two main parts, vocabulary acquisition and vocabulary retention. The level of significance, which the hypotheses were tested was .05.

The Result of the First Immediate Test

Table 2 shows the means and standard deviations of the first test scores and the results of the corresponding *t*-test. The experimental group's mean score was 5.15 with the standard deviation of 2.25, while the mean score of the control group was 4.20 with standard deviation of 3.34. The difference between the two mean score was 0.95, which indicated that the vocabulary acquisition mean score of the experimental group was higher than that of the control group. The *t* value of 1.13 indicated the difference between the vocabulary acquisition mean score of the experimental group and that of the control group. The *t* value of 0.293 indicated a non-significant difference between the experimental groups' mean scores of both tests. The finding indicated that there was no significant difference between using a CAI lesson and a printed-text lesson on EFL learners' vocabulary acquisition in the test I.

Table 2: The Results of Vocabulary Acquisition of the Control Group and the Experimental Group of the First Immediate Test

Groups	Vocabulary Acquisition Tests		*t*-test	
	Mean	SD	*T*	Sig of *t*
The Control Group	4.20	3.34	1.13	0.293
The Experimental Group	5.15	2.25		

The Result of the Second Immediate Test

Table 3 shows the means and standard deviations of the second vocabulary test scores and the results of the corresponding *t*-test. The experimental group's mean score was 5.90 with the standard deviation of 3.14, while the mean score of the control group was 3.65 with a standard deviation of 3.05. The difference between the two mean scores was 2.25, which indicated that the vocabulary acquisition mean score of the experimental group was higher than that of the control group. The *t* value of 2.09 indicated the difference between the vocabulary acquisition mean score of the experimental group and that of the control group. The difference between the two groups in the vocabulary acquisition test was statistically significant at the 0.050 level,

favoring the CAI lesson. The finding indicated that there were statistically significant between using a CAI lesson and a printed-text lesson on EFL learners' vocabulary acquisition in the test II.

Table 3: The Results of Vocabulary Acquisition of the Control Group and the Experimental Group of the Second Immediate Test

Groups	Vocabulary Acquisition Tests		*t*-test	
	Mean	SD	*t*	Sig of *t*
The Control Group	3.65	3.05	2.09	0.050
The Experimental Group	5.90	3.14		

The Result of the Third Immediate Test

Table 4 shows the means and standard deviations of the third vocabulary test scores and the results of the corresponding *t*-test. The experimental group's mean score was 6.00 with a standard deviation of 3.36, while the mean score of the control group was 3.85 with a standard deviation of 3.28. The difference between the two mean scores was 2.15, which indicated that the vocabulary acquisition mean score of the experimental group was higher than that of the control group. The *t*

value of 2.34 indicated the difference between the vocabulary acquisition mean score of the experimental group and that of the control group. The difference between the two groups in the vocabulary acquisition test was statistically significant at a 0.037 level, favoring the CAI lesson. The finding indicated that there were statistically significant between using a CAI lesson and a printed-text lesson on EFL learners' vocabulary acquisition in the test III.

Table 4: The Results of Vocabulary Acquisition of the Control Group and the Experimental Group of the Third Immediate Test

Groups	Vocabulary Acquisition Tests		*t*-test	
	Mean	SD	*t*	Sig of *t*
The Control Group	3.85	3.28	2.34	0.037
The Experimental Group	6.00	3.36		

Table 5 shows the means and standard deviations of the vocabulary acquisition test and the results of the corresponding *t*-test. The experimental group's mean score was 17.05 with a standard deviation of 6.66, while the mean score of the control group was 11.8 with a standard deviation of 7.16. The difference between the

two mean score was 5.25, which indicated that the vocabulary acquisition mean score of the experimental group was higher than that of the control group. The *t* value of 2.76 indicated the difference between the vocabulary acquisition mean score of the experimental group and that of the control group. The difference between the two groups in the vocabulary acquisition test was statistically significant at a 0.012 level, favoring the CAI lesson.

Table 5: The Results of Vocabulary Acquisition of the Experimental Group and the Control Group.

Groups	Vocabulary Acquisition Tests		*t*-test	
	Mean	SD	*t*	Sig of *t*
The Control Group	11.80	7.16	2.76	0.012
The Experimental Group	17.05	6.66		

Hypothesis 1 states that participants who participate in the reading of a CAI lesson will acquire more vocabulary words than the participants who acquire the same words from a printed text.

The results accepted this hypothesis. That is, the scores of EFL learners who studied vocabulary from a CAI

lesson were higher in a vocabulary acquisition test than those who studied a printed text lesson.

Vocabulary Retention

Table 6 shows that the mean score of the experimental group in the vocabulary retention test was 19.55 with a standard deviation of 6.78 whereas the mean score of the control group was 18.20 with a standard deviation of 7.37. The difference between two mean scores was 1.35, indicating that the vocabulary acquisition's mean score of the experimental group was higher than that of the control group. The *t* value of 0.77 indicated the difference between the mean scores of both groups in vocabulary retention. But there were no significant differences between their vocabulary retention mean scores.

Table 6: The Results of Vocabulary Retention of the Experimental Group and the Control Group

Groups	Vocabulary Retention Tests		*t*-test	
	Mean	SD	*t*	Sig of *t*
The Control Group	18.20	7.37	0.77	0.45
The Experimental Group	19.55	6.78		

Hypothesis 2 states that the participants who acquired vocabulary incidentally through reading of a CAI lesson will exhibit higher retention scores than the participants who studied the lesson with a printed text.

The results of this study rejected this hypothesis. That is, although the EFL learners who studied from a CAI lesson scored higher in a vocabulary retention test than those who studied from a printed text, there was no significant difference between their vocabulary retention mean scores.

In conclusion, the results of the data analysis suggested that, given the same vocabulary test, the CAI lesson was more effective than the printed-text lesson in helping the participants to acquire new vocabulary. However, there was no significant difference between using the CAI lesson and the printed-text lesson in vocabulary retention.

Vocabulary Acquisition VS Vocabulary Retention

Apart from the comparison between the control group and the experimental group, the comparison of the rate of vocabulary retention within each group was also described. It revealed the findings of effects of the

use of a CAI lesson and a printed-text lesson on vocabulary retention.

The Control Group

Table 7 compares the rate of vocabulary retention of the control group. It presents the means and standard deviations of the control group's scores and the results of the corresponding *t*-test. The control group's vocabulary acquisition mean score was 11.08 with a standard deviation of 7.16, whereas their vocabulary retention mean score was 18.20 with the standard deviation of 7.37. The difference between the two means score was 6.4. It shows that the control group's vocabulary retention mean score was higher than the vocabulary acquisition. The -3.48 of *t* value states that the difference between the mean score of the control group's vocabulary acquisition and vocabulary retention was significant at the 0.002 level, favoring vocabulary retention.

Table 7: The Results of the Rate of Vocabulary Retention of the Control Group

Tests	(Control Group)		*t*-test	
	Mean	SD	*t*	Sig of *t*
Vocabulary Acquisition	11.08	7.16	-3.48	0.002
Vocabulary Retention	18.20	7.37		

The Experimental Group

Table 8 compares the means and standard deviations of both tests of the experimental group. The mean score of vocabulary acquisition was 17.05 with a standard deviation of 6.66, while their mean score of vocabulary retention was 19.55 with a standard deviation of 6.78. The difference between the two mean scores was 2.5, which shows that the mean score of the experimental group's vocabulary retention was higher than the vocabulary acquisition. The *t* value of -1.21 showed a non-significant difference between the experimental groups' mean scores of both tests. When comparing within the group, rates of retention of the experimental group increased. However, this rate of increase indicated no significant difference between the two kinds of tests.

Table 8: The Results of the Rate of Vocabulary Retention of the Experimental Group

Groups	(Experimental Group)		*t*-test	
	Mean	SD	*t*	Sig of *t*
Vocabulary Acquisition	17.05	6.66	-1.21	0.23
Vocabulary Retention	19.55	6.78		

In conclusion, the vocabulary retention scores of both groups were higher than those of their vocabulary acquisition. This result exhibited that, given the same vocabulary acquisition test and the same vocabulary retention test, a printed text was more effective than a CAI lesson in EFL learners' long-term retention.

Discussion

The result of this study showed a significant improvement of the participants' vocabulary learning of both a CAI group and a printed text group after studying the reading lessons. There are two areas to be discussed: incidental vocabulary acquisition and vocabulary retention.

Incidental Vocabulary Acquisition

Generally, there is a widespread agreement that much of L2 vocabulary acquisition occurs incidentally (Sternberg, 1987). Reading is the best way to promote incidental vocabulary learning (Stahl, 1999). The current study aimed at finding out whether the CAI lesson or printed text was more effective for incidental vocabulary learning. The results from the data analysis indicates that the CAI lesson assisted the participants in acquiring vocabulary better than does the printed-text. Similarly, the study of Stone (1996) found that second- grade students who had received Computer-Assisted Instruction (CAI) in reading and other areas since kindergarten scored significantly higher in both reading comprehension and vocabulary than students with no CAI. The possible reasons are CAI materials are enjoyable, easy to use, usable as self-study, and also good for motivating participants to study English. It is also a tool which includes increasing language learners ability in terms of self-esteem, language proficiency and overall academic skills (Dunkel, 1990). The most important point is that the computer can present information in an easy way for comprehension. It provides access to various types of aids including pictures or voice recording.

These factors probably led to the higher scores of the CAI group than by the printed-text in this study.

Moreover, in order to avoid the role of "novelty value" of a CAI lesson, this study was conducted in three sessions within a week break. The findings revealed that in session II and session III of the vocabulary tests, the CAI lessons were statistically significant at the level of 0.050 and 0.037 respectively. It means that a CAI lesson was not a new material, which draws attention of participants in learning vocabulary. Instead, a CAI lesson was an effective tool to help participants to learn vocabulary incidentally.

Comparing the studies by Knight (1994) and Hulstijn et al.(1996), the global tasks assigned to learners were similar, reading texts for comprehension by computer. However, the current study differed from the studies by Knight (1994) and by Hulstijn et al. (1996) in two points, the length of the text presented to the participants and the highlighting of the words. Knight's subjects read a 250-word text with 14 non-highlighted target words. Hulstijn et al. (1996) used a 1,306-word text with 16 target words and these participants had accessed to a dictionary. In the current study, the participants read a 1,246-word text with 21 target words. The ratio of target words in the three studies was

indicated 14:16:21 respectively. Although, there are differences in the length of the text presented to the participants and the highlighting of the words, the three studies confirmed that the computer helped participants in vocabulary acquisition.

Vocabulary Retention

Regarding the data analysis of vocabulary retention between the groups, the CAI group had higher scores than the printed text group with no statistical significance. The finding about vocabulary retention from the current study was opposite to what was found in the study by Otto (2000), which indicated that students in the traditional classroom retained 30 to 35% of the vocabulary information. On the other hand, students who used interactive CAI lesson retained 90 to 95% of the information in half the time of the traditional classroom. Similarly, the participants in the CAI group in this study retained 93% of the information, while those in the control group retained 87%.

Successful incidental acquisition and retention relied on the level of language proficiency, vocabulary knowledge, strategic knowledge of the inferencing process and cues in the context (Groot, 2000, Schmitt & McCarthy,

1997 and). The finding that showed the vocabulary retention scores of both groups increased. The possible explanation was there might be other factors involved. Since the vocabulary retention test was given 1-3 weeks after learning, other factors could intervene with learners' vocabulary retention. After the immediate vocabulary tests, the participants may gain the meanings from other sources, for instance, looking up words in the dictionary, discussing with peers, or consulting textbooks. These factors could enhance their vocabulary retention scores. Furthermore, there are more connections in the memory representation when the input is visual (Baggett, 1989). The participants might imagine the pictures that they had seen in both the CAI lesson and the printed-text lesson and recalled the meaning. When the learners had time to consider the vocabulary without pressure, their capacity to recall vocabulary meanings would increase. Moreover, Nation (1999) stated the more the words are analyzed, or are enriched by imaginative and other associations, the more they would be retained. In the current study, the participants did the retention test after two weeks break without being informed them in advance. They had to use their imagination to think about the lesson that they had learned.

The results of the vocabulary retention test were contrasted with the study by Chun and Plass (1996) who found that the retention of vocabulary meaning in incidental tasks was low. Duquette at al. (1998) stated that one of the main problems for incidental vocabulary acquisition was that most vocabulary meaning could not be inferable from context, or led learners to make wrong inferences. Since participants did not acquire much vocabulary through incidental learning, it affected the low ability of retaining vocabulary. Opposite to the Chun and Plass study, the participants' vocabulary retention scores of the current study were higher than their vocabulary acquisition scores. It implied that the participants understood vocabulary meanings and they were remembered. Surprisingly, from the comparison of the experimental group and the control group in terms of vocabulary retention rate, the results showed that the participants who studied from a printed text could retain the vocabulary better than those learned from a CAI lesson.

The conclusion of the study is that an attractive computer program helped participants in vocabulary acquisition whereas a printed text supported vocabulary retention.

Summary of the Chapter

This chapter described the findings of the analysis of the data. First, it compared the vocabulary acquisition and vocabulary retention between the printed text group and the CAI group. Second, it described the rate of retention of both groups. From the findings, the CAI group had higher scores in both vocabulary acquisition and retention than the printed text group. It means that a CAI lesson supported vocabulary acquisition better than a printed text. When comparing the rate of retention within each group, the rate of the printed-text group was higher than that of the CAI group. It indicated that a printed text was a better tool to help EFL students in long-term vocabulary retention than a CAI lesson.