

# **Retention and Recall of Lexicon Using Semantic Maps**

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## ***Abstract***

*Semantic maps ensure a high potential to facilitate enhanced quality of understanding words. ESL students are often presented with new English vocabulary items that are many times pre-organized in sets of semantically related words. Although there is an assumption that word grouping facilitates the activities for vocabulary learning, little or no empirical justification is offered by researchers in support of employing this teaching technique. This study aims to examine to what extent semantic relatedness influences ESL vocabulary recall and retention for middle school students of Telangana. The current study was conducted with 30 seventh grade students who were divided into two groups to compare the effects of presenting semantic maps and wordlists for reading comprehension activities. The results reveal that both teaching strategies have positive effects on vocabulary recall and retention. Between these two strategies semantic mapping was found to yield better results on recall. The difference between the groups can be explained from the perspective of information process theory and memory model. Significant learning and effectiveness of semantic maps was found in the experiment group.*

**Keywords:** Semantic maps, recall, retention, syntactic, wordlists, vocabulary learning

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### **Introduction**

Vocabulary is one of the major components of language learning and considered the most important aspect of second language acquisition. It is difficult to learn a language without mastering the vocabulary as learners find it difficult to communicate in a particular language without this component. According to Laufer (1997, p. 140) learning vocabulary is one of the important elements; and neither comprehension nor production of language is possible without it. Learning vocabulary cannot be separated from other language skills, such as listening, speaking, reading and writing because the more words the learners know, they will be able to understand what they hear or read. As English is a second language for a large population of learners, remembering and recalling vocabulary seems difficult for ESL learners especially while memorizing new words and enhancing their vocabulary knowledge.

One of the problems in making use of a wordlist in vocabulary teaching-learning is that some teachers and learners focus solely on working with the list alphabetically and students might not find the words in context in the materials they are reading. Another problem that might arise is that students may never practice the words in meaningful ways if they focus only on the spelling and meaning of words, but not on using the words themselves in speaking and writing. Therefore, in order to get the real benefit from wordlists, teachers need to make sure that they provide frequent encounters of the words being taught to the learners since it is crucial for vocabulary acquisition; and when students are exposed to the same words many times, the result will be a higher degree of learning, an increased ability to remember and use the word. Therefore, teachers should vary their strategy in teaching vocabulary and motivate the students to learn words actively and independently.

One of the strategies that can be used to teach vocabulary is semantic mapping. It is one of the most powerful approaches to vocabulary teaching because it engages students in thinking about word relationships. This strategy increases students' active exploration of word relationships; therefore, it leads them to a deeper understanding of word meanings by developing their conceptual knowledge related to words. Hence, this strategy can help students to memorize new words easily and effectively.

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### **Review of Relevant Studies**

In this section, some studies on word list and its relationship with vocabulary teaching-learning are briefly presented as given under the themes that follow.

#### ***Semantic maps and reading comprehension***

To foster vocabulary acquisition in the long-term memory, teachers and language researchers have attempted to follow several strategies of teaching vocabulary. One among these strategies is the use of semantic maps. The strategy has some teaching privileges as it helps learners to categorize words in the reading text through visualization (Duffy, 2009). Bear and others (2011) emphasize the importance of this strategy as it prompts learners to activate their schemata in the learning of highly specialized vocabulary in various disciplines.

Integration of vocabulary items in a meaningful context through reading can enhance better learning outcomes in both reading and vocabulary (Nagy, 2005). According to Rivers (1981), most of the words are introduced to the learner through reading texts. Nunan (1989) supported this notion by confirming that readers depend on vocabulary existing in their mental structures while reading as vocabulary consists of interrelating systems. Presenting the items from reading text to the learners in a systematized manner illustrates the original nature of vocabulary and at the same time enables them to internalize the items in a coherent way.

In recent years there are numerous ESL textbooks, and ESL learners are thereby exposed to the English language through pre-organized semantic clusters - i.e. groups of words that share certain semantic and syntactic similarities. These groupings such as *arm, leg, toes, fingers* are presented as a lexical set (Gairns and Redman, 1986), whereas semantic maps are categorical structuring of information in graphic form (Heimlich and Pittelman, 1986, p. 779) that help in categorizing word-meanings and the key attributes by distinguishing one word from another. The brainstorming phase of semantic maps gives educators the insight into learner's schemata. Thus, it can show interests, level of readiness, gaps, misconceptions, and errors (Johnson and Pearson, 1978). Ideas from one student will trigger ideas from the other students in a chain reaction in thought process (Heimlich and Pittelman, 1986, p. 34).

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### ***Wordlists***

Wordlists are prepared for the study of L2 vocabulary to improve students' knowledge base and retention of vocabulary. According to Mehrpour (2008), wordlist strategies are the study of words in lists with explanation of their meanings in the target language or with a translation of their meanings in the first language for longer memorization of words. A number of studies suggest that increased amount of rehearsal leads to a higher probability that an item will be transferred to the long-term memory (Atkinson and Shiffrin, 1968; Waugh and Norman, 1965), or leads to stored images of greater strength, which are then more easily retrieved from memory (Gillund and Shiffrin, 1984). An explicit strategy for vocabulary acquisition is learning words from a list. Recent research indicates that working with a word list can be a very efficient means of acquiring L2 vocabulary (Nation, 1995; Meara, 1995) and vocabulary learned in lists is found resistant to decay and can be retained over several years (Hulstijn, 2001; Nation, 2001). Using lists and cards also facilitates self-directed learning and learner autonomy, as learners may work at their own pace (Nakata, 2008, p. 7). Shillaw (1995) reports success in a semester-long project using word lists with students at a Japanese university. Thornbury (2002) points out that the value of learning from lists may have been underestimated and suggests several techniques for using word lists in classroom. Recent research into word list learning suggests that teachers of second languages are taking a renewed interest in using word lists for vocabulary instruction.

### ***Semantic maps as a teaching strategy***

In vocabulary teaching, semantically related words are the sets of words which have certain connections, share common meanings, or compose a network in meanings. The pragmatic benefit has possibly contributed to the popularity of lexical-sets in some widely listed course books for English class (Nation and Waring, 1997). Developments in “lexical semantics” have prompted the development of the “semantic field theory”, “semantic networks” or “semantic grids” which organize words in terms of interrelated lexical meanings. The “semantic field” theory suggests that the lexical content of a language is best treated not as a “mere aggregation of independent words” but as a collection of interrelating networks or relations between words (Stubbs, cited in Amer, 2002).

It is noteworthy that words can be grouped together (relating one another) following different criteria. Animals, for example, may be grouped in terms

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of physical features; they may be grouped in terms of non-physical features also such as pet, wild, food, etc. (Gairns and Redman, 1986). Moreover, course book authors who favour lexical-sets have believed that showing the connections among words promotes learners' vocabulary concept learning (Folse, 2004). First, one of the rationales for presenting related words can be drawn from meaningful learning; and distinction is made between rote learning, a passive process, and meaningful learning, the active process of relating new information or concepts to learners' prior knowledge.

To be specific, a spreading activation model proposed by Collins and Loftus (1975) is one of the frequently cited theories to support the use of lexical-sets in vocabulary teaching (Bolger and Zapata, 2011; Hashemi and Gowdasiaei, 2005). In this model, the network consists of nodes representing words and lines between nodes representing connection between words. The length of the line shows how strongly the words are semantically associated (Randall, 2007). Once a certain node in a network is initiated, this activation spreads through the whole network, thus leading to the activation of other nodes in the network (Collins and Loftus, 1975). The spread results in a faster process. Simultaneous presentation of related words possibly strengthens the links between words and facilitates vocabulary learning. Additional theoretical support is found in the levels-of-processing theory (Morin and Goebel, 2001). Researchers have noted that recognized information can be processed at a variety of levels from shallow to deep, and that the amount of cognitive effort that is given to the process determines the quality of the retention. Proponents of lexical-sets approach have claimed that when related words are presented at the same time, learners benefit from comparing, contrasting and organizing or chunking the words (Chin, 2002; Hashemi and Gowdasiaei, 2005; Jullian, 2000; Randall, 2007; Seal, 1991).

### **Objective**

The study was conducted with the aim of finding out the extent to which semantic relatedness influences ESL vocabulary recall and retention among the middle school students of Telangana state, India.

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### Research questions

The following research questions helped in finding out the efficacy of the two strategies of vocabulary teaching.

- a) Does semantic mapping and wordlist strategy play a significant role in promoting students' knowledge and in retention of L2 vocabulary?
- b) Which strategy has a greater influence on students' retention of L2 vocabulary: semantic mapping or wordlists?

### Methodology

#### *Subjects*

To explore the effectiveness of both semantic mapping strategy and wordlist strategy, two groups of ESL students were chosen. They were 30 seventh grade ESL learners with a mean age of 12 years ( $SD=1.62$ ), fluent in the Telugu and Hindi languages, and learning English formally from grade 1. The researcher divided the subjects into two groups and assigned them as experimental group (EG) and the control group (CG). The EG ( $n=15$ ) received Semantic mapping strategy as the treatment and CG ( $n=15$ ) received the wordlists strategy as the treatment. All the students had 6 years of experience in the target language with a proficiency level ranging from high beginners (A2) to low intermediate level (B1) and were able to understand simple texts and use vocabulary in conversations and writing. They were proficient in reading skills but were not comfortable in speaking. The following table gives information about the participants' linguistic background. Data were collected using a questionnaire administered before the experiment.

**Table 1**  
**Students' background**

|                                | Minimum | Maximum | Mean   |
|--------------------------------|---------|---------|--------|
| Age                            | 11      | 13      | 12     |
| Beginning age for English      | 6       | 9       | 8      |
| Years of formal instruction    | 4       | 6       | 5      |
| % of English they use in a day | 25%     | 75%     | 50%    |
| Level                          | A2      | B1      | A2, B1 |

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Average rating of the skills were – Reading<sup>1</sup>, Listening<sup>2</sup>, Writing<sup>3</sup>, Speaking<sup>4</sup> (1 most comfortable, 4 least comfortable). The questionnaire responses show that school is the major source of L2 exposure and teachers the only model for most of the learners. A few of the learners mentioned ‘tuition’ and ‘home’ as additional sources. While school is the place of L2 use for all of them, some of them said they use L2 at home and also the ‘playground’ for some indicating peer interactions in L2. Their responses also indicate a range of literacy practices at home and school, such as book reading, digital media such as movies and internet which means they have exposure and opportunities to use L2 in the overlapping domains of both home and school.

### ***Materials and procedure***

To conduct this research words for the vocabulary test were drawn from unit 6 and unit 7 of grade VII Students’ English Course book. First, frequency of the words was considered important for the learners as most of the words are repeated; and it was assumed that recall would be easier for them. Second, the words had to be familiar for the learners. Third, various word forms were selected as similar forms create confusion in comprehending. A proficiency test, two reading comprehension texts with intermediate level vocabulary, a pre-test and a post-test with questions which included comprehension and retention questions, a video, writing task and a feedback form were used. This research was carried out through reading and writing modules.

Subjects were divided into two groups: an experimental group (EG) and a control group (CG). 40 target words were selected and made a list. Before and after the experiment, both groups were given pre-test and post-test respectively, to understand the vocabulary levels. The pre-test contained 25 multiple-choice test items that aimed at investigating the homogeneity of learners’ vocabulary knowledge. Following the pre-test, three vocabulary lessons (incorporated into reading comprehension texts) were given to the EG using semantic mapping strategy while the CG continued with the wordlist and traditional vocabulary teaching techniques. In other words, each treatment of the intervention process was presented through semantic maps vocabulary teaching technique with a six step procedure for EG and wordlists with traditional teaching techniques for the CG. After the intervention and completion of vocabulary lessons, post-test was administered to both the EG and CG. For the post-test, similar test items were employed which were used for the pre-test. The pre- and post- test scores were compared using paired t-test.

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It was an in-class teaching model undertaken for 6 weeks with 1 hour per day. In the first class the participants were given a proficiency test with multiple choice questions with ten ‘high beginners’ level vocabulary and ten ‘low intermediate’ level vocabulary taken from Coursebook in comparison to Paul Nation’s word list. They were given 15 minutes to mark their responses and the sheets were collected. In the remaining time the participants were exposed to the concept of semantic frames- a method to learn existing and new vocabulary, through a text. They were asked to read the text and underline the words which they felt were complex to comprehend. A pre-test was given to check their comprehension and retention of words. The first ten items had vocabulary which demanded their meanings and the second ten words had meanings which demanded exact words. Then input was provided using the semantic frame technique. On the second day the subjects were given a worksheet – a post- test which included the same questions as the pre-test. Their responses were collected.

In the second half of the session a domain was chosen – cooking. A cooking video was chosen and a framework was made with 15 possible words that can be used to explain the process. Then all those words were provided as input along with their meanings using the semantic frame technique. A cooking video was played and the learners were asked to write a recipe on their own using the input provided to them, to check their comprehension and retention of the words. Their responses were collected.

**Table 2**  
**Data elicitation scheme**

| <b>Methods</b> | <b>Comprehension</b>  | <b>Retention</b>   |
|----------------|---|--|
| 1.             | Words were given and meanings were asked  | Meanings were given and words were asked                               |
| 2.             | Use words or their meanings provided in the framework while writing the recipe. | Use the exact words provided in the framework while writing the recipe |
| 3.             | Place the words under correct headings  | Meanings were given and words were asked                               |

On the third day ‘house’ domain was chosen. Different words related to the domain were provided in a box along with their meanings. Then four prompts were given, and the learners were asked to arrange the words under appropriate prompts. This aided in understanding their comprehending skills. In order to assess their retention capacity a test was given which included



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meanings or explanation of particular words in which the learners were asked to write the accurate vocabulary. Their responses were collected and recorded. Finally, a feedback form on ‘Semantic frames effect on learning second language vocabulary’ was given to the participants and the responses were recorded.

For implementing the wordlist strategy each week target words were chosen from the course books. An academic pool of words was compiled using *lextutor.com*. This list included mostly the 40 most frequent words; then these words were written on colourful flashcards, and after being presented to the students in context they were added to the list on the wall every day. Therefore, the list was compiled by the teacher rather than asking the learners to do so. There were two lists on the walls. Each day a revision activity was conducted and when students knew the word, the word appeared in the *use list*; but when they could not, it was put in the *lose list*. Knowing the word included aspects of word knowledge such as part of speech, synonyms, antonyms, collocations and example sentences. In addition to ‘use it/lose it’ activity, the implementation schedule also included different comprehension and retention activities.

## **Results and discussion**

Students’ responses to the comprehension items (multiple-choice, translation, words in context, words in isolation) were scored. The result of test was analyzed using t-test formula to make sure whether there was a significant difference between pre-test and post-test in the EG and CG, and to know which strategy was more effective. Standard deviation was computed before counting the t-test. Quantitative analysis of comprehension scores was performed using ANOVA to determine if there were statistically significant differences between the means of scores in the two strategies (semantic mapping and wordlists).

### ***Pre-posttest findings in the EG***

A pre-test was held in the beginning of the study to know the beginning condition of the students’ vocabulary mastery before getting treatments. In the pre-test, the students had to answer 25 multiple-choice items in 40 minutes. The results were compared to the post-test which followed the same pattern. In both these tests, some learners gave either the exact answers to the questions, or they left a blank near the questions to which they did not know the answer. A few learners tried to explain the answers for the

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comprehension questions in the way they have understood it rather than giving the accurate answers that were given as inputs. In the retention test, instead of writing the exact word, the learners through their comprehension of the word used another word that was related to the prescribed word. For example: when the actual word was 'snatch', (the meaning of the word was given through the inputs provided) the learner had understood the word meaning but could not retain it. So when they were tested for the actual word, one of the subjects had written *stealed* (stole) which is nearest in meaning to the targeted word. This word was probably drawn from their schema which they had acquired in their past years of studying.

The results are presented in the following table:

**Table 3**  
**Progress of EG from pre- to post test**

| EG        | N  | Mean | SD   |
|-----------|----|------|------|
| Pre-test  | 15 | 3.0  | 1.77 |
| Post test | 15 | 18.4 | 5.97 |

The mean score of the group at the beginning of the experiment was 3.0 (N = 15 and M = 3 and SD = 1.77); and at the end of the experiment it became 18.4 (N = 15 and M = 18.4 and SD = 5.97). This shows a big difference in students' knowledge level of the target words before and after the experiment (15.5). The difference in the mean scores before and after the experiment using ANOVA is identified at 0.00 (P-value = 0.00 and T-value = 3.98). When the statistical significance of the mean scores is set at 0.05 or lower ( $P \leq 0.05$ ), this means that the above value (0.00) indicates a statistical significance. Therefore, the results indicate a statistical development in vocabulary knowledge level before and after the experiment to a significant degree.

#### *Pre-posttest results in CG*

The mean scores of CG in the pre-test and the post-test are compared using the descriptive statistics tool to investigate the development in students' knowledge level of the target words within the group over a six-week period which was the period of experiment. Below table explains the difference.

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**Table 4**  
**Pre-posttest comparison in CG**

| <b>CG</b>        | <b>N</b> | <b>Mean</b> | <b>SD</b> |
|------------------|----------|-------------|-----------|
| <b>Pre-test</b>  | 15       | 2.4         | 1.59      |
| <b>Post test</b> | 15       | 14.7        | 3.08      |

The big difference in the mean scores indicates a considerable development in students' vocabulary knowledge after employing the wordlist strategy. The results were also compared using ANOVA to ascertain whether the difference in the mean scores is statistically significant. As illustrated in table 4, the mean score of CG at the beginning of the experiment is 2.4 (N = 15 and M = 2.4 and SD = 1.59), which became 14.7 at the end of the experiment (N = 15 and M = 14.7 and SD = 3.08). This shows a big difference in students' knowledge level of the target words before and after the experiment (12.3). This suggests the use of wordlists in the classroom promotes students' knowledge level of L2 vocabulary. The result of the above figure shows that the difference in the mean score of the control group before and after the experiment using ANOVA is identified at 0.00 (P-value = 0.00 and T-value = 3.75). When the statistical significance of the mean scores is set at 0.05 or lower ( $P \leq 0.05$ ), this means that the above value (0.00) indicates a statistically significant difference. Therefore, the results indicate statistical development in vocabulary knowledge level before and after the experiment.

### *Mean score comparison between Pre- and Post-Tests: EG and CG*

The difference of experimentation could be seen through the difference of mean scores between the two groups.

**Table 5**  
**Mean score comparison of EG and CG**

| <b>Group</b> | <b>pre-test</b> | <b>post-test</b> |
|--------------|-----------------|------------------|
| EG           | 3.0             | 18.5             |
| CG           | 2.4             | 14.7             |

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The table above shows that the mean score of the pre- test in the EG was 3, while the mean score of the post-test was 18.5 in the same group. The percentage of the students' improvement of this group is higher when compared to that of CG. Therefore, there was a significant improvement between the pre-testing to post-testing situation achieved by the students of EG. In short, the writer concluded that there was better improvement of the experimental group's achievement after they received the treatment by using the strategy of semantic mapping in teaching vocabulary.

## **Conclusion**

In this study, it was found that use of semantic mapping is an effective way of enabling the students to achieve greater progress in vocabulary learning. As a result, the students had positive attitudes towards this method. The findings were also consistent with the literature review. This leads to the implication that semantic mapping can improve students' vocabulary comprehension; and this is a promising strategy for vocabulary teaching and learning. Therefore, the current study suggests that language teachers may be better off going to the class with no fixed or preconceived maps or graphs to maximize the benefit of using semantic maps as a vocabulary teaching strategy in the classroom.

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