

國立政治大學英國語文學系碩士在職專班碩士論文

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網絡圖教學對高中生英文字彙習得之效益研究：

以 The Frayer Model 為基礎

The Effects of Graphic Organizer Instruction on
English Vocabulary Acquisition of Senior High School Students:

Take the Frayer Model as the Basis

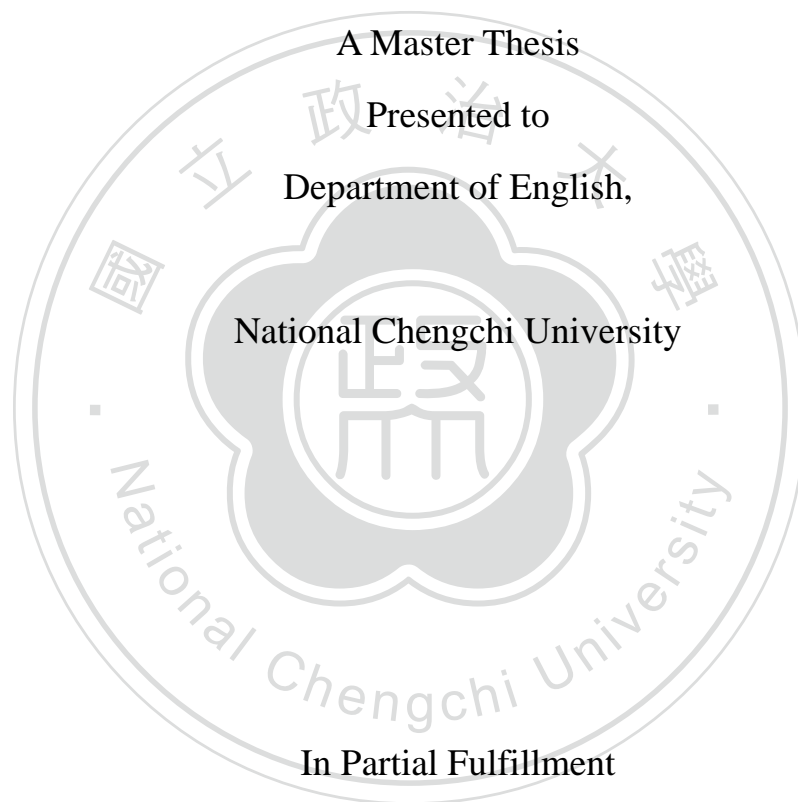
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The Effects of Graphic Organizer Instruction on
English Vocabulary Acquisition of Senior High School Students:
Take the Frayer Model as the Basis



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To My Beloved Parents

獻給我摯愛的父母



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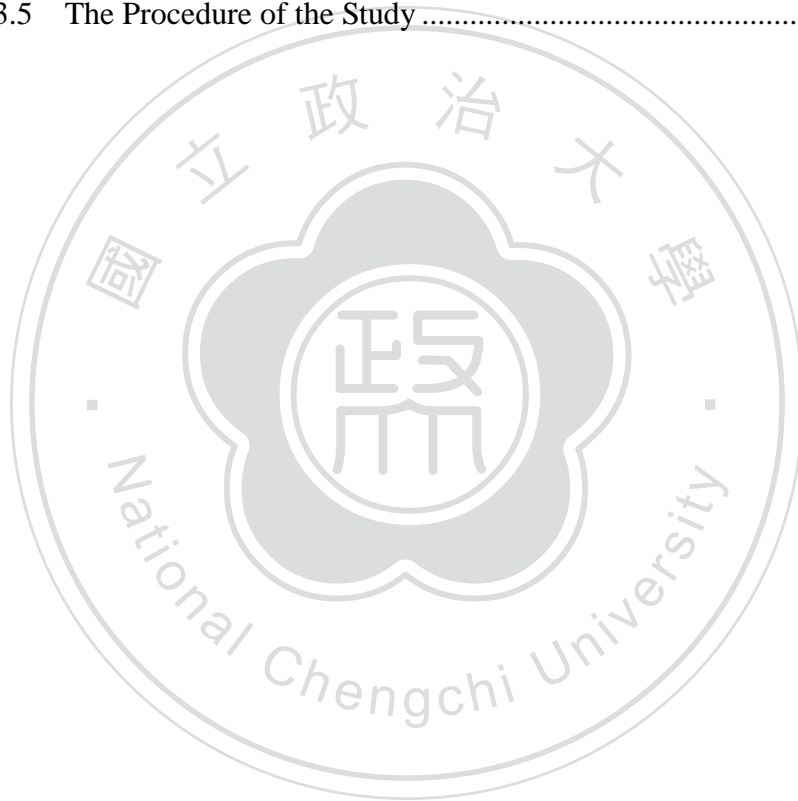
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國立政治大學英國語文學系碩士在職專班

碩士論文提要

論文名稱：網絡圖教學對高中生英文字彙習得之效益研究：

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指導教授：葉潔宇博士

研究生：吳依婷

論文提要內容：

本研究旨在探討網絡圖教學對高中生英文字彙習得的影響。網絡圖已廣泛運用於閱讀教學，且 the Frayer model 之前的研究都專注在學科領域的單字與閱讀教學。然而在以英語為第二外語的環境中，針對使用 the Frayer model 於網絡圖教學是否能增進學習者字彙習得(vocabulary acquisition)與記憶保留(word retention)，其相關研究仍顯不足。因此，本研究採用量化研究方法，以探究「網絡圖暨傳統單字教法」與「純傳統單字教法」對高中生英文字彙習得與記憶保留的影響。

研究對象為台灣北部一所公立高中一年級兩個班的六十九位學生，具有相同英文能力的這兩個班級被隨機指定為實驗組與控制組。在歷時六週的實驗教學中，實驗組與控制組分別接受「網絡圖暨傳統單字教法」與「純傳統單字教法」來學習三十二個主要單字。之後，兩組受試者隨即接受包含所有主要單字的研究者自編測驗，以得知兩組受試者的單字習得情形。一個月後，兩組受試者再次接受相同的單字測驗，以進一步得知單字的記憶保留情形。本研究主要發現如下：

(1)整體而言，接受「網絡圖暨傳統單字教法」的實驗組學生習得大多數的主要單字，但單字保留成效不佳；(2)總括來說，接受「純傳統單字教法」的控制組

學生習得並保留大多數的主要單字；(3)在單字習得與記憶保留成效方面，接受「網絡圖暨傳統單字教法」的實驗組學生顯著優於接受「純傳統單字教法」的控制組學生；(4)「網絡圖暨傳統單字教法」與「純傳統單字教法」對於高英語學習成就者的單字習得與記憶保留皆有正面影響，但只對低英語學習成就者的單字習得有正面影響；(5)對於高英語學習成就者之單字習得而言，「網絡圖暨傳統單字教法」的成效優於「純傳統單字教法」；然而，對於單字記憶保留而言，「網絡圖暨傳統單字教法」與「純傳統單字教法」的成效相同。對於低英語學習成就者之單字習得與記憶保留而言，「網絡圖暨傳統單字教法」與「純傳統單字教法」的成效相同。最後，研究者針對「網絡圖暨傳統單字教法」與「純傳統單字教法」在實際教學上的應用提供建議，以作為教育學者們的參考。



ABSTRACT

This study intends to explore the effects of graphic organizer instruction on vocabulary acquisition of senior high school students. Though graphic organizers have been widely employed in reading instruction and previous studies on the Frayer model focus on vocabulary and reading in content areas, little research has been conducted on whether graphic organizer instruction utilizing the adapted Frayer model will facilitate learners' vocabulary acquisition and word retention in an EFL context. Therefore, this present study adopted a quantitative research method to investigate the effectiveness of two different vocabulary instructions, i.e., "graphic organizer plus traditional vocabulary instruction" and "traditional vocabulary instruction only" on senior high school students' vocabulary acquisition and word retention.

Participants of this study were two classes of 69 first year students in a public senior high school in northern Taiwan. With similar English proficiency on General English Proficiency Test (GEPT), the two classes were randomly assigned as the experimental and control groups. During the six-week instructional experiment, the experimental and control groups received "graphic organizer plus traditional vocabulary instruction" and "traditional vocabulary instruction only" respectively to learn 32 target words selected in this study. After receiving the last vocabulary instructions, both groups took the immediate post-test, a researcher self-designed test, to assess their acquisition of all the target words. One month after the immediate post-test, both groups received the delayed post-test, which was the same as the immediate post-test, to track their word retention. The major findings are summarized as follows. (1) As a whole, learners receiving "graphic organizer plus traditional vocabulary instruction" acquired most of the target words but did not retain them one

month after. (2) Overall, learners receiving “traditional vocabulary instruction only” not only acquired the target words but also retained them in a month. (3) In terms of vocabulary acquisition and word retention, learners receiving “graphic organizer plus traditional vocabulary instruction” significantly performed better than those receiving “traditional vocabulary instruction only”. (4) Both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” promoted high proficiency learners’ vocabulary acquisition and word retention, but were only effective in low proficiency learners’ vocabulary acquisition. (5) High proficiency learners receiving “graphic organizer plus traditional vocabulary instruction” significantly acquired much more target words than those receiving “traditional vocabulary instruction only”, but similarly retained target words as those receiving “traditional vocabulary instruction only”. Low proficiency learners receiving “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” acquired target words as well as retained the words to a similar extent. Pedagogical implications and recommendations for further research were provided at the end of the thesis.

CHAPTER 1

INTRODUCTION

Background and Motivation

The importance of vocabulary cannot be overemphasized in language learning. Vocabulary is a vital component of language learning, for it is the indispensable element of language listening, speaking, reading and writing skills. Mastering vocabulary is particularly essential for EFL students. If they do not build good foundations in vocabulary, they will have difficulty comprehending reading texts and communicating with foreigners. As Wilkins (1972) claimed, “Without grammar, very little can be conveyed. Without vocabulary, nothing can be conveyed” (p. 111). The importance of vocabulary learning is obviously stated.

One of the assumptions of knowing a word put forth by Richards (1976) is that “knowing a word entails knowledge of the network of associations between that word and other words in language” (p. 81). He mentioned associating links between words by subordinate, coordinate, and superordinate classification, which echoes some components of the Frayer model. Hatch and Brown (1995) suggested five steps in the process of learning vocabulary: (1) encountering new words, (2) creating a mental picture of word form, either visual or auditory or both, (3) learning the words’ meaning, (4) creating a strong linkage between word form and meaning in the memory, and (5) using words (cited in Wang, 2010).

In order to facilitate vocabulary learning, various vocabulary teaching strategies and techniques have been applied to assisting learners in acquiring vocabulary efficiently (Chang, 2004; Holden, 1999; Jones & Thomas, 2006; Lai, 2003; Pressley & Harris, 1990; Richards, 1976; Smith, C. B., 2002). Jones and Thomas (2006) stated that “true vocabulary acquisition requires development of meaning to go with the words” (p. 59). They suggested some graphical vocabulary strategies, such as concept

of definition maps or word maps, be applied to helping learners acquire vocabulary in content areas like language arts and social studies. Holden (1999) also presented 15 memory and mnemonic strategies to help learners develop the range and breadth of their vocabulary, e.g. association method and keyword method. Since there are so many strategies and techniques concerning vocabulary learning in the literature, teachers should try to employ, besides traditional translation-based vocabulary instruction, other novel or peculiar methods to arouse students' interest in learning vocabulary.

In the language classroom, graphic organizers have been widely utilized in language learning, especially in reading (Dunston, 1992; Egan, 1999; Jiang & Grabe, 2007; Lo, 2010; Moore & Readence, 1984), writing (Chang, Sung & Chen, 2002; Reutzel, 1986; Smith, 2000), listening (Ruhe, 1996; Schmidt-Rinehart, 1994; Teng, 1994), and vocabulary (Hung, 2006; Irvin, 1990; Kaelin, 1991; Monroe, 1997; Smith, J. J., 2002).

The Frayer model, which was designed based on the concept of graphic organizers, has been frequently used for teaching mathematical vocabulary (Monroe, 1997; Monroe & Pendergrass, 1997; Wilder, 2010). However, little research has incorporated the Frayer model into English vocabulary teaching in an EFL context. Thus, the present study attempts to fill the gap by designing an experimental research to investigate the effect of graphic organizer instruction using the adapted Frayer model on the vocabulary acquisition of senior high school students.

Purpose of the Study

The purpose of the study was to investigate the effects of graphic organizer instruction on the vocabulary acquisition and word retention of EFL senior high school students. By conducting two different instructions, i.e., “graphic organizer plus

traditional vocabulary instruction” and “traditional vocabulary instruction only,” the researcher hoped to find out if “graphic organizer plus traditional vocabulary instruction” was more effective in promoting learners’ vocabulary acquisition and word retention than “traditional vocabulary instruction only,” and further to probe into how these two instructions affected high and low proficiency learners respectively.

Research Questions

In order to achieve the purpose of the study, five research questions were addressed as follows.

- (1) How much progress do learners who receive “graphic organizer plus traditional vocabulary instruction” make?
- (2) How much progress do learners who receive “traditional vocabulary instruction only” make?
- (3) Do learners who receive “graphic organizer plus traditional vocabulary instruction” perform better than those who receive “traditional vocabulary instruction only” on vocabulary acquisition?
- (4) Do learners who receive “graphic organizer plus traditional vocabulary instruction” perform better than those who receive “traditional vocabulary instruction only” on word retention?
- (5) Are both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” equally effective for high and low proficiency learners respectively?

Significance of the Study

The significance of this present study can be described in two ways. First, graphic organizer instruction may work as a novel alternative teaching method in EFL

vocabulary instruction to enhance learners' vocabulary acquisition and word retention. Graphic organizers not only connect learners' prior knowledge to new information but also motivate learners to associate and explore vocabulary, creating a pleasant and interactive learning atmosphere. Second, graphic organizer instruction was verified to be effective for high proficiency learners to acquire and retain vocabulary, and only effective for low proficiency learners to acquire vocabulary. It appears that graphic organizer instruction may meet the needs of learners with different proficiency levels, only if low proficiency learners were strongly motivated and longer exposed to graphic organizer instruction. Overall, it is hoped that this present study may shed light on senior high school students' vocabulary acquisition and word retention through different vocabulary instructions.

Definition of Terms

Graphic Organizer Instruction

In this present study, graphic organizer instruction was defined as an original vocabulary teaching method which requires students to utilize the adapted Frayer model to learn vocabulary words, including their definitions or synonyms, collocations, sentence making and associations.

Traditional Vocabulary Instruction

In this study, traditional vocabulary instruction referred to the translation-based teaching method which focuses on explanations and translations of vocabulary and example sentences, coupled with morphological forms and collocations if necessary.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the literature on the instruction of graphic organizers was reviewed in four sections. The first section elaborates on the definition, theories, applications, and variations of graphic organizers. The second section further probes into the relationship between vocabulary instruction and collocation. The third section discusses the related studies on the Frayer model. The last section describes the connection between the Frayer model and English vocabulary teaching.

Graphic Organizers

Graphic organizers can be used as vocabulary development activities and are thought of as an effective way to introduce new vocabulary before reading (Irvin, 1990). The details on the definition, theories, applications, and variations of graphic organizers are discussed below in the following parts.

Definition of graphic organizers

Numerous studies have offered various synonyms for graphic organizers, such as concept mapping, semantic webbing, graphic overview, and so on (Lo, 2010). Egan (1999) defined a graphic organizer as “a visual representation of knowledge, a way of structuring information, and of arranging essential aspects of an idea or topic into a pattern” (p. 641). That is, through the representation of graphic organizers, full command of text structure and higher level of thinking might be achieved. According to DiCecco and Gleason (2002), graphic organizers show the holistic relationship of all the contents and concepts by integrating them within a format of spatial arrangement. The format of a graphic organizer is made up of geometric shapes, lines, and arrows to demonstrate the interrelationships among major ideas (Darch et al.,

1986). Allen (1999) pointed out that “constructing graphic organizers aids and assists students as they discover meaning through intriguing pathways, separate from the traditional method” (cited in Smith, J. J., 2002, p. 4). For example, graphic organizers help students to grasp the essence of content material as well as promote positive involvement and discussion among students (Kaelin, 1991).

Theories of graphic organizers

Three theories related to graphic organizers are Ausubel’s meaningful learning theory, schema theory, and cognitive information processing theory. Graphic organizers have their origins in Ausubel’s advance organizers, whose function is to “provide ideational scaffolding for the stable incorporation and retention of the more detailed and differentiated material that follows” (Richard, 1979, p. 372). In other words, graphic organizers help to bridge the gap between what learners have already known and what they are going to learn by assimilating new information into their cognitive structures (Ivie, 1998). In one of Ausubel’s studies, he indicated that learners’ background knowledge had a significant effect on helping learners understand and retain new concepts (Ausubel & Youssef, 1963). That is, meaningful learning occurs when learners’ prior knowledge is activated and the new information is connected to the known information.

Schema theory is similar to meaningful learning theory to some extent. A schema, containing slots for specific information, is an organization of concepts and knowledge stored in memory (Dunston, 1992). The slots within a schema are just like the subsumers within our cognitive structure. If new information a learner takes fits into his or her existing schema, proper meanings will be constructed and comprehension will be improved. For instance, “teaching new vocabulary by linking the new word or label to a previously learned concept should result in greater learning

and longer retention than more conventional methods” (Eeds & Cockrum, 1985, p. 493). As Dunston (1992) stated:

Although the connection between schema theory and graphic organizers is not explicitly stated in the existing research, the implication is that key vocabulary terms or concepts from a learning task that are graphically displayed can activate prior knowledge more instantaneously and completely than abstract prose. (p. 59).

Teng (1994) also argued that visual cues provided before listening served as advance organizers, which activated relevant information in existing schema and as a result facilitated listening comprehension.

Another theory with relation to graphic organizers is cognitive information processing theory. According to Atkinson & Shrifin (1968), cognitive information processing theory refers to the role that sensory, short-term, and long-term memory play in receiving information and then transferring it to store and then recall in memory. If new information moving from sensory memory to short-term memory is actively used and integrated with existing knowledge, this information is more likely to store in learners’ long-term memory. Graphic organizers, visual presentation used for organizing information, help this process to occur (Dye, 2000). Moreover, cognitive information processing theory emphasizes the use of graphic diagrams, which helps learners connect new information with prior knowledge (Driscoll, 2002). Rekrut (1996) also exemplified such effective vocabulary instructions as semantic mapping, the modified Frayer model and the keyword method, which assist learners to build connections between previous conceptual knowledge and new words.

Applications of graphic organizers

Graphic organizers have been widely applied in language learning, especially in

reading (Dunston, 1992; Egan, 1999; Jiang & Grabe, 2007; Lo, 2010; Moore & Readence, 1984), writing (Chang, Sung & Chen, 2002; Reutzel, 1986; Smith, 2000), listening (Ruhe, 1996; Schmidt-Rinehart, 1994; Teng, 1994), and vocabulary (Hung, 2006; Irvin, 1990; Kaelin, 1991; Monroe, 1997; Smith, J. J., 2002). As for the applications of graphic organizers in reading, Jiang & Grabe (2007) compared the studies in the effect of graphic organizers that do and do not reflect text structures and concluded that the former facilitated learners' comprehension and retention of content area reading material. In Egan's (1999) research, she shared how she made use of graphic organizers to teach reading and provided practical instructional suggestions for teachers to consider. Lo (2010) found that graphic organizer instruction helps enhance reading comprehension of Taiwanese senior high school students and that they hold a positive attitude towards the use of graphic organizers. With regard to the applications of graphic organizers in writing and listening, Smith (2000) presented a unit of 10-day lesson plans on teaching descriptive writing, providing information about students' grade, ability level, prior knowledge, and key concepts and skills to develop. At the end of the unit, all of each student's writings would be compiled in a handbook. The title of the second-day lesson plan was "Modeling a Good Descriptive Text," in which a graphic organizer was used to develop students' ability to add descriptors and details to supporting sentences. Chang, Sung & Chen (2002) intended to explore the learning effects of concept-mapping strategies on students' text comprehension and summarization abilities. They discovered that both map-correction and scaffold-fading strategies helped enhance students' text summarization ability; students were thus able to grasp and organize the main ideas instead of trivial messages of an article. On the other hand, Teng (1994) maintained that visual cues allowed listeners to pay attention to specific information and to make predictions more accurately. Therefore, learners provided with visual cues performed

significantly better in listening comprehension than those without visual cues. Further, learners seeing visual cues before listening to the passage particularly produced greater performance than those seeing visual cues during or after listening.

Schmidt-Rinehart (1994) suggested that instructors should employ advance organizers as a means of connecting learners' background knowledge with new information so as to enhance learners' topic familiarity and contribute to their listening comprehension. Additionally, the applications of graphic organizers in vocabulary are illustrated as follows. In addition to emphasizing the importance of vocabulary knowledge, Irvin (1990) analyzed reasons for vocabulary acquisition and offered guidelines as well as learning strategies for effective vocabulary instruction. For instance, graphic organizers presented as a tree diagram are a good way of showing word relationships. Monroe (1997) not only summarized studies related to using graphic organizers in vocabulary instruction but also recommended that further research elaborate on teaching mathematics vocabulary through graphic organizers. Smith, J. J. (2002) conducted an instructional experiment on special education students but no significant differences existed among the four treatments of graphic organizer versus traditional instructions and assessments, pointing out that the use of graphic organizers does not necessarily fit for all situations. As the present study focuses on vocabulary teaching, the researcher further extends to explore the variations of graphic organizers in vocabulary instruction.

Variations of graphic organizers in vocabulary instruction

When it comes to vocabulary instruction, graphic organizers used as teaching techniques or strategies come in various formats, such as concept of definition maps, i.e., word maps, semantic feature analysis, word webs, sentence plus definition method, word analogies, the Frayer model, semantic mapping, concept wheels, and

the verbal-visual word association strategy (Chang, 2004; Greenwood, 2002; Hopkins & Bean, 1998; Monroe, 1997; Monroe & Pendergrass, 1997; Myers & Chang, 2009; Rosenbaum, 2001; Schwartz, 1988). As pointed out by Myers & Chang (2009), “visuals are powerful retention aids to promote students’ vocabulary understanding and acquisition” (p. 200). Among all the graphic organizers, concept of definition maps and the Frayer model are comparatively suitable for vocabulary teaching in senior high. These two graphic organizers are totally different from each other in format and in content. A concept of definition map, i.e., a word map, is a graphic representation of the definition of a word in terms of categories, properties, and illustrations. Three questions like “What is it?” “What is it like?” and “What are some examples?” help learners define a word more clearly. Schwartz (1988) exemplified in detail how he taught key vocabulary terms by means of concept of definition maps. He pointed out the limitations and problems he encountered during instruction and suggested feasible solutions to those problems. For example, students were puzzled about what to fill regarding the three questions, so he provided complete context passages for students to identify information to answer the three questions. The limitation of the map is that “the structure needs to be used flexibly and modified to fit particular concepts” (p. 111). Furthermore, the components of the Frayer model include relevant and irrelevant attributes, examples and non-examples, and superordinate, subordinate, and coordinate terms (Greenwood, 2002). The Frayer model uses four boxes to define examples, non-examples, characteristics, and non-characteristics of a concept or a word (see Figure 2.1). The Frayer model helps learners develop relationships and categories that are associated with the concept or the word. Learners have to define the target concept or word and apply the information to generate examples and non-examples. Wilder (2010) claimed that if students could write examples and develop non-examples of a concept on their own,

they would fully comprehend the concept. The Frayer model helped develop students' reasoning skills because vocabulary was presented as a concept related to other concepts rather than as a string of words put together. He made some modifications of the Frayer model to fit into what he wanted students to know about geometry and was amazed at the level of understanding his students achieved.

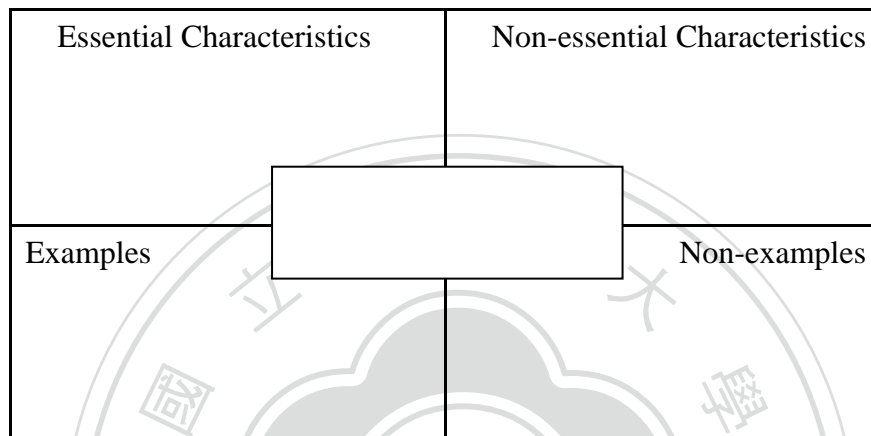


Figure 2.1 The Frayer Model

Vocabulary Instruction and Collocation

Since collocation is one of the essential parts comprising the adapted Frayer model of the present study (see Figure 3.4), the relationship between collocation and vocabulary instruction is explored as follows. Probing into vocabulary instruction, collocation is found to play an important role in lexical competence, but has long been undervalued (Wei, 1999; Bonk, 2000). Furthermore, Zimmerman (1993) pointed out that the concept of collocation is often neglected by language instructors and students thus fail to take notice of collocation despite its presence in classroom teaching materials (cited in Bonk, 2000). Therefore, collocation should be taught in such an explicit way in class that learners will get a clear picture of what words go with certain other words.

Definition of collocation

Benson et al. (1997) defined collocations, or recurrent, fixed combinations, as “fixed, identifiable, non-idiomatic phrases and constructions” (p. xv). According to Wei (1999), collocation is defined as the way words are typically combined or used together. Bonk (2000) claimed that collocations, or formulaic speech, refer to repeated and frequent combinations of lexical elements. Nation (1990) stated that collocation is the company that a word keeps and a type of word knowledge involving what words precede or follow a word. Palmer (1933) gave the definition of collocation as “successions of words that must or should be learnt... as an integral whole or independent entity, rather than by the process of piecing together their component parts” (cited in Durrant & Schmitt, 2010, p. 164). That is, words of collocation should not be learned as isolated words but acquired as meaningful chunks. Further, Durrant & Schmitt (2010) pointed out that collocations are word combinations that language learners encounter again and again so that these combinations are retained as their linguistic knowledge.

Classification of collocation

Collocations are usually categorized into two major groups: grammatical collocations and lexical collocations, based on Benson et al.'s classification of collocations (Benson et al., 1997; Liao, 2009; Myers & Chang, 2009; Wang & Good, 2007). Grammatical collocations are made up of a dominant word and a preposition or grammatical structure, whereas lexical collocations consist of nouns, adjectives, verbs and adverbs. There are eight types of grammatical collocations in Benson et al.'s (1997) categorization: (1) noun + preposition, (2) noun + to + infinitive, (3) noun + that-clause, (4) preposition + noun, (5) adjective + preposition, (6) adjective + to + infinitive, (7) adjective + that-clause, and (8) nineteen English verb patterns. As for

lexical collocations, seven types are illustrated as follows: (1) verb (creation/activation) + noun/pronoun, (2) verb (eradication/ nullification) + noun, (3) adjective + noun, (4) noun + verb, (5) noun (unit) + of + noun, (6) adverb + adjective, and (7) verb + adverb. Benson et al.'s (1997) classification of collocations has laid a solid foundation for the study of collocation henceforward.

Importance and necessity of explicit collocation instruction

The nature of collocation is so pervasive, inconspicuous and unpredictable that learners need a guide to make explicit acquisition (Durrant & Schmitt, 2010; Myers & Chang, 2009; Wei, 1999). Learners' acquisition of collocation depends on explicit attention to target collocation terms. Insufficient exposure to target collocation terms will contribute to defects in learners' collocation knowledge (Durrant & Schmitt, 2010). Myers & Chang (2009) claimed that collocation knowledge plays a crucial role in learners' communicative competence and language proficiency. That is, collocation knowledge enables learners to communicate in a more efficient and native-like way. Wei (1999) argued that instructors should provide learners with clear and explicit guidance to arouse their awareness of collocation, which helps promote learners' language development. Additionally, Liao (2009) maintained that learning collocations not only equips learners with accurate speaking and writing abilities but also enhances their language skills such as the usage of vocabulary. Chan & Liou (2005) indicated that collocation instruction is necessary and beneficial for EFL learners' collocation knowledge and confirmed the value of collocation instruction. Hsu (2002) concluded that "direct collocation instruction helps EFL learners acquire new collocations in written and spoken discourses that in turn enhance their proficiency in the four skills" (cited in Myers & Chang, 2009, p. 182). In other words, a strong correlation exists between learners' collocation competence and their general

proficiency in English (Bonk, 2000; Myers & Chang, 2009). Bonk (2000) contended that collocation knowledge greatly influences learners' comprehension and usage of language. For lack of repetition of collocations in textbooks, Wang & Good (2007) suggested that EFL instructors should provide explicit collocation instruction for learners to expose to collocations. After reviewing the importance of collocation in vocabulary instruction, let's investigate more studies pertinent to the Frayer model.

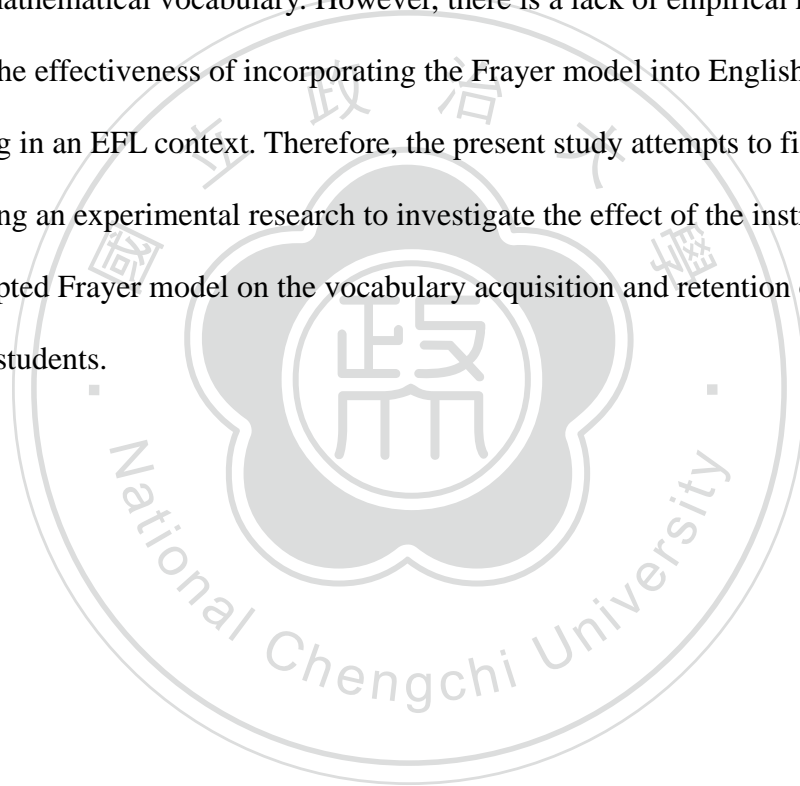
Related Studies on the Frayer Model

Most of the studies on the Frayer model focus on vocabulary and reading in content areas. As for the application of the Frayer model to reading, Peters (1974) pointed out that students using materials organized based on the Frayer model did significantly better in comprehending concepts than those employing materials organized based on the textbook approach. The result further showed a better performance for both high and low learners utilizing the Frayer model. Additionally, among these studies, the Frayer model has been frequently used for teaching mathematical vocabulary (Monroe, 1997; Monroe & Pendergrass, 1997; Wilder, 2010). Monroe and Pendergrass' (1997) research proved that students using the concept of definition map integrated with the Frayer model performed better than those using the definition-only model on the use of mathematical vocabulary in their journal writing. In other words, the integrated CD-Frayer model was effective in teaching mathematical vocabulary. Rekrut (1996) stated that the Frayer model was suitable for teaching complicated concepts and suggested it should be applied in such subjects as physics and art to clarify words like "mass" or "impressionism". Graves (1985) put forth a modified Frayer model with more explanations, examples, and exercises, which was easier for students to grasp the concept (cited in Rekrut, 1996). Flanigan & Greenwood (2007) divided all words into four levels from level 1 to level

4. Level 1 words refer to the words students need to have a deep understanding before they learn the reading passage. The Frayer model was recommended to teach level 1 words, for it enabled students to thoroughly understand a concept and to compare and contrast the concept with similar concepts.

The Frayer Model and English Vocabulary Teaching

As mentioned earlier, previous studies on the Frayer model were mostly used to teach mathematical vocabulary. However, there is a lack of empirical research to verify the effectiveness of incorporating the Frayer model into English vocabulary teaching in an EFL context. Therefore, the present study attempts to fill this gap by designing an experimental research to investigate the effect of the instruction using the adapted Frayer model on the vocabulary acquisition and retention of senior high school students.





CHAPTER 3

METHODOLOGY

The present study is an empirical study aiming to explore the effects of different vocabulary instructions, i.e., “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only”, on vocabulary acquisition and word retention of senior high school students. There are four sections in this chapter. The first section provides information about the participants. The second section describes the instruments of the study, including an English proficiency test (GEPT), a pre-test and two post-tests (researcher self-designed tests). The third section presents the whole procedures throughout the study. The last section focuses on the data analysis.

Participants

The participants in the study were 69 first year students from two classes in a public senior high school in northern Taiwan. These two classes were selected because they were the researcher’s own classes so that the experimental research was able to be conveniently conducted in practice. Prior to the instructional experiment, the participants took a standardized English proficiency test, GEPT, whose purpose was to distinguish high proficiency learners from low proficiency learners in the two classes. The scores of the two classes on the GEPT were analyzed through an independent t-test. The statistical results were illustrated in Table 3.1. The GEPT mean score of Class A ($n = 36$) was 67 with a standard deviation of 15.781, while that of Class B ($n = 33$) was 65.21 with a standard deviation of 16.294. Further, as shown in Table 3.2, these two classes passed the Levene’s test ($F = .153, p > .05$), indicating that the two classes were homogeneous. The t-test for equality of means revealed that there was no significant difference in the GEPT mean scores between the two classes

($t(67) = .463, p > .05$), indicating that the two classes were of similar English proficiency.

Table 3.1

Statistics of Participants' GEPT Scores

| Test | Group | <i>N</i> | <i>Mean</i> | <i>SD</i> |
|------|---------|----------|-------------|-----------|
| GEPT | Class A | 36 | 67 | 15.781 |
| | Class B | 33 | 65.21 | 16.294 |

Note. Total score is 100.

Table 3.2

Independent t-test on Participants' English Proficiency Test (GEPT)

| | | <i>Levene's Test for Equality of Variances</i> | | <i>t-test for Equality of Means</i> | | |
|----------|----------------------------|--|-------------|---|-----------|----------|
| | | <i>F</i> | <i>Sig.</i> | <i>t</i> | <i>df</i> | <i>p</i> |
| Class A- | Equal variances assumed | .153 | .697 | .463 | 67 | .645 |
| | Class B | Equal variances not assumed | | .462 | 66.045 | .645 |

As the two groups were of similar English proficiency, one of the classes was then randomly assigned as the experimental group and the other as the control group. The former received “graphic organizer plus traditional vocabulary instruction,” while the latter received “traditional vocabulary instruction only.” In addition, the participants aged 16 on average were all native speakers of Mandarin-Chinese and

attended four 50-minute formal English classes and one 80-minute after-school English class per week as the experiment was implemented.

To investigate the effects of different vocabulary instructions on vocabulary acquisition and word retention of high and low proficiency learners, the participants in each group were stratified into two levels, namely high and low English proficiency, based on their GEPT scores. The mean of the GEPT scores in each group was the cut-off point to distinguish high proficiency learners from low proficiency learners. As displayed in Table 3.1, in the experimental group, the participants ($n = 36$) with GEPT scores of 67 and above were classified as high proficiency learners ($n = 19$), whereas those with scores below 67 were classified as low proficiency learners ($n = 17$). In the control group, the participants ($n = 33$) with GEPT scores of 65.21 and above were classified as high proficiency learners ($n = 18$), whereas those with scores below 65.21 were classified as low proficiency learners ($n = 15$).

Instruments

The instruments employed in this study included (1) General English Proficiency Test (GEPT): Elementary Level Tests 4 & 5 (See Appendix A) and (2) researcher self-designed tests used as a pre-test and two post-tests (See Appendixes B & C). These two instruments, whose functions were summarized in Table 3.3, were elaborated in the following sections.

Table 3.3

The Instruments Used in this Study

| Instruments | Functions |
|---------------------------------------|---|
| 1. GEPT: Elementary Level Tests 4 & 5 | To ensure that the participants had the same level of English proficiency and to distinguish high proficiency learners from low proficiency ones |
| 2. Researcher Self-designed Tests | A pre-test: To ascertain that both groups had similar initial vocabulary proficiency Two post-tests: To assess the participants' vocabulary acquisition and word retention |

General English Proficiency Test (GEPT): Elementary Level Tests 4 & 5

The GEPT, a standardized English proficiency test developed by the Language Training and Testing Center (LTTC), targets English learners at all levels in Taiwan. It consists of five levels: Elementary, Intermediate, High-intermediate, Advanced, and Superior. The validity and reliability of the GEPT have been confirmed due to ongoing research of test development and administration. The Reading sections of the elementary level tests 4 & 5 were chosen as the instrument of this study for three reasons. First, the participants might not have taken the elementary level tests 4 & 5 because they were the latest practice test past papers. Second, the ability of an examinee that passed the Elementary level was roughly equivalent to that of a junior high school graduate. This conformed to the participants of the present study, the first year students in senior high. Third, since the focus of this study was on the effects of graphic organizer instruction on vocabulary acquisition, only the first part of the Reading section, Sentence Completion, could most directly measure the participants'

vocabulary proficiency. Therefore, Cloze and Reading Comprehension of the Reading section as well as the other sections of the GEPT, including Listening, Writing, and Speaking, were eliminated. Those questions in Sentence Completion that were related to sentence structure or grammar instead of vocabulary were also deleted. The first part of the Reading section, Sentence Completion, of the elementary level tests 4 & 5 as well as the sample tests downloaded from the GEPT official website (https://www.gept.org.tw/Exam_Intro/down01.asp) was administered to identify high and low proficiency learners of each group. There were 25 multiple choice questions in total. The participants could get 4 points for each correct answer. The full score was 100. The mean of all the participants' GEPT scores in each group was the cut-off point to distinguish high proficiency learners from low proficiency ones.

A Pre-test and Two Post-tests

The purpose of the pre-test was to examine if the experimental and control groups had similar vocabulary proficiency prior to the instructional experiment. The pre-test tested the vocabulary from lesson 2 to lesson 5 of the participants' textbook, which had not been taught by the teacher-researcher. To ensure that all the participants did not know the target words before the experiment, those who had known the target words in the pre-test would be excluded from the experiment. The researcher administered the immediate post-test to both groups right after the participants received their respective six-week vocabulary instructions to assess their vocabulary acquisition and the delayed post-test one month later to track their word retention. The one month interval difference was designed according to Ebbinghaus' (1964) theory of the curve of forgetting research. People will only retain about 21.1% of what they learned one month after they learned the information (cited in Kan, 2011). Therefore, one-month interval between the immediate post-test and the delayed post-test would

be appropriate in this study. In addition, all the pre- and post-tests were the same test designed by the researcher as an achievement test to evaluate if “graphic organizer plus traditional vocabulary instruction” had a greater effect on the participants’ vocabulary acquisition and word retention than “traditional vocabulary instruction only.” As the content of an achievement test was based directly on the objectives of the course, the researcher chose to design an achievement test rather than adopt the GEPT as the pre- and post-tests. The objective of the vocabulary instructions of both groups was not to measure the participants’ general English proficiency but to test if the participants could understand and memorize the new words taught by the teacher-researcher.

The pre- and post-tests were composed of two parts: 14 multiple choice questions and 14 gap filling questions by providing the initial and final letters, which were the most common question types of vocabulary tests in senior high and thus were quite familiar to the participants. The participants could get 3.5 points when they answered a question correctly. The full score was 98. The Cronbach’s alpha level of the pre- and post-tests was .8, meaning that there was high reliability among all the question items. As for the expert validity of the tests, the tests were reviewed by the researcher’s instructor and another instructor who specializes in testing. Moreover, three senior high school English teachers with over twenty years of teaching experiences were also invited to review the test. Based on their suggestions, some revisions were made, such as grammatical clues, possible answers and wording.

Teaching materials and worksheets

The teaching materials used for both the experimental group and the control group in this study were selected from lesson 2 to lesson 5 in the participants’ textbook, *English Reader for Senior High Schools Book 1*, Far East Edition. In

addition to the textbook, the teacher-researcher taught the experimental group with the worksheets of the adapted Frayer model developed by the researcher, and the control group with the traditional worksheets containing information, such as morphology and collocation, extracted from the teachers' manual. Lesson 1 was used as the warm-up training for the experimental group to make them familiar with the adapted Frayer model. The instructions and teaching materials for both groups are presented in Table 3.4. With the same textbook and identical treatment in the first class period for both groups, it was in the second class period of each lesson that both groups were taught with different instructions and worksheets.

Table 3.4

Instructions and Teaching Materials for CG and EG

| Instructions and Materials | Groups | The Control Group (CG) | The Experimental Group (EG) |
|---|--------|------------------------|-----------------------------|
| Textbook | | ✓ | ✓ |
| 1 st period: traditional vocabulary instruction + traditional worksheets | | ✓ | ✓ |
| 2 nd period: traditional vocabulary instruction + traditional worksheets | | ✓ | |
| 2 nd period: graphic organizer instruction + the adapted Frayer model worksheets | | | ✓ |

Note. Shaded areas are the different treatments.

Selection of Target Words

Owing to the limited time of the tight schedule in the school timetable and the time-consuming property of graphic organizer instruction, among all the vocabulary covered in the participants' textbook from lesson 2 to lesson 5, only eight words in each lesson would be selected as the target words for graphic organizer instruction. As

experimented in the pilot study, eight words were taught exactly within one class period. The eight words in each lesson for this study (see Table 3.5) were selected based on the following criteria. First, all the target words chosen for this study were content words, such as adjectives, adverbs, nouns, and verbs. Content words account for the majority of word classes and are much easier for learners to give definitions or make associations than function words. Second, the target words were critical to the key concepts of the Reading passage in each lesson. Third, the target words were more concrete in terms of meaning. The words that could be taught through the adapted Frayer model would be chosen as the target words. Some words that were too abstract for learners to describe their images, e.g. instead, following, were excluded from graphic organizer instruction. Fourth, the words with collocation usages in the teachers' manual were also included in the list of the target words. As for the rest of the new words in each lesson, they were taught through traditional vocabulary instruction with traditional worksheets in both groups so that the instructional time of the experimental group could be in accordance with that of the control group. In other words, for the experimental group, the eight target words were taught through graphic organizer instruction with the adapted Frayer model worksheets and the rest of the words were taught through traditional vocabulary instruction with traditional worksheets. For the control group, all the words were taught through traditional vocabulary instruction with traditional worksheets.

Table 3.5

Target Words in the Textbook

| Lessons | Target Words |
|---|--|
| Lesson 2: <i>Country Music</i> (8 words) | cattle, desert, calm, instrument, add, enemy, understanding, gather |
| Lesson 3: <i>Table Talk</i> (8 words) | service, area, fried, certainly, gentleman, gesture, website, lottery |
| Lesson 4: <i>The Little Shepherd Boy</i> (8 words) | shepherd, clever, single, flow, dizzy, eternity, wisdom, scholar |
| Lesson 5: <i>Skin Care</i> (8 words) | organ, protect, damage, vitamin, essential, squeeze, rub, proper |
| Total | 32 words |

Graphic Organizer Instruction: the Adapted Frayer Model

As mentioned in the literature review, the Frayer model can be developed to analyze and test concept attainment by presenting concepts in a relational manner. (Greenwood, 2002) The Frayer model, using four boxes to define examples, non-examples, characteristics, and non-characteristics of a concept or a word, helps learners form concepts and learn vocabulary. The Frayer model may improve learners' understanding of a concept or a word, but it ignores other aspects of vocabulary learning, such as synonyms, collocations, and sentence making. Later, three diagrams of a modified Frayer model (See Figure 3.1) and two word maps (See Figure 3.2 and 3.3) were found in *Reading Rockets* (http://www.readingrockets.org/strategies/word_maps/), a website funded by a major grant from the U.S. Department of Education with a variety of teaching information and resources about reading. The researcher thus thought the three diagrams were

more suitable for vocabulary teaching in senior high than the original Frayer model in educational settings of Taiwan. After checking these diagrams with five other in-service senior or vocational high school English teachers with an average of six-year teaching experiences, the researcher finally decided to eliminate the two word maps because they were either too complicated or too flexible. As shown in Figure 3.2, there were so many boxes for learners to fill in that there seemed to be no time to teach eight words in one class period. On the other hand, it was difficult to confine the possible answers to the boxes in the word map in Figure 3.3. It appeared that there were no standard criteria or range for learners to follow as long as any answer made sense. However, the modified Frayer model, consisting of “definition in your own words,” “synonyms,” “use it meaningfully in a sentence,” and “draw a picture of it,” was thereby considered more suitable for teaching vocabulary in senior high, for it clearly contained the knowledge and usage of a word. According to George, knowing a word can be interpreted from four classification criteria: form, position, function and meaning (cited in Nation, 1990), among which written form, collocations, concept, and associations respond to some of the boxes in the modified Frayer model. For example, written form of target words is revealed in the central box “vocabulary word,” while concept and associations are related to “definition” and “synonyms” of target words. In addition, collocations also play a vital role in knowing a word. As Nation (1990) claimed, “Knowing a word involves having some expectation of the words that it will collocate with” (p. 32). The researcher accordingly made a slight change to the modified version on the website to suit the needs of her vocabulary instruction. That is, “definition in your own words/ synonyms,” “collocations,” “your very own sentence,” and “your association/ sketch” comprised the adapted Frayer model of the present study (see Figure 3.4). The researcher combined definition and synonyms in one box and added collocations in

another and changed “draw a picture of it” to “your association/ sketch” in the last box. Based on Hatch and Brown’s (1995) five steps of vocabulary learning: (1) encountering new words, (2) creating a mental picture of word form, either visual or auditory or both, (3) learning the words’ meaning, (4) creating a strong linkage between word form and meaning in the memory, and (5) using words (cited in Wang, 2010), the last four steps responded to the adapted Frayer model of the present study. Learning the words’ meaning involves knowing their definitions and synonyms. Creating a mental picture of word form and a strong linkage between word form and meaning is related to association of the word, and collocations and making sentences are ways of knowing how to use words. The first item of the adapted Frayer model was meant to develop students’ ability to define a new word in their own words; occasionally they could just use synonyms to define it if any. The aim of the second item was to familiarize students with usages of a target word. Students had to know what types of words to use with it. The third item was intended to help students learn how to use a target word by making a sentence on their own. For the last item, students could write something like how they memorized and associated the new word or simply drew a picture reminding them of the word.

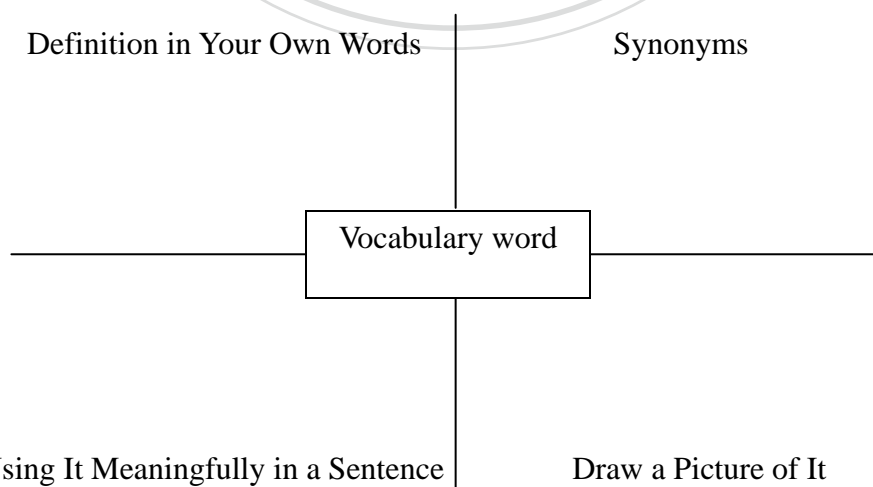


Figure 3.1 A Modified Frayer Model

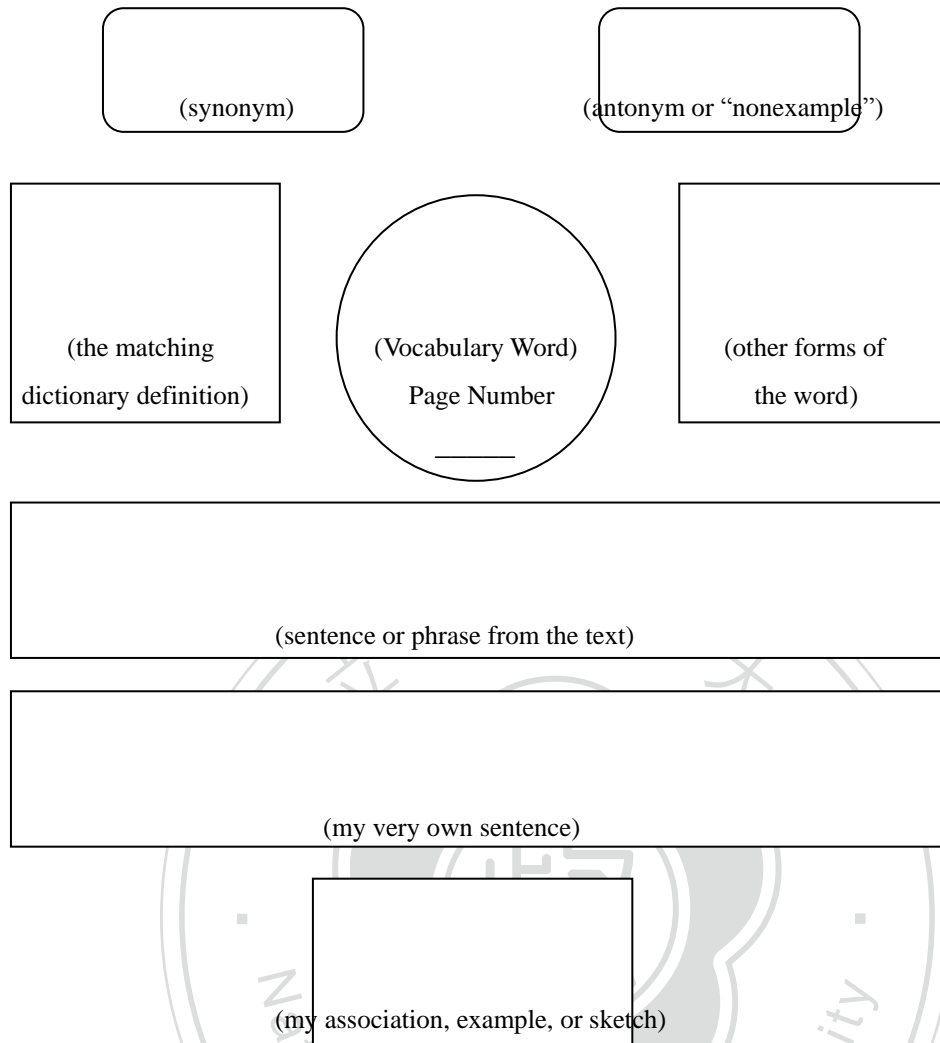


Figure 3.2 Word Map 1

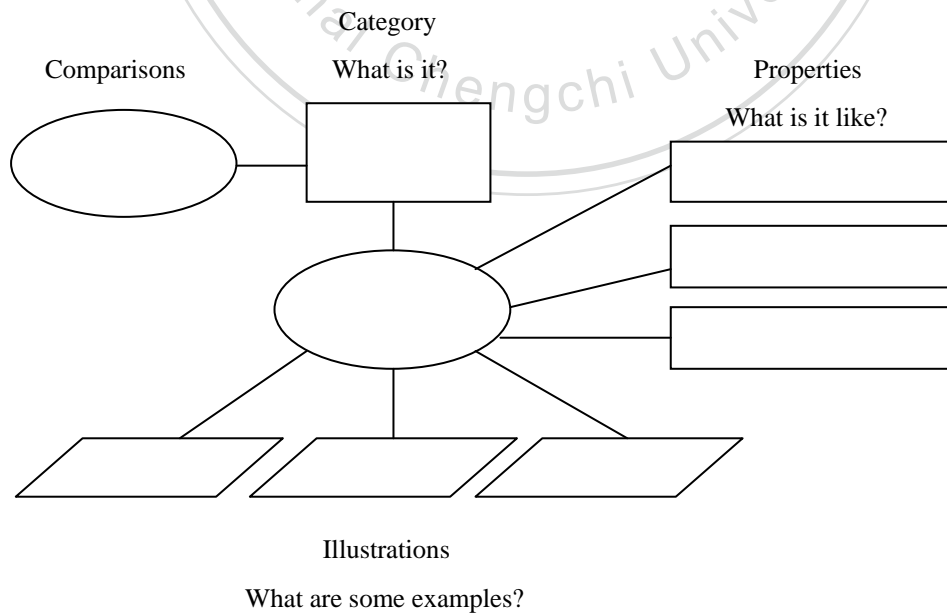


Figure 3.3 Word Map 2

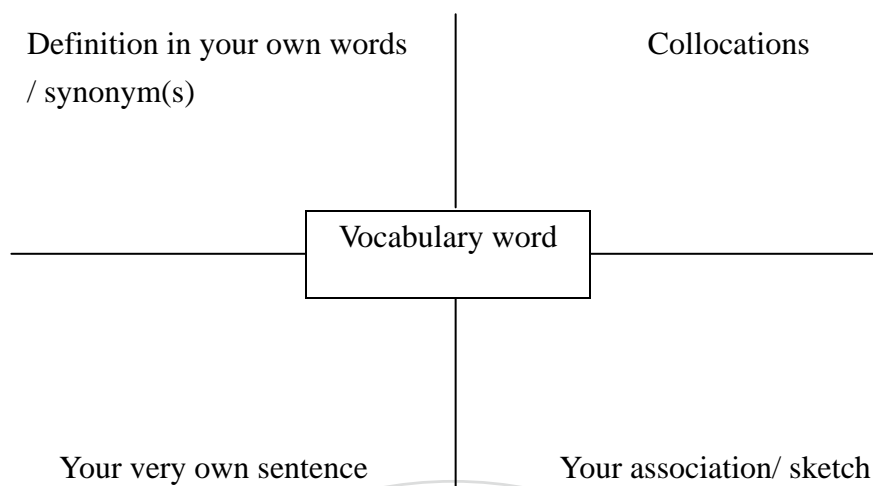


Figure 3.4

The Adapted Frayer Model

To make the experimental group familiar with the adapted Frayer model, the teacher-researcher taught the new words in lesson 1 (lesson 2 to lesson 5 were the content to be covered in the main study) in the following way as a warm-up training for one class period prior to the main study. Regarding the teaching procedure of the experimental group receiving graphic organizer instruction of eight target words, the researcher, i.e. the teacher, introduced a new word by giving a definition in such a plain way that students could understand the meaning of the new word and then listed several words from which students had to choose the synonym of the new word. The teacher-researcher went on to supplement some collocations of the new word. After that, the teacher led students to make a sentence with the new word. Finally, she shared how she associated or memorized the meaning of the new word and drew a picture reminding her of the new word. Students needed to fill in the handout box by box and got the picture of what the adapted Frayer model was like. When the main study was conducted, students in the experimental group were required to give

definitions, synonyms, collocations as well as make sentences and associations on their own. The teacher elicited and encouraged more responses from students and discussed their responses with the whole class. Students were able to use dictionaries in class so that they could check whether the words they came up with were correct or not, but they were not allowed to copy the definitions and the example sentences in the dictionaries. After the instruction of each class, the adapted Frayer model worksheets were examined by the teacher to ensure that no box was left blank by students. As for the first class period of each lesson, the experimental group received the same instruction and used the same textbook and worksheets as the control group receiving traditional vocabulary instruction.

Traditional Vocabulary Instruction

On the other hand, the control group, using the textbook as the teaching material, received the traditional translation-based vocabulary instruction, whose main focus was on the explicit explanation of vocabulary and translation of example sentences. That is, the teacher-researcher introduced a new word by guiding students to look at its definition in the textbook and explained the meaning of the new word in Chinese. The teacher then moved on to translate the meanings of the example sentences provided in the textbook or asked students to read the sentences and translate them into Chinese. Through example sentences, the teacher also explained the usages of the new word. The morphological forms and collocations of the new word were supplemented in the traditional worksheets.

Procedure

This research procedure of this study comprises two stages: a pilot study and the main study. After the pilot study, the participants took an English proficiency test

(GEPT) and the experimental group received a warm-up training of graphic organizer instruction so that they would be familiar with its teaching procedure prior to the main study. The main study includes: (1) a pre-test in word knowledge; (2) two types of vocabulary instructions, namely “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only”; (3) the immediate post-test and the delayed post-test with an interval of one month (see Figure 3.5).



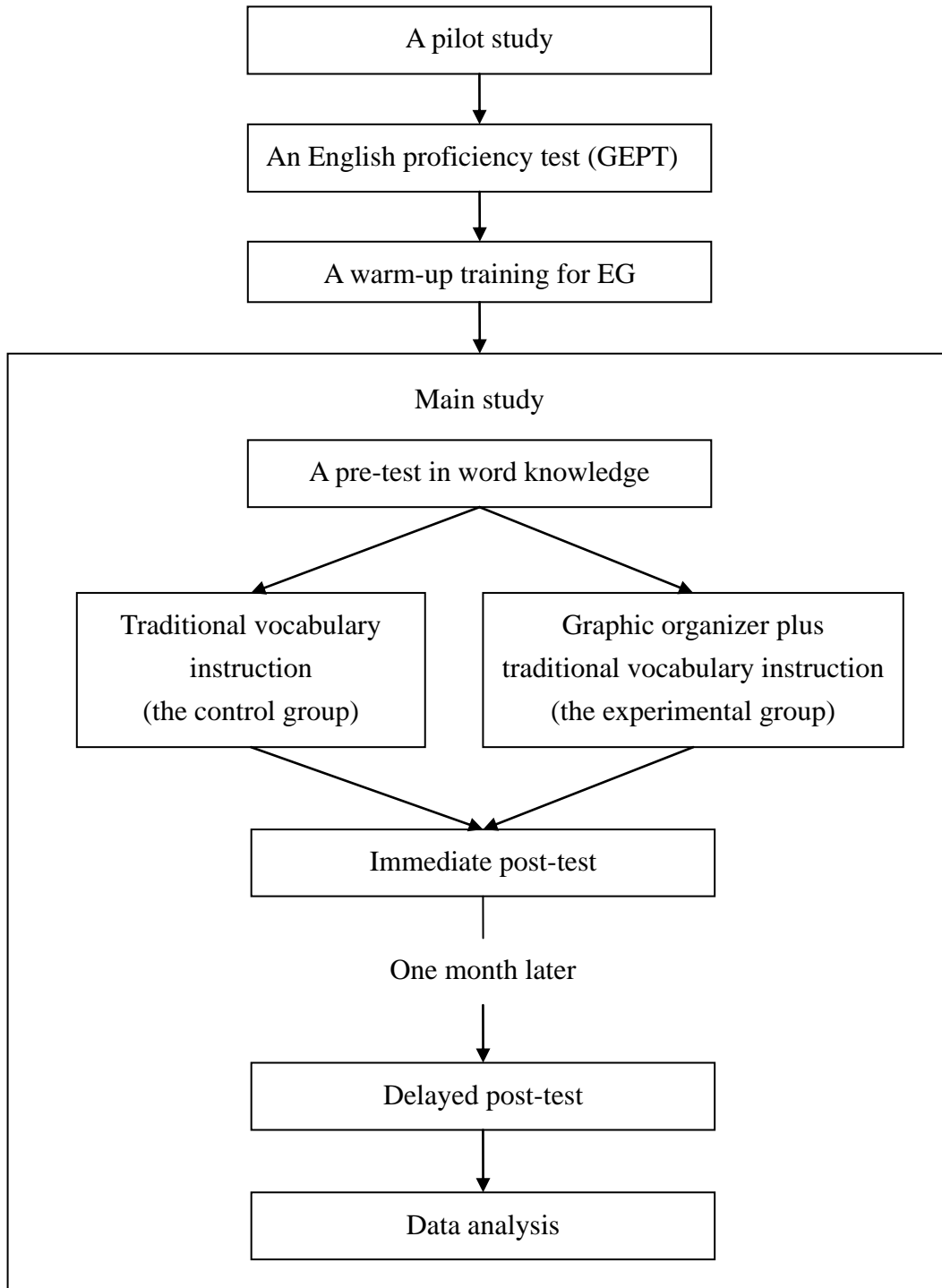


Figure 3.5

The Procedure of the Study

Pilot Study

To verify the feasibility of this study, a pilot study was conducted prior to the

main study, and some modifications were made based on the pilot study. The purposes of the pilot study were to find out whether there were some problems with the teaching procedure of graphic organizer instruction and to delete the questions of the researcher self-designed test whose reliability was below .3. The pilot study as well as the researcher self-designed test was administered to a senior one class that did not join the main study from the same school. The researcher went through the teaching procedure of graphic organizer instruction. The participants were taught eight new words of lesson 1 in a class period. At the beginning of the instruction, the participants looked surprised, for in school settings they had never learned English vocabulary in this way, which was thought of as novel and interesting after they got a picture of the teacher-researcher's teaching pattern. They especially took interest in the picture drawn in the box of "association" by the teacher-researcher. However, the participants seldom made responses when asked to make sentences for the new words.

The results of the pilot study are as follows: (1) As experimented in the pilot study, eight words were taught exactly in one class period; therefore, the researcher ensured the precise number of the words to be taught in one class period in the main study—8 words. (2) As mentioned above, the participants kept silent most of the time when they were asked to offer answers. Consequently, the researcher needed to provide the participants with hints and guidance to elicit more responses from them. (3) Most of the participants did not know the target words in the researcher self-designed test with the mean score of 18.87, confirming that the target words were unknown words for the participants. (4) The Cronbach's alpha level of the researcher self-designed test was .8, meaning that there was high reliability among all the question items, so no revision was made and the researcher self-designed test was thus taken as the pre- and post-tests.

Main Study

The whole procedure of the main study was illustrated in Table 3.6. The main study was carried out in the first semester of the 2011-2012 academic year. The thirteen-week main study included a pre-test, six-week vocabulary instruction, and two post-tests with a one-month interval. Specifically, both the experimental group and the control group received the pre-test in the 1st week of the main study to evaluate their initial word knowledge of the target words. From the 3rd to 9th week, “graphic organizer plus traditional vocabulary instruction” was implemented to the experimental group, while “traditional vocabulary instruction only” to the control group. During the six-week instruction with four 50-minute formal English classes and one 80-minute after-school English class per week, four lessons of vocabulary were respectively taught at the first two class periods of each lesson. As for the first class period of each lesson from the 3rd to 9th week, the teacher-researcher taught both groups the rest of the new words other than the eight target words through traditional vocabulary instruction with traditional worksheets. Then at the second class period from the 3rd to 9th week, the eight target words were taught with different treatments for both groups. That is, the experimental group received graphic organizer instruction via the adapted Frayer model worksheets, whereas the control group still received the same traditional vocabulary instruction as the first class period. The only difference between the two groups was the second class period of each lesson. The researcher did not teach all of the vocabulary merely through graphic organizer instruction for the experimental group because some of the words could not be taught via the adapted Frayer model. Additionally, teaching vocabulary through graphic organizer instruction was so time-consuming that the researcher decided to adopt “graphic organizer plus traditional vocabulary instruction” for the experimental group and “traditional vocabulary instruction only” for the control group, so that the teaching time allotted to

both groups would be the same. In the 9th week, immediately after the vocabulary instructions, both groups received the immediate post-test to assess their vocabulary acquisition. One month after the immediate post-test was finished, i.e., in the 13th week, both groups received the delayed post-test to track their word retention. Finally, data collected from the pre-test and two post-tests were analyzed.



Table 3.6

The Similarities and Differences in Treatments between the Two Groups

| Week | Lesson | Class Period | The Experimental Group | The Control Group |
|-------------|--------|----------------------------------|---|---|
| 1 | | 2 nd | Administer the pre-test (30 min.) | |
| 3 4 | L2 | 1 st | traditional vocabulary instruction + traditional worksheets | |
| | | 2 nd | graphic organizer instruction + the adapted Frayer model worksheets | traditional vocabulary instruction + traditional worksheets |
| | | 3 rd ~5 th | Grammar and Reading | |
| 4 5 | L3 | 1 st | traditional vocabulary instruction + traditional worksheets | |
| | | 2 nd | graphic organizer instruction + the adapted Frayer model worksheets | traditional vocabulary instruction + traditional worksheets |
| | | 3 rd ~5 th | Grammar and Reading | |
| 5 6 | L4 | 1 st | traditional vocabulary instruction + traditional worksheets | |
| | | 2 nd | graphic organizer instruction + the adapted Frayer model worksheets | traditional vocabulary instruction + traditional worksheets |
| | | 3 rd ~5 th | Grammar and Reading | |
| 8 9 | L5 | 1 st | traditional vocabulary instruction + traditional worksheets | |
| | | 2 nd | graphic organizer instruction + the adapted Frayer model worksheets | traditional vocabulary instruction + traditional worksheets |
| | | 3 rd ~5 th | Grammar and Reading | |
| 9 | | 3 rd | Administer the immediate post-test (30 min.) | |
| 13 | | 3 rd | Administer the delayed post-test (30 min.) | |

Note. Shaded areas are the different treatments.

Data Analysis

The researcher used the statistical package SPSS to quantitatively analyze the data collected in this study, which intended to find out the answers to the research questions presented earlier.

Research Question 1: How much progress do learners who receive “graphic organizer plus traditional vocabulary instruction” make?

To answer Research Question 1, a paired-sampled t-test was implemented to see if there were significant differences in the mean difference between the pre-test and the immediate post-test and in that between the immediate post-test and the delayed post-test of learners receiving “graphic organizer plus traditional vocabulary instruction.”

Research Question 2: How much progress do learners who receive “traditional vocabulary instruction only” make?

To answer Research Question 2, a paired-sampled t-test was conducted to see if significant differences existed in the mean difference between the pre-test and the immediate post-test and in that between the immediate post-test and the delayed post-test of learners receiving “traditional vocabulary instruction only.”

Research Question 3: Do learners who receive “graphic organizer plus traditional vocabulary instruction” perform better than those who receive “traditional vocabulary instruction only” on vocabulary acquisition?

To answer Research Question 3, an independent t-test was conducted to ascertain that there was no significant difference in the mean scores of the pre-test of the experimental and control groups to ensure that the participants in both groups had the same initial word knowledge of the target words. Next, an independent t-test was implemented for statistical significance in the mean scores of the immediate post-test of both groups to show that “graphic organizer plus traditional vocabulary

instruction” was more effective in enhancing vocabulary acquisition than “traditional vocabulary instruction only”.

Research Question 4: Do learners who receive “graphic organizer plus traditional vocabulary instruction” perform better than those who receive “traditional vocabulary instruction only” on word retention?

To answer Research Question 4, an independent t-test was employed for the mean scores of the delayed post-test of the experimental and control groups to measure if there was a significant difference between the two groups.

Research Question 5: Are both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” equally effective for high and low proficiency learners respectively?

To answer Research Question 5, an independent t-test and a paired-sampled t-test were conducted separately to investigate the effects of vocabulary instructions on vocabulary acquisition and word retention of high and low proficiency learners within each group and between the two groups. The alpha level for all statistical analyses was set at .05 for tests of significance.

CHAPTER 4

RESULTS

This chapter presents the results of the quantitative analysis of the data collected. The first two sections report the results for Research Question 1 and 2 — How much progress do learners who receive “graphic organizer plus traditional vocabulary instruction” make? How much progress do learners who receive “traditional vocabulary instruction only” make? The following two sections present the results for Research Question 3 and 4 — Do learners who receive “graphic organizer plus traditional vocabulary instruction” perform better than those who receive “traditional vocabulary instruction only” on vocabulary acquisition? Do learners who receive “graphic organizer plus traditional vocabulary instruction” perform better than those who receive “traditional vocabulary instruction only” on word retention? The fifth section demonstrates the results for Research Question 5 — Are both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” equally effective for high and low proficiency learners respectively? All of the findings in the study are summarized in the last section.

Results of the Progress the Experimental Group Made

This section reports the results of the pre-test, the immediate post-test and the delayed post-test of the experimental group, which responds to Research Question 1. The pre-test, the immediate post-test and the delayed post-test were the same test designed by the researcher. It comprised 28 question items, including 14 multiple choice questions and 14 gap filling questions. The participants could get 3.5 points when they answered a question correctly. The full score was 98. There were totally 69 students who took the pre-test and two post-tests, 36 in the experimental group and 33 in the control group. To answer Research Question 1, which concerned the progress

that learners who received “graphic organizer plus traditional vocabulary instruction” made, a paired-sampled t-test was administered to compare the mean scores of the experimental group’s pre-test, the immediate post-test and the delayed post-test. The immediate post-test was administered immediately after the participants received the last “graphic organizer plus traditional vocabulary instruction”. As illustrated in Table 4.1, a statistically significant difference existed in the mean difference ($MD = 45.889$) between the pre-test and the immediate post-test of the experimental group ($t(35) = 21.034, p < .05$), demonstrating that the experimental group made considerable progress in acquiring target words after receiving “graphic organizer plus traditional vocabulary instruction”. The delayed post-test was conducted one month right after the immediate post-test to track word retention of the participants. There was a significant difference in the mean difference ($MD = -5.542$) between the immediate post-test and the delayed post-test of the experimental group ($t(35) = -3.274, p < .05$), suggesting that “graphic organizer plus traditional vocabulary instruction” had a more crucial effect on the experimental group’s vocabulary acquisition than on their word retention. In conclusion, the experimental group who received “graphic organizer plus traditional vocabulary instruction” improved significantly on vocabulary acquisition but did not retain most of the target words after one month. That is, “graphic organizer plus traditional vocabulary instruction” significantly affected the experimental group’s vocabulary acquisition.

Table 4.1

Paired-Sampled t-test for Progress in the Experimental Group

| Test | <i>M</i> | <i>Mean Difference</i> | <i>t</i> | <i>p</i> |
|---------------------|----------|------------------------|----------|----------|
| Immediate post-test | 63.583 | 45.889 | 21.034 | .000*** |
| Pre-test | 17.694 | | | |
| Delayed post-test | 58.042 | -5.542 | -3.274 | .002** |
| Immediate post-test | 63.583 | | | |

** $p < .01$, *** $p < .001$

Results of the Progress the Control Group Made

This section presents the results of the pre-test, the immediate post-test and the delayed post-test of the control group, which responds to Research Question 2. To answer Research Question 2, which concerned the progress that learners who received “traditional vocabulary instruction only” made, a paired-sampled t-test was conducted to compare the mean scores of the control group’s pre-test, the immediate post-test and the delayed post-test. The immediate post-test was administered immediately after the participants received the last “traditional vocabulary instruction only”. As shown in Table 4.2, there was a statistically significant difference in the mean difference ($MD = 40.091$) between the pre-test and the immediate post-test of the control group ($t(32) = 20.423$, $p < .05$), illustrating that the control group made significant progress in vocabulary acquisition after they received “traditional vocabulary instruction only”. What’s more, no significant difference was found in the mean difference ($MD = -3.288$) between the immediate post-test and the delayed post-test of the control group ($t(32) = -1.681$, $p > .05$), implying that the effect of “traditional vocabulary instruction only” on the control group could last for one

month, so the mean difference between the immediate post-test and the delayed post-test was small. In sum, in addition to gaining significant word retention, the control group receiving “traditional vocabulary instruction only” made major progress in vocabulary acquisition. In other words, “traditional vocabulary instruction only” had a positive effect on the control group’s vocabulary acquisition and word retention.

Table 4.2

Paired-Sampled t-test for Progress in the Control Group

| Test | <i>M</i> | <i>Mean Difference</i> | <i>t</i> | <i>p</i> |
|---------------------|----------|------------------------|----------|----------|
| Immediate post-test | 54.197 | 40.091 | 20.423 | .000*** |
| Pre-test | 14.106 | | | |
| Delayed post-test | 50.909 | -3.288 | -1.681 | .103 |
| Immediate post-test | 54.197 | | | |

*** $p < .001$

Results of the Participants’ Performances on the Pre-test, the Immediate Post-test and the Delayed Post-test

This section compares the results of the pre-test, the immediate post-test and the delayed post-test between the experimental and control groups, which responds to Research Questions 3 and 4. Table 4.3 displays the statistical results between the experimental and control groups in the pre-test, the immediate post-test and the delayed post-test. To answer Research Question 3, an independent t-test was conducted to compare the mean scores of the two groups’ pre-test and immediate post-test. As for the pre-test, the mean score of the experimental group was 17.694, while that of the control group was 14.106. There was no significant difference in the

mean scores of pre-test between the two groups ($t(67) = 1.532, p > .05$), which indicates that the participants in both groups had similar vocabulary proficiency before the implementation of the vocabulary instruction. The immediate post-test was administered immediately after the participants received the last “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” respectively. According to Table 4.3, the difference of the mean scores of the immediate post-test between the two groups reached a statistically significant level ($t(67) = 3.079, p < .05$). The mean score of the immediate post-test of the experimental group ($M = 63.583$) was higher than that of the control group ($M = 54.197$). The experimental group significantly performed better than the control group in the immediate post-test. That is, the participants receiving “graphic organizer plus traditional vocabulary instruction” outperformed those receiving “traditional vocabulary instruction only” on vocabulary acquisition. In other words, “graphic organizer plus traditional vocabulary instruction” indeed had a greater effect on vocabulary acquisition of the participants than “traditional vocabulary instruction only”.

To answer Research Question 4, which concerned whether learners who received “graphic organizer plus traditional vocabulary instruction” performed better than those who received “traditional vocabulary instruction only” on word retention, the statistics of the delayed post-test between the experimental and control groups were analyzed through an independent t-test. The delayed post-test was conducted one month right after the immediate post-test to track word retention of the participants. As shown in Table 4.3, the mean score of the delayed post-test of the experimental group was 58.042, while that of the control group was 50.909. There was a statistically significant difference in the mean scores of the delayed post-test between the two groups ($t(67) = 2.055, p < .05$). The experimental group significantly

outscored the control group in the delayed post-test. That is, the participants receiving “graphic organizer plus traditional vocabulary instruction” performed better than those receiving “traditional vocabulary instruction only” on word retention. To put it differently, “graphic organizer plus traditional vocabulary instruction” truly resulted in more word retention of the participants than “traditional vocabulary instruction only”.

Table 4.3

Independent t-test on Participants' Pre-test, Immediate post-test and Delayed post-test

| Test | Group | N | Mean | SD | t | p |
|---------------------|--------------|----------|-------------|-----------|----------|----------|
| Pre-test | Experimental | 36 | 17.694 | 10.515 | 1.532 | .130 |
| | Control | 33 | 14.106 | 8.771 | | |
| Immediate post-test | Experimental | 36 | 63.583 | 13.633 | 3.079 | .003** |
| | Control | 33 | 54.197 | 11.48 | | |
| Delayed post-test | Experimental | 36 | 58.042 | 12.972 | 2.055 | .044* |
| | Control | 33 | 50.909 | 15.825 | | |

Note. 1. Total score is 98.

2. * $p < .05$, ** $p < .01$

Results of the Effects of Different Vocabulary Instructions on High and Low Proficiency Learners

This section first presents the statistical results of high and low proficiency learners in the experimental and control groups. Before the experiment, the initial proficiency level of high and low proficiency learners in both groups needed to be confirmed. The statistical results of high and low proficiency learners in both groups

were analyzed with the aid of an independent t-test to ascertain that there was a statistically significant difference between high and low proficiency learners within each group and that the difference of high and low proficiency learners between the two groups did not reach a statistically significant level. Furthermore, to answer Research Question 5, a paired-sampled t-test and an independent t-test were conducted to investigate the effects of different vocabulary instructions on vocabulary acquisition and word retention of high and low proficiency learners within each group and between the two groups.

The Statistical Results of the GEPT Scores of High and Low Proficiency Learners

The statistical results of the General English Proficiency Test (GEPT) scores of the high and low proficiency learners in the experimental and control groups are presented in Table 4.4. The participants in each group were divided into two levels, i.e., high and low proficiency learners, according to their scores on the GEPT, a standardized English proficiency test developed by the Language Training and Testing Center (LTTC). The GEPT in this study consisted of 25 multiple choice question items. The participants could get 4 points when they answered a question correctly. The full score was 100. The mean of the GEPT scores in each group was the cut-off point to distinguish high proficiency learners from low proficiency ones. The mean score of the experimental group was 67, while that of the control group was 65.21. Therefore, the experimental group was composed of 19 high proficiency learners, with the mean score of 78.95, and 17 low proficiency learners, with the mean score of 53.65. The control group comprised 18 high proficiency learners, with the mean score of 77.56, and 15 low proficiency learners, with the mean score of 50.40.

Table 4.4

Statistics of the GEPT Scores for High and Low Proficiency Learners within Each Group

| Group | Mean | SD | Proficiency | N | Mean | SD |
|--------------|-------------|-----------|--------------------|----------|-------------|-----------|
| Experimental | 67 | 15.781 | High | 19 | 78.95 | 8.828 |
| | | | Low | 17 | 53.65 | 9.905 |
| Control | 65.21 | 16.294 | High | 18 | 77.56 | 5.512 |
| | | | Low | 15 | 50.40 | 11.789 |

Note. Total score is 100.

To make sure that there was a statistically significant difference between high and low proficiency learners within each group prior to the formal vocabulary instruction, an independent t-test was adopted to analyze the results. According to Table 4.5, the t-test for equality of means showed that there was a statistically significant difference between the high and low proficiency learners in the experimental group ($t(34) = 8.105, p < .05$), which means that the high proficiency learners in the experimental group had higher English proficiency than the low proficiency learners. As for the control group, the statistics illustrated in Table 4.6 showed the similar results as well. The t-test for equality of means revealed that there existed a statistically significant difference between the high and low proficiency learners in the control group ($t(31) = 8.716, p < .05$), which indicates that the high proficiency learners in the control group had higher English proficiency than the low proficiency learners. Therefore, it is confirmed that the high proficiency learners in each group owned higher English proficiency than the low correspondents.

Table 4.5

Independent t-test on High and Low Proficiency Learners' GEPT Scores within the Experimental Group

| | | <i>Levene's Test for Equality of Variances</i> | | <i>t-test for Equality of Means</i> | | |
|-------|----------------------------|--|-------------|-------------------------------------|-----------|----------|
| | | <i>F</i> | <i>Sig.</i> | <i>t</i> | <i>df</i> | <i>p</i> |
| High- | Equal variances assumed | .010 | .921 | 8.105 | 34 | .000*** |
| | Low | Equal variances not assumed | | 8.052 | 32.316 | .000*** |

*** $p < .001$

Table 4.6

Independent t-test on High and Low Proficiency Learners' GEPT Scores within the Control Group

| | | <i>Levene's Test for Equality of Variances</i> | | <i>t-test for Equality of Means</i> | | |
|-------|----------------------------|--|-------------|-------------------------------------|-----------|----------|
| | | <i>F</i> | <i>Sig.</i> | <i>t</i> | <i>df</i> | <i>p</i> |
| High- | Equal variances assumed | 4.113 | .051 | 8.716 | 31 | .000*** |
| | Low | Equal variances not assumed | | 8.205 | 19.045 | .000*** |

*** $p < .001$

On the other hand, an independent t-test was employed to analyze the results to

prove that prior to the formal vocabulary instruction, the high proficiency learners between the experimental and control groups were of the similar proficiency level, and so were the low proficiency learners between the experimental and control groups. Based on Table 4.7, the high proficiency learners in the experimental and control groups passed the Levene's test ($F = 3.263, p > .05$), indicating that the high proficiency learners in the experimental and control groups were homogeneous. The t-test for equality of means revealed that there was no significant difference between the high proficiency learners in the experimental and control groups ($t(35) = .571, p > .05$), which suggests that the high proficiency learners in both groups had the similar English proficiency. Moreover, the statistics displayed in Table 4.8 presented the similar results for the low proficiency learners in both groups. The low proficiency learners in the experimental and control groups also passed the Levene's test ($F = .277, p > .05$), indicating that the low proficiency learners in the experimental and control groups were also homogeneous. The t-test for equality of means also indicated that there was no significant difference between the low proficiency learners in the experimental and control groups ($t(30) = .847, p > .05$), which demonstrates that the low proficiency learners in both groups had the similar English proficiency. It is obvious that the high proficiency learners in the experimental and control groups possessed the similar English proficiency, and so did the low correspondents in both groups.

Table 4.7

Independent t-test on High Proficiency Learners' GEPT Scores between Groups

| | | <i>Levene's Test for Equality of Variances</i> | | <i>t-test for Equality of Means</i> | | |
|---------------|--------------------------------|--|-------------|---|-----------|----------|
| | | <i>F</i> | <i>Sig.</i> | <i>t</i> | <i>df</i> | <i>p</i> |
| Experimental- | Equal variances assumed | 3.263 | .079 | .571 | 35 | .571 |
| | Control | | | | | |
| | Equal variances not assumed | | | .578 | 30.408 | .567 |

Table 4.8

Independent t-test on Low Proficiency Learners' GEPT Scores between Groups

| | | <i>Levene's Test for Equality of Variances</i> | | <i>t-test for Equality of Means</i> | | |
|---------------|--------------------------------|--|-------------|---|-----------|----------|
| | | <i>F</i> | <i>Sig.</i> | <i>t</i> | <i>df</i> | <i>p</i> |
| Experimental- | Equal variances assumed | .277 | .603 | .847 | 30 | .404 |
| | Control | | | | | |
| | Equal variances not assumed | | | .837 | 27.528 | .410 |

***The Statistical Results of High and Low Proficiency Learners' Performances within
Each Group and between the Two Groups***

To answer Research Question 5, a paired-sampled t-test and an independent t-test were conducted to see if different vocabulary instructions really had an effect on vocabulary acquisition and word retention of the high and low proficiency learners in

the experimental and control groups respectively. The statistical results of the high and low proficiency learners within each group in the pre-test, the immediate post-test and the delayed post-test were compared, followed by the statistical results of the high proficiency learners between the experimental and control groups in the pre-test, the immediate post-test and the delayed post-test as well as those of the low proficiency learners between the two groups.

High and Low Proficiency Learners' Performances within Each Group

The comparisons of the high and low proficiency learners' performances on the pre-test, the immediate post-test and the delayed post-test within each group were analyzed through a paired-sampled t-test to explore the effects of different vocabulary instructions. Table 4.9 and Table 4.10 present the progress in the experimental group and the control group respectively.

The progress in the experimental group

With regard to the high proficiency learners in the experimental group, as shown in Table 4.9, there was a statistically significant difference in the mean difference ($MD = 49.553$) between the pre-test and the immediate post-test ($t(18) = 13.945, p < .05$), demonstrating that the high proficiency learners made considerable progress after receiving “graphic organizer plus traditional vocabulary instruction”. What's more, there was no significant difference in the mean difference ($MD = -5.158$) between the immediate post-test and the delayed post-test ($t(18) = -2.062, p > .05$), indicating that the effect of “graphic organizer plus traditional vocabulary instruction” on the high proficiency learners could maintain one month, so the mean difference between the immediate post-test and the delayed post-test was small.

Table 4.9

Paired-Sampled t-test for Progress in High and Low Proficiency Learners of the Experimental Group

| Test | High Proficiency Learners (n=19) | | | | Low Proficiency Learners (n=17) | | | |
|---------------------|----------------------------------|------------------------|----------|----------|---------------------------------|------------------------|----------|----------|
| | <i>M</i> | <i>Mean Difference</i> | <i>t</i> | <i>p</i> | <i>M</i> | <i>Mean Difference</i> | <i>t</i> | <i>p</i> |
| Immediate post-test | 70.55 | | | | 55.79 | | | |
| Pre-test | 21.00 | 49.553 | 13.945 | .000*** | 14.00 | 41.794 | 20.428 | .000*** |
| Delayed post-test | 65.40 | | | | 49.82 | | | |
| Immediate post-test | 70.55 | -5.158 | -2.062 | .054 | 55.79 | -5.971 | -2.573 | .020* |

* $p < .05$, *** $p < .001$

As for the low proficiency learners in the experimental group in Table 4.9, a statistically significant difference was found in the mean difference ($MD = 41.794$) between the pre-test and the immediate post-test ($t(16) = 20.428$, $p < .05$), suggesting that the low proficiency learners made significant progress after receiving “graphic organizer plus traditional vocabulary instruction”. However, the mean difference ($MD = -5.971$) between the immediate post-test and the delayed post-test also reached a significant level ($t(16) = -2.573$, $p < .05$), indicating that “graphic organizer plus traditional vocabulary instruction” had a more positive effect on the low proficiency learners’ vocabulary acquisition than on their word retention.

In a nutshell, both the high and low proficiency learners in the experimental group improved considerably on vocabulary acquisition after receiving “graphic organizer plus traditional vocabulary instruction”. Furthermore, the high proficiency learners also retained most of the target words one month after the final “graphic

organizer plus traditional vocabulary instruction”, but the low proficiency learners did not. In other words, “graphic organizer plus traditional vocabulary instruction” had a crucial effect on vocabulary acquisition and word retention of the high proficiency learners and on vocabulary acquisition of the low proficiency learners.

The progress in the control group

As for the high proficiency learners in the control group in Table 4.10, a statistically significant difference existed in the mean difference ($MD = 39.278$) between the pre-test and the immediate post-test ($t(17) = 16.889, p < .05$), proving that the high proficiency learners made great progress after receiving “traditional vocabulary instruction only”. Moreover, no significant difference was found in the mean difference ($MD = -0.583$) between the immediate post-test and the delayed post-test ($t(17) = -0.205, p > .05$), meaning that the effect of “traditional vocabulary instruction only” on the high proficiency learners could last for one month, and thus the mean difference between the immediate post-test and the delayed post-test was quite small.

Table 4.10

Paired-Sampled t-test for Progress in High and Low Proficiency Learners of the Control Group

| Test | High Proficiency Learners (n=18) | | | | Low Proficiency Learners (n=15) | | | |
|---------------------|----------------------------------|------------------------|----------|----------|---------------------------------|------------------------|----------|----------|
| | <i>M</i> | <i>Mean Difference</i> | <i>t</i> | <i>p</i> | <i>M</i> | <i>Mean Difference</i> | <i>t</i> | <i>p</i> |
| Immediate post-test | 57.17 | | | | 50.63 | | | |
| Pre-test | 17.89 | 39.278 | 16.889 | .000*** | 9.57 | 41.067 | 12.178 | .000*** |
| Delayed post-test | 56.58 | | | | 44.10 | | | |
| Immediate post-test | 57.17 | -0.583 | -0.205 | .840 | 50.63 | -6.533 | -2.656 | .019* |

* $p < .05$, *** $p < .001$

Concerning the low proficiency learners in the control group, as shown in Table 4.10, there was a statistically significant difference in the mean difference ($MD = 41.067$) between the pre-test and the immediate post-test ($t(14) = 12.178, p < .05$), suggesting that the low proficiency learners achieved significant progress after receiving “traditional vocabulary instruction only”. Nevertheless, the mean difference ($MD = -6.533$) between the immediate post-test and the delayed post-test also reached statistical significance ($t(14) = -2.656, p < .05$), implying that “traditional vocabulary instruction only” had a more significant effect on the low proficiency learners’ vocabulary acquisition than on their word retention.

To sum up, both the high and low proficiency learners in the control group made major progress in acquiring vocabulary after receiving “traditional vocabulary instruction only”. Further, the high proficiency learners also retained most of the target words one month after having the final “traditional vocabulary instruction only”,

but the low proficiency learners did not. To put it differently, “traditional vocabulary instruction only” positively affected the high proficiency learners’ vocabulary acquisition and word retention as well as the low proficiency learners’ vocabulary acquisition.

In addition, as shown in Table 4.9 and 4.10, the mean difference of the immediate post-test and the delayed post-test for the low proficiency learners in both groups reached a significant level ($p = .02 < .05$ in EG; $p = .019 < .05$ in CG), whereas no significant difference existed in that of the immediate post-test and the delayed post-test for the high proficiency learners in both groups ($p = .054 > .05$ in EG; $p = .84 > .05$ in CG). Therefore, both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” produced a deeper and more significant impact on word retention of the high proficiency learners in both groups than on that of the low proficiency learners in both groups.

High and Low Proficiency Learners’ Performances between the Two Groups

The respective comparisons of the high and low proficiency learners’ performances between the experimental and control groups were conducted through an independent t-test to investigate the effects of different vocabulary instructions. Table 4.11 and Table 4.12 in turn present the statistical results of the high and low proficiency learners between the two groups.

High Proficiency Learners between the Two Groups

According to Table 4.11, the mean difference of the high proficiency learners between the two groups in the pre-test did not reach a significant level ($t(35) = .891, p > .05$). However, a statistically significant difference existed in the mean difference ($MD = 13.386$) of the high proficiency learners between the two groups in the

immediate post-test ($t(35) = 3.664, p < .05$), revealing that the high proficiency learners receiving “graphic organizer plus traditional vocabulary instruction” significantly acquired more target words than those receiving “traditional vocabulary instruction only”. Then, no significant difference was found in the mean difference ($MD = 8.812$) of the high proficiency learners between the two groups in the delayed post-test ($t(35) = 1.996, p > .05$), suggesting that the high proficiency learners gained word retention from both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only”.

Table 4.11

Independent t-test on High Proficiency Learners’ Pre-test, Immediate post-test, and Delayed post-test

| Proficiency | Test | Group | N | Mean | Mean Difference | t | p |
|-------------|---------------------|--------------|----|-------|-----------------|-------|--------|
| High | Pre-test | Experimental | 19 | 21.00 | 3.111 | .891 | .379 |
| | | Control | 18 | 17.89 | | | |
| | Immediate post-test | Experimental | 19 | 70.55 | 13.386 | 3.664 | .001** |
| | | Control | 18 | 57.17 | | | |
| | Delayed post-test | Experimental | 19 | 65.40 | 8.812 | 1.996 | .054 |
| | | Control | 18 | 56.58 | | | |

** $p < .01$

Low Proficiency Learners between the Two Groups

As clearly shown in Table 4.12, no significant difference existed in the mean difference of the low proficiency learners between the two groups in the pre-test($t(30)$)

= 1.843, $p > .05$), the immediate post-test ($t(30) = 1.246$, $p > .05$) and the delayed post-test ($t(30) = 1.334$, $p > .05$), demonstrating that both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” had similar effects on the low proficiency learners’ vocabulary acquisition and word retention.

Table 4.12

Independent t-test on Low Proficiency Learners’ Pre-test, Immediate post-test, and Delayed post-test

| Proficiency | Test | Group | <i>N</i> | <i>Mean</i> | <i>Mean Difference</i> | <i>t</i> | <i>p</i> |
|-------------|---------------------|--------------|----------|-------------|------------------------|----------|----------|
| Low | Pre-test | Experimental | 17 | 14.00 | 4.433 | 1.843 | .075 |
| | | Control | 15 | 9.57 | | | |
| | Immediate post-test | Experimental | 17 | 55.79 | 5.161 | 1.246 | .222 |
| | | Control | 15 | 50.63 | | | |
| | Delayed post-test | Experimental | 17 | 49.82 | 5.724 | 1.334 | .196 |
| | | Control | 15 | 44.10 | | | |

Summary

The main findings of the present study were summarized as follows.

1. Regarding the progress that learners receiving “graphic organizer plus traditional vocabulary instruction” made, the mean difference between the pre-test and the immediate post-test and that between the immediate post-test and the delayed post-test reached statistical significance, indicating that “graphic organizer plus traditional vocabulary instruction” had a significant effect on the experimental

group's vocabulary acquisition, but not on their word retention.

2. In terms of the progress that learners receiving “traditional vocabulary instruction only” made, a significant difference existed in the mean difference between the pre-test and the immediate post-test and no significant difference between the immediate post-test and the delayed post-test, suggesting that “traditional vocabulary instruction only” positively affected the control group's vocabulary acquisition and word retention.
3. With the same initial vocabulary proficiency of the target words in the pre-test, the experimental group receiving “graphic organizer plus traditional vocabulary instruction” performed significantly better than the control group receiving “traditional vocabulary instruction only” in the immediate post-test, verifying that “graphic organizer plus traditional vocabulary instruction” produced a more crucial effect on vocabulary acquisition of the participants than “traditional vocabulary instruction only”.
4. As for the participants' performances on the delayed post-test, the experimental group receiving “graphic organizer plus traditional vocabulary instruction” scored significantly higher than the control group receiving “traditional vocabulary instruction only”, proving that “graphic organizer plus traditional vocabulary instruction” had a more significant impact on word retention of the participants than “traditional vocabulary instruction only”.
5. Both the high and low proficiency learners in the experimental group improved significantly on vocabulary acquisition after receiving “graphic organizer plus traditional vocabulary instruction” and the high proficiency learners gained considerable word retention in a month, revealing that “graphic organizer plus traditional vocabulary instruction” was effective in promoting vocabulary acquisition and word retention of the high proficiency learners and vocabulary

acquisition of the low proficiency learners in the experimental group.

6. Both the high and low proficiency learners in the control group made progress on vocabulary acquisition after receiving “traditional vocabulary instruction only” and the high proficiency learners retained most of the target words in a month, meaning that “traditional vocabulary instruction only” resulted in vocabulary acquisition and word retention of the high proficiency learners and vocabulary acquisition of the low proficiency learners in the control group.
7. Concerning the high proficiency learners’ performances between the two groups, the high proficiency learners receiving “graphic organizer plus traditional vocabulary instruction” significantly acquired much more target words than those receiving “traditional vocabulary instruction only”, but similarly retained target words as those receiving “traditional vocabulary instruction only”.
8. With regard to the low proficiency learners’ performances between the two groups, the low proficiency learners receiving “graphic organizer plus traditional vocabulary instruction” and those receiving “traditional vocabulary instruction only” acquired target words as well as retained the words to a similar extent.

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter discusses the major findings of the present study. The five proposed research questions based on data collected are addressed in the first section, followed by the comparisons between the present study and the previous studies as well as possible explanations in the second section. Pedagogical implications for practical applications, limitations of the study and suggestions for further research are presented in section three to section five. Finally, students' feedback after the project is also provided prior to a conclusion drawn from the study.

Answers to the Research Questions

The present study was aimed to investigate the effects of different vocabulary instructions, i.e., “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only”, on vocabulary acquisition and word retention of senior high school students. Based on the results of the t-tests, the major findings of the five proposed research questions were summarized in this section.

Question 1: How much progress do learners who receive “graphic organizer plus traditional vocabulary instruction” make?

As for the experimental group receiving “graphic organizer plus traditional vocabulary instruction”, a statistically significant difference existed in the mean difference between the pre-test and the immediate post-test, revealing that the experimental group improved significantly on vocabulary acquisition. That is, “graphic organizer plus traditional vocabulary instruction” positively contributed to the experimental group's vocabulary acquisition. Additionally, a significant difference

was found in the mean difference between the immediate post-test and the delayed post-test, suggesting that the experimental group did not retain most of the target words one month after receiving the final “graphic organizer plus traditional vocabulary instruction”.

Question 2: How much progress do learners who receive “traditional vocabulary instruction only” make?

As for the control group receiving “traditional vocabulary instruction only,” the mean difference between the pre-test and the immediate post-test reached statistical significance, meaning that the control group made major progress in vocabulary acquisition. In other words, “traditional vocabulary instruction only” significantly affected the control group’s vocabulary acquisition. Moreover, no significant difference existing in the mean difference between the immediate post-test and the delayed post-test suggested that the control group retained most of the target words one month after receiving the final “traditional vocabulary instruction only”.

Question 3: Do learners who receive “graphic organizer plus traditional vocabulary instruction” perform better than those who receive “traditional vocabulary instruction only” on vocabulary acquisition?

With regard to vocabulary acquisition, before the implementation of the vocabulary instruction, there was no significant difference in the mean scores of the English proficiency test and the pre-test between learners receiving “graphic organizer plus traditional vocabulary instruction” and those receiving “traditional vocabulary

instruction only,” indicating that the two groups initially had similar vocabulary proficiency. However, a statistically significant difference existed in the mean scores of the immediate post-test between learners receiving “graphic organizer plus traditional vocabulary instruction” and those receiving “traditional vocabulary instruction only”. Learners receiving “graphic organizer plus traditional vocabulary instruction” significantly outperformed those receiving “traditional vocabulary instruction only” in the immediate post-test. That is, “graphic organizer plus traditional vocabulary instruction” indeed enhanced more vocabulary acquisition than “traditional vocabulary instruction only”.

Question 4: Do learners who receive “graphic organizer plus traditional vocabulary instruction” perform better than those who receive “traditional vocabulary instruction only” on word retention?

Concerning word retention, there was a statistically significant difference in the mean scores of the delayed post-test between learners who received “graphic organizer plus traditional vocabulary instruction” and those who received “traditional vocabulary instruction only”. Learners who received “graphic organizer plus traditional vocabulary instruction” significantly outscored those who received “traditional vocabulary instruction only” one month after receiving the last vocabulary instruction in the delayed post-test. To put it differently, “graphic organizer plus traditional vocabulary instruction” positively elicited more word retention than “traditional vocabulary instruction only”.

Question 5: Are both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” equally

effective for high and low proficiency learners respectively?

Regarding the progress of the high and low proficiency learners within each group, both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” facilitated the high proficiency learners’ vocabulary acquisition and word retention as well as the low proficiency learners’ vocabulary acquisition. As for “graphic organizer plus traditional vocabulary instruction,” a statistically significant difference was found in the mean difference between the pre-test and the immediate post-test, demonstrating that both high and low proficiency learners, after receiving “graphic organizer plus traditional vocabulary instruction,” made considerable progress in acquiring target words. Therefore, “graphic organizer plus traditional vocabulary instruction” remarkably promoted both high and low proficiency learners’ vocabulary acquisition. Likewise, as for “traditional vocabulary instruction only,” there was a statistically significant difference in the mean difference between the pre-test and the immediate post-test, implying that both high and low proficiency learners, after receiving “traditional vocabulary instruction only,” improved greatly on vocabulary acquisition. Thus, “traditional vocabulary instruction only” effectively led to vocabulary acquisition of both high and low proficiency learners. Furthermore, there was a significant difference in the mean difference of the immediate post-test and the delayed post-test for the low proficiency learners in both groups, but no significant difference for the high proficiency learners in both groups, suggesting that high proficiency learners receiving both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” retained most of the target words after one month, while low proficiency learners receiving the two instructions did not retain the words. To sum up, both “graphic organizer plus traditional vocabulary instruction”

and “traditional vocabulary instruction only” aided both high and low proficiency learners in acquiring target words, while high proficiency learners tended to perform better than low proficiency learners regarding retaining target words.

Concerning the comparisons of the high and low proficiency learners between the two groups, as for the high proficiency learners, the mean difference of the immediate post-test between the two groups reached a statistically significant difference, verifying that the high proficiency learners receiving “graphic organizer plus traditional vocabulary instruction” significantly produced more target words than those receiving “traditional vocabulary instruction only”. Nevertheless, no significant difference was found in the mean difference of the delayed post-test for the high proficiency learners between the two groups, indicating that the effect of “graphic organizer plus traditional vocabulary instruction” on the high proficiency learners’ word retention was similar to that of “traditional vocabulary instruction only”. Further, as for the low proficiency learners, there was no significant difference in the mean difference of the immediate post-test and the delayed post-test between the two groups, illustrating that both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” similarly influenced the low proficiency learners’ vocabulary acquisition and word retention. In conclusion, “graphic organizer plus traditional vocabulary instruction” appeared to have a more significant impact on the high proficiency learners’ vocabulary acquisition than “traditional vocabulary instruction only,” but exerted a similar effect on the high proficiency learners’ word retention as “traditional vocabulary instruction only”. Then, both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” affected the low proficiency learners’ vocabulary acquisition and word retention to a similar degree.

A Comparison between the Present Study and the Previous Studies

This section compared the findings of the present study with those of the previous studies and further provided possible explanations for the discrepancies between the findings of the present study and those of the previous studies.

The present study was conducted to investigate the effects of different vocabulary instructions, i.e., “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only”, on vocabulary acquisition and word retention of senior high school students in Taiwan. All in all, the results of this study were compatible with the findings of the previous research in the following aspects. First, learners receiving graphic organizer instruction significantly performed better on vocabulary acquisition than those receiving traditional vocabulary instruction. This finding was in accordance with the contention of previous research (Eeds & Cockrum, 1985; Peters, 1974). In Eeds & Cockrum’s (1985) research, students taking the Teacher Interaction approach (the Frayer model) acquired and retained more vocabulary than those taking the Dictionary approach and the Control approach. Peters (1974) concluded that students utilizing the Frayer model comprehended concepts better than those adopting the textbook approach. Moreover, this empirical study responded to Hung’s (2006) finding that glosses arranged in graphic organizers benefited students’ vocabulary learning as well as helped students retain as much vocabulary as glosses arranged in margins and lexical sets after one week. As mentioned in the literature review, graphic organizers were also applied to the teaching of mathematical vocabulary (Greenwood, 2002; Monroe, 1997; Monroe & Pendergrass, 1997; Wilder, 2010). Monroe & Pendergrass (1997) claimed that vocabulary instruction using a modified Concept of Definition graphic organizer combined with the Frayer model was more effective in enhancing students’ mathematical vocabulary acquisition than the definition-only instruction. Wilder

(2010) shared how she modified the Frayer model to achieve her teaching goal; that is, student involvement in exploring the meanings of mathematical vocabulary and connecting mathematical vocabulary to their real-world experiences. In addition, part of the previous research elaborated on teaching reflections upon applying graphic organizers to vocabulary instruction (Hopkins & Bean, 1998; Irvin, 1990; Jones & Thomas, 2006; Kaelin, 1991; Rosenbaum, 2001; Schwartz, 1988; Smith, J. J., 2002). Irvin (1990) recommended that graphic organizers be a useful method of introducing vocabulary before reading and that instructors provide partially completed graphic organizers to help learners arrange information and vocabulary in a stratified way. In Smith, J. J.'s (2002) research, ten special education students received either graphic organizer instruction or traditional instruction on a weekly rotation, with half of them followed by graphic organizer assessment while the others by traditional assessment. However, no significant difference existed among these students, suggesting that graphic organizers may not work in all situations, especially for students with learning disabilities.

Second, the results of the present study indicated that learners receiving “graphic organizer plus traditional vocabulary instruction” significantly retained more target words than those receiving “traditional vocabulary instruction only”. This finding was congruent with Eeds & Cockrum’s (1985) claim that the Teacher Interaction approach (the Frayer model) aided learners to retain more vocabulary than the Dictionary approach and the Control approach three weeks after the treatments ended. This result also echoed with Kim & Gilman’s (2008) argument that graphic aids played a crucial role in facilitating learners’ vocabulary acquisition and retention. One week after the end of the treatments, learners receiving “visual text, added spoken text, and added graphics” instruction significantly outperformed those receiving “visual text and added spoken text” and “reduced visual text and added

spoken text” instructions on the retention test. As a result, graphic organizer instruction is effective in enhancing learners’ word retention.

Third, “graphic organizer plus traditional vocabulary instruction” promoted both high and low proficiency learners to significantly acquire target words in the present study. This finding lent support to Eeds & Cockrum’s (1985) contention that the Teacher Interaction approach (the Frayer model), which connects new target words with an existing conceptual network, was proved to be substantially effective for both high and low ability students. Even the low ability students of the Teacher Interaction group outscored the high ability students of the Dictionary and Control groups on the multiple choices post-test. Likewise, this finding seemed compatible with the claim of Peters (1974) that both high and low learners utilizing the Frayer model performed significantly better on the concept comprehension test than those employing the textbook approach. In other words, the Frayer model facilitated both high and low learners’ comprehension of concepts. Therefore, “graphic organizer plus traditional vocabulary instruction” is beneficial to promoting vocabulary acquisition of both high and low proficiency learners.

Possible reasons for the effectiveness of graphic organizer instruction on vocabulary acquisition and word retention are discussed below. First of all, as indicated in Table 4.3 of Chapter 4, the mean scores of the delayed post-test in the experimental and control groups were lower than those of the immediate post-test in both groups. That is, learners receiving both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” scored higher in the immediate post-test than in the delayed post-test. The reason why this difference existed may be that both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” seemed to have a better immediate effect on vocabulary acquisition than on word retention. Due to lack of continuous practice

and repeated exposure to the target words, the participants were likely to forget some of the words they had learned before. Additionally, according to Ebbinghaus' (1964) theory of the curve of forgetting research mentioned in Chapter 3, people will only retain about 21.1% of what they learned one month after they learned the information (cited in Kan, 2011). Nevertheless, the mean scores of the delayed post-test in both groups were 58.042 and 50.909 (see Table 4.3), which were twice higher than the expected score ($M = 98 * 21.1\% = 20.678$) based on Ebbinghaus' (1964) theory.

Second, with regard to the progress that the experimental and control groups made (see Table 4.1 and 4.2), learners receiving “graphic organizer plus traditional vocabulary instruction” did not retain most of the target words, but those receiving “traditional vocabulary instruction only” did. According to Moore & Readence (1984), graphic organizers were beneficial to promoting vocabulary learning, but they did not seem to significantly facilitate long-term retention of target words, which accounted for the significant difference of learners receiving “graphic organizer plus traditional vocabulary instruction” between the immediate post-test and the delayed post-test (see Table 4.1). Another possible explanation for this phenomenon was that the participants had got used to multiple choice questions and gap filling questions, which are the most common and familiar vocabulary test patterns in senior high, so the effects of “graphic organizer plus traditional vocabulary instruction” might decline as time went by. That is why learners who received “graphic organizer plus traditional vocabulary instruction” failed to retain most of the target words in a month.

On the other hand, the result of the present study revealed that high proficiency learners receiving both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” retained more target words than low proficiency learners receiving both instructions (see Table 4.9 and 4.10). A possible explanation for this result was based on Han's (2009) finding that high proficiency

learners showed stronger learning motivation, either extrinsic or intrinsic, than low proficiency learners, which contributed to positive word retention of high proficiency learners receiving both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only”. Because high proficiency learners possessed stronger learning motivation, they displayed better performance no matter which instruction they received. High proficiency learners also employed more cognitive strategies than low proficiency learners; therefore, graphic organizers might lead to information overload for low proficiency learners (Han, 2009; Ritchie & Gimenez, 1995). That is the reason why low proficiency learners receiving both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” could not retain as many target words. In addition, “graphic organizer plus traditional vocabulary instruction” exerted more significant effects than “traditional vocabulary instruction only” on high proficiency learners’ vocabulary acquisition, but not on their word retention as well as on low proficiency learners’ vocabulary acquisition and word retention (see Table 4.11 and 4.12). According to Ritchie & Gimenez (1995), learners demonstrated significant short-term acquisition after short exposure to graphic organizers. The longer learners were exposed to graphic organizers, the more acquisition and retention they would produce. Thus, if the instructional time was extended, more significant results might be revealed.

Pedagogical Implications of the Study

Several pedagogical implications drawn from this study are described as follows.

1. Teachers are suggested to incorporate the adapted Frayer model or other similar graphic organizers into vocabulary instruction to facilitate learners’ vocabulary acquisition and word retention.

2. Graphic organizer instruction is more effective in improving high proficiency learners' word retention than low proficiency learners. Thus, graphic organizer instruction is especially recommended for high proficiency learners, who possess better capacities to extend or connect their prior knowledge of vocabulary than low proficiency learners.
3. Low proficiency learners are suggested to receive traditional vocabulary instruction at first. After the students get used to and have a basic grasp of vocabulary learning in senior high, a novel instruction like graphic organizer instruction is then introduced.
4. Since “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” in this study promoted learners to acquire target words and it is more time-consuming for teachers to teach vocabulary through graphic organizers, so the instruction should combine graphic organizer instruction with traditional vocabulary instruction.
5. Compared to traditional vocabulary instruction, graphic organizer instruction engaged students in making associations or sentences for target words and thus resulted in more interactions between teachers and students. Consequently, graphic organizer instruction may bring pleasant and active learning atmosphere into the classroom.

Limitations of the Study

The present study indicated that “graphic organizer plus traditional vocabulary instruction” had more significant effects on the participants' vocabulary acquisition and word retention than “traditional vocabulary instruction only,” but some limitations regarding the instructional experiment should be proposed. First, the participants of the present study were two first-year classes in a public senior high

school in northern Taiwan; therefore, the results of the present study may not be generalized to the students of other ages or other contexts.

Second, both the experimental and control groups in the present study only received different vocabulary instructions with a total of four times for the duration of six weeks. Longer periods of time and instructions may allow of more complete investigations of the effectiveness of a teaching method, though “graphic organizer plus traditional vocabulary instruction” significantly facilitated more vocabulary acquisition and word retention than “traditional vocabulary instruction only” in the present study.

Third, the sample size of the present study was not large enough. There were only 36 and 33 participants in the experimental and control groups respectively. When each group was further divided into high and low proficiency learners according to their GEPT scores to investigate the effects of different vocabulary instructions on different proficiency learners, the experimental group was only made up of 19 high proficiency learners and 17 low proficiency learners, whereas the control group only comprised 18 high proficiency learners and 15 low proficiency learners. Such small sample sizes for the four groups may not be sufficient to contribute to statistical significance of these groups.

Recommendations for Further Research

Few studies probe into the effects of incorporating graphic organizers into English vocabulary teaching in an EFL context. This empirical study may work as a preliminary study and provide suggestions for future research concerning English vocabulary teaching via graphic organizers.

First, a larger sample size of participants is recommended for further relevant research. Different age groups should be included. Thus, it is suggested that future

research should be conducted with a larger number of participants so that the generalization of the results could be applied to other grades or contexts.

Second, the instructional time of two types of vocabulary instructions in the present study for the experimental and control groups only lasted for six weeks. If the instructional period was extended, the differences in treatments for the two groups might be more obvious and more reliable and valid statistical results might be revealed. Therefore, it is recommended that future studies should work on graphic organizer instruction for a longer period of time.

Third, future researchers may adjust graphic organizers, or specifically, the Frayer model, based on his or her teaching needs or subjects. For instance, Wilder (2010) changed three boxes of the Frayer model to fit her teaching of geometry. That is, future researchers can replace the original boxes of the Frayer model with other terms or even adopt other kinds of graphic organizers to teach vocabulary.

Last, since the present study was a quantitative study, all the data were collected through independent and paired-sampled t-tests. In addition to learning effects after participants received different vocabulary instructions, their attitudes toward or difficulties in learning vocabulary were worth further exploration. Questionnaires and follow-up interviews are proper ways for future researchers to probe into participants' attitudes and feedback on learning English vocabulary via graphic organizers.

Students' Feedback after the Project

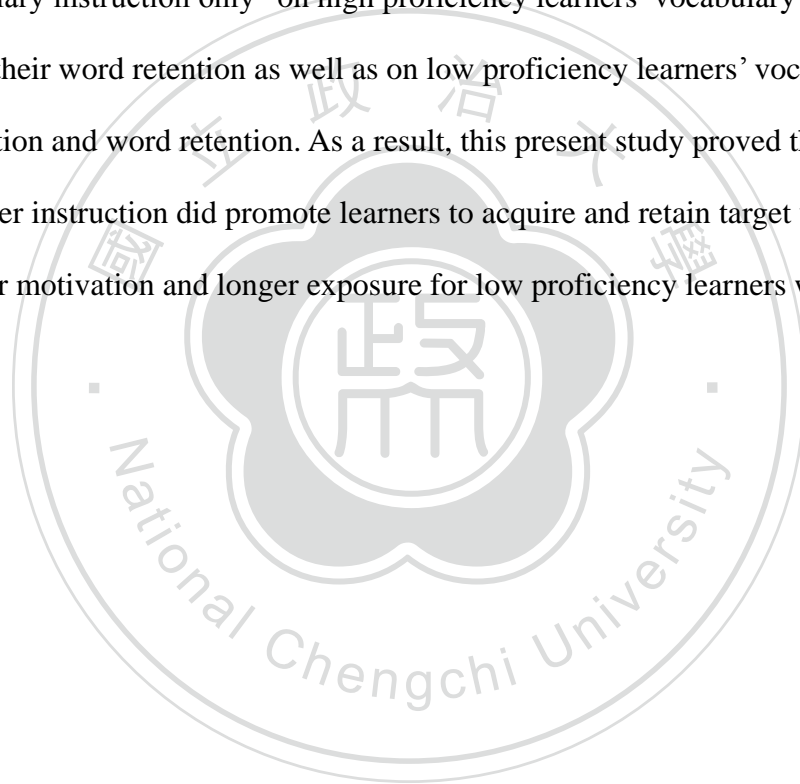
After the instructional experiment was over, students receiving “graphic organizer plus traditional vocabulary instruction” returned to receive the traditional vocabulary instruction. As soon as students learned vocabulary in a traditional translation-based way, they began to wonder why there were no more drawings and requested the researcher to give them the adapted Frayer model worksheets.

Additionally, students also felt that they had a great time learning vocabulary through graphic organizers and that the time of a class period appeared to pass more quickly for them. From these students' feedback, we can learn that graphic organizer instruction utilizing the adapted Frayer model worksheets did enhance students' vocabulary acquisition and word retention as well as arouse students' interest to learn vocabulary. Despite the fact that it takes longer time and more efforts to teach vocabulary via the adapted Frayer model, it is learners' growth in vocabulary acquisition and learning motivation that counts.

Conclusion

Nation (1990) maintained that “both learners and researchers see vocabulary as being a very important, if not the most important, element in language learning” (p. 2). A lack of vocabulary may lead to learning difficulties for learners in both receptive and productive language use. Therefore, the significance of vocabulary can not and should not be neglected at all. A variety of vocabulary teaching methods and strategies have been proposed for teachers to help learners acquire vocabulary effectively, such as the keyword method, semantic feature analysis, the Frayer model, semantic maps, and sentence plus definition method (Greenwood, 2002; Lai, 2003; Myers & Chang, 2009; Rekrut, 1996). Previous studies show that the Frayer model is mostly employed to teach mathematical vocabulary or reading in content areas. However, little research has been conducted on whether graphic organizer instruction utilizing the adapted Frayer model will facilitate learners' vocabulary acquisition and word retention in an EFL context. This present study attempts to fill this gap by comparing the effects of “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” on learners' vocabulary acquisition and word retention. This present study found that learners receiving “graphic organizer plus traditional vocabulary

instruction” significantly acquired and retained more target words than those receiving “traditional vocabulary instruction only”. Furthermore, both “graphic organizer plus traditional vocabulary instruction” and “traditional vocabulary instruction only” were verified to be effective in improving high proficiency learners’ vocabulary acquisition and word retention, but only effective in enhancing low proficiency learners’ vocabulary acquisition. In addition, “graphic organizer plus traditional vocabulary instruction” exerted more significant effects than “traditional vocabulary instruction only” on high proficiency learners’ vocabulary acquisition, but not on their word retention as well as on low proficiency learners’ vocabulary acquisition and word retention. As a result, this present study proved that graphic organizer instruction did promote learners to acquire and retain target words, only if stronger motivation and longer exposure for low proficiency learners were activated.



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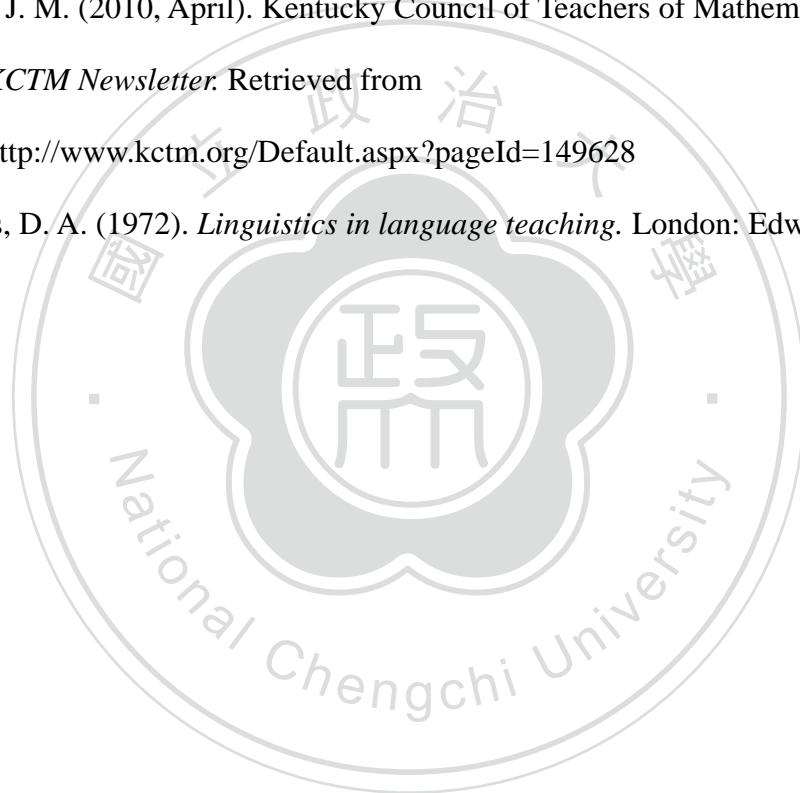
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APPENDIXES

Appendix A

General English Proficiency Test (GEPT): Elementary Level Tests 4 & 5

(Sentence Completion, the first part of the Reading section)

GEPT Elementary Test

Class: _____ No.: _____ Name: _____

請選出正確的答案。(每題 4 分)

1. The fastest way to get _____ the museum is to take the train.
(A) away (B) off (C) at (D) to
2. Peter cleaned his room very _____ to please his mother.
(A) easily (B) finally (C) carefully (D) strongly
3. Because Nancy didn't eat lunch, she began to feel _____ and hungry during class.
(A) great (B) weak (C) lucky (D) dirty
4. May likes animals very much; she has a lot of _____ keeping dogs and cats.
(A) experience (B) difficulties (C) taste (D) paths
5. David studies hard and always _____ the lessons well before tests.
(A) obeys (B) protects (C) reviews (D) controls
6. It was cold, so Jane _____ her coat and closed the window.
(A) put on (B) showed off (C) took off (D) gave up
7. My brother often goes bird watching with his friends _____ his free time.
(A) through (B) among (C) on (D) in
8. Martha's father does exercise at the _____ twice a week.
(A) gym (B) block (C) garage (D) stair
9. It's a nice day today. The sky is blue and the sun is _____ and warm.
(A) open (B) thick (C) fresh (D) bright
10. The voice of the talking robot _____ like that of a real person.
(A) acts (B) sounds (C) brushes (D) pushes
11. The fisherman _____ fought with the shark and finally got away safely.
(A) bravely (B) loudly (C) suddenly (D) generally
12. _____ home, Lucy fell from the bicycle and hurt her knee.
(A) Far from (B) Along with (C) On the way (D) In touch with
13. Remember to keep calm when you _____ in the mountains.

- (A) get lost (B) catch up (C) put off (D) carry around
14. Mr. Lee asked the woman sitting _____ him where she was from.
(A) past (B) beyond (C) against (D) beside
15. Ruth needed a new notebook, so she looked for a store that sold _____.
(A) products (B) bookcase (C) departments (D) stationery
16. After we ate the fried chicken, our fingers were oily, so we asked the waitress for more _____.
(A) napkins (B) packages (C) orders (D) menus
17. Sara was _____ because her grandmother had put more money in her brother's red envelope.
(A) sneaky (B) humble (C) greedy (D) jealous
18. Whitney told the doctor that she had _____ all night, and he gave her another kind of medicine.
(A) cured (B) crowed (C) coughed (D) clapped
19. Jack worked at the restaurant last year, but he doesn't work there _____.
(A) again (B) anymore (C) anywhere (D) anyway
20. The student raced out of the classroom and bumped _____ a teacher who was carrying a cup of coffee.
(A) into (B) at (C) to (D) on
21. My sister hates all _____, especially cockroaches.
(A) nieces (B) flutes (C) nails (D) bugs
22. The wind was so cold that the thin scarf wasn't very _____.
(A) responsible (B) changeable (C) familiar (D) effective
23. Todd hid the candy in his left hand. Then he held out both hands and said, "_____ where the candy is."
(A) Treat (B) Raise (C) Guess (D) Collect
24. Nancy gained four kilograms during the holidays, so she decided to go _____ a diet.
(A) on (B) to (C) in (D) for
25. _____ knows where the sailor hid his treasure, so people continue their search all over the island.
(A) Somebody (B) Nobody (C) Anybody (D) Everybody

Appendix B

The Pre-test

Vocabulary Test

Class: _____ No.: _____ Name: _____

I. Multiple choices: Choose the most appropriate answer. 選出最適當的答案。(每題 3.5 分)

- () 1. The UVA and UVB rays from the sun can cause great _____ to your skin and make it aging.
(A) waste (B) muscles (C) stress (D) damage
- () 2. The picture _____ me of those carefree days in senior high school.
(A) reduced (B) described (C) reminded (D) belonged
- () 3. She _____ three more teaspoons of sugar to the flour to make the cake taste sweeter.
(A) flowed (B) added (C) referred (D) sharpened
- () 4. Do you think Jeff would donate money to the charities if he won the _____?
(A) bill (B) lottery (C) bakery (D) diamond
- () 5. The anxious mother did everything she could to _____ her child from being bullied.
(A) block (B) infect (C) calm (D) protect
- () 6. Kelly felt so _____ that her stomach ached before she went on the stage.
(A) nervous (B) awake (C) unlucky (D) clever
- () 7. A _____ is a well-mannered man who always shows consideration for others.
(A) cowboy (B) blacksmith (C) gentleman (D) character
- () 8. Ellen left the party without saying a _____ word. She just disappeared silently.
(A) whole (B) single (C) wise (D) middle
- () 9. After taking the roller coaster, I felt like throwing up and couldn't help feeling _____.
(A) harmful (B) perfect (C) peaceful (D) dizzy
- () 10. The _____ never stopped attacking until the soldiers finally surrendered.
(A) enemies (B) designers (C) guests (D) bakers
- () 11. Look! Herds of _____ and sheep are being chased uphill on the ranch.

- (A) chickens (B) wolves (C) geese (D) cattle
- () 12. Do you think it _____ to call Michelle so late at midnight now?
 (A) proper (B) rough (C) equal (D) additional
- () 13. In pursuit of fame and wealth, he _____ his girlfriend and sacrificed their love.
 (A) pleased (B) boasted (C) avoided (D) deserted
- () 14. Terre _____ the bottle and suddenly the water rushed out, making all of us get wet.
 (A) joked (B) squeezed (C) popped (D) mined

II. Gap filling: Fill in the right vocabulary according to the hints provided. 依提示填入正確的單字。(每題 3.5 分)

- _____ 1. A balanced diet and regular exercise are e_____l to our health.
- _____ 2. The coffee shop is famous for its drip coffee and delicate d_____ts.
- _____ 3. The heart and the lungs are important o_____ns.
- _____ 4. To our amazement, Julie can play so many i_____ts at such a tender age.
- _____ 5. Having a good cry and relaxing yourself are effective ways to r_____e stress.
- _____ 6. She will c_____y become ill if she goes on working like that.
- _____ 7. Border Collie has been praised as the most intelligent s_____d dog.
- _____ 8. Most of the v_____ns and minerals have to be taken in from fruits and vegetables.
- _____ 9. She made a g_____e to the waiter to order one more serving of fish.
- _____ 10. God will live for all e_____y; that is, God will live forever.
- _____ 11. All the classmates g_____red together to attend the class reunion after graduating for three years.
- _____ 12. Don't r_____b too hard when washing your face, or it might hurt your skin.
- _____ 13. Nowadays people like to check in on the w_____e whenever they visit shops and may get discounts for merchandising at these shops.
- _____ 14. In order to boost sales, the manager asked his employees to raise the quality of s_____e to customers.

Appendix C

The Immediate Post-test & the Delayed Post-test

Vocabulary Test

Class: _____ No.: _____ Name: _____

I. Multiple choices: Choose the most appropriate answer. 選出最適當的答案。(每題 3.5 分)

- () 1. She _____ three more teaspoons of sugar to the flour to make the cake taste sweeter.
(A) flowed (B) added (C) referred (D) sharpened
- () 2. In pursuit of fame and wealth, he _____ his girlfriend and sacrificed their love.
(A) pleased (B) boasted (C) avoided (D) deserted
- () 3. Do you think it _____ to call Michelle so late at midnight now?
(A) proper (B) rough (C) equal (D) additional
- () 4. After taking the roller coaster, I felt like throwing up and couldn't help feeling _____.
(A) harmful (B) perfect (C) peaceful (D) dizzy
- () 5. Do you think Jeff would donate money to the charities if he won the _____?
(A) bill (B) lottery (C) bakery (D) diamond
- () 6. Terre _____ the bottle and suddenly the water rushed out, making all of us get wet.
(A) joked (B) squeezed (C) popped (D) mined
- () 7. Kelly felt so _____ that her stomach ached before she went on the stage.
(A) nervous (B) awake (C) unlucky (D) clever
- () 8. The picture _____ me of those carefree days in senior high school.
(A) reduced (B) described (C) reminded (D) belonged
- () 9. The anxious mother did everything she could to _____ her child from being bullied.
(A) block (B) infect (C) calm (D) protect
- () 10. Ellen left the party without saying a _____ word. She just disappeared silently.
(A) whole (B) single (C) wise (D) middle
- () 11. Look! Herds of _____ and sheep are being chased uphill on the ranch.

- (A) chickens (B) wolves (C) geese (D) cattle
- () 12. A _____ is a well-mannered man who always shows consideration for others.
- (A) cowboy (B) blacksmith (C) gentleman (D) character
- () 13. The _____ never stopped attacking until the soldiers finally surrendered.
- (A) enemies (B) designers (C) guests (D) bakers
- () 14. The UVA and UVB rays from the sun can cause great _____ to your skin and make it aging.
- (A) waste (B) muscles (C) stress (D) damage

II. Gap filling: Fill in the right vocabulary according to the hints provided. 依提示填入正確的單字。(每題 3.5 分)

- _____ 1. She made a g_____e to the waiter to order one more serving of fish.
- _____ 2. The heart and the lungs are important o_____ns.
- _____ 3. God will live for all e_____y; that is, God will live forever.
- _____ 4. Border Collie has been praised as the most intelligent s_____d dog.
- _____ 5. In order to boost sales, the manager asked his employees to raise the quality of s_____e to customers.
- _____ 6. A balanced diet and regular exercise are e_____l to our health.
- _____ 7. All the classmates g_____red together to attend the class reunion after graduating for three years.
- _____ 8. To our amazement, Julie can play so many i_____ts at such a tender age.
- _____ 9. Having a good cry and relaxing yourself are effective ways to r_____e stress.
- _____ 10. Most of the v_____ns and minerals have to be taken in from fruits and vegetables.
- _____ 11. The coffee shop is famous for its drip coffee and delicate d_____ts.
- _____ 12. Don't r_____b too hard when washing your face, or it might hurt your skin.
- _____ 13. Nowadays people like to check in on the w_____e whenever they visit shops and may get discounts for merchandising at these shops.
- _____ 14. She will c_____y become ill if she goes on working like that.

Appendix D

Traditional Worksheets of Lesson 5 in *English Reader for Senior High Schools*

Book 1 for Both Experimental and Control Groups

Lesson 5 Skin Care 皮膚保養

Vocabulary 5-1

2. **human** *adj.* 人的；人類的 *n.* [C] 人類

- human being 人類
- human error 人為疏失
- human nature 人性
- human relations 人際關係
- human resources 人力資源
- human rights 人權

human *adj.* 有人性的

例：To err is human, to forgive divine. 【諺】犯錯是人之常情，寬恕乃神聖之舉。

humane *adj.* 慈悲的；人道的 [反]：cruel *adj.* 殘酷的

inhumane *adj.* 不人道的；不近人情的

humane treatment 人道對待

3. **guard** *v.* [T, I] 保衛

[例]：Children should wash their hands before eating in order to guard against disease.

guard *n.* [C] 守衛；警衛

- a prison guard 監獄看守員
- a guard dog 警犬
- a security guard 保全人員

4. **muscle** *n.* [C] 肌肉

muscular *adj.* 肌肉的；肌肉發達的

[例]：Look at that muscular man. He looks very strong.

- muscular tissue 肌肉組織

6. **harm** *v.* [T] 傷害；損害

harm *n.* [U] 傷害；損害

harmful *adj.* 有害的

[例]：Smoking is harmful to your health, and it may lead to lung cancer.

8. **tip** *n.* [C] 小提示；內線消息

tip n. [C] 小費；內線消息；尖端

- get a tip 拿到小費
- leave/give a tip 給小費
- give the police a tip 向警方通風報信
- give somebody a tip on the market 向某人透露市場行情
- (just) the tip of the iceberg (只是) 冰山的一角
- on the tip of one's tongue (話) 就在嘴邊 (卻想不起來)

例：He gave the waitress a tip.

tip v. [T] 給小費；[I] 翻倒

例：She tipped the bellboy two dollars.

I hung my heavy backpack on the back of a chair, causing the chair to tip.

9. **well-balanced** *adj.* 均衡的

well-balanced adj. 神智健全的

例：A well-balanced person is usually sensible and has the ability to control his or her behavior.

12. **waste** *n.* [U] 廢物；浪費

waste v. [T] 浪費

- waste disposal 廢棄物處理
- toxic waste 有毒的廢物
- nuclear waste 核廢料

waste adj. 廢棄的；無用的

- waste paper 廢紙

13. **infected** *adj.* (傷口等) 受感染的

infection n. [U, C] 感染

infectious adj. 傳染的

例：SARS is a deadly disease, and it is highly infectious.

14. **cell** *n.* [C] 細胞

- red/white blood cell 紅/白血球
- nerve cell 神經細胞 (= neuron)
- brain cell 腦細胞

15. **avoid** *v.* [T] 避免

avoid + V-ing 避免做.....

例：The driver swerve to avoid hitting the deer.

avoidable *adj.* 可避免的

unavoidable *adj.* 不可避免的

- avoidable mistakes/ errors 可以避免的錯誤
- unavoidable costs 無可避免的開銷
- unavoidable risks 無可避免的風險

18. **reduce** *v.* [T] 縮減；降低

reduction *n.* [C, U] 縮減

例：Lately, there seems to have been a slight reduction in the price of oil.

19. **stress** *n.* [U] 壓力

stress *v.* [T] 強調

例：My English teacher lays great stress on grammar.

- cause stress 造成壓力
- create/produce stress 產生壓力
- reduce/ease stress 減輕壓力
- manage stress 處理應付壓力
- under stress 受到壓力

stress *n.* [C] 強調；重要（性）

stress *n.* [C] 重要（性）；重音

例：In the phrase “White House” the stress falls on the first word.


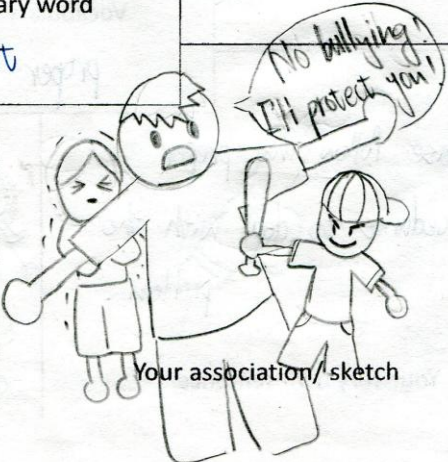
21. **method** *n.* [C] 方法

methodical *adj.* 有條理的

例：Our company needs a methodical worker who can do things in a systematic way.

Appendix E

The Adapted Frayer Model Worksheets of Lesson 5 in *English Reader for Senior High Schools Book 1* for the Experimental Group

| | |
|--|---|
| <p>1. organ n.</p> <p>Definition in your own words/ synonym(s)</p> <p>a part of body that has a particular purpose.</p> | <p>Collocations</p> <p>organ } donation 器官捐贈 donor 器官捐贈者</p> <p>organ transplant 器官移植</p> |
| <p>Vocabulary word</p> <p>organ</p> | |
| <p>The heart and the lungs are important organs.</p> |  |
| <p>Your very own sentence</p> | <p>Your association/ sketch</p> |
| <p>5. protect v.</p> <p>Definition in your own words/ synonym(s)</p> <p>to make sure that sb./sth. is not harmed.</p> | <p>Collocations</p> <p>protect sb. from N/Ving 保護...免於</p> <p>seek / offer protection 尋求 給予</p> |
| <p>Vocabulary word</p> <p>protect</p> | |
| <p>Parents always protect their children from being harmed.</p> |  |
| <p>Your very own sentence</p> | <p>Your association/ sketch</p> |

7. damage v.

Definition in your own words/ synonym(s)

to harm or ruin sth.
V. 破壞

Collocations

{ cause
do damage to N

suffer damage 受損

flood damage 水災

Vocabulary word

damage

Several cars were damaged
in this car accident.

Your very own sentence

10. vitamin n.

Definition in your own words/ synonym(s)

a natural ^{物質} substance found in
food to keep your body healthy.

Collocations

vitamin pills / tablets
丸 錠

Vocabulary word

vitamin

Oranges ^{富含} are rich in vitamin C.

Your very own sentence



Your association/ sketch

11. essential adj.

Definition in your own words/ synonym(s)

= necessary
indispensable 不可或缺的
extremely important
極度的

Collocations

be essential ^(介) to N 对...是必要的
it is essential that S+V...
是必要的

Vocabulary word

essential

Money ^(not) is essential to happiness.

Your very own sentence

16. squeeze v.

Definition in your own words/ synonym(s)

to press sth. hard with your fingers.

Collocations

擠牙膏
squeeze a tube of toothpaste
管子

freshly squeezed orange juice
↑ 現榨的

Vocabulary word

squeeze

She squeezed orange juice into a glass.

Your very own sentence



Your association/ sketch

17. rub v.

Definition in your own words/ synonym(s)

to move your hand back and forth over a surface. 來回地
表面

Collocations

rub one's hands 搓双手
rub the ^(A)mud off your ^(B)shoes.
將A從B搓掉

Vocabulary word

rub

He rubbed his chin thoughtfully.

cf: rob a bank
搶

Your very own sentence

20. proper adj.

Definition in your own words/ synonym(s)

= rights, appropriate
correct 適當的

↔ improper

Collocations

proper name 專有名詞
rights and proper 合理合情的

Vocabulary word

proper

Please follow the proper procedures to deal with the problem.

Your very own sentence

Your association/ sketch



Your association/ sketch



Appendix F

Traditional Worksheets of Lesson 5 in *English Reader for Senior High Schools*

Book 1 for the Control Group

Lesson 5 Skin Care 皮膚保養

Vocabulary 5-2

1. **organ** n. [C] 器官

- organ donor 器官捐贈者
- organ transplant 器官移植

organ n. [C] 管風琴；風琴

organic adj. 器官的；有機的

例：I like organic fruits because they are natural and healthy.

- organic vegetables 有機蔬菜
- organically adv. 有機地
- organically-grown fruits 有機栽種的水果

例：People prefer organically-grown fruits to GM food (= genetically modified food 基因改良食品) .

5. **protect** v. [T] 保護

protection n. [U] 保護

- provide/offer protection 給予保護
- receive protection 受到保護
- seek protection 尋求保護
- protection money 保護費（付給黑道的）

7. **damage** v. [T] 損害

例：He left his laptop outside, and it was damaged by the rain.

damage n. [U] 損害

- do damage (to ...) 損害（到……）
- suffer damage 受損
- serious/severe damage 嚴重損壞
- brain/nerve damage 腦部／神經損傷
- storm/flood damage 暴風雨災害／水災
- What's the damage? 這要多少錢？（幽默的說法）

damage n. [pl.] 賠償金

10. **vitamin** *n.* [C] 維他命

- fat-soluble vitamins 脂溶性維生素
- water-soluble vitamins 水溶性維生素

11. **essential** *adj.* 必要的；不可或缺的；最重要的

同：necessary *adj.* 必要的；必需的
crucial *adj.* 極重要的

- it is essential (that) + 子句是必要的
 - play an essential role/part in something 在某事上面扮演舉足輕重的角色
- essential *n.* [C] 要點；要素；必需品

例：Before we left home, we only packed some essentials.

16. **squeeze** *v.* [T] 擠壓；榨出（水、汁等）

- squeeze a tube of toothpaste 擠牙膏
- 例：He squeezed the tube hard to make the toothpaste come out.
- squeeze somebody's hand 捏一捏手（表示愛意或同情）
 - squeeze orange juice into a glass 擠柳橙汁到杯子裡

17. **rub** *v.* [T] (rub, rubbed, rubbed) 磨；搓；揉；塗抹

- rub ... down 擦淨；磨平
- 例：She rubbed down the old chair with a cloth until the wood shone.
- rub something off something 將某物從某物上擦掉
- 例：You had better rub the mud off your clothes.
- rub something out 用橡皮擦擦掉.....
- 例：The teacher asked the student to rub out a mistake in his homework.

20. **proper** *adj.* 適當的；正確的

properly *adv.* 適當地；正確地

- proper name 專有名詞（一般以大寫字母開頭）

反：improper 不適當的

例：It is improper to wear short trousers at a dinner party.