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# A Comparative Study of the Effects of Semantic Mapping and Interactive Word Walls on Iranian EFL Learners' Vocabulary Achievement

**Hassan Salmani Kerdabadi***
University of Sistan-o-Baluchest
hassansalmani48@gmail.com
**Mansoure Jaafari**
Isfahan University of Teacher Training
jaafarim1400@gmail.com

**Abstract**

Teaching vocabulary to senior high school students requires that educators find the most effective means of instruction. The aim of this mixed-methods study was to examine the comparative effect of using interactive WWs and semantic mapping strategies on EFL learners' vocabulary achievement. The study was carried out in two separately intact classes of two isolated schools in Isfahan, Iran, at the beginning of their second semester. They were assessed through a teacher-made pretest related to lessons 3 and 4 they had known nothing about before their second semester began. They were then randomly assigned to two experimental groups and were instructed to make use of IWWs or to utilize SMs. A posttest and an independent samples t-test were conducted on both groups in April to see which treatment had a significantly different effect on learners' vocabulary achievement. Finally two separated semi-structured interviews and the teacher's reflective notes formed the qualitative data. While these tenth graders received lower marks in their first semester exams due to using traditional vocabulary learning ineffectively, they then could improve their vocabulary achievement more motivationally and more effectively, utilizing IWWs or SM; furthermore, IWWs group outperformed the SMs group in their final vocabulary achievement test.

**Keywords:** interactive WWs, semantic mapping, vocabulary achievement, motivational strategies

## 1. Introduction

### 1-1. The Importance of learning vocabulary

Vocabulary knowledge is often viewed as a critical tool for second language learners because a limited vocabulary in a second language impedes successful communication. [1]Schmitt (2000) emphasizes that "lexical knowledge is central to communicative competence and to the acquisition of a second language" p. 55). [2] Nation (2001) further describes the relationship between vocabulary knowledge and language use as complementary: knowledge of vocabulary enables language use and, conversely, language use leads to an increase in vocabulary knowledge. The importance of vocabulary is demonstrated daily in and out of the school. In classroom, the achieving students possess the most sufficient vocabulary. Researchers such as [3] Nation and others have realized that the acquisition of vocabulary is essential for successful second language use and plays an important role in the formation of complete spoken and written texts. In English as a second language (ESL) and English as a foreign language (EFL) learning, vocabulary items play a vital role in all language skills i.e. listening, speaking, reading, and writing. [4]Rivers and Nunan (1991), furthermore, argue that the acquisition of an adequate vocabulary is essential for successful second language use because without an extensive vocabulary, we will be unable to use the structures and functions we may have learned for comprehensible communication.

Research has shown that second language readers rely heavily on vocabulary knowledge and the lack of that knowledge is the main and the largest obstacle for L2 readers to overcome.

In production, when we have a meaning or concept that we wish to express, we need to have a store of words from which we can select to express this meaning or concept. ‘‘When students travel, they don’t carry grammar books, they carry dictionaries’’ [5]. Many researchers argue that vocabulary is one of the most important-if not the most important-components in learning a foreign language, and foreign language curricula must reflect this. [6]Wilkins (1972) states that: “There is not much value in being able to produce grammatical sentences if one has not got the vocabulary needed to convey what one wishes. While without grammar very little can be conveyed, without vocabulary nothing can be conveyed” p97).

On the other hand, vocabulary has been acknowledged as L2 learners’ greatest single source of problems. The open-endedness of a vocabulary system, the fact that, unlike syntax and phonology, vocabulary does not have rules the learners may follow to acquire and develop their knowledge and tens of thousands of different meanings that vocabulary items have, form the causes of the problem. Despite these difficulties that language learners face in L2 vocabulary, they still have to deal with it in their examinations as ‘‘vocabulary has traditionally been one of the language components measured in language tests’’ [7]. Furthermore, many learners see foreign language learning as essentially a matter of learning vocabulary and therefore they spend a great deal of time on memorizing lists of L2 words and rely on their bilingual dictionary as a basic communicative resource. As a result, language teachers and applied linguists now generally recognize the importance of vocabulary learning and are exploring ways of promoting it more effectively. Some of this research takes the form of investigation of strategies learners use specifically for vocabulary (VLS), which is our focus of attention.

This study was designed to assess the effectiveness of using IWWs compared with SM to teach vocabulary items to high school learners. The design of the study was based on the findings of multiple researchers. Research has demonstrated that vocabulary and reading comprehension are related. Also, the importance of vocabulary is clearly established [8], and researchers support the need to teach vocabulary in all classrooms. Memory strategies in the case of learning second or foreign language are considered vital in vocabulary teaching [9]. Current methods and techniques which teachers are applying in their classes are almost ineffective and artificial, because these methods will not oblige the students to associate the new words and concepts in their minds together with the schema, which they already know [10]. Therefore, the crucial role of memory strategies such as SM and IWWs which may expand second or foreign language learners’ vocabulary knowledge, must not be neglected.

As a result of the connection between reading comprehension and learning vocabulary, the most effective teaching strategies must be determined for teaching vocabulary. Research revealed five of the most effective teaching strategies that may be used to teach vocabulary in the classroom [11]. Those strategies are using a print-rich environment, allowing students to create their own definitions, using words in context, enhancing student engagement, and encouraging students to make associations. Collectively, these strategies provide a powerful vocabulary presentation; however, research indicates that elementary teachers use these strategies consistently, but middle and high school teachers tend to depend on independent learning for their students.

Another technique that has shown to be effective in instruction is social interaction [12]. Researchers have claimed that social interaction plays a pivotal role in student learning. They also claimed that students gain a better understanding of vocabulary words when they worked together and interacted socially [13]. Elementary teachers usually embrace student interaction more often than do middle or high school teachers [14]. Consequently, senior high school students may not be receiving the most effective methods of vocabulary instruction.

**1-2. SM Strategy**

SM is the process for constructing visual graphics of categories and their relationship. It is an approach which helps students to relate new words to their own experiences and prior knowledge. Semantic maps represent the

relationship between categories of concepts while the learners perform a particular learning task. They include a key concept (main idea), within categorized concepts connected to the key concept. The association between key concept and categorized concepts are showed visually in diagram or map. SM is a visual strategy for expanding vocabulary knowledge by presenting categorized words related to one another [15]. SM is an effective strategy to build up schema or prior knowledge in learners. The first researcher who designed and developed SM procedure to enhance the teaching of study skill was [16] Hanf (1995). This strategy can make a summary out of the main ideas and help students to build up their schema which do not yet possess [17].

**1-3 IWWs**

In an effort to determine the most effective ways to teach vocabulary to high school students, combining research-based teaching strategies and social interaction seems to be an excellent opportunity. However, this task may seem overwhelming and difficult to accomplish. Consequently, finding a tool that embraced all of these strategies and was a realistic option for teaching vocabulary to high school students was advantageous. The WW strategy seemed to be an instructional strategy that combined research-based strategies and social interaction.

Words are the foundation of knowledge. They are powerful tools used to express ideas, communicate with others, access prior knowledge, and learn new concepts. Research shows a strong relationship between student word knowledge and academic achievement [18].As a result, building academic content vocabulary is an important part of science instruction. As with most students, English language learners (ELLs) benefit when vocabulary instruction is contextually rich and cognitively demanding. Contextually rich instruction builds basic language comprehension through the use of context clues that include authentic pictures, illustrations, diagrams, graphic organizers, and interactive learning experiences. Cognitively demanding instruction requires students to simultaneously process different types of information. Students who are ELLs achieved a deeper understanding of concepts and enhanced their knowledge of vocabulary when they were guided through inquiry-based, multisensory explorations that repeatedly exposed them to keywords, used visual clues, and used definitions in context [19]. One example of visual clues for vocabulary development is the use of an interactive WW. Such visual presentation of material can be extremely beneficial, as one study reported that scores on high-stakes tests increased across all student groups when teachers used IWWs and provided opportunities for students to encounter and use vocabulary in authentic and engaging ways [20]. Many middle school classrooms have traditional WWs displaying unorganized lists of vocabulary students have encountered in class. WWs are designed to serve as visual scaffolds and to support reading and language arts instruction. To support vocabulary development in ELLs, researchers created IWWs that resemble semantic maps. Semantic maps visually show case relationships among concepts and appear as web or concept maps [19]. An interactive WW, as opposed to the traditional one, provides visual aids illustrating word meanings and conceptually organizing words to deepen understanding.

WWs are useful tools for both teachers and students since they let both see and monitor what has been taught and learned. In addition, they serve as guides for teachers to determine what needs to be added to make word study systematic and to avoid gaps in the curriculum. Similarly, these artifacts are only valuable when students are actively engaged in meaningful tasks with them [21]. This wall holds instructional potential for contributing to the learning of new items according to Dual Coding Theory which claims that the mind contains a network of verbal and imaginal representations for words. Therefore, the IWW is effective since it serves as a memory aid helping the learners to visualize the network of relationship between new and familiar words. Consequently, regular use of the WW ensures greater retention of vocabulary since the use of it allows teachers to recycle many words. Having considered all these, the study described in this paper seeks to investigate the effect of using vocabulary WW in an EFL classroom, setting on students' vocabulary acquisition as well as the attitudes of the students.

Research indicated that WWs provide a print-rich environment for a classroom as a visual reminder of the material being learned [22] so that they stand to reason that content clues, student-created definitions, student engagement, and student identified associations may be applied to WWs. Research is limited in this area, and most of the available research has been conducted at the elementary level [23]. Additionally, few studies have been conducted on the effects that WWs have had specifically on vocabulary learning. An even lesser researched area is the effect that WWs have had on vocabulary learning of middle school students. Some research demonstrated the value that WWs may have in middle schools [13]. Interestingly, some researchers also included in their study [13] the social interactive component proposed by Vygotsky [12]. However, within these studies, student choice of vocabulary words was a major component, and this practice is not always feasible. Also, the strength of these studies was the qualitative portion which explored teacher and student knowledge, expectations, and responses to the WW used in the classroom.

Research has demonstrated that WWs are effective in teaching at the elementary level, and some research demonstrated their effectiveness in teaching vocabulary. However, limited research is available that demonstrates the use of WWs at the senior high school level, and even fewer studies have been conducted on using them to teach vocabulary as a multisensory strategy in ELT vocabulary learning. Even narrower is the research that has combined effective teaching strategies and social interaction through the use of WWs to teach vocabulary to high school students. As a result, this study used WWs as the focus tool that combined effective teaching strategies and social interaction to teach vocabulary to senior school students. Nevertheless, since the comparative effect of SMs and IWWs on learners' vocabulary achievement has never been argued, the aim of this study was to determine which one of these two strategies has a more significant effect on learners' vocabulary achievement.

## 2. Literature Review

### 2-1. Theoretical literature on SM

Much information has been written about SM strategy as an instructional strategy and its importance for improving students' motivation and developing their vocabulary performance. Three different types of vocabulary instruction have been tested through the history of English language teaching: Definition-based instruction, consisting of a list of words that learners look up, and write the definitions down; context-as-a-clue instruction, through which meanings of the target words are inferred from the adjacent material [24]; and the SM approach, in which new words are associated with other words already present in the learners' mental lexicon. Moreover, SM is a useful way to teach vocabulary which "provides the teacher with an assessment of the students' prior knowledge or schema availability on the topic" [17] (p. 24). Similarly, some argued that SMs can help teachers assess the learners' prior knowledge, and make students ready for encountering the text [25]. In the same vein, others indicated that SM exercises can prepare learners for understanding, assimilating, and evaluating the information they read [26].

Words form unique associative networks; therefore, knowing the relationships between the words helps students learn their meaning, and, as a result, they may develop the ability to use the words appropriately [27]. SM was also considered as an effective tool for improving the students' vocabulary knowledge. In a like manner, the introduction of SM in reading classrooms was advocated which had been proven to be a beneficial reading technique even for the native speakers of all educational levels [28]. It was found that learners had shown an impressive improvement on such areas as vocabulary development, writing ability and most importantly reading comprehension. Considering the positive impact SM had on EFL readers, he confirmed the use of SM as a crucial vocabulary strategy. In addition, SM enables students to visualize the relationships and categorize these relationships [29]. Teachers can introduce semantic maps in circles, squares, or ovals with connected lines. They can write the main idea on the board, ask students to brainstorm about the reading topic and put the words in circles connected to the main idea.

## 2-2. Studies on the Effectiveness of SM Strategy

One of the major benefits of SM is that it helps students to build their schema. For instance, middle grade students who learned new vocabulary through SM did better than students who relied upon other methods of learning vocabulary [30]. SM is an effective strategy in improving both the reading comprehension and writing performance of upper elementary school children. Mapping expands schema by allowing new information to be related to prior knowledge [31]. Some used semantic maps, in study of metacognitive strategies with learning disabled students, and found out that it would be an effective tool that helps learners to analyze the relationships between ideas in the text and facilitates comprehension and recall of information at a delayed period of time [32].

Moreover, SM was superior to other semantic strategies. One researcher examined the effects of two methods of vocabulary instruction on vocabulary learning of the eleventh grade Thai EFL students [33]. Schema theory, semantic field theory and semantic network theory provided the theoretical framework for the experimental method of vocabulary instruction which used mainly the SM technique as the pre-reading vocabulary teaching strategy. The control group used the traditional method provided with lists of difficult words in the reading passage as the vocabulary strategy. The subjects were 52 Thai EFL students from two intact classes in a secondary school. The results indicated that the experimental group performed significantly better on the listening comprehension section of the standardized proficiency test. The researcher concluded that the experimental method (SM) might be used as an alternative method useful for vocabulary instruction for EFL students. A study was conducted to determine the effectiveness of SM as an independent note-taking skill especially in the content area of $11^{th}$ grade English [33]. The subjects consisted of 49 students. Results did not indicate a significant difference resulting from the use of SM although students' attitude and assessment indicated an interest in and a willingness to use the method. The researcher recommended considering SM as an alternative to traditional linear note-taking because it is equally useful to promote achievement and may be more appealing to students.

A study was carried out to find whether 400 male and female secondary Jordanian EFL learners encode vocabulary in memory clusters according to semantic clusters more than acoustic clusters. The study showed that students encode vocabulary in memory clusters according to associations in sound or meaning, but the acoustic clusters were commonly used. Furthermore, significant differences were found between male and female students on semantic clustering in favor of females [33].

The review of related literature on SM has been conducted on different samples whereas the current study has been conducted on senior high school EFL students. Moreover, there seems to be no experimental studies at all (to the best knowledge of the researcher) on the usage of SM conducted among EFL senior high school classrooms in Iran. Therefore, this study aimed at filling this gap.

## 2-3. Theoretical literature on IWWs

While there has been significant research done to determine the effectiveness of WWs at the elementary level, there is little research related to using them within a secondary or high school classroom [34];[35]; [36]. A combination of explicit and responsive instruction can increase student vocabulary knowledge better than either instructional method independently [37]. Findings from their study of over 100 early childhood students provided with a combination of responsive and explicit instruction showed their vocabulary knowledge increased significantly compared to responsive teaching alone. IWWs combine multiple instructional strategies and create a print-rich environment for learning while encouraging students to use the terms regularly throughout the school year [36].

Another investigation concluded that WWs support student's vocabulary learning. WWs contribute to making a classroom a print-rich environment [38]. Primary classrooms use WWs for high frequency words, sight words or vocabulary [23]. Teachers' perceptions of WWs affect how they are used. For WWs to be effective, they should be interactive and incorporated into the classroom instruction [38].

## 2-4. Studies on the Effectiveness of WW Strategy

Research into the effectiveness of using WWs within the primary classrooms with typical students has determined it to be a useful teaching method, but little research has been conducted to determine the efficacy on students with vocabulary learning weaknesses [34]; [35]. Students with learning weaknesses tend to be less proficient in word learning strategies which results in fragmented and less complete knowledge of words. Building academic content vocabulary is an important part of science instruction [36] and may ensure that students are able to understand the information presented to them. This study aims to determine if there is a relationship between the use of IWWs, vocabulary retention, and reading comprehension of students in the EFL classroom. Previous research indicates that explicit vocabulary instruction is deemphasized as content requirements increase. Integrating explicit vocabulary instruction through IWWs in the EFL classroom may increase student vocabulary retention and reading comprehension.

39]Yates, et al, (2011) conducted a study on IWWs for middle school students in a rural public school. Words from the eighth grade curriculum in Language Arts, Math and Science were taught and placed on a content area WW. They were also placed on a larger WW along with words from the other content areas in the school hallway. Results of the study showed that making vocabulary learning intentional caused students to use the words more frequently. In addition, double-digit gains were made in eighth-grade proficiency scores in all state tested content areas. A limitation of this study is that it did not address other variables that could have affected scores.

Several studies have been carried out using WWs for vocabulary acquisition. However, they focus on contexts involving young learners. One study tried to examine 'The effects of WWs and WW activities on the reading fluency of first grade students over a four-week period' [23]. It was found that WW activities might have been one factor that strengthened high-frequency word recognition resulting in an increase of words read per minute. WWs have proved to be useful by encouraging learner's active involvement in the learning process, rather than their passive reception of information. The learners consciously look at the WW for any specific word and its usage in their learning activities.

Some studies suggest that WWs are effectively used to scaffold learning by encouraging student choice. A mixed methods study was conducted with 44 seventh graders in a suburban middle school [13]. Interviews, artifacts, field notes and audio taped interactions between teachers and students were collected and coded. Quantitative data collected was the vocabulary portion of Group Reading Assessment and Diagnostic Evaluation as a pre and post-test. In addition, six teacher-developed tests were used as an assessment. WWs have the potential for enhancing vocabulary learning in seventh grade students in conjunction with other instructional methods such as flashcards, storytelling or extensive reading [13].

A six-week vocabulary intervention was designed based on the research that guided the WW intervention design [40]. The WW vocabulary instruction included: (a) background information was built by the teacher to guide student's selections of vocabulary words, (b) students introduced self-selected words by color coding, (c) students drew symbols or illustrations to represent words on index cards, (d) students wrote sentence completion using vocabulary words on poster chart and, (e) students presented words to the class and added them to the WW. Twenty-one students used a traditional vocabulary program. The results of the study showed that scores collected from six weekly tests showed no significant difference. However, delayed test scores showed that WW students achieved higher scores on application and sentence completion sections of the teacher developed tests.Moreover, students commented on the importance of color-coding and pictures as triggers to remember meanings. The study concluded that the use of an interactive WW achieved a higher level of understanding of word meaning and application. These studies support the use of a WW as a tool that contributes to frequent and varied exposure to vocabulary [48]. Based on this research, it appeared as if a WW may be used effectively to teach vocabulary.

WWs provide references that enable students to become more independent and strategic problem solvers as they read and write. The

term WW can generate a variety of ideas amongst people because of its use as a fairly generic term [41]. WWs can be teacher generated or student developed depending on the design [35]. Traditionally, WWs are simply key terms displayed in the classroom in large font so the students can see when they are in the classroom. Alternatively, WWs have developed into more detailed, visually appealing teaching tools that encourage word and image connections [36]. This type of WW is termed *interactive WW* due to the nature of the conceptualization, generation, and application. IWWs encourage the students to visually organize the new terms, relate the new terms to one another, and use the terms throughout lessons. Displaying and connecting information using IWWs provides students the opportunity to identify important words and ideas while linking those ideas to one another [34].

Exposing students to the words on a daily basis through WWs allows them to see new terms and potentially reminds the students to incorporate the words into their work. 5 secondary teachers were recruited, instructed, and interviewed regarding the use of IWWs within their classrooms [41]. Teachers that had once considered WWs to be something that would not improve their classroom reported that following the incorporation of IWWs resulted in the students demonstrating greater vocabulary acquisition and willingness to include their expanded vocabulary in their work, and served as a positive formative assessment tool for them [41].Repeated and consistent exposure to visual clues through an interactive WW can assist students in developing a deeper understanding of concepts and vocabulary [35].The teachers that participated in another study reported that students were actively involved in creating and adding to the WW as well as identifying and using the words in their daily lives [35]. In surveying 6th and 8th grade students [36], an overwhelmingly positive response to the use of the IWWs was reported. Students' responses included being happy with having the ability to turn and look for reminders, and having a picture to remember was good and useful. Some students are more successful when they can associate images with words; when used correctly, IWWs provide visual connection and graphic organization that improves vocabulary retention.

Jackson and colleagues (2011) [36] generated a rubric identifying six criteria that are necessary for creating the most effective WWs: (1) academic vocabulary is posted, (2) words are aligned with current instruction, (3) words are visible from a distance, (4) words are arranged to illustrate relationships and organize learning, (5) wall contains student-generated material, and (6) visual supports are color pictures, photographs, or actual items. Since students in language classes often have various learning needs, it is necessary for teachers to provide instruction that caters to diverse learning styles [48].

### 2-5. Research Questions

**Q1**. Is there any significant difference between the effect of using IWWs and SM strategies on EFL learners' vocabulary achievement?

**Q2.** What are students' views on the advantages and disadvantages of the two strategies when Learning vocabulary in an EFL classroom?

complement the findings with another (qualitative research method) [43]; [44].

## 3. Method

### 3-1. Design

The researcher chose a mixed-methods design because he believes that there are two main benefits for the use of mixed-methods research over a single method approach in a study. First, employing MMR enables a researcher to develop a meta-inference, based on a combination of quantitative and qualitative data analyses. Second, MMR provides an opportunity for a researcher to examine the research questions through one research method lens (quantitative research method) and

### 3-2. Participants

The participants for this study were 64 male tenth-grade EFL students with an average age of 16 at Tajaddod High School and Shahid-45 High School in Isfahan, Iran. There were 2 intact classes which met 3 hours a week. The classes were taught by the same teacher, both consisting of 32 participants. All the participants were at their fourth level of English language proficiency (the fourth year of studying English according to the Iranian Language Planning developed in the Ministry

of Education and their first year in senior high school) and had no prior knowledge of the SM or IWWs strategies.

The similar age of the participants, their attendance in the same grade of senior high school with the same teacher, suggested that these two groups of students would be of comparable ability. The students regarded rote learning of vocabulary used in their regular classes boring and they showed a great interest in new ways of learning.

**3-3. Procedure**

**3-3-1-Quantitative Data Collection**

**3-3-1-1. Pre-treatment Stage**

As mentioned earlier, two intact classes, both consisting of 32 male students, were selected. The experiment was conducted during regular class hours. The researcher dedicated the first session from the 21 sessions of the second semester to teaching each class how to prepare a semantic map or an interactive WW. In each class he divided 32 students into 5 groups of 6 or 7 classmates, each group having a representative who was supposed to prepare and deliver their related semantic map or their related WW as their own tasks. Each group was about to work on a 24-word set. A total of the same 120 English words, related to the second semester section of their English Course Book called "Vision 1", were assigned to each class. Class-A learners (WWs group) were supposed to prepare a WW including the following components:

1. the word 2. pronunciation 3. definition 4. first example (from their own textbook 5. the second example (from E-to-E Dictionary) 6. related picture 7. L1 meaning (Farsi meaning).

Class-A students should have made some WW cardboards consisting of 120 words, each group a 24-item cardboard, written so clear and bold that everybody in every point of the class can see properly enough; then, it should be put on the class wall somewhere around the whiteboard.

Similarly, Class B was taught how to summarize each paragraph of the related texts into just one sentence and then write each one in a visual graphic which represents the relationship between categories of concepts while the learners perform a particular learning task. It includes a key concept (main idea), within categorized concepts connected to it. Still each group works on about 24 words related to the assigned paragraphs during 4 sessions.

The participants in the experimental group A received the same words as the participants in the experimental group B with the difference that the participants in the experimental group A worked on the words using EFL WWs while group B made use of semantic maps to learn them. After the collection of data, the participants' scores were obtained by adding up the correct answers. Each participant's total score fluctuated between 0 and 20. A vocabulary test including 45-items was administered to the both experimental groups as a pre-test before the treatment began. At the end of the 20 sessions of instruction a posttest including 40-items was administered to both groups. The pre-test and posttest were parallel tests and all of their items were chosen from the main course book of this study (the tenth-graders' EFL course book developed by Iranian Ministry of Education). It's worth mentioning that both pretest and posttest were piloted with 28 participants prior to their main administrations. The results of actual administration of vocabulary test showed that 5 items from part one of the test that were known to participants were excluded from the posttest. In the next step, the researcher randomly assigned 64 participants into two experimental groups. Each group took 20 sessions of course book instructions for learning 2 lessons, each lesson was taught in 10 sessions and each group worked on 6 words during each session. So the whole treatment for both experimental groups took 20 sessions and 65-minute portions of the usual 90-minute classes were devoted to the treatment.

**3-3-1-1-a. The First Experimental Group**

The participants in the experimental group A worked on the words using EFL WWs while group B made use of semantic maps to learn them. After that, the teacher engaged the students in another activity called "Pictionary". The researcher asked one member of each team to go to the board and then the teacher handed a written word to each one of the students. The students had one minute to get their team to say the item only by drawing the pictorial clues on the WWs. In this

activity, written words, verbal clues, or gestures were forbidden. The first team who said the word, scored a point. As the number of words that the learners were going to work on was 120 lexical items, and the second semester took 14 weeks during which they had 21 sessions, they were supposed to learn about 6 words each session.

**3-3-1-1-b. The Second Experimental Group**

The second experimental group was taught through SM technique. After introducing SM strategy, and when the learners got completely familiarized with this technique, the teacher asked the students to do their course book tasks based on SM strategy. As the second part of the course book included 120 new words and expressions throughout 20 different texts forming semantic-mapping-based tasks and activities (in both Student Book & Work book), the learners were supposed to work on at least one SM-based task each session. The teacher asked the students to read the mini-passage, and then they had to use SM strategy and made a web word connection between the main idea and details of the passage by using the words they already learned. For example, if the text was about endangered animals, the teacher asked students to categorize different animals into two categories (e.g. carnivorous and herbivorous), each of which can again be divided into living in Iran and non-living in Iran based on their characteristics by drawing a web of word maps to relate each animal to its category. After that, teacher used two semantic-mapping-based activities in order to evaluate students' on-going learning for the last 15 minutes. The first one was called 'outburst' and the second, "Categories".

**3-3-1-2. Post-treatment Stage**

A vocabulary achievement posttest was made by the researcher including 40 items with which the learners showed no familiarity on the pretest and were taught to them during the 20-week treatment. The test was administered at the end of the treatment. Students have to respond to part one, which included 20 multiple-choice items and part two, which included 20 fill-in-the-blank items. The allocated time was 40 minutes and each correct answer was given one point. Prior to the actual administration, the vocabulary achievement posttest was piloted with 28 participants who had the same characteristics of the main participants of the study. The reliability of the test was calculated and it turned out to be 0.87. It's worth mentioning that pretest and posttest were parallel forms.

**3-3-2. Qualitative Data collection**

**3-3-2-1. Student Perceptions on IWWs**

Twenty students participated in the semi-structured interview that yielded data related to their perceptions of WWs after the experimental design. (See Table). The interview asked students about the interaction, motivation, shortcomings and usefulness of a WW. In this section, the findings of the in-depth student interviews are reported. The first trend that emerged was the communicative function of a word-wall-based task. The students interviewed in this study seemed to demonstrate a general understanding of a WW. Generally, students explained that a WW is used to expose the class to words they don't know when they use them during each task. The vocabulary items are put up there so students can go back and use them again if they need it. A WW is important because it is another way for them to use language more properly than before.

Student interview data evidenced a change towards a more student-centered classroom. Concepts related to this change included student choice in selecting words, group work and collaboration, peer presentations and peer correction. The group work allowed students to be involved in the decision making process and sharing the tasks to be completed. Most of them were willing and able to help fellow students who needed more support (emphasizing the scaffolding and ZPD in Vygotsky's view). All 20 interviewees felt that WWs help them in learning new vocabulary words and their meanings, in their reading, in understanding more words in preparation for the End-of-Semester Test, with their spelling, and later in life. Many students also wanted to see the WW arranged in alphabetical order in order to locate a word quickly. They felt the interactive WW they created [with the above-mentioned characteristics] was more helpful than a word list that just had words as well as making them actively engaged with learning activities. Moreover, during the interviews some students were giving examples of how

they related a drawing to the meaning of certain words. Most students felt that creating a picture or symbol was the most helpful part of the design because they had a visual element helping them to remember the definition.

However, they thought that creating a sentence for a situation related to the word was the most difficult task, especially the written tasks. For example, finding a situation for using the word "honesty" proved difficult for a student in EFL classroom since it is an abstract but not a concrete word. Creating a context required students to apply word meanings in meaningful contexts. They reported the impact that a large vocabulary will have on their future success in life. Students also felt that the tasks they had to complete helped them remember the definitions of the key vocabulary. They expressed their typical vocabulary instruction included rote memorization, dictionary usage and little meaningful use of the words. Conversely, the interactive WW was a contextualized tool that would help them learn and use more word families.

**3-3-2-2. Student Perceptions toward SMs Student Interview**

Since using only the tests could not help the researcher explore complex data for numerous questions, an interview was considered for this study. The interview was one of the most important data gathering tools in qualitative research that could allow researchers to investigate phenomena that were not directly observable, such as learners' self-reported perceptions or attitudes. The researcher could also achieve data from particular individuals by face-to-face meeting, assisting the students with clarifying the questions or clearly defining their responses.

The interview was designed to explore the students' attitudes towards SM technique as well as more comprehensive understanding of the results; therefore, it was given only to the students in the experimental group 2 after the treatment. The 20 students were asked six questions the first three of which mentioned the frequency of using the SM to learn vocabulary and the last three were for the students' attitudes towards the SM. There was a positive perception of students toward the implementation of SM strategy because they can enjoy learning in the classroom, improve their vocabulary knowledge, understand the content of the reading text and understanding the part of speech of the main word. They are also able to make simple sentences. It can also facilitate teaching vocabulary for EFL teachers. Nevertheless, the disadvantage of the strategy is that it mainly focuses on the individual work and throughout the learning process there is little interaction among students in this strategy.

**Teacher's Reflective notes**

Teacher's reflective notes supported the test results and the interviewees' ideas in the sense that students showed an improvement in vocabulary knowledge thanks to using a vocabulary WW or SM in the language classroom (some of his comments are given in appendices). However, he believes that the number and the quality of interactions among IWWs group members have been more frequent and more efficient than the SMs group. Many students wanted to see the WW arranged in alphabetical order in order to locate a word quickly. They described their perceptions of a regular word list containing only words with that of an interactive WW they created that contained the words, pronunciations, definitions, course-book-based examples, dictionary-based examples, pictures, and L1 meanings to represent word meanings and word use. All students felt the interactive WW was more helpful than a word list that just had words. Finally, the WWs group's motivation and interest during their learning processes was much more substantial than the SM's group.

**4. Results**

Following the data collection, the two experimental groups took a posttest so that their performance was evaluated after the treatment. In order to investigate the null hypothesis of the study, an independent samples t-test was run to see whether the treatments had a significantly different effect on learners' vocabulary achievement or not. For the independent samples t-test it is assumed that both samples come from normally distributed populations with equal standard deviations (or variances). Since the Sig**.** value of the Shapiro-Wilk Test (Table 1 below) is greater than 0.05 in both groups (0.124 in group A and 0.309 in group B), the

data is normally distributed. Another assumption is that the two groups have a similar dispersion of scores (or homogeneity or equality of variance). As Table 3 indicates The *p*-value of Levene's test is printed as ".356" which is greater than α=0.05; as the variances are equal across the two groups (i.e., *p*-value large), we will rely on the first row of output, Equal variances assumed, (under *t*-test for Equality of Means) and thus the calculation uses pooled variances.

**Table 1. Tests of Normality of Distribution**

**Tests of Normality**

| Groups | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | | Statistic | df | Sig. | Statistic | df | Sig. |
| Scores | Group A | .123 | 32 | .200* | .948 | 32 | .124 |
| | Group B | .095 | 32 | .200* | .962 | 32 | .309 |

*. This is a lower bound of the true significance. a. Lilliefors Significance Correction

**Table 2. Descriptive Statistics of Posttest Scores**

| **Groups** | **Mean** | **N** | **Std. Deviation** | **Std. Error of Mean** | **Minimum** | **Maximum** | **Range** | **Variance** | **Kurtosis** | **Skewness** |
|---|---|---|---|---|---|---|---|---|---|---|
| Group A | 30.8438 | 32 | 6.88200 | 1.21658 | 15.00 | 40.00 | 25.00 | 47.362 | -.592 | -.497 |
| Group B | 25.4687 | 32 | 6.21125 | 1.09800 | 10.00 | 35.00 | 25.00 | 38.580 | .042 | -.611 |
| **Total** | 28.1563 | 64 | 7.04457 | .88057 | 10.00 | 40.00 | 30.00 | 49.626 | -.330 | -.317 |

**Table 3. Independent Samples t-test between Experimental Groups' Posttest Scores**

**Independent Samples t-Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| Post-test Scores | Equal variances assumed | .866 | .356 | 3.280 | 62 | .002 | 5.37500 | 1.63880 | 2.09908 | 8.65092 |
| | Equal variances not assumed | | | 3.280 | 61.359 | .002 | 5.37500 | 1.63880 | 2.09840 | 8.65160 |

According to the data (Table 2), with a mean of 30.84, the first experimental group had outperformed the second experimental group who scored a mean of 25.47. The standard

deviations equaled 6.88 and 6.29 respectively. Furthermore, as we see in Table 3, the Sig. value is 0.002 which is less than 0.05 (p-value); therefore, it was confirmed that the two experimental groups were significantly different in vocabulary achievement following the treatment. Thus, the null hypothesis of the study was rejected.

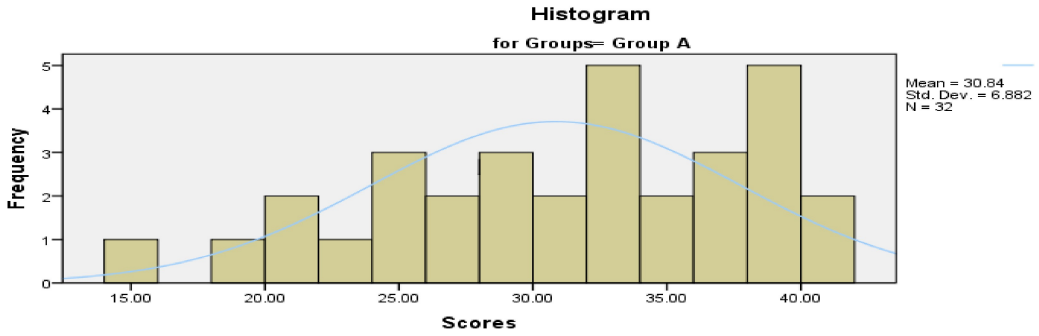


**Figure 1. Distribution of Experimental Group 1 Posttest Scores**

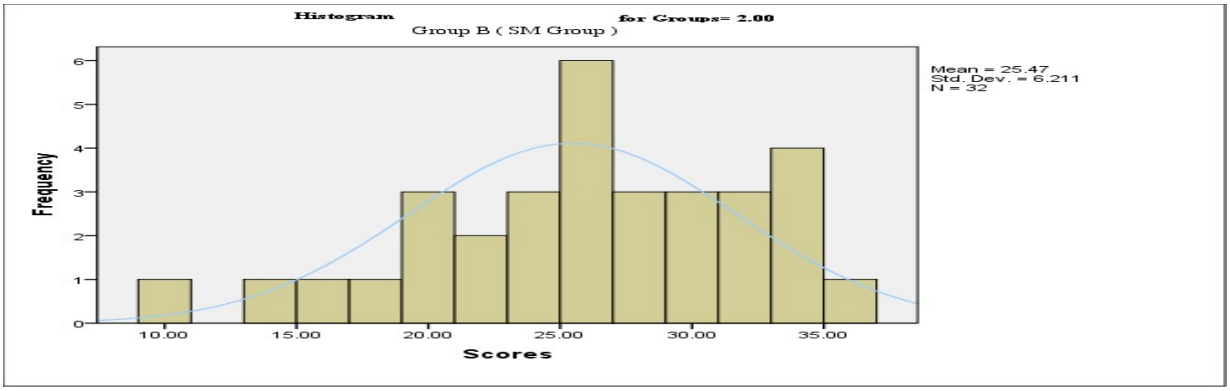


**Figure 2. Distribution of Experimental Group 2 Posttest Scores**

According to the statistics related to the qualitative data based on both interviewees' responses and teacher's reflective notes (as we see in the table 4 below), there is a large degree of overlap between the quantitative and qualitative results in terms of confirming the fact that the WWs group has certainly outperformed the SMs group in vocabulary learning achievement due to using more efficient strategy to learn new lexical items.

**Table 4-Qualitative data statistics**

| | Experimental group | WWs Group (A) | | | | SMs Group (B) | | | |
|---|---|---|---|---|---|---|---|---|---|
| **no.** | **interviewees' responses** | **Yes** | **percent** | **No** | **percent** | **Yes** | **percent** | **No** | **percent** |
| 1 | higher motivation after the new strategy | 20 | 100 % | 0 | 0 % | 14 | 70% | 6 | 30% |
| 2 | using language more properly than before | 19 | 95% | 1 | 5% | 13 | 65% | 7 | 35% |
| 3 | having less spelling errors | 20 | 100% | 0 | 0% | 12 | 60% | 8 | 40% |

## 5. Discussion

The results of this research have shown that both of the vocabulary learning strategies (IWWs and SM) were able to effectively increase the students' vocabulary knowledge. A comparison of pre-test and post-test through independent samples t-test of both experimental groups showed elevation in scores and since the students in IWWs group performed much better than

those in SM group, there was a significant difference between the two groups. Besides, the p-value was less than 0.05 ($P<0.05$), which means that there was a statistically significant difference between the means of two experimental groups. Thus, the researcher was able to reject the null hypothesis. These findings imply that IWWs and SM strategies promote vocabulary achievement for EFL learners at senior high school level, that is, there was a significant difference between EFL high school learners who used visual and social strategies at the same time, with those who just used SM strategy.

The results were consistent with the research conducted by [45] Margosein, et al (1982) and [47] Salmani & Jaafari (2016) and many others who found that SM had a greater impact on vocabulary acquisition. However, the studies carried out by the previous researchers compared the effectiveness of the SM 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 the SM and that of the WWs. One reason for helping vocabulary memorizing could be the SM's effectiveness in visually integrating new words with old ones and promoting a deep level of semantic processing.

This study showed the same outcome as the study conducted by [37] Hong and Diamond (2011) in which a combination of explicit and responsive instruction can increase student vocabulary knowledge better than either instructional method independently. Following implementation of IWWs within their classroom over the course of 6 weeks, Vintinner et al. (2015) , reported differing opinions about vocabulary instruction and were pleased with the positive impact that the IWWs had on their class [42];[47]. The study conducted by [37] Blachowitz and others (2006) concluded that WWs support student's vocabulary learning, thus in keeping with this research.

The finding of this research is also in line with the published study of [39] Yates and colleagues (2012) who reported that students were actively involved in creating and adding to the WW as well as identifying and using the words in their daily lives; moreover, the studies carried out by different groups of researchers support the use of a WW as a tool that contributes to frequent and varied exposure to vocabulary [47].

## 6. Conclusion

The results of this study showed that participants in both experimental groups welcomed learning vocabularies through unfamiliar but exciting vocabulary strategies and they have disliked using routine and cliché ways of vocabulary learning. Teachers of teenage learners can take the idea of specialists' rote to exploration of the ways these techniques work for teenage learners. This means that the results of this study open up new horizons for such teachers to dig into the special characteristics, abilities and attitudes children bring with them into the classroom. One way to integrate explicit language instruction is by creating a print-rich environment to address the needs for vocabulary instruction [41]. WWs provide a print-rich environment and various learning and exposure opportunities for students with diverse learning needs [35]. Research supports the claim that a combination of explicit language instruction methods provides the most effective results in terms of both vocabulary acquisition and retention [34]; [35]; [36].

In this study, it was found that introducing and having students practice using the SM was an effective way of enabling them to achieve greater progress in vocabulary learning. As a result, 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 SM conducted before. This leads to the implication that the SM can improve high school students' vocabulary retention and is promising to vocabulary teaching and learning.

Multisensory IWWs provide an overview of each lesson and, upon completion, an overview of the unit, as well [36]. Teachers who implemented IWWs found that they are useful to students in unifying related terms, in helping students understand connections and in making them become more self-sufficient during activities and labs, while

finding information they needed by looking at the WW rather than asking the teacher.

Providing various instructional methods will enable all learners to connect with the information. IWWs encourage the use of varied instructional methods through student participation in generation of wall and repeated exposure and practice within each classroom session [41].Traditional and IWWs have shown their effectiveness at the elementary level in a variety of studies, yet research is limited at the high school level [41]; [34];[47]. Students up through grade eight have expressed positive opinions towards the use of WWs in terms of comprehension and vocabulary acquisition[35] but further research appears warranted to determine the efficacy of this method at the senior high school level and with students with learning difficulties. This study aims do so.

Since the participants of both experimental groups in this study improved their knowledge of vocabulary through the use of SM and IWWs as vocabulary learning techniques and strategies, EFL learners should take their use into account, provided that they want to expand their vocabulary knowledge. In the past, vocabularies were usually learnt through rote-learning memorization and repetition which were ineffective and tedious but the strategies used these days, such as IWWs and SM which were utilized in this study, are influential and enjoyable. Students are willing to focus on vocabularies through new strategies and techniques; thus those responsible for designing syllabus and developing materials for EFL learners should include such exciting strategies in materials and syllabi in order to increase students' learning excitements, motivation and abilities.

After analyzing data collected through each instrument, all the data indicated that the use of WWs could have an impact on students' written or spoken skills. Overall, the students made gains in their vocabulary learning strategies. They utilized the WW in all of their classroom tasks. The students' sentence-writing was improved both in syntagmatic and collocational aspects with the use of the WW, as well as their motivation towards speaking and writing. Their writing pieces no longer contained repetitive sentences. Their short-story-restating started to become more enjoyable. WWs have been used successfully in primary classrooms, and have been shown in this research to be successful in low-intermediate classrooms especially with students that have vocabulary-learning difficulties. Having a WW in a low-intermediate EFL classroom, consisting of their course-book new words and expressions, would be beneficial to all students. It would allow them to be more independent while they are performing communicative tasks. WWs are also beneficial to students since they can reduce their anxiety when they are learning new lexical items. Most of the words that the students need are on the WW. Teachers should utilize this tool in their classrooms. They are easy to make and they benefit not just those who have vocabulary-learning difficulties, but the entire class.

Taking all of this together, it is strongly believed that positive implications are emergent and a majority of the students have gained much from such focused vocabulary enhancement strategies, especially ones such as the WWs which by their very presence can bring about an interest in learning words.

**Ethical considerations**

Although students' names were required in the tests, confidentiality was maintained by disguising students' identity because information that is given to social researchers during the course of their investigation should be treated as confidential.

**Limitations and Future Research**

As an extension of this research, future studies may wish to investigate teaching vocabulary through WWs in classrooms more deeply. Teachers can better contribute to the improvement of their students' vocabulary acquisition thanks to the pedagogical implications suggested by such studies. However, the student sample in this study was small and probably did not capture a complete picture of students' perspectives about vocabulary instruction. A future study could be conducted by

increasing the number of students involved in the study and recording the transition in students' vocabulary throughout a year to capture a more complete picture of their vocabulary development. In addition, the researcher observed the vocabulary instruction in the classrooms for just four months. In the future, a longer study could be conducted over the course of an entire academic year to gain a more complete picture of what is happening in a particular classroom in terms of vocabulary instruction. Similarly, a study could be conducted to investigate the difference in vocabulary instruction in technical schools. Another limitation is that the results may not be generalizable to a large population because of the relatively limited number and scope of subjects participating in this study. Still another one, is that since the study was conducted in a limited time, long-term effects of the intervention could not be tested. Therefore, it is difficult to come to the conclusion that students' newly acquired knowledge of target vocabulary will be retained over time. Next, because of the time limit, there was only one test of vocabulary retention used in the present study. Others should have had some progress tests or delayed ones to measure students' vocabulary memorizing in longer intervals of time.

Although there are a few limitations, it is hoped that the total outcome of this study could be a starting point for more thorough investigations on teaching vocabulary through WWs in high school and tech-voc classrooms.

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**Recommendations for Professional Practice**

Vocabulary is an integral part of reading comprehension, and using effective instruction should be the goal of educators. Although elementary teachers often use multiple strategies in their classrooms, high school teachers often limit themselves to traditional instruction. The nature of this research naturally focused on an outcome that might affect future teaching and learning of the high school population. Given that the results of this study appeared to demonstrate that WWs have a positive impact on the vocabulary learning of high school students, the professional practice recommendation is simply that teachers use this strategy in their classrooms. By implementing the use of WWs in the classroom, teachers may realize a difference in their students' vocabulary learning. Because the strength of this study was the results of the triangulation method of data collection and analysis, teachers may find the primary impact that WWs have, is on their students' retaining vocabulary knowledge to improve their reading comprehension.

Another recommendation involves the motivational strategies related to the assessment tool used in this study. The goal of the on-going evaluation that took place during the WW or SM tasks and activities were so effective that had highly increased their motivation to learn new vocabulary items compared to their interest in the first semester. Furthermore, instead of using an absolute-credit method of rating, the researcher made use of a partial-credit approach to rate their fill-in-the-blanks or sentence portion of the assessment. Since the assessment tool was successful, EFL teachers are recommended to have a leveled rating system to make the assessment more accurate and more motivating [46].

The next recommendation is concerned with the delayed assessment. Since the researcher was not allowed to gather students after their final exam (after the end of school year) again, in this study there were no delayed tests; however, the mean scores of the SM group have begun to increase over the second semester after the fourteen weeks of intervention, so given more time, the mean scores will continue to improve. Further research may reveal the need to implement SM or IWWs early in the school year to allow the most optimal timeframe for success

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