The Effect of Semantic Mapping as a Vocabulary Instruction Technique on EFL Learners with Different Perceptual Learning Styles

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Traditional and modern vocabulary instruction techniques have been introduced in the past few decades to improve the learners' performance in reading comprehension. Semantic mapping, which entails drawing learners' attention to the interrelationships among lexical items through graphic organizers, is claimed to enhance vocabulary learning significantly. However, whether this technique suits all types of learners has not been adequately investigated. This study examines the effectiveness of employing semantic mapping versus traditional approaches in vocabulary instruction to EFL learners with different perceptual modalities. A modified version of Reid's (1987) perceptual learning style questionnaire was used to determine the learners' modality types. The results indicate that semantic mapping in comparison to the traditional approaches significantly enhances vocabulary learning of EFL learners. However, although visual learners slightly outperformed other types of learners on the post-test, no significant differences were observed among intermediate learners with different perceptual modalities employing semantic mapping for vocabulary practice.
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Learning vocabulary is one of the most important elements without which neither comprehension nor production of language is possible (Laufer, 1997). From a pedagogic point of view, the inevitability of vocabulary learning is a concept on which both instructors and learners agree. Word knowledge is an indispensable constituent of communicative competence (Seal, 1991); it is central in production and comprehension tasks in a foreign language. On the whole, a direct link has been observed between vocabulary knowledge and language skills. Commenting on the link between lexical richness and the reading skill, for instance, the National Reading Panel (2000) states, "Reading comprehension is a cognitive process that integrates complex skills and cannot be understood without examining the critical role of vocabulary learning and instruction in its development" (p. 4).The acknowledgment of the significance of vocabulary by second/foreign language acquisition (SLA) researchers has resulted in an escalating enthusiasm centered on investigating viable methods of helping learners with the tedious task of learning new words. Nonetheless, there has been a debate in the research literature about the optimal means of vocabulary instruction. Some research findings support explicit instruction of vocabulary while others focus on implicit instruction through using semantic maps, word associations, etc. Meanwhile, learning takes place inside the individual learners' cognition, and thus learners with different perceptual modalities may approach different vocabulary instruction techniques differently. To further examine this issue, this study tried to compare the effectiveness of traditional and new vocabulary instruction techniques through semantic maps on the comprehension of the learners with different perceptual modalities. Perceptual learning style deals with the physical environment in which we learn, and involves using our senses in order to perceive data (Renou, 2010). For instance, Dunn (1990) demonstrated that learners with visual styles as their preferred means of learning may have difficulty learning through lectures (auditory) as opposed to auditory learners who may be in favor of learning through lectures . In what follows, first an overview of the research related to the current topic will be provided followed by the research questions,

procedures and findings of the study. Finally, the results will be discussed with reference to the findings.

Optimal Vocabulary Instruction

For quite a period of time in the history of language teaching, teacher preparation programs undervalued the need for developing a sound approach to teaching vocabulary, and thus provided less relevant training on vocabulary instruction. The extent of this practice went as far as persuading teachers that learners needed no help with learning vocabulary. Allen (1983, p.3) listed three reasons for neglecting vocabulary in the mid-twentieth century:

a) excessive previous emphasis on vocabulary learning to the point of seeing language learning as solely learning vocabulary;

b) a conviction by some specialists that vocabulary learning was too complicated a matter to be dealt with and, consequently, that meaning of words could not be adequately taught; and

c) a fear by some specialists in methodology that learners "would make mistakes in sentence construction if too many words were learned before the basic grammar had been mastered.

In the last two decades, however, the significance of vocabulary learning has been revisited by SLA researchers, and several studies have shown that vocabulary knowledge plays an essential role in L2 acquisition, and that vocabulary instruction is an indispensable part of language instruction. As Nunan (1999, p. 103) contends:

In recent years, the teaching of vocabulary has assumed its rightful place as a fundamentally important aspect of language development. This is partly due to the influence of comprehensive-based approaches to language development, partly due to the research efforts of influential applied linguists, and partly due to the exciting possibilities opened up by the development of computer-based language corpora.

L2 teachers often recognize and delineate technical or unusual words in texts; most teachers are unaware that knowing a

word involves more than knowing its definition. Efficient vocabulary training necessitates that teachers appreciate how words are learned in non-instructional contexts in the course of oral exchanges and reading (Carter & Nunan, 2001).

There is a dispute, however, in the body of the literature centered on the best way to teach vocabulary, referred to as the "fertility versus futility debate" (Baumann & Kame'enui, 1991). The debate is based upon the dilemma of utilizing direct vocabulary instruction techniques or relying on 'incidental learning' only. Several experimental studies symptomatic of larger efficiency of direct vocabulary instruction are mentioned (e.g., Harley, Howard, and Robergez, 1996; Shostak, 2003) by the supporters of direct instruction (fertile view). On the contrary, advocates of the futile view present evidence in support of vocabulary development within a broader educational agenda that provides opportunities for learners to map word meanings onto existing schemas. Nonetheless, research findings on the whole seem to support direct instruction in general adult SLA.

Research, according to Doughty (2003), indicates that post-critical-period learners seem to have lost, at least partially, the capacity for implicit induction of language patterns from naturalistic input. This, in turn, has serious implications for L2 pedagogy, in that adult L2 education cannot rely on mere exposure of the learners to input or even comprehensible input. Consequently, the case for the necessity of instruction in adult L2 learning is strongly advocated. Doughty (2003) states that except for a small number of researchers who advocate a strong non-interventionist position in adult SLA, most SLA researchers seem to agree on the necessity of instruction, and not mere exposure to input in adult second language classrooms (Long and Robinson, (1998). The non-interventionist position asserts that "(i) SLA is driven by the same Universal Grammar (UG) that guides first language acquisition, and (ii) SLA, like first language acquisition, is entirely incidental" (Doughty, 2003, p.257).

On the other hand, a meta-analysis of relevant experimental and quasi-experimental studies on the effectiveness of L2 vocabulary instruction by Norris and Ortega (2000) provide some

positive evidence for the superiority of explicit instruction over implicit instruction of vocabulary and evidence for the durability of L2 instruction. A reassuring point here is that Norris and Ortega's findings echo Long's (1983) finding that instruction does positively impact classroom L2 acquisition, provided that appropriate instruction is implemented. This finding serves as a substantial impetus for practitioners and researchers in the field to seek the best possible instructional practices.

As for the type of explicit instruction, multiple techniques have been suggested.

Bleckley (2006) reports that 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; and the semantic mapping approach, in which new words are associated with other words already present in the learners' mental lexicon. In this study semantic mapping as a new approach is taken up and its role in SLA will be discussed.

Semantic Mapping

Barcroft (2004, p.200) defines semantic mapping as "the increased evaluation of an item with regard to its meaning". A semantic map can be used as a tool for discovering the conceptual relationships between vocabulary items. Semantic elaboration seems to enhance word learning and retention, through a learning phase called 'integration' (Shostak, 2003). Integration is based on the view that in order for learning to occur, new information should be incorporated into what the learner previously knows (Christen and Murphy, 1991, cited in Shostak, 2003). That is, instruction should guide learners to use words and ideas available to them in their word and concept repertoire to help them associate meaning with words they do not know. It is believed that this will lead to deeper learning, and thus, longer retention of the learned words. Previous research on vocabulary acquisition has revealed a

significant improvement in vocabulary learning whenever semantic maps were employed. Harley, Howard, & Roberge (1996), for instance, employed semantic maps in two French-as-a-second-language classes. Their findings revealed a significant gain in vocabulary knowledge in both classes over the three to four weeks of treatment.

Barcroft (2004) argues that semantic elaboration enhances memory retention of lexical items. Based on previous research findings, Barcroft (2002, p. 2001) asserts that:

> … semantic elaboration positively affects memory for (a) previously acquired words (Bower & Reitman, 1972; Craik & Tulving, 1975; Johnson-Laird, Gibbs, & de Mowbray, 1978; Hyde & Jenkins, 1969; Ross, 1981; Schuman, 1974,; Tresselt & Mayzner, 1960); (b) new words recorded as known words (Atkinson & Raugh, 1975; Levin et al., 1982; Pressley et al., 1982; Ellis & Beaton, 1995); and (c) other types of stimuli (e.g. first language [L1][1] sentence recall: Stevenson, 1981; L1 text recall: McDaniel, 1984).

In the same vein, Winters (2001) asserts that graphic organizers represent a graphic teaching strategy which has been devised to help learners build the conceptual connections they need to decipher any word completely. It is this graphic feature of semantic maps that inspired the present study in exploring a potential gain for learners with different perceptual modalities when vocabulary is taught and learned through these graphic organizers.

Successful SLA individual Learners' perceptual modalities

In L2 learning settings, numerous cases have been reported in which learners attending the same class show significant variability in the progress rate associated with learning language elements. Investigation into this observed inconsistency is suggestive of divergence in learner characteristics being the

explanation. A rather comprehensive list of these characteristics is presented in Table 1 below.

Table1
Factors listed as influencing individual learner differences (IDs) in language learning (adapted from Ellis, 1994)

Atman (1980)	Skehan (1989)	Larsen-Freeman and Long (1991)

1. Age
2. Sex
3. Previous experience with language learning
4. Proficiency in the native language
5. Personality factors
6. Language aptitude
7. Attitudes and motivation
8. General intelligence (IQ)
9. Sense modality preference
10. Sociological preference (e.g. learning with peers vs. learning with the teacher)
11. Cognitive styles
12. Learner strategies
	1. Language aptitude
	2. Motivation
	3. Language learning strategies
	4. Cognitive and affective factors
	  a. extroversion/introversion
	  b. risk-taking
	  c. intelligence
	  d. field independence
	  e. anxiety
		1. Age
		2. Socio-psychological factors
		  a. motivation
		  b. attitude
		3. Personality
		  a. self-esteem
		  b. extroversion
		  c. anxiety
		  d. risk-taking
		  e. sensitivity or rejection
		  f. empathy
		  g. inhibition
		  h. tolerance of ambiguity
		4. Cognitive style
		  a. field independence/ dependence
		  b. category width
		  c. reflexivity/impulsivity
		  d. aural/visual
		  e. analytic/gestalt
		5. Hemisphere specialization
		6. Learning strategies
		7. Other factors e.g. memory, sex

Lightbown and Spada (1999) classify learner characteristics that conspicuously affect language learning success into five main categories: motivation, aptitude, personality, intelligence, learner preferences, and age. In the discussions on individual differences the aspect which has recently been a topic of great interest is what Atman (1980) refers to as "Sense modality preference". In Larsen-Freeman and Long's (1991) classification, this attribute falls under cognitive style. Many other researchers (e.g., Oxford, 2001, Doyle & Rutherford, 1984) categorize perceptual modalities under learning styles. According to Oxford (2001) "Perceptual modalities

refer to physical and perceptual learning channels with which the learner is the most comfortable." (p. 360). Oxford perceives perceptual modalities as comprising four main areas: visual, auditory, kinaesthetic (movement-oriented), and tactile (touch-oriented). Accordingly, visual learners rely to a significant extent on visual 'backup' in the process of learning, and lessons involving mere lectures, conversations, or oral instructions can easily perplex them. They prefer to read and gain significantly from visual stimulation. Auditory learners, on the other hand, can benefit from lengthy lectures and oral instructions; they take pleasure in taking part in classroom conversations and need little or no visual aid. Finally, kinaesthetic and tactile learners seem to enjoy working with more concrete elements such as flashcards and collages. They like moving around, thus sitting at a table for hours can be a challenge to their patience.

Doyle and Rutherford (1984) seem to have merged Oxford's fourth category for sensory preference, namely *tactile*, into the kinesthetic area. Oxford, along with many others, frequently refers to both interchangeably. A central point regarding perceptual modalities is that any one of these preferences, as measured by the instruments available, is not a single marker of sensory preference in any one person. This is demonstrated by Reid (1987) who treats sensory preferences in his questionnaire, i.e., '*perceptual learning style preference questionnaire*' (PLSPQ). He uses terms such as *major*, *minor*, and *negative* to describe one's sensory preference. Moreover, there are some learners who have more than one preferred sensory modality. That is, they feel comfortable receiving and processing information through more than one sensory channel. These learners have been called *multisensory* learners (Meyers, 1980, p. 64).

This study intends to investigate the effectiveness of vocabulary instruction via semantic mapping against the established traditional vocabulary teaching techniques in Iran. The second objective of the study is trying to discover a potential match between any groups of learners (based on perceptual modality), and employing semantic maps in vocabulary instruction. In other words, it tries to discover which learner

groups (auditory, visual, kinesthetic, or multisensory) benefit more from employing semantic maps in vocabulary learning tasks.

The study, therefore, aims at answering the following research questions:

1. Is teaching vocabulary to adult Iranian EFL learners via semantic mapping more effective than using the traditional vocabulary teaching techniques?
2. Do adult Iranian EFL learners' perceptual modalities significantly affect the relative efficacy of employing semantic maps in vocabulary instruction?

The methodology employed to answer the research questions is delineated in the following section.

Method

Participants

Two hundred and sixty four intermediate adult Iranian EFL learners from different language institutes in Orumieh took part in the study. They were selected based on a pre-test (The Vocabulary Levels Test, Schmitt, 2000). Finally, 196 participants whose scores were between one standard deviation above and below the mean were selected. They were divided into two equal groups consisting of 9 classes in the control group, and 8 classes in the experimental group.

Instruments

- Schmitt Vocabulary Levels Test (SVLT)

The Vocabulary Levels Test (Schmitt, 2000) was used to estimate the learners' English vocabulary size prior to the study. It consists of 4 sections: the 2,000 word level; the 3,000 word level; the 5,000 word level; and the 10,000 word level. On the basis of the validity evidence presented by Schmitt, Schmitt, and Calpham (2001), the researcher adopted version 1 of this test.

In the test, there were four levels with ten clusters at each level, and six words in each cluster. The total number of test items was 120. Each test item contained six words and three definitions. The participants were expected to match the three definitions with three of the six words provided in the item by writing the corresponding number of the item next to its definitions. The following example illustrates the format of the test:

1. business
2. clock   _____ part of a house
3. horse   _____ animal with four legs
4. pencil   _____ something used for writing
5. shoe
6. wall

Apart from the Vocabulary Levels Test the following research instruments were used to conduct the study.

- The Reading Passages

Four reading passages from S*elect Readings: Intermediate* (Lee & Gunderson, 2001) were chosen as the instructional materials for the study. This book consists of 14 reading passages accompanied by vocabulary, grammar, and reading-skill tips and exercises. The main objective of the book is to teach reading skills and strategies. From amongst the 14 themes presented in the book, and based on the aforementioned criteria, four themes were preferred. These include *Culture Shock* (pp. 24-35), *How to Make a Speech* (pp. 58-69), *Letters of Application* (pp. 94-107), and *John's Taiwanese Wedding* (pp. 132-143). The book provides vocabulary glosses for some lexical items which are written in boldface letters in each of the texts. There are also some culture notes in the form of an appendix in the final section of the book. The culture notes are divided into 14 sections (corresponding to the chapters), and comment on some proper names for people, places, or cultural events, which are written in blue boldface letters in the texts.

The first passage, *Culture Shock* (written by Bob Weinstein, a New York journalist, for the Boston Globe, a major daily

newspaper in Boston), is an approximately 900-word text divided into 11 paragraphs. It summarizes the culture shock an Australian girl from Melbourne, who attended Boston College in Blackmore, experienced during her first semester at the school. The chapter containing this text aims at helping the learners distinguish and differentiate the topic and the main ideas in an English text. It also tries to introduce English collocations containing the verb *feel*. Finally, a comparison is made between *used to*, *get used to*, and *be used to*.

The second passage, entitled *How to Make a Speech* (adopted from *How to Use the Power of the Printed Word*; written by George Plimpton, a writer, public speaker, editor, and actor in New York), is an approximately 950-word text which outlines eight tips on how to make a public speech. It is divided into 11 short paragraphs eight of which have headings. Chapter 6 in the book, which contains this passage, underlines the salience of headings in trying to understand a written text. It also introduces imperative sentences and a group of English verbs it refers to as "power verbs", which are verbs such as *lead*, *manage*, or *inspire* that demonstrate "action and authority" (Lee & Gunderson, 2001, p. 65). It is claimed by the authors that such verbs create an impression of confidence in resumes, letters of application, and other business documents.

The third passage, *Letters of Application* (written by Andrea B. Geffner, a business educator and writer and also the former dean of the Taylor Business Institute in New York), is a text of roughly 900 words which summarizes the elements of an effective application letter. The text is divided into 14 short paragraphs. Through chapter 9, the book tries to improve the readers' skill in encountering instructional materials. It also highlights the contribution of connecting words (such as conjunctions and relative pronouns) to the coherence in a text, and the use of English modals *should* and *must*, the imperative voice, and several other expressions (such as "It's a good idea to …") to give advice.

The fourth passage, *John's Taiwanese Wedding* (written by John Felty, a graduate student in Asian Political Systems, and Bill McDowell, a photographer and professor in Texas) is a text of

nearly 950 words, divided into 12 paragraphs. The text is written in the first person point of view, and through an account of muddled cross-cultural communication due to the narrator's imperfect Mandarin and inexperience with Taiwanese customs, tries to promote learners' inferencing skill in reading. It also introduces the application of verbs in the subjunctive mood used in noun clauses following English verbs such as *advice*, *insist*, *propose*, *suggest*, etc.

To minimize the impact of topic familiarity, an attempt was made to select material with which the learners had the least means of drawing on background knowledge.

- Perceptual Learning Style Preference Questionnaire (PLSPQ)

To identify the perceptual modalities of the participants in the experimental group, an adapted version of the Reid's (1987) Perceptual Learning Style Preference Questionnaire (PLSPQ) was used. PLSPQ has been the central instrument for many studies in EFL contexts and validated by several researchers (e.g., Peacock, 2001; Wintergerst, DeCapua, Itzen, 2001).For the purpose of the present study, categories that were relevant to perceptual modality were needed. Thus, in line with many researchers who do not acknowledge a difference between tactile and kinesthetic modalities (e.g., Doyle & Rutherford, 1984; Oxford, 1993; Kinsella, 1993), the tactile category was   excluded from the test. Thus, in the present study, the three major perceptual styles of visual, auditory, and kinesthetic (VAK) were identified using Reid's (1987) questionnaire. Those learners that demonstrated a significant inclination towards two or all perceptual modalities were categorized as multi-sensory.

- Vocabulary Post-Test

In order to measure how much learning had taken place in both the experimental and control groups, a test of vocabulary was devised by the researchers. Originally, it consisted of 70 questions

testing all the previously learnt target vocabulary items. This test was piloted with a group of 10 students, and later reviewed by two language testing researchers judging the workability, appropriacy, and accuracy of the items. Thus 10 items which were considered to be non-fit were removed. The final version consisted of 60 test items. The target vocabulary items were tested using a matching, gap-filling, and multiple-choice test format.

Procedure

Initially, the SVLT (Schmitt 2,000) was administered to the volunteered participants. The rationale behind this phase was to choose a homogeneous group of participants in terms of vocabulary knowledge to join the study. The mean score and the standard deviation obtained for the test were 57.64 and 14.08 respectively. In order to have a consistent group, only those learners who scored within one standard deviation above and below the mean participated in the study. As a result, 68 volunteering learners were excluded from the study. In order not to impede the regular language learning process of the excluded learners, and give administrative limitations stated by the language institutes, they attended the instructional sessions for the experimental or the control groups, were given the tests, and allowed to participate in classroom activities. However, the test results of those learners were excluded from the final data.

Since this study aimed at exploring the possible effects of vocabulary instruction through graphic organizers on vocabulary learning, it was necessary to select, as target words, those items that were unfamiliar to the learners.

During the initial meeting session, the researcher and his associates administered the pre-test in separate group settings for both the experimental and the control group. A list of lexical items that the instructors believed their students might not know was extracted from the passages. A test was designed based on the list. The resulting pre-test consisted of a vocabulary test of 100 items. The learners were expected to match the words with their definitions. The result was 20 clusters each consisting of 5 items. The following is one of the clusters for the words extracted from

the passage "Letters of Application".

Expand   a. to express thoughts and feelings clearly
Approach   b. a short account of one's education, and previous jobs,
Résumé   sent to an employer
Restate   c. to say something again in a different way
Communicate   d. a method of doing something or dealing with a problem
                    e. to become larger in size, number, or amount
                    f. to start doing something again after a short pause

After the pre-test session and deciding on which classes to receive the desired treatment, instructors, who were all experienced English teachers, were briefed through two gatherings on how to use semantic maps to teach vocabulary, and were equipped with the organizers. Prior to the briefing sessions, the instructors were asked to study sources provided by the researcher about the application of semantic maps in vocabulary instruction. Then, sample maps were completed during the sessions.

The following time frame was set: a forty-five-minute portion of the standard ninety-minute class time was devoted to usual class activities and covering the textbook; the remaining forty-five minutes were dedicated to grouping vocabulary items using graphic organizers for the experimental group, and traditional vocabulary instruction techniques for the control group (e.g., providing Persian equivalents, English synonyms and definitions, referring the learners to their dictionaries, etc.). Both groups discussed the reading passages, their content, and vocabulary.

Eight sessions of treatment were held over an eight-week period in all classes. The treatment involved a reading passage with commonplace reading instruction practices, including a warm-up, introduction of a reading skill, and reading the text while applying the newly learned skill to answer the comprehension questions that follow each text in the original format of the text-book. In the second half of the class time, however, learners in the control and experimental groups followed different paths. The control group received traditional vocabulary instruction whereas

the experimental group participated in semantic elaboration activities. The semantic maps, which were used for the treatment in the experimental group, were descriptive or thematic maps, spider maps, problem and solution maps, and fishbone maps. The maps for the first two reading passages were filled by the learners with the teachers' assistance. For the last two passages, however, they were assigned to the learners to fill in groups of four or five people. The teachers only observed and provided help if needed in this phase. The resulting maps which were checked to ascertain whether they had accommodated all the target lexical items were finally approved by the teachers.

The control group received traditional vocabulary instruction in which all the words that were identified to be unknown or unfamiliar were taught. This approach of teaching vocabulary which is widely applied by language teachers, does not entail teaching words with explicitly organizing them into a unified semantic field. The teacher provides the learners with definitions of the new words; the object is to provide a gloss for the text. A brief outline for lesson plan which was implemented in each group is presented below:
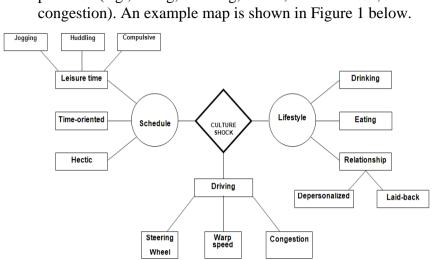
The Experimental Group

The treatment groups were engaged in a focused brainstorming activity to help retrieval of the concepts related to the target vocabulary items. An outline for the experimental-group lesson plan follows:

i. A ten-to-fifteen-minute classroom discussion based on the questions directed to the learners by the instructor, and the learners' responses and comments on other learners' points of view constituted the warm-up phase of the instructional session. There seems to be a consensus between language theoreticians and practitioners on the value of this phase which serves to trigger the relevant schemata in the learners' minds.

ii. What followed the initial warm-up section was the introduction of a reading skill intended for each unit with an orientation towards preparing the learners for tackling the reading

questions in standardized tests such as the TOEFL™ or the IELTS ™. This section was among the objectives of the textbook, and was emphasized in order to increase the participants' motivation to attend the sessions regularly. It should be noted that a good number of Iranian EFL learners, especially in the age range typical of this study, aim at eventually taking a standardized test for vocational or educational purposes.

iii.   The third part of each session was the time when the reading passage was actually read, and the newly learned skill practiced. The learners went through a timed silent reading phase which was ensued by attempting the comprehension questions. In cases where there were detail-questions, the learners were asked to scan parts of the text for a second time. Subsequently, the answers were peer-compared, and eventually verified or corrected by the teacher through a class discussion.

iv.   The key aspect of the treatment in the experimental group which made it distinct from that of the control group was the process of using graphic organizers to teach vocabulary items. The following steps constitute this phase:

  a.   The semantic maps were introduced, and the learners were provided with guidelines on how they are used supported by completed examples of such maps.

  b.   Then, the first map was completed by the instructor on the board using the words provided by the learners. By drawing a large circle on the board and writing the heading, the instructor started the brainstorming phase of the semantic mapping during which the learners provided as many words relevant to the topic as they could think of. The learners were encouraged at this stage to provide only those words that they could find in the text. For instance, they were asked to think of the main causes of culture shock, and the differences between their country and the USA. The ultimate answers were timeliness, driving, and lifestyle, each of which was divided into other subcategories. The students were encouraged to see the relationship among their suggestions, and add more words to each category that was already

provided (e.g., eating, drinking, traffic, time oriented, and congestion). An example map is shown in Figure 1 below.

Figure 1. A completed semantic map for the first passage

   c. In the time that followed, the learners were divided into groups, and asked to create other maps. They agreed on which words to put in the map by negotiating with other group members. These maps were then collected, and the instructor selected those which contained the target vocabulary items for that session to copy on the board. In cases where not all target vocabulary items were offered by the learners through class discussion, the instructor generated other maps to accommodate them.

   d. Finally, the learners were asked to copy the maps on the board into their vocabulary notebooks.

The Control Group

The first three stages of the instruction in the control group were identical to those of the experimental group. As for handling the new words, the following procedure was followed:

Subsequent to answering the comprehension questions following each text, taking turns, the learners were asked to read a

paragraph of the text aloud for the class. They were referred to footnote definitions provided by the textbook for some words and expressions in each chapter. Then, they were invited to ask for the definition of any unfamiliar or vague words in the paragraph just read. Whenever questions were posed, the instructor asked the other learners to provide synonyms, definitions, or Persian equivalents. Monolingual and bilingual dictionary use was allowed at this stage. The acceptable definitions or equivalents provided by the learners for each vocabulary item were put on the board by the instructor or a learner. Once the learners had no more questions, the class moved on to the next paragraph. This process was repeated until the whole text was covered.

In the next stage, the instructor referred the learners to the vocabulary exercises provided by the textbook in a section titled "Building Vocabulary". The crossword puzzle at the end of each chapter, which partially focused on vocabulary items introduced in the passage, was assigned as homework, and checked first thing a week later in the succeeding session.

Design

The present study should be categorized as a quasi-experimental work as there was no true randomization. According to Mackay and Gass (2005), the best alternative for an experimental design is a quasi-experimental format. Due to the limitations of the study to conduct a true experiment, a quasi-experimental design was considered as the best alternative accordingly.

<div align="center">Results</div>

The Homogenizing Pre-Test

Schmitt Vocabulary Levels Test (SVLT) was used as a homogenizing tool prior to the study to select the study participants. Table 2 presents the descriptive statistics on this test.

Table 2
Descriptive statistics for the SVLT

	N	Minimum	Maximum	Mean	Std. Deviation
SVLT	264	24	96	57.64	14.081

The reliability of the test was calculated using the KR-21 test of reliability which was 0.88.

Based on the mean and SD results, the 196 learners who scored one SD above and below the mean constituted the participants of the study.

Perceptual Learning Style Preference Questionnaire

In order to determine the perceptual modalities of the participants, a modified version of Reid's (1987) Perceptual Learning Style Preference Questionnaire was administered. Based on the participants' performance on this questionnaire, they were divided into three groups of auditory, visual, and kinesthetic oriented learners. The results are presented in table 3.

Table 3
Descriptive statistics of the participants based on their perceptual modalities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Auditory	59	30.1	30.1	30.1
	Visual	63	32.1	32.1	62.2
	Kinesthetic	74	37.8	37.8	100.0
	Total	196	100.0	100.0	

Vocabulary Post-Test

Subsequent to the treatments, an achievement test measuring the participants' mastery over the target vocabulary items specified in the pilot study was administered. The reliability of the test was calculated to be 0.81. The collected data are described in table 4.

Table 4
Descriptive statistics for the vocabulary post-test

	N	Minimum	Maximum	Mean	Std. Deviation
Vocabulary Post-Test	196	27	58	44.61	7.708

Data Analysis

To answer the first question of the study, the performances of the participants on the post test were compared using an independent-samples t-test (See Table 5 below).

Table 5
Independent samples t-test comparing the experimental and control groups' performances

Levene's Test for Equality of Variances						
	F	Sig.	t	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	2.876	.091	2.918	.004	3.153	1.080
Equal variances not assumed			2.918	.004	3.153	1.080

The *t* value observed (2.918) was greater than the critical value of *t*. This indicates that the experimental group demonstrated significant superiority over the control group with regard to the scores obtained in the post-test. In other words, employing semantic maps to teach vocabulary items was demonstrated to have a positive effect on the vocabulary learning of adult Iranian EFL learners. The effect size of the treatment was calculated to be medium (0.38) based on Cohen's (1988) *d* for effect size.

To answer the second research question, the participants' performances in the experimental group were analyzed. Since there was one independent variable (perceptual modality) with four

groups and a single dependent variable (performance on the post-test), statistical analysis involving a one-way analysis of variance (ANOVA) was conducted. The descriptive data are presented in table 6.

Table 6
Vocabulary post-test performance for the experimental group

	N	Mean	Std. Deviation	Std. Error
Auditory	21	46.71	6.813	1.487
Visual	31	47.58	6.536	1.174
Kinesthetic	26	46.12	7.268	1.425
Multisensory	20	43.55	7.287	1.629
Total	98	46.18	6.994	.706

As can be seen from the data, the participants with a visual perceptual modality outperformed other groups. The auditory, kinesthetic, and multisensory participants come next in the ranking. The four groups with different perceptual modalities were compared to discover any statistically significant differences in their performance on the post test (See Table 7).

Table 7
One-way ANOVA comparing the four perceptual groups' performance on the vocabulary post-test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	205.256	3	68.419	1.417	.243
Within Groups	4539.438	94	48.292		
Total	4744.694	97			

The ANOVA results show that no significant differences were found among learners with different perceptual modalities in learning through semantic maps.

Discussion

The statistical analyses of the first research question indicate that utilizing semantic maps in vocabulary instruction enhances word learning and vocabulary retention for the experimental group. In other words, the results are in favor of employing semantic maps in teaching words. The effect size for the treatment, as computed by Cohen's *d*, turned out to be medium. This means that employing semantic maps in adult EFL classes is worthwhile, and the extent of gain is considerable and more effective than employing the traditional vocabulary teaching techniques.

This finding is in line with previous research findings concerning the effect of semantic mapping in enhancing vocabulary learning (Anders, Bos, & Filip, 1984; Stahl & Kapinus, 1991; Margosein, Pascarella, & Pflaum, 1982). This positive impact of semantic elaboration techniques can be attributed to the fact that in semantic mapping the relationships between words are explored, and thus, more ties among them are made in the lexical knowledge network of the learner. Establishing such a semantic network in the cognitive repertoire of the learner can lead to stronger comprehension of texts that use the target words (Bravo and Cervetti, 2008). This result is in line with Bravo and Cevetti (2008, p.136) findings that, "Taken together, … research suggests that approaches that provide more information about the words, particularly about the relationships among words, result in increased word learning and often in stronger comprehension of texts that use the target words".

The feedbacks from both the instructors and the learners confirm the time-costliness of semantic mapping activities. Some learners and even instructors expressed their doubt regarding the worthiness of employing semantic maps to teach vocabulary. They claimed that the traditional methods would take much less time in comparison, and thus, they would have more time to concentrate on texts and reading skills. These views, however, are at least partially rooted in their super-ordination of the reading skill to lexical wealth. Contrary to their feelings, we realize that although semantic mapping is costly in terms of both teachers' and learners'

in-class time, it can be very beneficial in that students learn a good deal about new words and the interrelationships of the concepts associated with the words in their long-term memory.

Nonetheless, the researchers' observation during the treatment phase in the experimental group was that the learners were very interested in the semantic mapping activities. Direct feedback collected from a random group of learners confirmed this observation. This is in line with the comments of Graves (1986) in which the participants enjoyed the procedure, and it spurred their interest in words and the relationships among words in the texts.

Results for the second question of the study revealed that learners with any perceptual modality benefit from vocabulary instruction which incorporates semantic maps almost equally. Visually-oriented learners, however, demonstrated a slight advantage over other perceptual modality groups. This might be attributable to the visual nature of semantic maps. Learners who have a visual strength or preference would like the teacher to provide demonstrations. They often use lists to sustain and organize thoughts, and recognize words by sight. It should be stressed, however, that all the learners were intermediate learners. Therefore, we may come up with a different pattern of results with other learner groups.

One interesting finding in the post-test for different types of learners, in terms of perceptual modality, was the above-average performance of the auditory learners. Considering the characteristics of auditory learners who prefer a class in which the teacher provides verbal instructions, this finding was slightly surprising.

A second thought about the preferences of auditory learners, however, makes this incident more understandable. Auditory learners find it easy to learn by listening. They enjoy dialogues, discussions, and plays. Based on the fact that initially the semantic maps were completed through class discussions, and that later they were assigned to groups, the collaborative nature of completing

semantic maps necessitated a good amount of contribution by such learners. In other words, the activities involved a significant amount of learner talk. This might be a justification for an overall advantage of the auditory learners compared to kinaesthetic and multi-sensory learners.

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