

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

This chapter presents the research methodology including research subjects, research instruments, research procedure, and data analysis procedure.

#### **3.1 Subjects of the Study**

Subjects voluntarily participating in this study were seventy-three students, enrolled in the Foundation English II course in the second semester of the 2003 academic year at Prince of Songkla University, Hat Yai. They were selected with regard to their scores on the final examination of the Foundation English I course in the first semester of the 2003 academic year. Students who displayed an average level of English proficiency based on their performance on the final examination were selected as the subjects of the study. Initially, they were eighty-five in number. However, twelve students' data had to be excluded from the final analysis because they did not complete all treatments or measures. Thus, the data of seventy-three students were included in the analysis. Since this study was a within-subject design, the subjects used the same version of the CALL reading package and were exposed to the same treatment conditions.

#### **3.2 Research Instruments**

##### **3.2.1 The CALL Reading Package**

###### **3.2.1.1 Construction of the CALL Reading Package**

Since this study aimed to investigate look up behavior of the students who used computer-assisted language learning reading material, the CALL reading package was designed as the experimental instrument. The procedure for the CALL reading package construction included six stages.

Firstly, related empirical research on the design and effectiveness of the CALL reading package contributing to vocabulary acquisition and retention was reviewed. Other information, such as techniques for presenting the unfamiliar words in a reading text and types of lexical information provided, were also studied.

Secondly, three reading texts were selected and adapted for this study: "Hooked on Horoscopes", "NASA's Chief Calls for Bold Vision in Aviation", and "Keiko Adapts To Life In Iceland Waters" (See appendix A). The researcher chose the articles on the basis of topic, difficulty, number of possible unfamiliar words, and length. Two experienced English teachers commented on whether the texts were appropriate in terms of length, appeal, level of grammatical complexity and number of unfamiliar words. The researcher revised accordingly and a native English speaker edited the revised versions before the final versions, each of which consisted of about 300 words, were made.

Thirdly, the unknown words to be learned and to be tested were selected from the three reading texts. A list of eighty-four possible unknown words taken from each adapted reading text was given to five experienced English teachers. These five teachers were asked to indicate words they thought first year students who had average ability in English did not know meanings (See appendix B). Words that at least three of the five experienced English teachers indicated were identified as unknown to the subjects. Forty-nine unfamiliar words from the total number of the three reading texts (14 words for reading text 1, 17 for reading text 2, and 18 for reading text 3) were highlighted in the texts and used as words to be tested on vocabulary acquisition and retention tests.

Fourthly, on the basis of the indicated unfamiliar words, the comprehension exercises namely the multiple choices, the true/false and the text summary were written for each reading text. These constructed exercises were commented by the supervisors and edited by a native English speaker before being used in the study.

Fifthly, the researcher constructed the CALL reading package using the Macromedia Authorware 6. The first reading text on "Hooked on Horoscopes" was constructed using information and design techniques gained from the studies of empirical CALL reading research done in the first stage. The package consisted of

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the reading text with highlighted unknown words on which the students can click to see five options of lexical information about the word. The computer log tracking file was included in the package to record the learners' use of the package. To find out its usability, five students similar to the subject groups in terms of level of English proficiency used the first CALL Reading text on "Hooked on Horoscopes". The students were asked to complete questionnaires asking about the design of the package and its multimedia components. Results obtained from the try out of the first reading text were used to construct the other two reading texts.

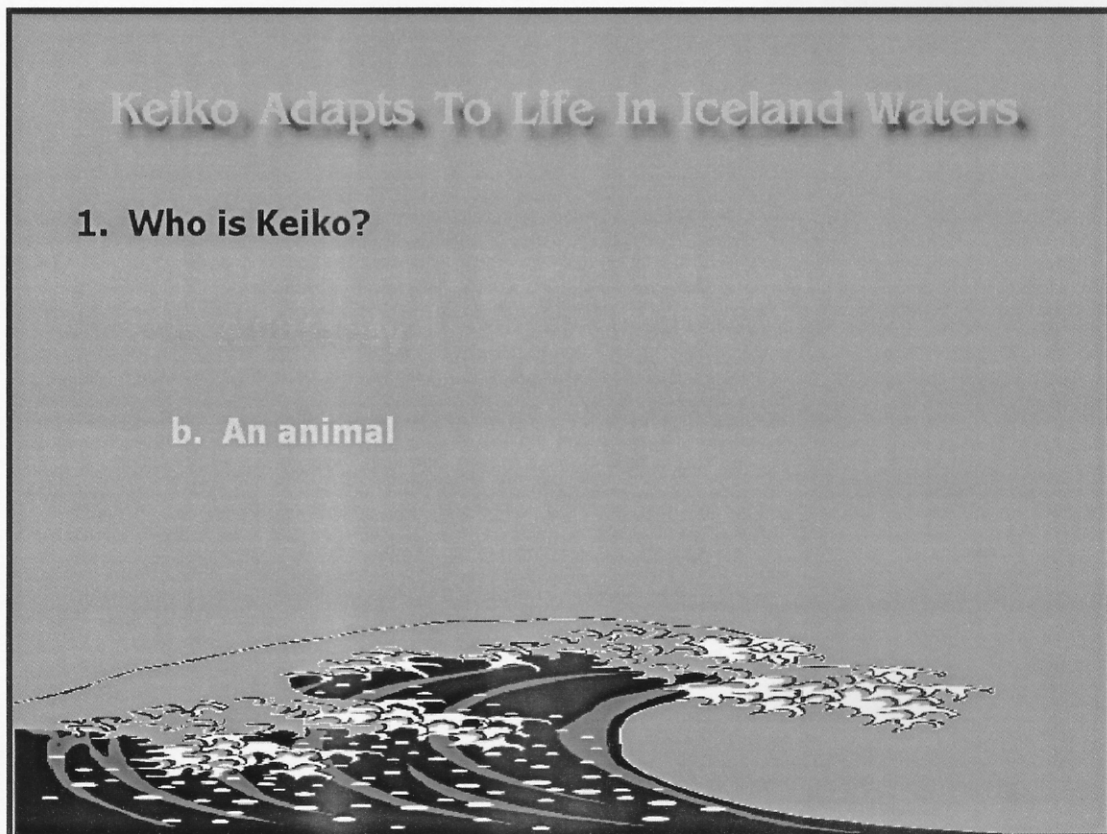
Finally, the complete second and third CALL reading texts on "NASA's Chief Calls for Bold Vision in Aviation", and "Keiko Adapts To Life In Iceland Waters" were tried out with five students similar to the research subjects to check for technical errors and revised accordingly.

### **3.2.1.2 Description of the CALL Reading Package**

The CALL reading package which provides the students with three reading texts was constructed and consisted of five parts: (1) pre-reading questions, (2) a reading text in which unfamiliar words appear highlighted, (3) various types of lexical information for unfamiliar words in the form of five look up options, (4) reading comprehension exercises, and (5) a computer log tracking file.




*Pre-reading questions:* In order to establish the students' background knowledge about a reading text, pre-reading questions are displayed on screen asking students to answer questions before reading the text, as in Figure 3.1.

**Figure 3.1 A Pre-Reading Question**









*A reading text:* After the students finish answering the pre-reading questions, the reading text in which unfamiliar words appear highlighted is presented, as in Figure 3.2.

**Figure 3.2 A Reading Text with Highlighted Unfamiliar Words**

<b>Keiko Adapts To Life In Iceland Waters</b>		<b>Selection:</b>
<p>The winter in Iceland has been one of the worst ever. An animal that was born in Iceland and just returned there has enjoyed the weather. Keiko, the star of the hit movie "Free Willy", is now adapting well in a secluded bay and could be released into the open sea.</p>		English Meaning:
<p>5 Critics predicted Keiko would experience frostbite when he returned to the frigid waters in September. But the rehabilitating whale has proved <u>them</u> wrong.</p>		Thai Meaning:
<p>Keiko was captured at the age of 1 or 2. In 1985 the 6.4-meter whale lived in a cramped pen with an excessively warm water temperature</p> <p>10 in Mexico. In 1993 the film drew attention to his plight, and in 1996 the Free Willy Keiko Foundation moved him to an aquarium.</p>		Synonym / Antonym:
<p>The foundation has made efforts to repatriate Keiko. Last year the 18,100-kilogram whale was flown on a C-17 airplane to a pen near the</p>	1 of 2	Example of Word Use:
 <span>English meaning</span> <span>Thai meaning</span> <span>Synonym Antonym</span> <span>Example of word use</span>		 

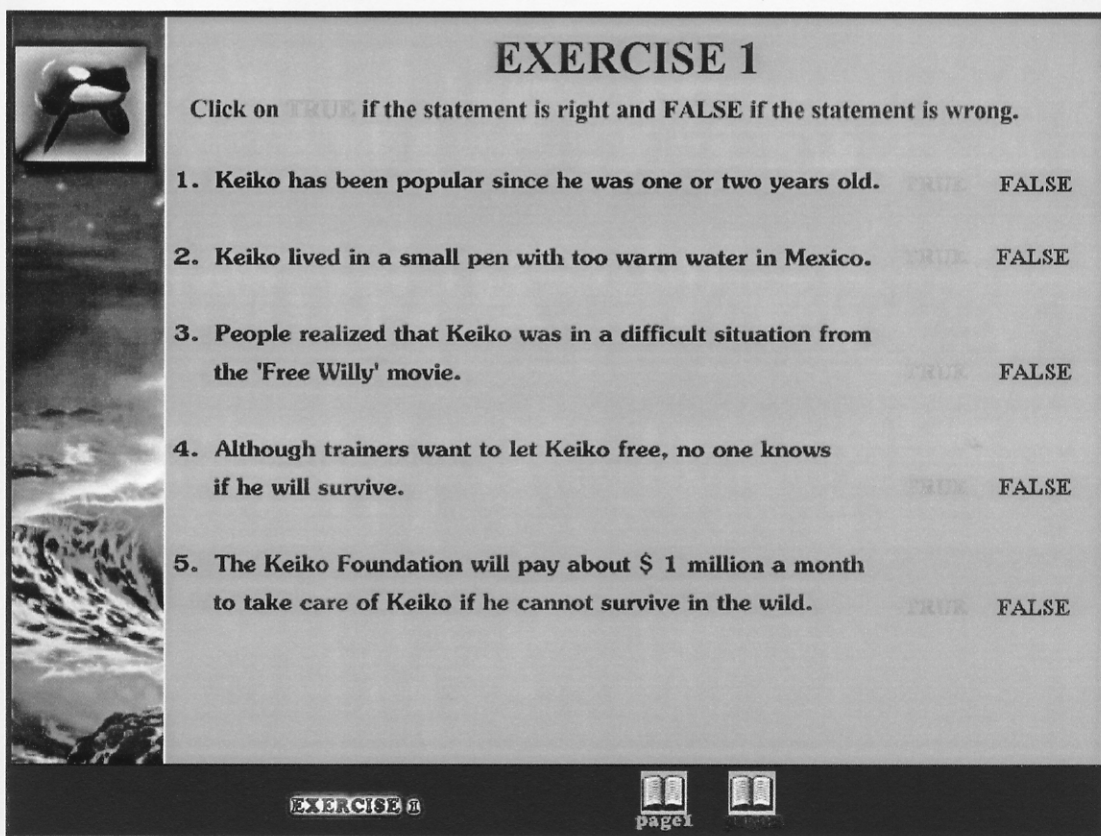
*Look up options:* All highlighted unfamiliar words are provided under five separated look up options: (1) word pronunciation, (2) meaning in English, (3) meaning in Thai, (4) synonym/antonym, and (5) contextual example of the word use. The students are able to click on any unknown words and choose one or more look up options to learn word meanings and related lexical information. In addition, the students can click on the highlighted words whenever they wish and as many times as they wish. Figure 3.3 displays the word *secluded* and its meaning and other related lexical information.

**Figure 3.3 Word Shown with Various Types of Lexical Information**

<p style="text-align: center;"><b>Keiko Adapts To Life In Iceland Waters</b></p> <p>The winter in Iceland has been one of the worst ever. An animal that was born in Iceland and just returned there has enjoyed the weather. Keiko, the star of the hit movie "Free Willy", is now adapting well in a secluded bay and could be released into the open sea.</p> <p>5 Critics predicted Keiko would experience frostbite when he returned to the frigid waters in September. But the rehabilitating whale has proved <u>them</u> wrong.</p> <p>Keiko was captured at the age of 1 or 2. In 1985 the 6.4-meter whale lived in a cramped pen with an excessively warm water temperature</p> <p>10 in Mexico. In 1993 the film drew attention to his plight, and in 1996 the Free Willy Keiko Foundation moved him to an aquarium.</p> <p>The foundation has made efforts to repatriate Keiko. Last year the 18,100-kilogram whale was flown on a C-17 airplane to a pen near the</p> <p style="text-align: right;">1 of 2</p>	<p><b>Selection:</b> secluded</p> <p><b>English Meaning:</b> (adj.) (of a place) not visited or seen by many people</p> <p><b>Thai Meaning:</b> เงียบสงบ, ตัดขาดจากโลกภายนอก</p> <p><b>Synonym/Antonym:</b> Syn: hidden Ant: open</p> <p><b>Example of Word Use:</b> <i>There was a secluded garden behind high walls.</i></p>
<p> English meaning</p> <p> Thai meaning</p> <p> Synonym Antonym</p> <p> Example of word use</p>	<p style="text-align: right;"> </p>

*Reading comprehension exercises:* Reading comprehension exercises are displayed on screen asking the students to answer questions after reading a text. While doing the exercises, the students can go back to the reading text anytime they want to re-read it. Figure 3.4 shows the screen-print with the true/false exercise, figure 3.5 shows the multiple choice exercise, and figure 3.6 shows the summary exercise.



**Figure 3.4 The True/False Exercise**



**EXERCISE 1**


Click on **TRUE** if the statement is right and **FALSE** if the statement is wrong.

1. Keiko has been popular since he was one or two years old.  TRUE  FALSE
2. Keiko lived in a small pen with too warm water in Mexico.  TRUE  FALSE
3. People realized that Keiko was in a difficult situation from the 'Free Willy' movie.  TRUE  FALSE
4. Although trainers want to let Keiko free, no one knows if he will survive.  TRUE  FALSE
5. The Keiko Foundation will pay about \$ 1 million a month to take care of Keiko if he cannot survive in the wild.  TRUE  FALSE

**EXERCISE 1**  

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Figure 3.5 The Multiple Choice Exercise



## EXERCISE 2

Question  
1 of 10

**Click on a, b, c, or d to choose the best answer.**

1. Critics thought that Keiko might \_\_\_\_\_.

- a. want to be free
- b. be able to catch his own food
- c. would be happy to return home
- d. die from the cold water in Iceland

Question 1



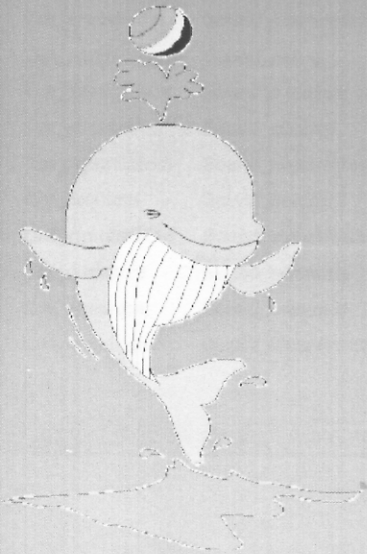



Figure 3.6 The Summary Exercise



## Exercise 3

Complete the following summary which is based on the article you have read by clicking on appropriate words to fill in the blanks.

From the "Free Willy" movie, people learned about Keiko's bad living conditions. Then, the Free Willy Foundation tried to bring Keiko back to Iceland. \_1.\_\_\_\_\_ the weather is bad, Keiko who has spent most of his life in capture \_2.\_\_\_\_\_ well in a hidden bay. Critics thought Keiko would suffer in the cold water. \_3.\_\_\_\_\_, he is enjoying the cold and is becoming more active. However, there still is \_4.\_\_\_\_\_ whether Keiko is ready for the wild. If he cannot survive, the foundation is \_5.\_\_\_\_\_ to take care of him. It will cost about \$ 1 million a year.

1 of 5



Although

Because

But

So

Question 1



*A computer log tracking file:* A computer log tracking file registers every action of the user. Whenever a student selects any unfamiliar word by clicking on it, the log registers the frequency of looking ups in the log file. For example, the word *adapt* was looked up six times (See Figure 3.7). In addition, the look up options the student selects and the frequencies are recorded in a log file of behavior data. To illustrate, the student heard the word pronunciation of the word *adapt* eleven times and looked up its meaning in English three times, its meaning in Thai six times, its synonym and antonym three times, and an example of the word use two times. Each student's data recorded in the log file were used for analyzing look up behavior.

**Figure 3.7 A Student Log File**

Word	Sound	Eng	Thai	Syn	Ex
Cnt_adapt:6	Sound_adapt:11	Eng_adapt:3	Thai_adapt:6	Syn_adapt:3	Ex_adapt:2
Cnt_secluded:6	Sound_secluded:8	Eng_secluded:2	Thai_secluded:6	Syn_secluded:1	Ex_secluded:1
Cnt_crittc:7	Sound_crittc:13	Eng_crittc:3	Thai_crittc:9	Syn_crittc:3	Ex_crittc:2
Cnt_frostbite:6	Sound_frostbite:9	Eng_frostbite:3	Thai_frostbite:6	Syn_frostbite:1	Ex_frostbite:1
Cnt_frigid:7	Sound_frigid:7	Eng_frigid:3	Thai_frigid:6	Syn_frigid:2	Ex_frigid:1
Cnt_rehabilitate:7	Sound_rehabilitate:9	Eng_rehabilitate:3	Thai_rehabilitate:7	Syn_rehabilitate:1	Ex_rehabilitate:1
Cnt_capture:6	Sound_capture:6	Eng_capture:3	Thai_capture:6	Syn_capture:3	Ex_capture:3
Cnt_cramped:6	Sound_cramped:6	Eng_cramped:2	Thai_cramped:3	Syn_cramped:2	Ex_cramped:2
Cnt_pen:6	Sound_pen:4	Eng_pen:2	Thai_pen:4	Syn_pen:2	Ex_pen:2
Cnt_excessive:4	Sound_excessive:6	Eng_excessive:2	Thai_excessive:4	Syn_excessive:2	Ex_excessive:2
Cnt_plight:6	Sound_plight:7	Eng_plight:3	Thai_plight:6	Syn_plight:3	Ex_plight:3
Cnt_repatriate:6	Sound_repatriate:9	Eng_repatriate:4	Thai_repatriate:6	Syn_repatriate:2	Ex_repatriate:3
Cnt_hurdle:6	Sound_hurdle:6	Eng_hurdle:3	Thai_hurdle:6	Syn_hurdle:2	Ex_hurdle:2
Cnt_simulated:6	Sound_simulated:5	Eng_simulated:3	Thai_simulated:6	Syn_simulated:2	Ex_simulated:2
Cnt_remain:6	Sound_remain:6	Eng_remain:2	Thai_remain:6	Syn_remain:3	Ex_remain:3
Cnt_ensure:4	Sound_ensure:6	Eng_ensure:2	Thai_ensure:4	Syn_ensure:2	Ex_ensure:2
Cnt_leviathan:6	Sound_leviathan:7	Eng_leviathan:3	Thai_leviathan:6	Syn_leviathan:3	Ex_leviathan:3

### **3.2.2 Vocabulary Tests**

In order to measure vocabulary acquisition and retention after using the CALL reading package, a supply-definition vocabulary test was used in this study. To measure vocabulary acquisition, the subjects were asked to take a vocabulary test immediately after completing the reading tasks for each reading text. In each immediate vocabulary test, only the unfamiliar words for each reading text were listed and the subjects were required to supply the meaning of each word either in Thai or in English (See appendix C). To measure vocabulary retention, all forty-nine unfamiliar words were arranged in alphabetical order on the delayed vocabulary test and the subjects were required to supply the meanings (See appendix D). The delayed vocabulary test was conducted two weeks after the reading treatment. After the delayed test, the subjects were given a questionnaire.

### **3.2.3 Questionnaire**

A five-point Likert scale from "Strongly agree" to "Strongly disagree" questionnaire including an open-ended question asking for students' opinions, comments and suggestions regarding any aspect of the CALL reading package was distributed to the subjects to determine students' attitudes towards the provision of lexical information in the CALL reading package (See appendix E). An initial version of the questionnaire was piloted with ten students who were not involved in the main study, following their use of the CALL reading package in the trial stage. This pilot version led to the deletion and alteration of statements before employing it in the main study.

### **3.2.4 Informal Interviews**

Informal individual interviews were conducted. Based on look up behavior in log files, some of the students were asked to participate in the informal interviews. The interviews focused on these students' reasons for selecting or ignoring look up

options. Open-ended questions were used as a guideline to obtain more information from interviewees (See appendix F).

### **3.3 Research Procedure**

The study was conducted over a period of three weeks. Data collection took place during leisure time at a computer lab under the supervision of the researcher. The research procedure consisted of the following five phases: (1) introductory phase, (2) reading comprehension phase, (3) delayed vocabulary phase, (4) questionnaire response phase, and (5) informal interview phase.

#### **3.3.1 Introductory Phase**

In this phase, the subjects were informed that they would be instructed to read three reading texts through CALL reading materials and to answer a questionnaire two weeks after the reading treatment. One reading text was used in a fifty-minute period. They were also told that the purpose of the study was to test for reading comprehension. That is, each subject read a text for content, and then did three reading comprehension exercises. After completing all the three exercises they could review any exercises they wanted. The subjects were allowed to take as much time as they wished to read a text and to do the exercises within the given period.

Next, the subjects were given a brief introduction to the CALL reading package, and its objectives. The researcher explained how to use the CALL reading package and demonstrated that clicking on highlighted words allowed them to select a variety of look up options, namely word pronunciation, meaning in English, meaning in Thai, synonym/antonym, and a contextual example of the word use. They were told that they could look up highlighted words whenever they wished and as many times as they wished. In addition, the researcher showed the subjects how to go back to the reading text while they were doing reading comprehension exercises. There was no mention of registration of their look up behavior data. This phase took approximately fifteen minutes and was conducted only in the first period the subjects met with the researcher.

### **3.3.2 Reading Comprehension Phase**

The subjects learned one text within a period. Each student read the reading text and completed reading comprehension exercises individually, using the CALL reading package with the provision of lexical information for word learning. The subjects looked up word meanings and related lexical information during the reading comprehension process. In this phase, the computer log tracking recorded the total number of times each word was looked up, and the look up options the subjects chose in a log file. The subjects spent approximately forty minutes reading each text and doing comprehension exercises.

After exiting the CALL reading package, the subjects were given a supply-definition vocabulary test over highlighted words in the reading text they had just read in order to measure acquisition of vocabulary. The subjects spent approximately fifteen minutes taking immediate vocabulary tests. Then, the look up behavior data stored on the computer was printed out.

### **3.3.3 Delayed Vocabulary Test Phase**

Two weeks after the reading treatment, the subjects took a delayed supply definition vocabulary test over all forty-nine highlighted words they encountered in all three reading texts in order to measure the long-term retention of vocabulary. The subjects spent approximately thirty minutes completing the test.

### **3.3.4 Questionnaire Response Phase**

After taking a delayed vocabulary test, the subjects were asked to respond to a questionnaire asking them to rate their opinions about the provision of lexical information and the attitudes towards the CALL reading package. The subjects spent approximately fifteen minutes responding to the questionnaire.

### 3.3.5 Informal Interviews Phase

Finally, fifteen students who were selected with regard to their look up behavior engaged in short interviews informally after they finished the questionnaire. All fifteen students were asked to explain particular reasons for selecting and ignoring look up options. This phase took approximately ten minutes for each student.

### 3.4 Data Analysis Procedure

To answer three research questions, the following statistical techniques were used in analyzing the data of the study.

Research question 1:            To what extent do intermediate EFL students acquire and retain vocabulary knowledge after using the CALL reading package?

To answer the first research question, immediate and delayed vocabulary tests were scored. One point was allotted for a correct answer, and zero for an incorrect answer. Percentages and mean scores on immediate and delayed vocabulary tests were calculated to identify the extent of vocabulary knowledge students acquired and retained after using the CALL reading package. Paired samples t-test was also utilized to determine the significant differences between mean scores on immediate vocabulary tests and delayed vocabulary test.

Research question 2:            What is the relationship between students' look up behavior and their levels of word acquisition and retention?

For the first analysis of look up behavior, the mean value of the number of words looked up in each reading text was calculated. In order to find out whether there was a relationship between the number of words looked up and scores on immediate and delayed vocabulary tests, the Pearson correlation coefficient was computed to see the relationship between the number of words looked up and scores on immediate and delayed vocabulary tests. In addition, to see whether there was a

relationship between the frequency of looking ups and scores on immediate and delayed vocabulary tests, the mean value of frequency of looking ups was calculated and the Pearson correlation coefficient was applied.

The students were classified by their look up behavior registered by the computer log tracking. The students who solely selected the meaning in Thai look up option were classified as L1 type, and those who selected the meaning in Thai look up option together with related lexical information were classified as L1+ type.

For the comparison of look up types and levels of vocabulary acquisition and retention, the mean scores on immediate and delayed vocabulary tests of each look up type were calculated. In each look up type, a paired samples t-test was utilized to determine significant differences between mean scores on immediate vocabulary tests and those on delayed vocabulary test. Independent-samples t-test was also computed to analyze whether the mean scores on immediate and delayed vocabulary tests of the two look up types were significantly different.

Research question 3:                   What are the students' attitudes towards the provision of lexical information in the CALL reading package?

The data drawn from the five-point rating scale were calculated for means and ranges in order to interpret the levels of agreement. Criteria for the rating scale interpretation are presented below.

**Table 3.1 Criteria for Rating Scale Interpretation**

<b>Ranges of the Means</b>	<b>Levels of Agreements</b>
1.00-1.80	Strongly disagree
1.81-2.60	Disagree
2.61-3.40	Moderately agree
3.41-4.20	Agree
4.21-5.00	Strongly agree