

CHAPTER THREE METHODOLOGY

To investigate the effects of vocabulary learning strategy instruction on senior high school students, the present study adopted a pretest-posttest-delayed posttest, control-group design and employed quantitative and qualitative methods to collect data. In the experimental group, six vocabulary learning strategies were instructed explicitly and integrated into the English curriculum. In the control group, no explicit vocabulary learning strategies were applied but conventional teacher-centered instruction of vocabulary. Before the instruction began, both groups were required to fill in two questionnaires: one questionnaire about their use of vocabulary learning strategies, and the other on their vocabulary learning motivation. At the same time, one vocabulary level test was also administered to both groups to measure their English vocabulary initial knowledge. A set of vocabulary tests, consisting of comprehension and production items, were conducted to both groups before, immediately after and four weeks after the instruction to measure the effects of VLSI on vocabulary acquisition. The instruction lasted for twelve weeks. During the instruction, the participants' application of the taught strategies was monitored through a checklist completed by the participants every week. Right after the instruction, the same set of vocabulary learning strategy and motivation questionnaires administered at the pre-test was also administered. Four weeks later, the same strategy and motivation questionnaires were administered to both groups again to determine the delayed effects of vocabulary strategy instruction on strategy use and motivation. Besides, the experimental group were required to answer an extra questionnaire on their feedback to the vocabulary strategy instruction. Several participants chosen from the experimental group were interviewed respectively to explore the process and the difficulties in applying vocabulary learning strategies. The

responses to the questionnaires and the scores from the tests were analyzed quantitatively by the SPSS version 13.0. The qualitative data obtained from the questionnaires, the interview, students' checklists, and the teacher's notes were documented and classified into categories. The following are detailed descriptions of the participants, instruments, treatment, data collection procedures, and data analysis procedures.

Participants

The present study recruited two intact classes of first grade students from a vocational senior high school in Kaohsiung City by convenient sampling to participate in this study. These two classes were from the section of comprehensive high school (綜合高中部). In their first year, they were taught the same courses as their counterparts in an ordinary senior high school, but with different periods. In this school, these students had four English classes a week while those in a regular senior high school often had five. Entering the second grade, they could decide to enter the vocational (專業/高職學程) or the academic (學術/高中學程) programs. Nearly three-fourths of their school seniors chose the vocational track. One class consisting of 35 (28 male and 7 female) students assigned to the experimental group was instructed to use six vocabulary learning strategies: dictionary use, word-part analysis, phonological analysis, keyword, using words in a context, and vocabulary cards. The other class consisting of 37 (30 male and 7 female) students assigned to the control group received no explicit instruction of vocabulary learning strategies. All the participants' English scores in the Basic Competence Test, which they took two months before admission to senior high schools, were collected to determine the students' English proficiency. The full mark for the Basic Competence Test was 60. The average English score the experimental group got was 46 and the control group

45. In fact, between two classes existed no significant differences in terms of their scores in the vocabulary level test, in the Basic Competence Test, and in the pretest motivation questionnaire. According to their scores in the Basic Competence Test, the participants in the experimental group were further divided into three different proficiency levels: high, intermediate, and low. From each level, four students were interviewed to investigate whether the participants encountered difficulties in applying vocabulary learning strategies. The researcher in the current study was also the English teacher of the two classes.

The age of the participants ranged from 16 to 17. Based on the official statistics, they had received at least seven years' formal English education. The participants in both groups had four English classes per week, each for 50 minutes.

Instruments

The instruments employed in this study included a vocabulary learning strategy questionnaire (VLSQ), a vocabulary learning motivation questionnaire (VLMQ), a vocabulary level test (VLT), vocabulary tests (VT), a vocabulary learning strategy checklist, and a questionnaire on vocabulary learning strategy instruction (VLSIQ).

Vocabulary Learning Strategy Questionnaire (VLSQ)

A vocabulary learning strategy questionnaire (see Appendix A), written in Chinese, was used to elicit the information about the participants' use frequency and mastery of vocabulary learning strategies. It consisted of two sections. Section 1 asked about participant's background information and their English learning experience. The second section, following Schmitt's (1997) taxonomy of vocabulary learning strategies, contained 50 strategies that could be classified into two dimensions—Discovery and Consolidation, and five categories—Determination

Strategies, Social Strategies, Memory Strategies, Cognitive Strategies, and Metacognitive Strategies. The distribution of the strategy items in different categories was shown in Table 3.

Table 3. Distribution of Vocabulary Learning Strategies

Discovery Dimension		Consolidation Dimension	
Category	Item No.	Category	Item No.
Determination	Items 1-7	Social	Items 13-15
Social	Items 8-12	Memory	Items 16-35
		Cognitive	Items 36-47
		Metacognitive	Items 48-50

This vocabulary learning strategy questionnaire (VLSQ) was mainly based on the Chinese version VLS questionnaire translated and exemplified by Yeh and Wang (2004) and Chen (2006). The reliability coefficient of Yeh and Wang’s 50-item questionnaire was .93 and that of Chen’s 58-item questionnaire was .96. Some changes were made so that the questionnaire could be more suitable for the participants in this present study. Some items in Schmitt’s taxonomy were deleted. For example, based on the researcher’s experiences with senior high school students, the items, such as the use of “semantic feature grids,” “Peg Method,” “Loci Method,” and “Configuration,” are too complicated for them to understand, so these items were deleted. Since Chinese and English do not belong to the same language family, the use of “L1 cognates” is also impossible for the participants to use. Therefore, the item “cognates” was left out, too. Some items were modified according to the students’ English learning experience in senior high schools. For example, based on the researcher’s experience with senior high school students, the use of “underlining initial letter of the word” was changed into “underlining the whole word.” The use of “interacting with native speakers” was changed into “interacting with other people”

due to the limited opportunities of encountering native speakers in the EFL context. Some items were added due to the insufficiency and inadequacy of the original Schmitt's taxonomy. For example, Schmitt's dictionary strategies consist of only bilingual and monolingual dictionaries, but electronic dictionaries are commonly used by senior high school students in Taiwan. Therefore, use of electronic dictionaries (Item 6) was added. Regarding rote repetition, original verbal repetition was further divided into repetition by individual letters (Item 36) and repetition by syllables (Item 37). A combination of verbal and written repetition (Item 39) was added to the questionnaire. The final version consists of 50 items.

Table 4. Distribution of Six Instructed VLS in VLSQ

Dimension	Discovery	Consolidation
Determination Strategies	Using dictionaries (Items 4-6)	
	Using vocabulary cards (Item 7)	--
	Word-part analysis (Item 2)	
Social Strategies	--	Using words in a context (Item 15)
Memory Strategies		Phonological analysis (Item 27)
	--	Keyword method (Item 30)
		Using words in a context (Items 24-25)
Cognitive Strategies		Word-part analysis (Item 31)
	--	Phonological analysis (Items 37, 39)
		Keep vocabulary cards/notebooks (Items 41, 47)
Metacognitive Strategies	--	--

Regarding the six vocabulary strategies selected to be taught, their distribution in the VLSQ was presented in Table 4. In addition to analysis of overall strategy use,

these fifteen items were analyzed separately from other strategy items to determine whether the participants in the experimental group outperformed the control group on these strategies after vocabulary learning strategy instruction.

This questionnaire was administered three times over the study—at the beginning, immediately after, and four weeks after the instruction. As for the way of responding to the questionnaire, in the pretest VLSQ and the immediate-posttest VLSQ, the participants were instructed to rate their use frequency and mastery of each strategy on a 5-point Likert-scale, ranging from never/with no mastery (1 point), seldom/with little mastery (2 points), sometimes/with some mastery (3 points), often/with enough mastery (4 points), to always/with lots of mastery (5 points). Thus, students had to respond to a total of 100 items in the questionnaire. While filling the questionnaire, the participants complained about the length of the questionnaire. To address the problem, the researcher calculated the correlations between strategy frequency and mastery in the pretest and immediate posttest strategy questionnaires and found out the correlations between frequency and mastery were high (.930 in the pretest and .933 in the immediate posttest). Besides, the internal consistency reliability of the mastery scale ($\alpha = .942$ in the pretest and .942 in the immediate posttest) was a little higher than that of the frequency scale ($\alpha = .933$ in the pretest, and .939 in the immediate posttest). As a result, in the delayed posttest VLSQ, only the mastery of each strategy was rated. In the present study, only mastery of the vocabulary strategies was discussed instead of frequency. The reliability of the mastery scale in the delayed posttest was .952.

Vocabulary Level Test (VLT)

A vocabulary level test (see Appendix B), including two levels of word-frequency: the 1000-word level (Huang, 2004) and the 2000-word level

(Schmitt, 2000), was adopted to measure the participants' vocabulary size at the beginning of the study. Following the format of Schmitt's (2000) Vocabulary Levels Test, the 1000-word level test was designed by Huang (2004). In the 1000-word level test, 36 words were randomly selected from West's General Service List (1953). Its reliability was .91 (Huang, 2004). The reliability for the 2000-word level test was above .90 (Schmitt, Schmitt & Clapham, 2001). As for scoring, one point was given for each correct choice and matching of a word and its definition. The full score in the 1000-word level test was 18 and the 2000-word level test 30. The total score in the vocabulary level test was 48.

Vocabulary Test (VT)

A vocabulary test was designed to measure participants' vocabulary learning. The target words in the vocabulary test were selected from Level Two in "Far East English Vocabulary in Use" (遠東活用句子學單字). The target words excluded the words in the 2000-word list published by Ministry of Education (MOE) and the words in the vocabulary list of the participants' English textbook (Volume One, New Far East English Reader for Senior High Schools). The parts of speech and the number of syllables in the words were taken into consideration in deciding the target words. The number of vocabulary items in each part of speech was controlled (see Table 5). The ratio of noun to verb, and to adjective and adverb was 2:2:1. The vocabulary test consisted of two parts: receptive and productive use of vocabulary (see Appendix C). Each part included 20 items, so there were 40 items in total. The recognition part required the participants to provide Chinese translation for each English given word; the production part required the participants to spell the target English words with the first letter provided.

Table 5. Target Words in Vocabulary Tests

Parts of Speech	Recognition			Production		
	Words	Syllables	Letters	Words	Syllables	Letters
adj	confident	3	9	bloody	2	6
adj	needless	2	8	legal	2	5
adj	unbelievable	5	12	forgetful	3	9
adv	besides	2	7	hardly	2	6
n	activity	4	8	education	4	9
n	customer	3	8	interview	3	9
n	distance	2	8	hunter	2	6
n	focus	2	5	manager	3	7
n	government	3	10	drugstore	2	9
n	humor	2	5	ability	4	7
n	independence	4	12	congratulation	5	14
n	leadership	3	10	microwave	3	9
v	apply	2	5	delay	2	5
v	burn	1	4	earn	1	4
v	cancel	2	6	handle	2	6
v	charge	1	6	lock	1	4
v	encourage	3	9	disappear	3	9
v	gather	2	6	compare	2	7
v	hire	1	4	judge	1	5
v	ignore	2	6	forgive	2	7
Mean		2.45	7.4		2.45	7.15

Note. adj = adjective; adv = adverb; n = noun; v = verb.

In order to further make sure that the target items in production or recognition parts would have a similar degree of difficulty, a pilot test had been done to a group of 20 second-grade students from the section of comprehensive school at the same school. They were asked to take a production test consisting of 40 target words and 10 distracters at the beginning of a math class; at the end of the math class, they were asked to finish a recognition test containing the same 40 test items. The test results showed that a better job was done when the target items appeared in the recognition

forms. Besides, as shown in Table 6, no significant difference ($p = .166$) was found in the students' performances between production of the target items from the receptive section and production of the target items from the productive section in the vocabulary test. There was also no significant difference ($p = .871$) in the students' performances between recognition of the target items from the receptive section and recognition of the target items from the productive section in the vocabulary test. That meant the target items in the vocabulary test from both parts do not favor any kind of testing format.

Table 6. Paired-samples *t*-Test of Production and Recognition Forms in the Pilot Test

Pair	MD	Std. Error	<i>t</i>	<i>p</i>
Production_A ($M_{pa} = 9.050$) – Production_B ($M_{pb} = 10.900$)	-1.850	1.284	-1.441	.166
Recognition_A ($M_{ra} = 24.050$) – Recognition_B ($M_{rb} = 23.900$)	0.150	.910	.165	.871

Note. A = items from the receptive section in the vocabulary test.

B = items from the productive section in the vocabulary test.

MD = mean difference.

As for the scoring, in the recognition part, a correct answer received two points, an answer with similar semantic meaning received one point, and an incorrect answer or a blank received no points. For example, an answer *yi-qi* “一起” to the target item *gather* received one point. In the production part, a correct spelling received two points, a morphologically approximate spelling (no more than 2 letters were misspelled) received one point, and an incorrect answer or a blank received no points. For example, an answer “*forgetfull*” to the item “健忘的” received one point since only one letter was misspelled, and “*forget*” received no point since three letters “f-u-l” were missing. The maximum grades a student could receive in the recognition

and production parts were 40 respectively. Three versions of the test that contained the same test items in different orders were administered: before the instruction (VT1), immediately following the instruction (VT2) and four weeks later (VT3). Ten more different distracters, taken from Nation's (2001) Productive Word Level Test, were added to the pretest and the posttests in order to reduce the practicing effect of the tests. They were *adopt*, *dust*, *examine*, *flesh*, and *journey* in the recognition part of the pretest, *cap*, *concern*, *factory*, *inquire*, and *sport* in the production part of the pretest, *bake*, *charm*, *fold*, *pupil*, and *total* in the recognition part of the posttests, and *admire*, *climb*, *electric*, *firm*, and *nail* in the production part of the posttests.

Vocabulary Learning Motivation Questionnaire (VLMQ)

A vocabulary learning motivation questionnaire (Appendix D), adapted from Tseng (2006), was used to measure the participants' motivation for learning vocabulary before and after the instruction. The reliability coefficient of Tseng's (2006) 32-item motivation questionnaire was .96. In this study, the wording of some statements was adapted in order to clarify the meanings. The only negatively worded statement "If I have vocabulary homework to do, I leave it until the last minute" was rephrased into "If I have vocabulary homework to do, I will do it as soon as possible" (Item 11) in order to make it consistent with other statements. The participants were asked to express agreement or disagreement on a 5-point Likert-scale. The degree of agreement ranged from strongly disagree (1 point), disagree (2 points), partly agree (3 points), agree (4 points), to strongly agree (5 points). This questionnaire was administered three times over the study— at the beginning of, immediately after, and four weeks after the instruction. The reliabilities of the motivation questionnaire in the pretest, the immediate posttest, and the delayed posttest were .947, .947, and .957.

Checklists

The assumption of learning strategy instruction is to raise learners' awareness of learning strategies and to provide learners with opportunities to practice, reinforce and monitor their strategy use (Cohen, 1998; Oxford, 1990) so that learners can become more active in their learning. That is, in addition to instruction and provision of practice of strategies, students should be made aware that once they have begun to use specific strategies, they need to check periodically whether or not those strategies are being used as intended. Therefore, a vocabulary learning strategy checklist (see Appendix E) was designed to monitor the experimental group's employment of the taught vocabulary learning strategies in self-learning of the supplementary vocabulary from "Far East English Vocabulary in Use" (遠東活用句子學單字). The participants in the experimental group were required to check the strategies they used in memorization of each vocabulary item every week. The checklist could also function as a tool to arouse students' awareness of applying the strategies taught in class to vocabulary learning outside class. To balance the monitoring effect, the students in the control group were given a vocabulary knowledge checklist (see Appendix E) to check and monitor what they learned every week. They were asked to indicate if they (1) do not know, (2) know but are not entirely sure of the meaning of, or (3) know and are able to provide the correct meaning of the words assigned to self study at home.

Questionnaire on Vocabulary Learning Strategy Instruction (VLSIQ)

In order to investigate the students' responses to VLSI, the researcher adapted the questionnaires (see Appendix F) from Lin (1999) and Jiang (2001). The VLSIQ consisted of two parts. The first part was concerned about the instructed vocabulary strategies, and the second section dealt with their responses to the researcher's instruction. The questions in Lin (1999) which overlapped with those in the

questionnaire of motivation in the present study were deleted. This questionnaire was administered at the end of the study.

Semi-structured Interview Questions

At the end of the experiment, four participants from each proficiency level that is, high, intermediate, and low in the experimental group were interviewed to collect qualitative data. The interview was conducted through semi-structured questions that focus on:

- (1) Students' views of the role of vocabulary in learning English,
- (2) The difficulties, if any, students encountered in attempting to applying the instructed strategies to vocabulary learning, and
- (3) Students' views about their own vocabulary learning.

Treatment

During the instruction period, in the experimental group, the researcher incorporated vocabulary learning strategy training in her instruction of the vocabulary section in Volume One, *New Far East English Reader for Senior High Schools* (遠東新高中英文第一冊). The researcher modeled the use of the six chosen vocabulary learning strategies whenever they were applicable. In the control group, vocabulary was taught in a traditional teacher-centered method only. After receiving the vocabulary instruction in each lesson, both groups were asked to memorize the vocabulary in their textbook and to take the vocabulary quizzes regularly.

In addition to the vocabulary section in their textbooks, every week the researcher assigned the students in both groups 10 words from "Far East English Vocabulary in Use" (遠東活用句子學單字) to memorize. Both groups were guided to read the additional words aloud at school. At the beginning of the study, both

groups were informed of the vocabulary test to be held near the end of the semester. The students in the experimental group were encouraged to apply the instructed vocabulary learning strategies to learning these words. They were also required to monitor and evaluate their use of the instructed strategies by means of the checklist, and to share their learning experience with their classmates in class. In contrast, those in the control group were instructed in the traditional vocabulary teaching method and asked to learn these additional words on their own. Their learning of additional words was monitored by a self-checking list. The students in the control group had to put a check on whether and how well they learned each item every week. Each group had four English classes a week. Each class took about fifty minutes; by estimation, the time spent on vocabulary instruction was 100 minutes a week or so in both groups.

Traditional Vocabulary Instruction

In the control group, the researcher adopted the traditional teaching method when introducing new words. That is, when the new words in the vocabulary section of the textbook, Volume One, *New Far East English Reader for Senior High Schools* (遠東新高中英文第一冊), were taught, the participants were first asked to repeat the pronunciation after the researcher. The definition and translation of each new word were offered and its usage were explained through the illustrative sentence. The participants' attention was sometimes called to its part of speech and suffix derivation (e.g., the adverb-forming suffix *-ly*). Some derived words were provided (e.g., providing *competitive, competitively, competition, competitor* while the word *compete* was taught). Besides, some synonyms and antonyms of a word taught were also offered if available (e.g., *wide = broad, wide↔narrow*). In encountering words in a reading passage that were not introduced in the vocabulary section, each unfamiliar word was given its Chinese equivalent directly. Besides receiving instruction on

textbook vocabulary, the control group was assigned 120 additional words (see Appendix M) from “Far East English Vocabulary in Use” (遠東活用句子學單字) to memorize (10 words each week). Every week the researcher modeled pronunciation of the 10 words and asked the control group to repeat after her. Besides modeling pronunciation, the researcher also explained the meanings of example sentences offered in “Far East English Vocabulary in Use” (遠東活用句子學單字). In this kind of teacher-centered approach, no further techniques were provided for the participants to learn the new words. The students in the control group had to memorize new words on their own. But in order to balance the monitoring effect on the experimental group, the control group was also given a self-study checklist on supplementary words every week.

Vocabulary Learning Strategy Instruction

The experimental group received the vocabulary strategy instruction, which was integrated into the normal course curriculum. The content of instruction was based on their English textbook Volume One, *New Far East English Reader for Senior High Schools* (遠東新高中英文第一冊). The strategy instruction followed a model of “presentation” (the researcher’s explanation and demonstration of a strategy), “practice” (students’ practice with guidance), and “expansion” (students’ expansion of the taught strategy to other materials or tasks) (Chamot et al., 1999). Besides, their awareness was raised and their strategy use was monitored with the vocabulary learning strategy checklist (see Appendix E).

The six instructed strategies included “using dictionaries,” “keeping vocabulary cards,” “phonological analysis,” “word-part analysis,” “using keyword,” and “using words in a context.” Using dictionaries and vocabulary cards are two important self-learning strategies for language learners. If instructed how to consult a dictionary,

learners can discover information needed efficiently. If taught how to keeping vocabulary cards, they can review words repetitively at their own pace. Phonological analysis is also essential for learners. Once acquiring the knowledge of phonetic symbols and sound-letter corresponding rules, they can say a word correctly and memorize it more easily. In addition, “the keyword method” and “word-part analysis” are two effective memory strategies strengthening the form-meaning link. Analysis of word parts may increase learners’ accuracy of guessing the meaning of an unfamiliar word as well. Besides cultivation of learners’ receptive knowledge of vocabulary, learners should be instructed how to use words in a spoken or written context correctly. Equipped with the six types of vocabulary learning strategies, learners may develop their own lexicon outside the classroom in the long run.

When instructing new words in the vocabulary section in the English textbook, the researcher presented words with the vocabulary learning techniques if the selected strategies were applicable. Take the vocabulary in Volume One (遠東新高中英文第一冊) for example. When teaching the word “explorer,” the researcher adopted the technique “word-part analysis.” The students were reminded of the learned words with the same suffix “-er” such as *teacher*, *singer*, and *player*, and then were encouraged to analyze the target word as the root “explore” plus the suffix “er” and to guess its meaning. When teaching the word “lay,” the researcher helped the students to develop the strategy of “phonological analysis”: they were instructed to pronounce it by phonics first and then to check the correct pronunciation by means of the phonetic symbols. Subsequently, they were given two examples: “A penguin lays two eggs on a beach.” and “Don’t lay your hand on my shoulder.” Their awareness could be raised that a word may carry different meanings in different contexts. To encourage the use of “dictionary strategy,” they were further asked to look up the word “lay” in the dictionary to find out more information about the word and to

identify the correct entry in the dictionary. As for the way to memorize to-be-learned words, the procedure of applying the keyword method was demonstrated. Take the word ‘certain’ for example. First, they were encouraged to think of a Chinese word which had a similar sound to [ˈsɜːtən]. “舌疼” (she-teng means “a sore tongue”) may come into their mind and then a visual image “a boy who ate certain poisonous mushrooms would hurt his tongue for certain” (某些的毒菇吃了一定會舌疼) would be formed (see Appendix K for more examples). In this way, some words may be committed to memory more efficiently. In addition to this mnemonic method of memorizing vocabulary, the students were reminded that acquisition of vocabulary needs repetitive rehearsal at regular intervals. Therefore, in some lessons, the researcher chose three words to instruct students how to keep those words in “vocabulary cards”: writing down a word’s form on one side and its meaning on the other side. With the vocabulary cards, the students were also instructed how to review the words in varying order at regular intervals. They were required to “use these words in context” such as making sentences or doing the activity of making a story chain with the words in a lesson.

Besides the words in the textbook, 120 additional words (see Appendix M) were chosen from “Far East English Vocabulary in Use” (遠東活用句子學單字) for students to memorize (10 words each week), and encouraged them to practice using the taught strategies after class. The students were required to document and evaluate their use of strategies by checklists, and then to share with each other how they applied the vocabulary learning strategies to those words in class. They were encouraged to choose at least five words from the ten assigned words to note down on their vocabulary cards in the first five weeks. Every week, the researcher checked their strategy use checklists. Moreover, a worksheet on each vocabulary learning strategy (see Appendices G-L) was distributed to students to familiarize them with the

application of these strategies after school.

Data Collection Procedures

The overall experiment was generally divided into four phases (see Table 7). All the activities in these phases were carried out by the researcher. Before the present study began, the researcher designed the classroom activities that incorporated instruction of the selected vocabulary learning strategies for each lesson based on the literature and the English textbook adopted in the comprehensive senior high school. The 100-item vocabulary learning strategy questionnaire and the 32-item vocabulary learning motivation questionnaire were piloted to four second-grade students from the same comprehensive school, aiming to avoid any possible misunderstanding toward items and to check the time for completing the 132-item questionnaire. The 40 target words in the vocabulary test were piloted to a group of 20 second-grade students at the same school with a view to confirming that the target words in the receptive and productive parts would have a similar degree of difficulty.

This study began from September 7th, 2006, lasted for four months and ended on January 11th, 2007. The general procedure of conducting the present study was shown in Table 7. In the first phase, all the participants in both groups were required to fill in the questionnaires of strategy use and motivation (VLSQ and VLMQ), and took the vocabulary level test (VLT) and the vocabulary pretest (VT1) before the program. Both groups were informed of the immediate vocabulary posttest (VT2) at the beginning of the experiment and one week before the test. Immediately after the instruction, because of the teaching schedule, the VT2, and the strategy use and motivation questionnaires had to be administered on different days. Both groups were given the VT2 first. One day after the VT2 was conducted, they answered the VLSQ and the VLMQ. Four weeks later, without being informed in advance, the participants

took a VT3: another version of the VT that contained the same test items in different order. One day after the VT3, they completed the same VLSQ and VLMQ again. All the questionnaires and the tests were administered during class time with the presence of the researcher. After the class, the participants in the experimental group filled in one more questionnaire on their responses to the VLS instruction (VLSIQ). Twelve of them (four from each of the three proficiency levels) were interviewed by the researcher to investigate the difficulties they encountered in applying the strategies.

Table 7. Procedure of Conducting This Study

Phases	The Experimental Group	The Control Group
1. Pre-test	A. VLSQ (30 ms)	A. VLSQ (30 ms)
	B. VLMQ (5 ms)	B. VLMQ (5 ms)
	C. VLT (30 ms)	C. VLT (30 ms)
	D. VT1 (10 ms)	D. VT1 (10 ms)
2. Treatment (12 weeks)	Strategies-based vocabulary instruction (6 vocabulary learning strategies)	Traditional vocabulary instruction
3. Immediate Post-test	A. VT2 (10 ms)	A. VT2 (10 ms)
	B. VLSQ (30 ms)	B. VLSQ (30 ms)
	C. VLMQ (5 ms)	C. VLMQ (5 ms)
4. Delayed Post-test	A. VT3 (10 ms)	A. VT3 (10 ms)
	B. VLSQ (20 ms)	B. VLSQ (20 ms)
	C. VLMQ (5 ms)	C. VLMQ (5 ms)
5. Feedback on instruction	A. VLSIQ	--
	B. Interview	

Note. VLSQ = vocabulary learning strategy questionnaire.

VLMQ = vocabulary learning motivation questionnaire.

VLT = vocabulary level test. VT = vocabulary test.

VLSIQ = vocabulary learning strategy instruction questionnaire.

ms = minutes.

Data Analysis

To answer the research questions proposed earlier, the data collected in this study were analyzed quantitatively and qualitatively. Analysis of the quantitative data obtained from the questionnaires of strategy use and motivation (VLSQ and VLMQ), the vocabulary level test (VLT), the second part of the questionnaire on vocabulary strategy instruction (VLSIQ) and from the vocabulary tests (VT) were conducted using the SPSS statistical package. The qualitative data collected from the first part of VLSIQ and interviews were classified into different subcategories. Details about the data analysis procedures are presented below in accordance with the research questions.

Research Question 1: How well are the vocabulary learning strategies used respectively by all of the participants as a group and by each of the two groups (experimental vs. control groups) before and after the instruction? Which strategies are mastered the most or the least well?

To answer this question, the results obtained from the 50-item VLSQ before and after the instruction were first analyzed by descriptive statistics (e.g., mean, standard deviation, etc.) to see the overall patterns of vocabulary learning strategy use by all the students as a group and by each of the two groups (experimental vs. control groups).

Research Question 2: Is there a significant difference between the experimental group and the control group in mastery of the instructed vocabulary learning strategies before and after the instruction?

To examine the effects of vocabulary learning strategy instruction on strategy use, two-way ANOVA with a one between-subjects factor (i.e., experimental group vs. control group) and one within-subjects factor (i.e., pretest vs. immediate posttest vs. delayed posttest) repeated measures factorial design (time \times group) was used on the

summed mastery scores of fifteen items (see Table 4) on the VLSQ corresponding to the six kinds of instructed vocabulary learning strategies. Because no significant difference existed between two groups' pre-instruction vocabulary learning motivation, no statistical method was used to control the two groups' initial motivation and vocabulary size, which were potential contributors to differences in strategy use.

Research Question 3: Is there a significant difference between the experimental group and the control group in performance on vocabulary reception and production tests conducted before and after the instruction?

To determine the effects of vocabulary learning strategy instruction on vocabulary learning, two-way ANOVA with a one between-subjects factor (i.e., experimental group vs. control group) and one within-subjects factor (i.e., pretest vs. immediate posttest vs. delayed posttest) repeated measures factorial design (time × group) was adopted to examine scores on vocabulary recognition and production tests. Since two groups showed no significant differences in their initial vocabulary learning motivation, overall vocabulary learning strategy use, and vocabulary size, no attempt was made to control these potential contributing factors to vocabulary learning in this analysis.

Research Question 4: Is there a significant difference between the experimental group and the control group in vocabulary learning motivation before and after the instruction?

To investigate the effects of vocabulary learning strategy instruction on vocabulary learning motivation, two-way ANOVA with a one between-subjects factor (i.e., experimental group vs. control group) and one within-subjects factor (i.e., pretest vs. immediate posttest vs. delayed posttest) repeated measures factorial design (time × group) was employed on the VLMQ scores.

Research Question 5: What are students' attitude and feedback toward vocabulary strategy instruction? What are the difficulties the students' have in applying vocabulary learning strategies?

To deal with this question, participants' responses to the first part of VLSIQ in the experimental group were classified into categories, whereas their responses to the second part of the VLSIQ were analyzed using descriptive statistics. As for the difficulties the participants met in employing vocabulary learning strategies, data gathered from the teacher's notes and the semi-structured interviews with the participants in the experimental group were analyzed and classified into categories.