

# The Effect of Thematic versus Semantic Clustering of English Vocabulary

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## ABSTRACT

The present study investigated the effect of thematic vs. semantic clusters of English vocabulary on L2 vocabulary learning. Participants included 60 EFL intermediate learners. During six treatment sessions, forty vocabularies were presented. In thematically clustered group, concept mapping were utilized for word instruction (experimental 1, n=20). In semantic clustering group (experimental 2, n=20) synonym of the words were presented. The comparison group (n=20) received placebo. Following the treatment all participants took immediate and delayed posttests. Results of split-plot and two Tukey post hoc ANOVAs revealed that although both thematic and semantic clustering improved learners' vocabulary knowledge, the thematic clustering group was much more superior in vocabulary learning and retention. Semantic clustering group performed better than comparison group in immediate posttest but not on delayed posttest and consequently had less impact on retention.

**Keywords:** thematic clustering; semantic clustering; concept mapping; L2 reading comprehension; L2 vocabulary learning.

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## 1. INTRODUCTION

One of the big challenges English language learners face with is learning a large number of lexical items. There has been increasing body of research over the past two decades investigating L2 vocabulary learning and the role of vocabulary in receptive and productive skills of language (e.g., Brown, 2011; Bruton, 2007; de la Fuente, 2006; Ellis & He, 1999; Folse, 2006; Hill & Laufer, 2003; Huang, 2007; Hunt & Beglar, 2005; Kang, 1995; Laufer & Nation, 1995; Min, 2008; Okuyama, 2007; Paribakht & Wesche, 1993; Shen, 2010; Sydorenko, 2010; Vidal, 2011; Webb, 2007; Wesche & Paribakht, 2000). Vocabulary is an important element in language (Hoshino, 2010) and it is a necessary component for improving competency in all areas of communication (Godwin-Jones, 2010). Lexical development is an essential step in SLA (Tight, 2010). Stating that one cannot learn language without vocabulary, Krashen (1989) highlights the importance of vocabulary learning. Nassaji (2004) points out that learners should experience tasks such as extensive reading with repeated exposure with lexical items as well as explicit instruction (Schmitt, 2008), in order to reach to the depth of vocabulary knowledge. Explicit instruction drastically enhances vocabulary knowledge. The students are given lists of words or pictures that are most related to particular topic or situation (Bolger & Zapata, 2011). Thinking about the relationship between what the learners know and how s/he learns the new words, Tinkham (1993, 1997) and Waring (1997) emphasized on the importance of thematic clustering of English vocabulary. ). The majority of studies conducted on the impact of the presentation of vocabulary in semantic clusters (Altarriba & Mathis, 1997; Grandy, 1992; Graves, 2006; Hashemi & Gowdasiaei, 2005; Seal, 1991; Stahl & Nagy, 2006; Stoller & Grabe, 1995; Wharton & Race, 1999). They believe that presenting two words in semantic cluster helps a learner to become aware of the similarities in meaning and to determine and remember the differences between them. Much of the support for presenting vocabulary in semantic clusters comes from studies of the organization of the mental lexicon in L1. this study investigates the effect of thematic versus semantic clustering instruction of L2 vocabulary through two different forms of vocabulary instruction techniques with a follow-up reading activity on learners' vocabulary enhancement.

## 2. Background Research

Focusing on the semantic categories and L2 vocabulary learning, Bolger and Zapata (2011) came up with the conclusion that participants were successful in semantically unrelated story group than semantically related story group. In their study, the vocabulary items ("alien" non words) presented in two sets of English stories which highlighted in boldface. Sitting in front of PC using Windows XP, the participants were given oral instruction on the task, followed by written instruction. When they finished reading the story, they started answering follow-up "yes", "no" questions. To summarize, the unrelated group was slightly more accurate than the related group in the vocabulary-

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picture matching task, but the differences were not significant. However, in the true-false statements, the unrelated group was significantly more accurate overall than related group.

Numerous SLA practitioners claim that there is a good organization of semantic fields in the human brain (Aitchison, 1994; Lewis, 1997; Grandy, 1992; McCarthy, 1990; Rogers, 1996). Focusing on the semantically clustered vocabulary in the human brain, Aitchison (1994, 1996) Found that individuals recall words on the basis of semantic field in which are conceptually mapped. On the other hand, Heycraft (1993) represented that it is easier to teach vocabulary items that belong to the same semantic field because the learner will be able to form a pattern of interrelated words in his mind.

Erten and Tekin (2008) conducted a research using two intact groups of participants, all of whom were fourth grade students with a similar proficiency level. The participants were asked to match vocabulary items—semantic sets and semantically unrelated sets—to corresponding pictures. The word list was in the form of picture-word matching—all concrete, since abstract words would be difficult to pretest, illustrate, and measure in terms of recall using visual materials—to avoid any possible difficulties in comprehension. The result of the study demonstrated that presenting new words in semantic sets, rather than in semantically unrelated word groups, can interfere with learning. Compared to the learning semantically unrelated words, most of the studies about L2 vocabulary learning represented that learners need much more time to learn new words introduced into semantically clustered sets (Erten & Tekin, 2008; Nation, 2000; Tinkham, 1993, 1997; Waring, 1997). Learning semantically clustered sets took about 50 percent longer than learning semantically unrelated words; therefore, learning semantic clusters proved to be more difficult for L2 learners (Tagashira *et al.*, 2010).

Tinkham (1993) stated that learning new words clustered in semantic sets required more learning trails. In his experiment, he presented three word-pairs pairing semantically related English words with artificial words and three word-pairs pairing unrelated English words through multiple exposure to the pairs mixed together, in varying orders, in six pair sets to a group of twenty subjects. The results of the experiment indicated that the subjects learned three word-pairs pairing semantically related English words with artificial words more slowly than they learned unrelated words. In his second experiment, the study was conducted to two sets, one set containing six semantically related English words paired with artificial words and the other set containing six unrelated English words paired with artificial words. Waring (1997) confirmed Tinkham's finding. Tinkham (1997) conducted the study in two modalities: orally, by responding to a word they hear by saying their response and written, by responding to a word they saw by typing their response. The words were presented in four phases, linguistically related "semantic clusters" versus linguistically unrelated sets, and cognitively associated "thematic clusters" versus cognitively unassociated sets, with sets of artificial words created for experiments. Each participant heard and recognized the artificial words and said the corresponding English word and he heard the English words and recalled the artificial corresponding word in oral modality. In written modality, the materials were virtually the same as those administered in oral modality, except for saying the word participants were required to type the word. The outcome of the study revealed that the new L2 vocabulary items arranged in semantic clusters were learnt with more difficulty than new vocabulary items learnt in unrelated sets. The data also presented that new L2 vocabulary item arranged in thematic clusters were more easily learnt than new L2 vocabulary items arranged in unassociated sets.

Finkbeiner and Nicol (2003) carried out their experiment by utilizing four categorize of eight pseudo word-picture pairs, which were presented in either semantically related or unrelated sets. Both groups were presented the words orally and then they saw the picture depicting the meaning of the word, after which they repeated the new label for the word twice. Once the participants had been trained in this way, they completed oral L1-L2 and L2-L1 translation tasks, for which translation latencies were measured. The results showed that the semantically related group was slower than the unrelated group, which seems to confirm the inhibitory effect that presenting vocabulary in semantically related sets can have on vocabulary learning. In the experiments conducted by Finkbeiner and Nicol (2003) and Tinkham (1997), the effects on foreign language learners' memorization tasks of these three types of vocabulary organization (thematic clusters, semantic clusters & unrelated words) were measured. Their findings showed that learners were most successful at memorizing new words when the words were learnt in thematically clustered sets. And surprisingly, the words belonging to semantic clusters were those that the subjects had the least success in memorizing. In his experiment, Hoshino (2010) stated that categorical words were more effective type of word list for L2 vocabulary learning than other lists, regardless of the individual student's learning style.

**Concept Mapping:** Novak and Canas (2008) represented that concept maps are graphical representations of knowledge. They visually depict separate but related concepts by showing the relationship between the concepts with a line, or directional arrows. The word on the linking lines

demonstrates the relationship between the concepts. Two linked concepts are called proposition, and propositions form meaningful statements when read.

### 2.1. The study

Vocabulary as "the building block of language" (Schmitt, Schmitt, & Clapham, 2001, p. 53), is considered by some to be "the most important aspect of foreign language teaching (Knight, 1994). One of the things that students, teachers, material writers, and researchers have all agreed upon is that an important part of mastering a second language is learning vocabulary (Groot, 2006). However, the best means of achieving good vocabulary learning is still unclear, partly because it depends on a wide variety of factors. Vocabulary as an essential part of language proficiency provides a basis for how well learners speak, listen, read, and write. Without an extensive amount of vocabulary and strategy for acquiring new vocabulary, learners may be unable to make use of some language learning opportunities around them such as watching television, listening to radio, and listening to the native speakers (Richards & Renandya, 2002).

According to Schmitt (1997), a vocabulary learning strategy is any strategy that results in the learning of vocabulary. The great number of learners favored some forms of the mechanical strategy such as repetition over deeper, more complex ones (Schmitt & McCarthy, 1997). Regarding the previously mentioned reasons, educators look to research to provide ideas on what instructional methods might provide the best learner outcome. Examining the learning of vocabulary through two different types of clusters may provide teachers, who are looking for a strategy to teach vocabulary, a new method by which to present those words. These techniques – semantic and thematic clustering – make the process of vocabulary learning a more meaningful and communicative process and also more creative activity for EFL learners. They also introduce communicative approaches to EFL teachers to teach L2 vocabulary. This would be of particular interest to ESL teachers as there is a correlation of great importance between reading comprehension, learning new vocabulary and learning a L2. The present study investigated the way vocabulary learning might be facilitated through learning vocabulary semantically vs. thematically in comparison with traditional method. The purpose of manipulating thematic or semantic clustering in the present study was to facilitate intermediate EFL learners' vocabulary learning and encourage them to apply appropriate method in comprehending reading texts in order to find out which method works better.

### 2.2. Research Questions

Based on the findings of SLA research with regard to the effectiveness of thematic and semantic clustering of vocabulary on reading comprehension, the following research questions guided the present study:

R.Q.1. Do thematic and semantic clustering of English vocabulary differ in their effectiveness on L2 vocabulary learning?

R.Q.2. If they differ, which vocabulary teaching technique is more effective?

## 3. METHOD

### 3.1. Participants

Ninety two female intermediate EFL learners between the ages of 18–23 in one of the English institutes in, Astara, Iran called Shokouh English institute participated in this study. Participants were bilingual in Azari-Turkish and Persian. They had studied in the same institute, and had received three years of formal English instruction. English classes were held two sessions per week, each session lasted 90 minutes. For getting assurance as the homogeneity of the participants, they were taken Oxford Placement Test (OPT). Then, they were assigned to three groups. The first group was thematic clustering group (n = 20); the second group was semantic clustering group (n = 20); and, the third group was the control group (n = 20). The rationale behind the selection of intermediate students is that concept mapping assumes that learners have a large vocabulary size, so it is more appropriate for learners with large amount of vocabulary (Stoller & Grabe, 1993).

### 3.2. Materials

The researcher adopted six short gap filling exercises from *intermediate vocabulary book by Thomas (1986)* which were used in the treatment sessions—and then using the answer key of the book, she filled in the gaps to change the incomplete texts into short reading comprehension texts. The rationale behind it was the selection of the appropriate words to create a concept map. Forty vocabulary words were presented in this study. Two tests were used in this study. The Oxford Placement Test (2007), Solution Placement Test used to homogenize three groups. The test contains 50 multiple choice questions which assess students' knowledge of key grammar and vocabulary from elementary to

intermediate levels, a reading text with ten graded comprehension questions, and an optimal writing task that assesses students' ability to produce the language. The 50 multiple choice questions and reading task are designed to be done together in 45 minutes. The writing can be done in, approximately, 20 minutes. The Vocabulary Knowledge Scale developed by Paribakht and Wesche (1993) used as a pretest and post test and the delayed post test to trace any significant differences among three groups, performance and retention.

### 3.3. Procedures

After administering OPT, on the bases of the test result 60 female students whose homogeneity was confirmed were selected. Following the guidelines in the test those learners who scored above 47 were selected as intermediate which was appropriate for the purpose of this study. Then they were divided into three groups of 20, one as control group and two experimental groups, one as thematic and the other one as semantic clustering group. The pretest provided for the three groups under the study, contained eighty vocabulary words, based on Vocabulary Knowledge Scale Test (VKS). The pretest was presented in order to find out which vocabulary items the learners did not know. The score obtained from the pretest was not included in the study since it did not have influence on the process of the study. After the pretest, each group attended English classes twice a week for three weeks. Every session the students of two experimental and control groups worked on the same passage.

In the control group, the students were provided with a short passage. The topic of the passage was introduced to the students. Once it was presented, some questions related to the topic were asked. Translating the key words of the texts, the teacher asked the students to read the text during the specified time. After silent reading which were used in all three groups, the students were asked to answer the follow-up comprehension questions on the passage. In the experimental group 1, which was thematic clustering group, the teacher announced the topic of the unit by drawing the concept map on the board and asks the students to think of words that might be related to the topic. Concept mapping in this case was a circular map with a topic inside and some spoke like arrows showing the connection between the thematic words which were lexically related to the particular topic or theme. The teacher motivated learners with asking question related to topic in order to elicit the related words in Persian or English then was writing the word on the board. If the word was not exactly what the teacher needed to get, she gave definition to get the word out and then substituted the required word on the board.

On the other hand, in experimental group 2, which was semantic clustering group, the teacher presented the topic of the unit by categorizing words in different lexical clusters as noun, verb, adjective, and illustrated the words on the board with the use of synonym for each word. The teacher gave the learners some incomplete semantic clusters containing some key words of the text along with their definition and read them aloud. The students were asked to categorize their ideas in that incomplete cluster that was given to them (fill in the gaps).

In this study, at the end of treatment sessions in both thematic and semantic clustering groups, and placebo which comparison group received, the participants took immediate post test which contained 40 instructed vocabulary items in one and a half hour. This test was supposed to be completed in an hour and a half, but due to having slow writers among participants it took two hours to be completed. Then after three weeks time interval delayed post test was given to the test takers in order to find out their vocabulary retention. *VKS measurement in this study*, the participants' test scores were calculated as follow in this study: the scores of item number 1 and 2 were given to all participants in this study since the researcher was required to give 3 scores to those participants who didnot learn the item. So the accurate respondents who were not required to answer these two parts, they were given the score to balance the range. Moreover, those participants who responded right and accurate got the scores for items 3, 4, and 5. Each vocabulary item in this test would score 15 if the participant responded right to it. So with respect to having 40 vocabulary items in this test, the score of the whole test would be 600.

## 4. RESULTS

### 4.1. Results of Proficiency Test Scores

In order to ensure that students in all the three participating groups began the study with similar level of proficiency, an analysis of variance (ANOVA) was performed on the scores obtained from the proficiency test. The results are presented in Table 1.

Table 1: Descriptive statistics for the proficiency scores of three groups

	N	Mean	SD	Std. Error
<b>Thematic</b>	20	56.45	5.56	1.24
<b>Semantic</b>	20	57.80	4.58	1.02
<b>Control</b>	20	57.85	4.45	.99
<b>Total</b>	60	57.36	4.85	.62

As it can be observed in Table 1, the three participating groups of this study were not different in terms of descriptive statistics,  $M = 57.36$ ,  $SD = 4.85$ . Table 2 summarizes the results of one-way ANOVA run for the proficiency scores of the three participating groups.

Table 2: Results of one way ANOVA for proficiency test scores of the three groups

proficiency	SS	df	MS	F-value	Sig.
Between groups	25.23	2	12.61	.52	.59
Within groups	1364.70	57	23.94		
total	1389.93	59			

As shown in Table 2, there was no statistically significant difference among the three participating groups involved in this study,  $F(2, 57) = 0.52$ ,  $p = 0.59$  in terms of their proficiency.

#### 4.2. Descriptive statistics for immediate and delayed posttest

This section presents results of the analyzing the data obtained from the study of the effect of different types of vocabulary instruction techniques that help improve their vocabulary learning. The means and the standard deviations for immediate and delayed post tests are shown in Table 3 and 4.

Table 3: Descriptive statistics for vocabulary immediate posttest scores of the three groups

	N	M	SD	Std. Error
Thematic	20	562.75	21.21	4.74
Semantic	20	509.00	39.52	8.83
Control	20	455.15	55.02	12.30
total	60	508.96	59.86	7.73

Table 3 shows that the thematic clustering group ( $M = 562.75$ ,  $SD = 21.21$ ), semantic clustering group ( $M = 509.00$ ,  $SD = 39.52$ ) and control group ( $M = 455.15$ ,  $SD = 55.02$ ) did not have equal means and the participants could not be considered as identical in terms of L2 vocabulary learning. Table 3 indicates that thematic clustering group has higher mean score and less standard deviation than the other two participating groups, and semantic clustering group outperformed control group that got placebo.

Table 4 illustrates that the thematic clustering group ( $M = 556.65$ ,  $SD = 21.23$ ), semantic clustering group ( $M = 474.90$ ,  $SD = 43.27$ ) and control group ( $M = 412.05$ ,  $SD = 44.67$ ) did not have equal means and the participants could not be considered as identical in terms of L2 vocabulary learning. It can be concluded that the thematic clustering group outperformed semantic clustering and control groups in delayed posttest.

Table 4: Descriptive statistics for vocabulary delayed posttest scores of the three groups

	N	M	SD	Std. Error
Thematic	20	556.65	21.23	4.74
Semantic	20	474.90	43.27	9.67
Control	20	412.05	44.67	9.98
total	60	481.20	70.39	9.08

#### Split-plot ANOVA design

A split-plot ANOVA revealed that there was a differential effect for the vocabulary instruction techniques at alpha level of 0.05, ( $F = 51.58$ ,  $p = .000$ ). So it can be said that the main effect for group was statistically significant (Table 5).

Table 5: Results of between-subjects effects

Source	Type III SS	df	MS	F	Sig.	Partial Eta squared
Group	318613.26	2	159306.63	51.86	.000	.645

To find out the effect of time (the rate of retention), a comparison was made between the three groups on the scores obtained from the two tests results, immediate and delayed posttests, due to the different vocabulary instruction techniques. The results are shown in Table 5. Table 5 shows the between-subject effects. The *Sig. value* is .000 that is less than the alpha level of .05, so it can be concluded that the main effect for group is statistically significant. The partial Eta squared value for group in this case is .645, which shows a large effect size.

Table 6: Multivariate test for within-subjects effects (time)

Effect		Value	F	Sig.	Partial Eta squared
Time	Wilks' Lambda	.106	479.99	.000	.894

In Table 6, it was indicated that the value for Wilks' Lambda for time is .106, with a  $sig = .001$ . Because  $p < .05$ , it can be concluded that there is a statistically significant effect for time. This suggested that there was a change in immediate and delayed posttest scores across the two different time periods. The main effect for time was significant. The Partial Eta squared value obtained for time in this study was .894 which is greater than .14. Using the commonly used guidelines proposed by Cohen (1988, as cited in Pallant, 2007),  $.01 = small\ effect$ ,  $.06 = moderate\ effect$ ,  $.14 = large\ effect$ , this result suggested a very large effect size.

Table 7: Multivariate test for between-within-subjects effects (time\*group)

Effect		Value	F	Sig.	Partial Eta squared
Time*group	Wilks' Lambda	.269	77.26	.000	.731

As Table 7 demonstrates, the sig. value in between-within-subject effects is  $sig = .000$ . The result represented that  $p < .05$ , so it can be concluded that the main effect for the group is significant. There was significant difference in the vocabulary instruction scores for the three participating groups. The effect size of the between – subjects effect, the Partial Eta Squared value for groups was .731.

#### 4.3. Tukey post hoc Test

Table 8 indicates the results of one-way ANOVA for the differences among three participating groups in terms of immediate post test.

Table 8: Results of one-way ANOVA for immediate post test scores

	SS	df	MS	F	Sig
Between groups	115777.63	2	57888.81	34.46	.000
Within groups	95752.30	57	1679.86		
total	211529.93	59			

Table 8 shows that there was statistically significant differences between thematic clustering, semantic clustering and control groups,  $F = 34.46$ ,  $p < .001$ . However, to pinpoint exactly where the differences existed, Tukey post-hoc ANOVA was run on the immediate post-test. As the Table 9 shows, participants assigned to the thematic clustering group outperformed the semantic clustering and control groups,  $p < .001$ .

Table 9: Tukey post-hoc ANOVA results among three groups for immediate post test

Group (1)		Group (2)	Mean Differences	Std. Error	Sig.
Thematic	vs.	Semantic	53.75	12.96	.000***
Thematic	vs.	Control	107.60	12.96	.000***
Semantic	vs.	Control	53.85	12.96	.000***

Table 10 indicates the results of one-way ANOVA for the differences among three participating groups in terms of delayed post test.

Table 10: Results of one-way ANOVA for delayed post test

	SS	df	MS	F	Sig
Between groups	210282.30	2	105141.15	73.03	.000
Within groups	82063.30	57	1439.70		
total	292345.60	59			

Table 10 displays that there was statistically significant differences between thematic, semantic and control groups,  $F = 73.03$ ,  $p < .001$ . However, to indicate exactly where the differences existed, Tukey post-hoc ANOVA was run on the delayed post-test. As the Table 4.11 shows, participants assigned to the thematic group outperformed the semantic and control groups,  $p < .001$ .



Table 11: Tukey post-hoc ANOVA results among three groups for delayed post test

Group (1)	Group (2)	Mean Differences	Std. Error	Sig.
Thematic vs. Semantic	Semantic	81.75	11.99	.000***
Thematic vs. Control	Control	144.60	11.99	.000***
Semantic vs. Control	Control	62.85	11.99	.000***

Now it is time to answer the question which motivated the study. The questions were whether there are any significant differences between thematic vs. semantic clustering vocabulary instruction on EFL learners' vocabulary learning and if so, which vocabulary instruction technique is more effective. The answer is positive since there is a significant difference between the performances of the three participating groups. Based on the findings and the statistics run the thematic clustering group outperformed semantic and control group.

## 5. DISCUSSION

As stated earlier vocabulary knowledge has an efficient role in receptive and productive skills. It is an important element in comprehending a text and it has a great impact on the way we communicate. As Krashen (1989) pointed out that one cannot learn a language without vocabulary, vocabulary research has received increased attention in recent years. There should be some techniques to draw learners' attention to learning vocabulary efficiently. Laufer (2005) pointed out that intentional vocabulary learning and explicit instruction are more beneficial to the improvement of learners' vocabulary knowledge. The positive effect of different vocabulary teaching strategies, methods, or techniques on learners' vocabulary knowledge enhancement has already been proved. However, what has remained the issue of much debate among the researchers is the degree of effectiveness of such instruction in different settings. Effectiveness of thematic vs. semantic clustering of English vocabulary on L2 vocabulary learning was challenged in this study in order to find out which vocabulary instruction technique is more effective.

The study found that thematic clustering vocabulary had significant effect on L2 vocabulary learning. Regarding to this finding, one can easily draw the conclusion that Tinkham (1993, 1997) was right when he claimed that providing learners' vocabulary with thematic clusters is an effective method of instruction than semantically clustered sets. Learners can learn words that belong to the particular topic or theme better than those vocabularies that are semantically clustered. It demonstrates that presenting new words in semantic clusters takes more trail time than thematic clusters. And they seem to be more difficult to learn than the other cluster. In the comparison that was made between semantically clustered vocabularies and the traditional method of instruction, semantically related vocabulary clusters were more effective than traditional method in immediate posttest.

As Laufer (1992) and Qian (1999, 2002) stated vocabulary knowledge and reading skill correlate strongly. So, in the present study, vocabulary was presented to the learners before they start reading the text. In fact learners were able to find out the meaning of the provided vocabularies with the cooperation of the teacher; along with, they were presented with different instruction techniques. Furthermore, giving learners a list of synonymous word in semantic clusters interfere on their learning. This way of presenting vocabulary hinders the learning. However, providing learners with the conceptual mapping triggered their mind to cognitively attach newly learnt word to those they had been encountered before. As a matter of fact, vocabulary instruction for EFL learners at intermediate level is one of the ways and also important one to increase vocabulary knowledge. Having this factor in mind, one can find out that based on this research finding, even there is a change in the vocabulary knowledge of the control group, since they received no treatment. It shows that traditional method of presenting vocabulary can be effective, but not as much as planned and practical method of instruction.

Numerous SLA theorists and practitioners demonstrated that teaching new L2 vocabulary in semantically clustered sets is an effective method of vocabulary instruction. These studies were supported by the organization of the mental lexicon in L1. Since most words used in this study were not concrete, truly it needed mentally lexicon organization that was appropriate for the intermediate learners. The study conducted by some practitioners (e.g., Bolger & Zapata, 2011; Erten & Tekin, 2008; Heycraft, 1993; Tinkham, 1993, 1997; Waring, 1997) indicated that they made use of different instrument such as windows XP, picture-word matching technique, oral and written modality, and alien word pairing in order to demonstrate the superiority of thematically clustered sets on semantically clustered or contrary in different setting. However, in this study the vocabulary words were the same for all groups. Synonymous vocabulary were presented to semantic clusters and concept mapping was presented to thematically clustered and the result showed that thematic clustering group outperformed semantic clustered group and control group in immediate posttest. In delayed post test, the present

study indicated that the participants who have been instructed under thematic clustering technique outperformed the other groups with the slight variation in their test result. So they retained the newly learnt vocabulary better than the other groups. Though, the semantic and control group did not do well in delayed posttest due to forgetting the vocabulary. The most essential differences drawn between thematic clustering and semantic clustering are the amount of involvement load on the learners' memory. According to research on human memory, depth of processing in the encoding process ( Craik, 2002) determines the chance of new lexical item in long-term memory. If the learner is engaged input processing which require deeper processing of a particular word, tasks with higher involvement load index (Laufer & Hulstijn, 2001), s/he retains a word meaning. When learners are instructed through concept mapping, reading a text, they use their prior knowledge to connect the word together so they have to exert more mental effort compared to when they are given synonym or word meaning alone.

### 5.1. Pedagogical Implications

Based on the findings of the present study thematic clustering of English vocabulary has profound implications for the future of vocabulary teaching and learning. This could help language teachers and administrators in making decision about the most effective vocabulary instruction programs to enhance L2 vocabulary learning. As most learners learn vocabulary through traditional ways of vocabulary learning (e.g., lists of words with native language meaning) and might not know how other types of strategies foster vocabulary learning, teachers need to spend some times training students to use thematic clustering in the most beneficial way. Besides reading, listening is also assuming great importance in foreign language classroom, since as Rost (1994) points out; listening provides comprehensible input for the learners, providing learners with thematically clustered word can give great insight to the language learners. Considering the important role of vocabulary knowledge in second language learning, it is indicated that learners not only can learn new target words incidentally but they can learn them intentionally during reading activities.

### 5.2. Suggestion for Further Research

This study is open to further investigation. This study focused on the effect of thematic vs. semantic clustering of English vocabulary on L2 vocabulary learning. Other researches can be conducted on the effect of thematic vs. semantic clustering on other language learning skills. A similar research can be conducted with a large number of participants at other proficiency levels. A similar study can be carried out with only male subjects to observe the differences of their performance.

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