

The Use of Semantic Mapping to Improve Vocabulary Comprehension

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Abstract: *Learning vocabulary is considered to be the most important aspect of second language acquisition (Knight, 1994). The purposes of this study were to investigate the effects of the semantic mapping technique on student vocabulary comprehension, and to examine the students' attitudes towards the semantic mapping technique. The study employed a quasi-experimental research method with two groups (experimental and control). The experimental group learned vocabulary with the use of semantic mapping, while the control group learned with a traditional method. The data were analyzed by means, standard deviations, descriptive statistics, an independent t-test, and paired t-test. The participants of this study were 46 students selected from Vocational-3/1 majoring in computer business and Vocational-3/2 majoring in marketing. The results from comparing the pre-tests and post-tests of this study showed that the experimental group made higher improvement than the control group and the students had positive attitudes towards the semantic mapping technique.*

Keywords: vocabulary comprehension, semantic mapping, students effectively improve vocabulary

Introduction

1.1 Overview

The importance of vocabulary in English has been widely recognized (Stahl & Bravo, 2010). Vocabulary learning is an essential part of language learning. Learning vocabulary is considered to be the most important aspect of second language acquisition (Knight, 1994). Candlin (1988) stated that "the study of vocabulary is at the heart of language teaching in terms of organization of syllabuses, the evaluation of learner performance, and the provision of learning resources" (pp.15-32). In Thailand, the importance of vocabulary learning has been addressed in the national curriculum, detailing the expected number of vocabulary words (Office of Basic Education, 2014).

Since vocabulary is vital to language learning, many researchers have paid attention to vocabulary instruction. Generally speaking, vocabulary instruction should provide opportunities for students to repeatedly encounter words in contexts. Multiple exposures allow students to gather more information about the meanings. Using and applying many examples of a word in a variety of contexts reinforces word knowledge. Hunt and Beglar (1998) identified three approaches to enhance vocabulary learning, namely, incidental learning, explicit instruction, and independent strategy development. Among the three, incidental vocabulary learning was viewed as an essential part of L2 vocabulary acquisition.

For many educators, vocabulary instruction has been considered as a challenging part to teach effectively to language learners. Much of the research indicates that enlarging vocabulary has been one of the objectives of many EFL learners (NogcThuy, 2013). However, students usually have to face many difficulties in learning vocabulary, especially in memorizing the word meanings. Low vocabulary proficiency is an obstacle for them in acquiring language knowledge and participating in the activities in class. It is frustrating when they discover that they cannot communicate effectively because they do not know enough vocabulary. Students usually forget the words they have learned or fail to use words communicatively. Although they spend most of the time learning vocabulary, the results are still disappointing (Borkovska, 2007). As a result, it

is important to provide vocabulary instruction to increase vocabulary knowledge and to help them remember vocabulary better.

As an English teacher at a vocational college, students usually have to face difficulty in learning technical vocabulary, low vocabulary proficiency is an obstacle for them in acquiring language knowledge because they do not know enough vocabulary. To improve student vocabulary knowledge, it is important to use an appropriate teaching method, strategy, or technique. The review of literature revealed that semantic mapping might be appropriate to improve student vocabulary comprehension. According to Buzan (1990), semantic mapping is a technique that visually displays a word or phrase and a set of related words or concepts. It gives the freedom to roam the infinite expanses of the brain. Most importantly, the map will help students comprehend the meanings of the vocabulary words. Therefore, this study attempted to use semantic mapping technique to foster students' vocabulary comprehension.

1.2 Semantic Mapping

Semantic mapping is a powerful graphic technique which provides a universal key to a universal key to unlock the potential of the brain. It harnesses the full range of cortical skills word, image, number, logic, rhythm, color and spatial awareness – in a single, uniquely powerful manner (Buzan, 1990). Also, semantic mapping is a kind of graphic organizer. It illustrates a number of approaches designed to demonstrate how keywords or concepts are associated to one another through graphic presentations. This method has been identified by most researchers as an excellent technique for increasing vocabulary and improving reading comprehensions and Semantic mapping is a method of vocabulary instruction that allows students to make connections between a new vocabulary word and words that are already known. Johnson, Pittelman, and Heimlich (1986, pp. 778-782) defined semantic mapping as, “a categorical structuring of information in graphic form.” Rupley, Logan, and Nichols (1999, pp. 336-346) expounded upon Johnson et al.'s definition, noting students can, “conceptually explore their knowledge of a new word by mapping it with other words or phrases, which categorically share meaning with the new word”. Nagy (1988) also described the purposes of semantic mapping as helping to “activate appropriate background knowledge” (p.11). Often, students do not use what they already know about a word or words unless prompted. Second, “the procedure allows the teacher to identify and assess the specific background knowledge of the students in that class”. Using the information obtained, teachers can then relate new vocabulary to students' prior experiences. Finally, semantic mapping can “provide a rich basis for further writing, as well as reading”. Pikulski (1989) further described an important feature of semantic mapping as “the building of an understanding of how the target vocabulary words relate to known words and concepts” (p.42). Two studies are examined and compare semantic mapping with other.

Semantic mapping was adapted from the test in word mapping strategy to promote students' deeper understanding of words through depicting varying relationships between and among words. Research reveals that to develop students' vocabularies, teachers need to promote in-depth word knowledge (Beck, McKeown, & Kucan, 2002). The word mapping strategy, or semantic mapping, is one of the most powerful approaches to teaching vocabulary because it engages students in thinking about word relationships (Graves, 2006). However, Tony Buzan launched his own software program to support mind mapping called iMindMap in December 2006. His website, Buzan World, cites trademarks on the phrase 'Mind Maps' which he has registered in many countries. He is a proponent of the techniques of mind mapping and mental literacy. He is an author and educational consultant. He has worked with: corporate entities and businesses all over the world; academics Olympic athletes children of all ages governments and

high-profile individuals, in teaching them how to maximize the use of their brain power (Tony Buzan, 2006).

1.3 Evaluative

The data from the test and questionnaire of the main study were calculated through computer calculation application software for analysis. The interpretations of the data were divided into several analysis forms: *Descriptive Statistics*, an *Independent t-test*, and *Paired t-test*. They were used to calculate the data to respond to the two research questions. Research Question 1: *Does the semantic mapping technique improve student vocabulary comprehension?* To answer this question, *Descriptive Statistics*, an *Independent t-test*, and *Paired t-test* (means and standard deviations) were used. The means and standard deviations were used to measure vocabulary comprehension using the categories of semantic mapping. Research Question 2: *What are the student's attitudes toward the semantic mapping technique?* In order to answer this question, *Descriptive Statistics* (means and standard deviations) from students' feelings and things are useful was used to examine whether there were any significant differences in the implementation of the use of vocabulary comprehension with attitudes toward the semantic mapping technique.

It was an experimental study with two groups that underwent a set of different activities using different methods or ways of teaching, namely the implementation of the semantic mapping technique and the traditional way of teaching vocabulary. The students were separated as the control group and the experimental group. Both groups took a pre-test and post-test as adapted from the test in Truong (2009). This experimental study followed two groups with a pre-test and post-test design that were made from two instruments. First, the test on vocabulary knowledge, and second was the questionnaire on the student's attitude, perception towards semantic mapping was employed to collect quantitative data. All the data that was obtained from the completed pre-test and post-test were encoded and analyzed using SPSS.

1.4 Research Questions

This study sought to answer the following questions:

1. Does the semantic mapping technique improve student vocabulary comprehension?
2. What are the students' attitudes toward the semantic mapping technique?

Literature Review

The strategy is most effective when used before, during, and after reading (Margosein et al., 1982). Most teachers use the word mapping strategy to introduce new vocabulary before reading. As a follow-up to reading and discussion of the text, they encourage students to develop their word maps by using the new information they acquired through reading. Students may also use word maps during reading, as they add new ideas and words to further build word knowledge and extend understanding of word relationships, implementing the word mapping strategy step by step. First, select words for vocabulary instruction. Prepare for vocabulary instruction by carefully selecting the words to be taught. Choose words by considering the readings and the words that are key to understanding the text. Second, project a blank word map on the screen. Model how to construct a word map and demonstrate to students how to use the word map for building and exploring word relationships. Third, write the key words on the word map. In each blank, write and say the key word that will be taught. Fourth, use a think-aloud to model how to explore relationships between words. Use the think-aloud strategy to (1) demonstrate how to explore word relationships; (2) think about the meaning of the key word or related words; (3) model how to further the meaning of the word by examples and nonexamples, or synonyms and

antonyms, of the word; (4) find the definition of the word in a glossary or dictionary and find its use in context or a discussion with another student about the word's meaning; and (5) draw a picture of the word to illustrate its meaning in context. Fifth, record ideas that have been used to explore the word meanings and relationships, during the think-aloud, record information about the word in the appropriate space on the word map. Sixth, students are directed to use the word maps during and after reading to add information about the key words. Students use the word maps for recording new information while they are reading. After reading, they may further develop their word meanings by looking for dictionary definitions, drawing pictures of words, and adding new words from their readings. And seventh, students share their maps with others. Have students share their maps with the class. During this sharing period, students use the information on their word maps to develop and expand the class map. Students write new information on the group map and are encouraged to revise their own word maps to incorporate these new ideas.

Pikula (1987) compared the effectiveness of the two techniques (semantic mapping and dictionary) for 38 students of experimental and control groups. In his study, the experiment group developed the network of semantic categories using their existing knowledge of vocabulary whereas the control group used a dictionary to learn vocabulary. Posttest results at the end of the six-week period indicated a statistically significant difference between the two groups. The experimental group exhibited a greater gain than the control sample.

Vogt (1983) investigated the effectiveness of semantic mapping as a technique to improve recall of word meanings versus the traditional method of teaching vocabulary. Eight intermediate-level students from grades 4, 5, and 6, five of whom were identified as learning-disabled students, were the subjects. They were tested using vocabulary subtests of the Gates-Ginitie reading tests to determine the 30 words that were unknown. The students were then presented words using the traditional technique and other words using semantic mapping. A month later a posttest of all words was administered. The two methods of instruction were compared using the Wilcoxon two sample test. Results showed that the total number of word meanings remembered in the free recall setting and in context was greater for those taught by the semantic mapping technique than for those taught by the traditional method.

Nilforoushan, Somayeh (2012) compared the effect of teaching vocabulary through semantic mapping on EFL learners' awareness of the affective dimensions of deep vocabulary knowledge. Sixty intermediate EFL female adult learners participated in their study were chosen among 90 students through Preliminary English test and a general vocabulary knowledge test. They were thus randomly divided into two groups, experimental and control, each consisting of 30 students. As for the treatment, modifiers describing peoples' characteristics were taught in the text and through semantic mapping, whereas these words were taught by usual vocabulary instruction in the control group. At the end, students took a vocabulary achievement test and a test of awareness of evaluation and potency dimensions of deep vocabulary knowledge. A t-test was run to analyze the data from the vocabulary achievement test. Results showed that teaching collocations has great influence on the students' general vocabulary knowledge. To see if the independent variable had significant effects on awareness of evaluation and potency dimensions of deep vocabulary knowledge, a MANOVA was run revealing that teaching vocabularies through semantic mapping significantly improved learners' awareness of the two dimensions.

Method

3.1 Population and Participants

The population of this study was the vocational education learners at a Vocational College in Chonburi province, Thailand. The participants were 46 students, 23 from the control group (marketing major) and the other 23 were from the experimental group (computer business major).

3.2 Instruments and Instructional Instrument

Two instruments were utilized in this study design to collect the quantitative data. The first one was a multiple-choice test that was used for the pre-test and the post-test (Nogc Thuy, 2009). First, 60 vocabulary items were selected from the course materials. Then, these items were administered to a group of students at the same level for the pilot study. After obtaining the data, the process of item analysis was carried out. Some of the items which were most difficult or easy were discarded, and some were modified. The liability of the vocabulary knowledge test was also calculated. The second instrument was a questionnaire on the students' attitudes towards semantic mapping was employed to collect the quantitative data. Each item included a statement about the student's attitudes towards using the semantic mapping technique (developed based from Truong, 2009). The test was piloted with a group of subjects similar to the original simple. It consisted of three parts: (1) cluster A – student's interest in semantic mapping, (2) cluster B – student's attitudes towards the benefits of semantic mapping, and (3) cluster C – student's attitudes towards the convenience of semantic mapping. All parts were in the form of a questionnaire. Altogether, there were 21 items and the time allotted was 45 minutes. Finally, the research used two instruments: (1) a test on vocabulary comprehension and (2) a questionnaire on students' attitude towards semantic mapping. The pre-test and the post-test were designed to be similar to each other in terms of content, task types, allotted time and numbers of the tasks. In other words, the post-test was the pre-test with the items rearranged. The test was multiple choice, consisting of 50 items (units 1-5). The total score was 10, calculated by using the average of each unit. For the questionnaire, it was self-reported with a five-point Likert scale, asking about students' attitudes toward semantic mapping.

3.3 Procedure

The list of target words included five units that used 60 vocabulary words for each unit of the two groups. The name of the subject is English for Commerce. The Subject Code is 2000-1208. There were five units in the course: (1) Applying for a job – 5 hours, (2) Memorandums – 5 hours, (3) Giving business information – 5 hours, (4) Telephoning and making appointments – 5 hours, and (5) Exchanging business information – 5 hours. In total, there were 11 weeks.

Examples of teaching semantic mapping technique in Unit 1 on the topic of Applying for a job, the implementation of semantic mapping technique was monitored to help the experimental group comprehend word meanings from the word lists. The objectives were students would brainstorm words related to the topic, demonstrate an understanding of the target vocabulary and understand job qualification in the advertisement. PowerPoint was used for the following materials in Unit 1: Apply for a job, exercise, sample job postings, list of target words, blank maps, and pencils or markers.

The teaching procedures were as follows. First, the teacher would discuss the scope of learning in the measurement method and the evaluation of learning English for commerce and let students work in groups of 4 to 5 students. Second, the teacher would let the students see the announcements for recruitment from the newspaper then assign students to answer a job for any position. Third, present the language point "Look for a job". The teacher would write the key

word on the map which is job then would ask students to build and explore word relationships from the keyword. Fourth, useful grammar point expressions; teacher described useful expressions with examples using PowerPoint.

-Agreeing with somebody→ Yes, I agree. / That's right. / I couldn't agree more. That's just what I was thinking

-Disagreeing with somebody→ I'm afraid I disagree. / Sorry to say but I don't entirely agree with you. / Actually, I see things rather differently myself.

- Asking for clarification or repetition→ Pardon? / Excuse me. Could you repeat what you said? / Sorry, I'm afraid I didn't catch that. Would you mind repeating that?

-Giving (yourself) time to think→ I'm not so sure about that. May I think about that for a moment?

Fifth discussion; in each of the groupings, let them brainstorm and elicit word meanings, language patterns and other word relations. Sixth application; each group would expand and develop their ideas by gathering more information from the other groups. This activity would broaden the information they had in their map and they would have the opportunity to revise their own word maps by incorporating new ideas. Seventh generalization; the teacher would show her word map and let the students do exercise about "looking for a job" Then the students would read the job announcement and answer questions to assure understanding and measuring the comprehension of the topic. Aside from that, the students would use recycled paper or used it from front to back to do the exercises. Eighth evaluation criteria; the teacher would ask each group to present their word map, explain the ideas they have got and how they got these ideas, and let students do homework on building and exploring word relationships from the key by individual work in Unit 1. However, the two groups also used lesson plans and the English for commerce book concurrently.

3.4 Design

This study was conducted at a vocational college in the eastern part of Thailand. The Vocational College has been established for more than 10 years. The college has a population of approximately 850 students. It has three lower vocational levels and two higher vocational levels. The research employed quasi-experimental research with two groups by pre-test and post-test design.

There were 220 students from seven classes in Vocational 3. Out of these classes, two classes were purposefully selected by using criteria as follows: (1) number of students in a class, and (2) prior English grades. The first class of Vocational-3/1 students was randomly assigned as the control group whereas the second class of Vocational-3/2 students was randomly assigned as the experimental group. Before and after the experiment, both groups were given a pre-test of vocabulary comprehension. During the experiment, the implementation of semantic mapping technique was used in the experimental group, and a traditional vocabulary instruction was taught in the control group. After the experiment, a posttest was used to measure vocabulary comprehension and a questionnaire to examine students' attitudes towards semantic mapping.

Results

This section presents a general description after implementing the semantic mapping technique to improve vocabulary comprehension. It was observed that students were engaged in the instruction. Most of the them understood the objective of each lesson and did well in class. The plan was executed accordingly; there were no unexpected events during the data collection.

Findings of Research Question 1: Does the semantic mapping technique improve student vocabulary comprehension?

This section reports the answers to the first research question by using *Descriptive Statistics, Mean Scores, and Standard Deviations*. The data were from the test of vocabulary comprehension. The total score of the test was 10. The data are presented in Table 1 below.

Table 1. Average Scores of Pre-test and Post-test in the Experimental Group and Control Group

Groups (N = 23)	Pre-test		Post-test	
	M	SD	M	SD
Experimental Group	2.94	0.86	8.06	0.94
Control Group	2.80	0.84	6.03	1.13

Descriptive statistics was conducted on the test result of the pre-test and post-test of the two groups at the experimental group and control group. As shown in Table 1, there was a significant difference in the scores of the experimental group for the pre-test ($M = 2.9, SD = 0.86$) and post-test ($M = 8.1, SD = 0.94$) and the control group for the pre-test ($M = 2.8, SD = 0.84$) and post-test ($M = 6.0, SD = 1.13$). The results of the average score of the whole class really does have an effect on comprehension word meanings for pre-test because the two groups are not different. Specifically, the results on comprehension word meanings for the post-test in the two groups were different.

In order to present the data in detail, Figure 1 presents the average pre-test scores of each unit and Figure 2 presents the average scores of the posttests of each unit.

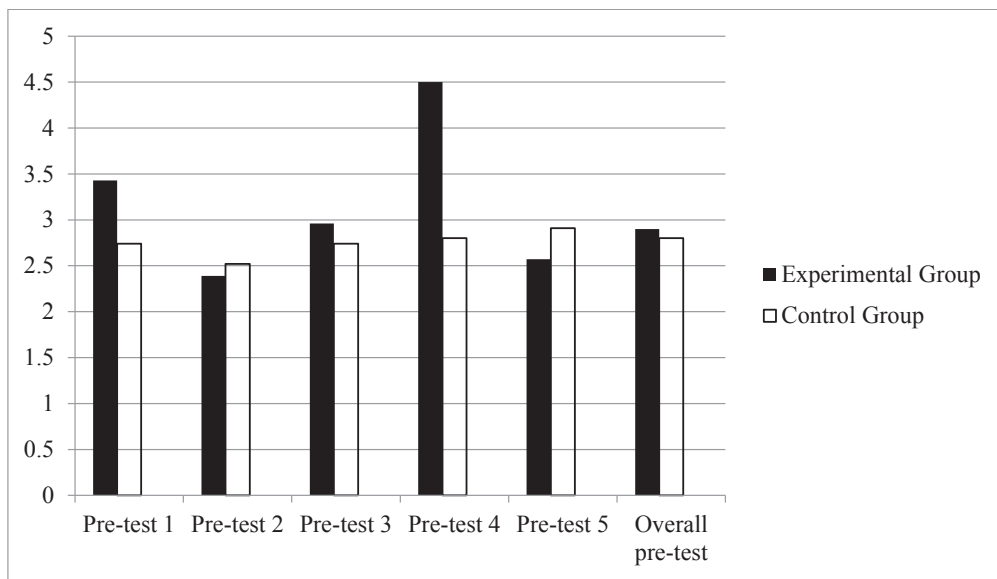


Figure 1 Overall Pre-test

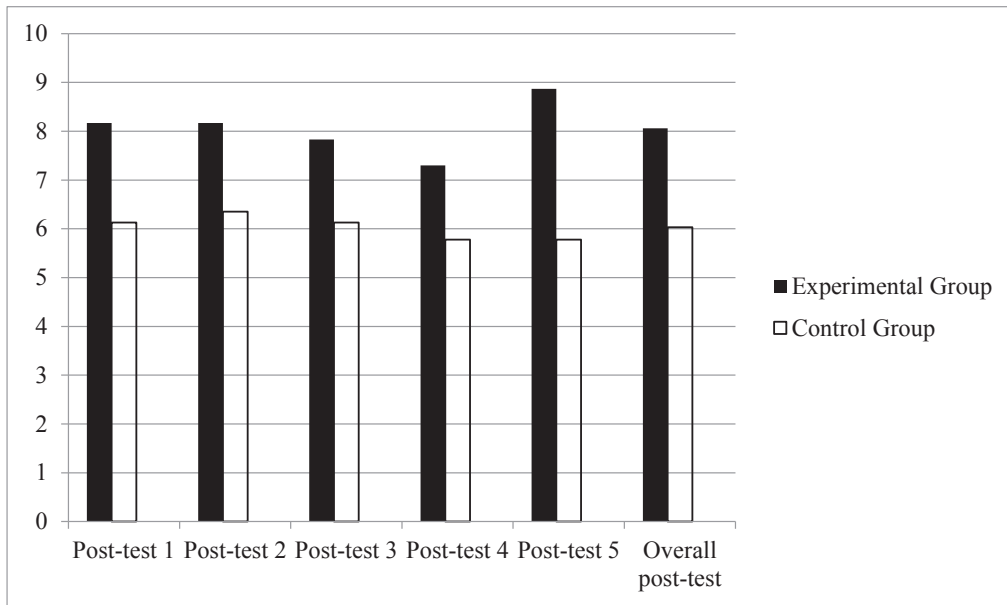


Figure 2 Overall Post-test

An Independent-samples *t*-test

Table 2. Comparison of the Experimental Group Pre-test with the Control Group Pre-test

Groups (<i>N</i> = 23)	Pre-test			
	<i>M</i>	<i>SD</i>	<i>t</i> -test	<i>p</i>
Experimental Group	2.94	0.86	0.417	0.679
Control Group	2.80	0.84	0.417	0.679

**p* < .05

An independent-samples *t*-test was conducted to compare the pre-tests of the two groups: experimental group and control group. It was found that there were no significant differences in the scores of the experimental group pre-test (*M* = 2.9, *SD* = 0.86) and the control group pre-test (*M* = 2.8, *SD* = 0.84). This means that the two groups were equivalent and they could be used to compare the posttest scores.

An Independent-samples *t*-test

Table 3. Comparison of the Experimental Group Post-test with the Control Group Post test

Groups (<i>N</i> = 23)	Post-test			
	<i>M</i>	<i>SD</i>	<i>t</i> -test	<i>p</i>
Experimental Group	8.06	0.94	6.644	0.000
Control Group	6.03	1.13	6.644	0.000

**p* < .05

An independent-samples *t*-test was conducted to compare the post-tests of the two groups: experimental group and control group. It was found that there was a significant difference in the scores of the experimental group post-test ($M = 8.1$, $SD = 0.94$) and the control group post-test ($M = 6.0$, $SD = 1.13$). This means that after learning with the semantic mapping technique, the posttest score of the experimental group was different from the control group.

A Paired Samples Test

Table 4. Comparison of the Pre-test and Post-test for the Experimental Group

Experimental Group ($N = 23$)	<i>M</i>	<i>SD</i>	<i>t</i> -test	<i>p</i>
Pre-test	2.90	0.86		
Post-test	8.06	0.94	-24.179*	.000

* $p < .05$

A paired samples test was conducted to compare the pre-test and post-test of the experimental group. It was found that there was a significant difference in the scores of the experimental group pre-test ($M = 2.9$, $SD = 0.86$) and post-test ($M = 8.1$, $SD = 0.94$). This means that after learning with the semantic mapping technique, the posttest score of the experimental group was different from the pre-test score.

A Paired Samples Test

Table 5. Comparison of the Pre-test and Post-test in the Control Group

Control Group ($N = 23$)	<i>M</i>	<i>SD</i>	<i>t</i> -test	<i>p</i>
Pre-test	2.80	0.84		
Post-test	6.03	1.13	-15.69*	.000

* $p < .05$

A paired samples test was conducted to compare the pre-test and post-test in the control group. It was found that there was a significant difference in the scores of the control group for the pre-test ($M = 2.8$, $SD = 0.84$) and post-test ($M = 6.0$, $SD = 1.13$). This means that after learning with the traditional method, the posttest score of the control group was different from the pre-test. However, it should be noted that the increased scores of the control group was fewer than the experimental group.

In conclusion, multiple *t*-tests were performed to determine the differences of the average scores between the experimental group and the control group. It could be concluded that after learning with the semantic mapping, there were increased scores for vocabulary comprehension. The increased scores could be attributed to the use of semantic mapping. In other words, semantic mapping improved vocabulary comprehension.

Findings of Research Question 2: *What are the students' attitudes towards the semantic mapping technique?*

This section reports the answers to the second research question by using *Descriptive Statistics, Mean Scores, and Standard Deviations*. It also reports the use of semantic mapping to improve vocabulary comprehension. The interpretation of the range score of each category and each item are as follows:

- 4.50 – 5.00 = highest satisfaction
- 3.50 – 4.49 = high satisfaction
- 2.50 – 3.49 = moderate satisfaction
- 1.50 – 2.49 = low satisfaction
- 1.00 – 1.49 = lowest satisfaction

Table 6. Results of the Students' Attitudes towards Semantic Mapping

Clusters	Categories	Experimental group	
		<i>M</i>	<i>SD</i>
A	Student's interest in semantic mapping.	3.73	0.52
B	Student's attitudes towards the benefits of semantic mapping	3.65	0.58
C	Student's attitudes towards the convenience of semantic mapping.	3.64	0.58
Overall cluster		3.67	0.53

Descriptive statistics of vocabulary comprehension using semantic mapping (Experimental group) are presented in Table 6 Overall, the results of the students' attitudes towards semantic mapping are at the high level ($M = 3.67$, $SD = 0.53$). When considering each category separately, the participants had equal comprehension in "clusters A, B, and C" at the high level with mean scores from 3.64 to 3.73.

In order to examine the attitudes in detail, Tables 7-9 present each cluster separately.

Table 7. Student's Interest in Semantic Mapping

Item	Clusters 1	Experimental Group	
		<i>M</i>	<i>SD</i>
1.	I use semantic mapping in reading lessons.	3.86	0.86
2.	I add some more examples in the semantic maps.	3.91	0.66
18.	I can read more words from the lesson.	3.60	0.72
20.	I can combine the use of semantic mapping and the word list for comprehension.	3.47	0.66
21.	I require both Thai - Thai and Thai - English dictionaries for interpreting.	3.78	0.73
Overall		3.73	0.51

Table 7. Illustrates the statistics of the results of student's interest in semantic mapping. As shown in the table above, the participants reported comprehension of five perceptions towards item 2. I added some more examples in the semantic maps at the high level with the mean scores from 3.60 to 3.91. In addition, for item 20, I combined the use of semantic mapping

and the word list for comprehension was reported being comprehensive at the moderate level with the mean scores from 3.47. Overall cluster 1 was at the high level ($M = 3.73$, $SD = 0.51$).

Table 8. Student's Attitudes towards the Benefits of Semantic Mapping

Item	Clusters 2	Experimental Group	
		<i>M</i>	<i>SD</i>
3.	Semantic mapping helps me comprehend the words better.	3.86	0.81
4	Semantic mapping helps me recall the words more easily.	3.73	0.75
5	Semantic mapping encourages me to improve my logical thinking.	3.47	0.79
6	When I use semantic mapping, I can expand my vocabulary.	3.60	0.65
7	Semantic mapping helps me to integrate and improve other skills such as reading and writing.	3.82	0.77
8	Semantic mapping displays interrelationships among different ideas.	3.65	0.83
9	I have no problems learning vocabulary using semantic mapping.	3.56	0.78
10	When I use semantic mapping, I can discover the relationships between words that I already know.	3.73	0.96
11	I am more motivated to learn using semantic mapping.	3.39	0.78
17	I remember the precise meaning of vocabulary for a long time.	3.60	0.72
Overall		3.64	0.58

In general, the participants reported in clusters 2 for student's attitudes towards the benefits of semantic mapping at the high level ($M = 3.64$, $SD = 0.58$).

When considering each category separately, the participants equally comprehension in "Semantic mapping helps me comprehend the words better at the high level with the mean scores from 3.86 to 3.56. I am more motivated to learn using semantic mapping reported comprehension at the moderate level with the mean scores from 3.39.

Table 9. Student's Attitudes towards the Convenience of Semantic Mapping

Item	Clusters 3	Experimental group	
		<i>M</i>	<i>SD</i>
12	I can easily categorize words related to other words.	3.61	0.78
13	I can fully understand the definitions of the words through semantic mapping.	3.61	0.99
14	I use semantic mapping to help me enrich my vocabulary.	3.74	0.86
15	I use semantic mapping to help me improve memory acquisition.	3.47	0.67
16	I use semantic mapping to help deepen my understanding by creating associative linking vocabulary.	3.65	0.78
19	I understand more word meanings by using semantic mapping.	3.78	0.74
Overall		3.64	0.58

As shown in Table 9, the participants reported student's attitudes towards the convenience of semantic mapping at the high level in clusters 3: I understand more word meanings by using semantic mapping ($M = 3.78, SD = 0.74$); I use semantic mapping to help me enrich my vocabulary ($M = 3.74, SD = 0.86$); I use semantic mapping to help deepen my understanding by creating associative linking vocabulary ($M = 3.65, SD = 0.78$); and I can easily categorize words related to other words, I can fully understand the definitions of the words through semantic mapping ($M = 3.61, SD = 0.78$). However, semantic mapping helps me to improve memory acquisition ($M = 3.47, SD = 0.67$).

Discussion

The discussion begins with the results of the pre-test and post-test on the quantitative data, Does the semantic mapping technique improve student vocabulary comprehension? With regards to the statistical results comparing the test scores within each group, it was found that participants in both the experimental and control groups were statistically significant. This implies that both instructions had a different mean score, with the experimental group higher than the control group for the effect on students' vocabulary comprehension. The students were able to become familiar with the target word meanings after using semantic mapping with three hours of instruction twice a week for eleven weeks. The results are consistent with the research conducted by Margosein et al. (1982), Pikula (1987), Vogt (1983), and Nilforoushan, S. (2012), who found that semantic mapping had a greater impact on vocabulary acquisition. However, the studies carried out by the previous researchers compared the effectiveness of semantic mapping and other techniques (context clue approach, the traditional dictionary-definition-plus-example approach, or the dictionary). In this study, the researcher compared the effectiveness of semantic mapping and that of the word lists. Actually, the semantic mapping helped organize words in a systematical way and created a semantic link between the words by the topics or by the ideas in the context. This required the students to have deeper mental processing to find the relationship between the words and to build up a map of words. As a result, the students could comprehend

the words right after the lessons, most of them could transfer the words they learned into the semantic map created for consolidation. The improvement in comprehension, in turn, resulted in spontaneous immediate retrieval.

It was found that the hypotheses were confirmed. Introducing and having students practice using the semantic mapping is an effective way of enabling the students to achieve greater progress in vocabulary learning. As a result, what are the students' attitudes toward the semantic mapping technique? The students had positive attitudes towards this method. The findings were not only consistent with the literature review but also supportive of the research on using the semantic mapping. This leads to the implication that the semantic mapping can improve high vocational students' vocabulary comprehension and is promising for vocabulary teaching and learning.

Recommendation

Should focus on the analogy of the learning process. More analogy, new words, and minimal pair comparison. Vocabulary pairs exist only in the slightest difference. Vocabulary match pairs with specific points to practice understanding of vocabulary and listening, perception is the basis for understanding vocabulary is to control the environment, not too difficult, focus on different ways, how to recognize vocabulary.

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