Vocabulary Teaching

Mnemonic and Mapping Techniques in Focus

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Chapter One: Preliminaries

1.1. Introduction

Vocabulary learning is an indispensable component of second language acquisition. In English learning, expanding vocabulary size, knowing frequent words, familiarity with word parts and knowledge of lexical items play a critical role in promoting learners' abilities in reading, writing, listening and speaking skills.

Vocabulary learning is an essential ingredient in English learning because vocabulary constitutes a fundamental basis of English sentences. Learning English encompasses memorization, practice, repetition and recall of large-scale word lists; learners have to pay more attention to vocabulary because without vocabulary knowledge, meaning cannot be understood (Chen & Chung, 2008). One of the major responsibilities of language instructors is to improve the learning conditions, and to use more effective activities to facilitate students' vocabulary learning. An instructor can present an L2-L1 dictionary or organize the glossary into sub-lists. The instructor can explain the history and significance of vocabulary learning in second language acquisition. In addition, providing different vocabulary learning strategies such as vocabulary-memorizing techniques and various kinds of vocabulary exercises may improve vocabulary learning. The instructor can also supply further conditions to improve students' vocabulary knowledge. These conditions include drawing students' attention to certain words, making them work on vocabulary drills to process new

words at various cognitive levels or creating extrinsic motivation (Llinares, Leiva, Cartaya, & St. Louis, 2008).

One of the most important areas in ESL/EFL research pivots round the issue of the most effective techniques of vocabulary teaching. There has been considerable research on the ways to help students to retain vocabulary items (Khosravizadeh & Mollaei, 2011). Many studies offer strategies for English vocabulary learning so that students' communication and performance in English learning becomes effective. Thus, developing modern learning tools and forms can enhance effective vocabulary teaching (Chen & Chung, 2008).

1.2. Statement of the Problem

Over the past two decades, a massive amount of research has been conducted on numerous aspects of vocabulary, vocabulary learning and vocabulary learning strategies. Anderson and Nagy (1993) hold that different vocabulary learning strategies have superiority over traditional instructions in terms of increasing word consciousness, word meanings and word analysis.

There are two shortcomings and weaknesses of the conventional approaches to vocabulary learning. First, traditional approaches cannot encompass an adequate range of words. Second, conventional approaches to vocabulary learning have limitations of definition. In traditional approaches, there is a difference between knowing a definition and knowing the respective word. Furthermore, there are faults

in the definitions of glossaries, and school dictionaries as well as students may have different interpretations of definitions (Anderson & Nagy, 1993).

Although many studies have been conducted on the effects of the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping, these techniques have rarely been compared together. There is no explicit and clear understanding of the superiority and dominance of any of these techniques over the others. Thus, there exists a gap and this study attempts to bridge part of this gap with the comparison of the effects of these techniques on vocabulary learning.

1.3. Significance of the Study

A word in L2 includes a series of meaningful letters, and a learner should know the meaning of this letter string to learn the respective word in the target language (Jiang, 2002). The rate of students' vocabulary growth demonstrates that average students can learn almost 3000 words each year. This rate can also be possible when students learn most words incidentally and through daily reading (Anderson & Nagy, 1993). English language learners who develop slowly in the field of vocabulary learning not only are less able to understand the passage and get the main idea of it, but also have poor performance on tests. Thus, they may be identified as learning disabled (August, Carlo, Dressler, & Snow, 2005). Low vocabulary students have less contextual information and are presented with more unfamiliar words (Shefelbine, 1990). In

addition, low vocabulary learners are at risk of being recognized as poor readers and encounter failure at school. Conversely, high vocabulary learners achieve the greatest school results (Anderson & Nagy, 1993). Considerable studies acknowledge the utilization of effective instructional tools to facilitate vocabulary learning because the slow development of vocabulary and poor performance on tests by second language learners may put them in the category of disabled learners (August, Carlo, Dressler, & Snow, 2005).

There are many studies on how to improve English vocabulary learning (Asgari & Ghazali Bin, 2011). Over the past decades, there has been an ongoing interest in vocabulary learning strategies because they help promote second or foreign language vocabulary learning and recall; hence, correct instruction of vocabulary learning strategies improves students' mastery in vocabulary learning (Atay & Ozbulgan, 2007). In the case of learning vocabulary in second language, students need to be educated with different vocabulary learning strategies (Asgari & Ghazali Bin, 2011). English teaching course books supply opportunities for classroom practices to instruct learners the use of vocabulary learning strategies; hence, vocabulary learning strategies facilitate learning and make it transferrable to new contexts (Bastanfar & Hashemi, 2010).

Since vocabulary is a crucial component of language, any technique or strategy which affects vocabulary learning and increases the quantity and quality of word knowledge can expand language knowledge. To acquire this vast reservoir, students need to receive instruction. Any study which contributes to vocabulary learning can

facilitate language learning. So, the study of the effects of the selected presentation techniques including the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping on L2 vocabulary comprehension and production can affect language teaching and learning.

1.4. Statement of the Questions and Hypotheses

1.4.1. Research Questions

This study is an attempt to answer the following questions:

1. Are there any significant differences among the effects of the selected presentation techniques (the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping) on vocabulary comprehension?
2. Are there any significant differences among the effects of the selected presentation techniques (the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping) on vocabulary production?

1.4.2. Hypotheses

The following null hypotheses are formulated in response to the above questions.

1. There are no significant differences among the effects of the selected presentation techniques (the keyword method, the peg word method, the loci

method, argument mapping, concept mapping and mind mapping) on vocabulary comprehension.

2. There are no significant differences among the effects of the selected presentation techniques (the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping) on vocabulary production.

1.5. Definition of the Key Terms

The key terms used in this study may have been defined in different ways. This study adopts the following definitions:

Keyword Method: According to Masteropieri and Scruggs (1998), the keyword method is a mnemonic strategy to help students learn new words. The keyword method consists of two stages: The first stage is to create a key word that is acoustically similar to the new word. At the second stage, the learner visualizes the keyword and the definition of the new word, after which the learner connects these two things. For example, in order to remember *barrister*, meaning lawyer, the learner mentions *the bear* as the keyword for *barrister*. Then, he/she makes a mental picture of the bear which is acting like a lawyer in a courtroom. According to Crutcher (1990), the Spanish word *"doronico"* means *"leopard"*. The English word *"door"* is considered as the keyword (because of the similarity in sound to *"doronico"*); then, creates an interactive image between the *"door"* and *"leopard"*.

Peg Word Method: The peg word mnemonic technique consists of two steps. In the first step, the learner remembers the rhyming words for the number 1 to 10. In the second step, the learner visualizes the new word and the rhyming word and then associates these two things with other words with the related number (McCabe, 2010).

Loci Method: According to Nemati (2009), "to use this ancient technique, imagine a familiar location such as a room, then mentally place items to be remembered there, to recall take an imaginary walk along the landmarks in the room and retrieve the items in it" (p. 124). Bakken and Simpson (2011) also note that the loci method or mental walk can be performed through imaginations and pictures to organize and remember information.

Argument Mapping: According to Hoffmann (2009), an argument involves a claim and one or more reasons to support or criticize the claim. An argumentation comprises the main argument, and further arguments for each of its reasons are represented to support or criticize the main one.

Concept Mapping: Novak and Cañas (2008) define concept mapping as a graphical tool for organizing and representing knowledge. Concept maps include concepts which are demonstrated by lines. Lines connect two concepts, and words on these lines are the linking words or phrases which recognize the relationship between the two concepts.

Mind Mapping: Mind mapping is an analytical process that encompasses a combination of single words, simple phrases, colours, symbols and images. Mind mapping can be used to take note, brainstorm and link ideas. It can be used as a summary to study before exams (Monet, Rolheise, & Bennett, 2001).

Chapter Two: Theoretical Review

2.1. Introduction

One of the crucial issues in EFL and ESL settings is vocabulary learning. There have been massive studies exploring methods and strategies to facilitate students' retention of vocabulary items in a viable way (Khosravizadeh & Mollaei, 2011).

This chapter is divided into three parts. The first part is related to the definitions and significance of vocabulary, vocabulary size, and vocabulary learning and its importance. The second part includes definition and introduction of various vocabulary learning strategies. In the third part, which is the focus of the present study, a review of some definitions and procedures of the respective techniques, characteristics, advantages, applications, and a number of conducted studies on the selected techniques are presented to investigate their effects on improving L2 vocabulary comprehension and production. These techniques consist of the Keyword, the Peg word, and the Loci methods, Argument mapping, Concept mapping and Mind mapping techniques.

2.2. Vocabulary

Words encompass a fundamental element of language with which second language learners can communicate fluently. To master a foreign language is to

master vocabulary (Sorbi, 2010). Vocabulary consists of single words and lexical sets (Hasbun, 2005). The word vocabulary suggests different wordlists in various subject matters (Doczi, 2011). Vocabulary sets (composed of vocabulary lists, dictionaries and those word series in the mental lexicon of the teacher and learners) and written or oral texts are the two important sources of vocabulary (Crammer, 1986). Language teachers hold that foreign language learners pay much more attention to vocabulary than other skills so that learners set vocabulary knowledge as their first priority (Yu-Ling, 2005).

2.2.1. The Significance of Vocabulary

A large number of vocabulary learning studies have repeatedly acknowledged the significance of vocabulary in foreign language learning (Nikolova, 2002). Several theoretical and empirical studies have emphasized the impact of lexis and word knowledge on second language learning and teaching (Sanchez & Manchon, 2007). Undoubtedly, lexical competence plays a crucial role in communicative competence. Individuals have unique lexical needs which vary in terms of different personal, professional and academic aspects (Bastanfar & Hashemi, 2010).

With respect to the importance of vocabulary, Sedita (2005) maintains that students with restricted English knowledge or proficiency, students with no reading comprehension outside of school, those with reading or learning disabilities, and beginners with limited vocabulary knowledge face barriers in promoting their

vocabulary and face difficulties in school. According to Oya, Manalo and Greenwood (2009), many of the past studies put emphasis on the significance of vocabulary knowledge and its impact on reading comprehension, academic courses and writing tasks. Asgari and Ghazali Bin (2011) highlight the significance of vocabulary knowledge on language use in which insufficient vocabulary knowledge of the learners leads to difficulties in second language learning.

2.2.2. Vocabulary Size

Learners and teachers of a second or foreign language emphasize that to master a second or foreign language is to master a large number of vocabulary items (Wu, 2009). A learner needs to learn 3000 high frequency words in a second language (Nation & Waring, 1997). Vocabulary size reflects the English proficiency level of learners (Hai-peng & Li-jing, 2007). Large-scale vocabulary size has critical significance and a central place in learning a language (Wu, 2009). Insufficient vocabulary size can present a second language learner with problems in comprehension or accuracy, communicative fluency, and reading comprehension (Hai-peng & Li-jing, 2007).

Students know the role of cognitive strategies (note taking and high lighting) and meta-cognitive strategies (studying and repeating new words and using English language media) in vocabulary learning; so these strategies are frequently applied in such a manner that they contribute to vocabulary size (Gani Hamzah, Kafipour, &

Kumar Abdollah, 2009). Instructors can use pictures, visual communication, aural or concrete interaction, music, songs, films, videos, and computers to enhance the vocabulary size of second language learner (Hai-peng & Li-jing, 2007).

2.2.3. Vocabulary Learning and its Importance

Over the past two decades, a considerable amount of research regarding vocabulary learning has given us valuable information about vocabulary instruction in language classrooms (Yu-Ling, 2005). The main objective of research on vocabulary learning is to investigate vocabulary development and the description of the main processes which underlie the learning of this language component (Maria & Catalan, 2003).

Vocabulary learning includes the comprehension of the word, its form, meanings, and its use in different contexts, its various sets and frequency through new techniques and skills (Hasbun, 2005). Vocabulary learning can be influenced by two major factors: Inter-lexical and intra-lexical. These factors deal with the relationships between the new words and the words learners already know. These variables are derived from the word itself (Laufer, 1997). Vocabulary learning is a crucial part of any language. It can be considered as the most important sub-classification of English learning because it forms the fundamental structures of English sentences (Chen & Chung, 2008). Vocabulary learning has a critical function in language teaching and learning (Hai-peng & Li-jing, 2007). Learning vocabulary is one of the most important issues that learners always deal with during the process of second language

learning (Asgari & Ghazali Bin, 2011). Vocabulary learning can also have impact on the linguistic capacities of the learners (Hai-peng and Li-jing, 2007). It has a foremost place for university students in English language and literature to enhance their language knowledge (Doczi, 2011).

2.2.4. Vocabulary Learning Strategies (VLS)

Since language learning strategies are important in learning a second or foreign language, longitudinal studies have been conducted on various aspects of language learning strategies. These strategies include dealing with the learner, personality, nature factors, learning style, age, sex, and culture (Doczi, 2011). The implementation of language learning strategies improves students' autonomy and language learning abilities (Kuolee, 2010).

Among the most important language learning strategies are vocabulary learning strategies, which have gained considerable attention since 1970s. There are different types of vocabulary learning strategies including determination, memory, social, cognitive and meta-cognitive strategies (Gani Hamzah, Kafipour, & Kumar Abdollah, 2009). Vocabulary learning strategies play a crucial role in vocabulary studies and vocabulary instruction. Good perceptions of vocabulary learning strategies facilitate vocabulary instruction and give useful insights about learners' beliefs as to the efficacy and helpfulness of these learning strategies (Wu, 2005). It is

worth noting that there are various ways of teaching and learning vocabulary, and each strategy has its own advantages and disadvantages (Nemati, 2009).

Some of the common vocabulary learning strategies include dictionary use, reading and extensive reading, using context, rehearsal, guessing vocabulary from context, semantic mapping, Picture Word Inductive Model (PWIM), synonyms and antonyms, the system of grids, incidental vocabulary learning, word part analysis, memorization strategies, cognitive strategies such as written and verbal repetition, semantic field theory, meta-linguistic strategies, using monolingual and bilingual dictionaries, utilizing English words in daily speaking, social strategies, using English language media, multimedia messages via mobile phones, and using different songs such as lyrics and music (Asgari & Ghazali Bin, 2011; Bagus Subekti & Lawson, 2007; Hai-peng & Li-jing, 2007; Harvey, 1983; Joe, 1998; Khosravizadeh & Mollaei, 2011; Li & Brand, 2009; Linares, Leiva, Cartaya, & St. Louis, 2008; Pellicer-Sanchez & Schmitt, 2010; Pigada & Schmitt, 2006; Rupley, Logan, & Nichols, 1999; Saran & Sefreroglu, 2010; Sedita, 2005; Shefelbine, 1990; Swartzendruber, 2007; Wu, 2009; Yu-Ling, 2005).

Crammer (1986) believes that the following items are some ways of vocabulary teaching: definition of a word or a lexical item, giving examples and descriptions of the word, analogy and comparison of the word to its broad category, translations of concrete or real items, understanding the word meaning through context, description, demonstration or showing the meaning of the word through actions, mime or elaboration through movements or gestures, using real or concrete objects, pictures,

photos, visualizations, explanation of the culture or academic words, using synonym or antonym, using grids and applying generalizations or parts of speech.

According to Ellis and Beaton (1993), word frequency, imageability of the concept, word class (part of speech), semantic context, keyword, repetition, word meaningfulness, orthographic factors, similarity of foreign language and native words, word length and using keyword mediation are effective techniques of vocabulary learning. Ellis and Beaton believe that the level of accordance between a specific foreign language word and the phonotactics of the native language facilitate learning a specific word.

According to Ellis (1995), some of the successful instructional tools for vocabulary learning are: looking up the word in a dictionary, visual negotiation by using the keyword method, inferring from context, guessing from context, semantic mediation such as applying keywords (which deal with language borrowing or the same origins between the two languages), deep processing and elaboration, repetition, spacing effect (that is spaced presentations give better learning results and achievements than massed presentations), and testing and the retrieval practice effect.

Lawson and Hogben (1996) refer to the most frequent vocabulary learning techniques. These techniques include deliberate vocabulary learning tasks, using context, students' strategies for vocabulary learning (repetition of the target word and its meaning), reading of related words, simple practice, writing of word and meaning, increasing practice, spelling, word categorization, sentence translation, form

similarity, sound link, suffix, simple use of context, paraphrasing, mnemonic methods, a simple reading of the dictionary-like entries and the contextual use to create new meanings.

The purpose of the present study is to examine the effects of the selected presentation techniques on L2 vocabulary comprehension and production. These techniques are the Keyword, the Peg word and the Loci methods as well as Argument mapping, Concept mapping and Mind mapping techniques.

2.3. The Keyword Method

Raugh and Atkinson (1974) define the keyword method as associations between an acoustic similarity of an English keyword to a foreign word and the visual association of the English keyword to the English definition of the foreign word.

Vocabulary learning through the keyword method is divided into two stages: In the first step, the student creates an English word (keyword) that is somehow similar to the foreign word; in the second step, the student visualizes the keyword (English word) interacting with the English definition of the foreign word (Atkinson & Raugh, 1974; Griffith, 1980; Raugh & Atkinson, 1974; Raugh, Schupbach, & Atkinson, 1975). When the keyword method is utilized for spoken foreign words, each word is pronounced and English keywords connecting to the mental image of English definitions are indicated (Raugh & Atkinson, 1974).

The keyword method is a mnemonic strategy for learning foreign-English pairs. This technique is conducted in such a manner that connects the foreign word to a keyword. The Keyword is a concrete English word which has some similarity in sound to some part of the foreign word. Afterwards, the learner creates a memorable mental image of the keyword to the English equivalent (translation) to show their interactions (Crutcher, 1990). The keyword mnemonic strategy facilitates learning and remembering complex information. The keyword method uses the visualization of information to determine its meanings and suggests more than the ordinary information (Keskinkilic & Sunbul, 2011).

For example, the Russian word *"zvonok"* means bell. It is pronounced *"zvahn-oak"* and the English keyword is considered *"oak"*. An individual makes an image of the oak growing under a huge bell jar (Atkinson & Raugh, 1974). In another example, the Spanish word *"pato"* (meaning *"duck"*) is pronounced *"pot-o"*. The English keyword sounds like *"pot"* and the student imagines the keyword *"pot"* interacting in a graphic way with the word *"duck"*. The student imagines a duck hiding under an overturned flower pot (Raugh & Atkinson, 1974).

According to Griffith (1980), most proponents of the keyword method believe that the keyword method is used when other techniques cannot work well. It should not be used for every vocabulary item.

Its usefulness to a series of foreign words, the presentation of the keyword for each item, associating the sound of some part of the foreign word to the keyword, creating a mental image to link the keyword to the English definition (L1 translation), and

uniqueness and flexibility of the keyword are important aspects of the keyword method (Atkinson & Raugh, 1974; Crutcher, 1990; Griffith, 1980; Raugh & Atkinson, 1974; Raugh, Schupbach, & Atkinson, 1975). Any part of the foreign word can be regarded as its key sound in the selection of keywords (Atkinson & Raugh, 1974). There are various techniques to facilitate the associations between the keywords and the English translations. For example, rhyme, alliteration, cadence or synonymy can be used to create imagery link or oral construct (Raugh & Atkinson, 1974).

According to Raugh and Atkinson (1974), the English keyword has some idiosyncratic features with which a vocabulary test must be arranged. They believe that the keyword method is flexible, makes simple imagery link, easily visualizes, has clear effects on the English translation, and keeps away from vagueness. Raugh and Atkinson point out that the keyword that looks like some part of the foreign word (acoustic similarity) creates an unforgettable imagery connection between the keyword and the English translation.

The keyword mnemonic method has also crucial advantages and applications. According to Raugh and Atkinson (1974), the adjustment of links mentioned in the keyword method can help change and modify learning strategies. For example, an orthographic link and an oral construct can be replaced by an acoustic similarity link and a mnemonic or imagery link, respectively. The orthographic link deals with spelling similarity, whereas the oral construct entails a sentence whose subject is considered as the keyword and its object as the English definition. Additionally, it is

interesting to know that the keyword method can be applied for a foreign language course study.

The keyword method is useful for learning new vocabulary whether the vocabulary belongs to foreign, native or technical (specific purposes) language. The keyword mnemonic method enhances the learning rate of new vocabulary items. It can also be a useful strategy for linguists, personnel in non-native English speaking countries, personnel learning English as a second language, and personnel in BSEP (Basic Skills Education Program) (Griffith, 1980).

Several experiments have been conducted to investigate the effectiveness of the keyword mnemonic method (Raugh & Atkinson, 1974). A large number of experiments have investigated the usefulness of the keyword method using acoustic and imagery links to show whether the keyword method improves memory recall and foreign language vocabulary learning (Taguchi, 2006). Previous studies on the experimental texts show that the keyword mnemonic technique is an effective strategy to improve memory recall and vocabulary learning (Griffith, 1980).

Using mnemonic techniques such as the keyword method gives teachers useful information about the advantages of this technique and reveals useful results for further research (Keskinkilic & Sunbul, 2011).

According to Wyra, Lawson and Hungi (2007), the keyword method is an effective mnemonic strategy for vocabulary learning and remembrance. The study examined the effects of explicit word meaning recalls using the keyword method on retrieval

time and self-report ability of students to visualize. The effects of these two components were examined on backward and forward recall performance. Wyra, Lawson and Hungi also conducted the study to compare learning Spanish words in bidirectional instruction using the keyword method and the control group who used the standard keyword process. 36 female and 41 male students (age 11-12 years) participated in the research. Most of them had learned Spanish since year 2. They completed two questionnaires, namely the VVIQ and the Ability to Make Images (AMI). Based on the achievement scores, students were divided into two groups that were described as the standard keyword group and the keyword retrieval group. Although the pattern of recall performance was similar for both groups in either backward or forward recall directions, there was considerable difference in the level of recall between the two groups in question. Multilevel analysis procedures were used to analyse data. At the end of the experiment, Wyra, Lawson and Hungi reported the following results that showed the efficacy of the keyword method for vocabulary learning and recall.

First, the results indicated that bidirectional retrieval instruction using the keyword method was a crucial predicator of backward and forward recall procedure. Second, after instructing word meaning recalls using the keyword method at retrieval time, the outcome indicated significant benefits for recall performance. This emphasized the application of the keyword method procedure for both training and retrieval. The capacity of students to self-assess and visualize improved the recall performance. The study further revealed an improvement in vocabulary recall for backward and forward

recall performances in the recall testing situations. Students' instructions using unambiguous keyword method in word-meaning recall led to this improvement.

Yi Lin and Cheng (2008) examined the combined effects of the key word method and phonics instruction on 5th graders' (elementary school students') English vocabulary learning in Taiwan. The study integrated the keyword method and the phonics instruction approach to increase effective vocabulary learning in word meaning and spelling abilities on both receptive and productive recall performances. 105 fifth graders from EFL classes were randomly assigned to three groups (keyword, phonics, and integrated keyword-phonics). Each learning session lasted for 40 minutes, during which 10 new words were taught. Students were engaged in producing their own keywords, mental images and those that were closer to the sounds of the foreign words. After three learning sessions were completed within one week, the students received two recall tests. These recall tests (receptive and productive recall tests) were administered to measure the learning progress both instantly and after a time interval as well as to assess students' learning of word meanings and spelling. Although students' input was the same, they achieved different results. Yi Lin and Cheng came to the conclusion that although the keyword group and the integrated keyword-phonics group performed better than the phonics group both instantly and after a retrieval time on receptive recall test, the phonics group functioned better than the other two groups on instant and delayed productive recall tests. In addition, the keyword method and the phonics instruction improved students' learning of word meanings and spellings, respectively. The combination of

the keyword method and the phonics instruction resulted in improving students' learning of word meanings and spelling abilities. Moreover, the keyword method did not influence spelling abilities in productive recall performance. The phonics instruction turned out to be ineffective on word meaning in receptive recall performance.

Benge and Robbins (2009) used action research methodology to explore the critical place of the keyword method. 13 junior and senior students participated to utilize the keyword method for vocabulary learning. The data collection lasted 3 hours. They reported that each student received a questionnaire to examine the relationship between reading, non-reading and retention rate. In the next step, a teacher used a checklist composed of 130 SAT words and then 100 items in multiple choice format were administered to cover all SAT words. Afterwards, the students reviewed the keywords and finally took a test. Benge and Robbins concluded that the mean retention rate was 73.6% and after a 15 minute review, it changed to 82.5%. The checklist showed that new words were retained at a higher rate in the first nine weeks. Therefore, the study indicated that the keyword method can be considered as a further vocabulary instruction technique to develop secondary students' vocabulary. Meanwhile, action research methodology showed the effectiveness of the keyword method.

In another study, Keskinkilic and Sunbul (2011) investigated the impact of the mnemonic keyword method on students' achievements and attitudes. The participants were randomly divided into the experimental group with 41 students using the

keyword method and the control group with 37 students utilizing the traditional teaching. Keskinkilic and Sunbul started the study by administering achievement, manner and feeling pre-tests to the experimental and the control groups. Then, the experimental group and the control group used the keyword method and the traditional teaching courses, respectively. Finally, a post-test was administered based on achievement and attitude tests to both groups in question. The results indicated that there were significant differences in perception, information and total access levels but in contrast, no important differences in terms of attitude scores. Additionally, students using the keyword method instruction had higher achievements than their counterparts in the traditional way.

2.4. The Peg word Method

Bower and Reitman (1972) believe that previous studies show the efficacy of the peg word mnemonic system for learning lists of unconnected items to be true. The process of using the peg word method starts with learning a set of concrete words (pegs) associated with the first 20 or so whole numbers. The same sound words or pegs are such as “1 is a bun, 2 is a shoe, and 3 is a tree…..”. To learn any new list of items, an individual must visualize the referent of the respective new words in explicit interaction with the referent of the peg words in question.

A number of studies have been conducted to examine the effectiveness of the peg word mnemonic method on vocabulary learning. Bower and Reitman (1972)

investigated retroactive or effective interference (RI) from learning several word lists that might be changed by using mnemonic strategies. The study included three groups of subjects. The first group was the Separate Images or SI group. The Separate Images group learned five successive lists of 20 words. These words were linked by 20 pegs (rhyming words) based on the formation of concepts through mental imagery. The second group was the Progressive Elaboration or PE group. In order to learn five lists of 20 words, the Progressive Elaboration group explained the scene and then visualized across the peg words. The third group was Loci group who used Progressive Elaboration technique, but the subjects of this group created their own common familiar locations as mnemonic pegs. The Progressive Elaboration Technique is used in such a manner that when a learner is presented with the nth word in one list, he/she must memorize its nth peg word (or image) in that list and try to remember all the previous objects in prior lists that have been placed in that visual event. Afterwards, the learner must add the referent of the new word from the respective list to the old event and make associations between the new referent image and the previous objects. In addition, the process of using the Progressive Elaboration Technique was compared with the control group. The control group created new imaginable events without remembering previous lists associated to the peg words. The outcomes indicated that the participants who used the progressive elaboration technique showed less effective interference across successive lists than the control group (the Separate Images or SI group), who used separate images to link words from successive lists to their relevant pegs. Furthermore, the Loci and the Peg word

groups had the same recall tasks. Based on the results, both the Separate Images group and the Progressive Elaboration group had the same instant recall, but the Separate Images group remembered less than the Progressive Elaboration group at the end of the session.

Wang and Thomas (2000) investigated the long-term efficiency of utilizing mnemonic strategies such as the peg word method and the loci method on serial recall and compared their effects with visual-based strategies of adults. The control group utilized traditional methods of vocabulary learning. The participants (adult college students) of the peg word method were given a paper consisting of the peg word rhymes. The participants were instructed the peg word method. They used the rhymes to memorize the respective words through generating a mental image of the peg word having clear effect on the new word. Helpful examples using abstract and real words were given; afterwards, the students received 20 words. The participants wrote the list of related peg words twice. Once they wrote beside the items 1-10 and once beside the items 11-20. Next, 5 minutes were given to review the 20 items. The participants in the no-delay group were tested instantly within 5 minutes for remembering the items, whereas the two-day group were tested after two days. The loci method group were presented with an explanation of the loci method, its reasons, principles, and examples of sample items using abstract and concrete words. The participants were asked to create 10 places as recognizable objects or important events. These places were envisaged and associated easily to each other. The participants created those places and wrote them on paper. Afterwards, 20 words

were presented to them. The participants wrote the list of locations (places) twice. Once they wrote beside the items 1-10 and once beside the items 11-20. Next, they were also asked to make clear mental images of each word and its respective location. The allocated time was 5 minutes to serially learn the 20 items. The results indicated that the participants of the peg word method and the loci method functioned similarly. Although prolonged forgetting occurred, the peg word method and the loci method groups performed as well as adult learners who generated their own visual-based strategies. In addition, the peg word method and the loci method learners outperformed those who used rehearsal technique. Wang and Thomas also concluded that using special mnemonic instructions may be more effective for populations such as children, learning-disabled individuals and older adults who find it sophisticated to create effective strategies. Astonishingly, mnemonic instructions such as the peg word method may also be helpful for college students who did not spontaneously create such a method.

The study conducted by Richmond, Cummings and Klapp (2008) investigated the loci method, the peg word method, and the keyword method in an eighth grade classroom. The study sought to find out whether students could transfer the afore-mentioned methods under both specific and general transfer conditions. To this end, 108 eighth grade students participated in the study. They were assigned to four groups and each group randomly received one of the four conditions including the loci method, the peg word method, the keyword method, and the free study. The study lasted over two weeks. The students were instructed the respective techniques

and then tested on their capacity to transfer their mnemonic under specific and general conditions. The specific conditions included studying metal alloy uses and the general conditions consisted of studying revolutionary war battle events. The results of the study showed that students who received the keyword method transferred a mnemonic under both specific and general conditions effectively. Moreover, teaching the keyword method improved memory strategy and academic performance.

2.5. The Loci Method

Lindenberger, Kliegl and Baltes (1992) define the loci method as a method in which, using visual imagery, new words are connected to locations successively. When it is necessary to recall the respective words, the locations are mentally imagined. According to Baltes and Kliegl (1992), “the key component of the method of loci is the forgoing of mental images or thought linking words to be remembered in order of appearance to an invariant series of mental landmarks. At recall, one mentally revisits the mental locations in order, retrieves the associated mental image or thought, and decodes from these mental images the words to be remembered” (p. 121).

According to Cornoldi and De Beni (1991), the loci mnemonic method facilitates memorization of separated items, and learning and remembering passages. It improves oral representation and explanation of text more than individual study of a written text.

Grin (2005) believes that to remember a conversation using the loci mnemonic method, it is necessary to make associations between the conversation and the place it takes place. Utilizing the loci method to learn new information or a large list of words enables us to visualize and associate illogical items to generate sensible links between words or items. Therefore, the loci mnemonic method enables us to make mental associations between past events or locations and to enhance our short or long term memory retention.

A number of studies have been conducted on the loci method. Roediger (1980) examined the effectiveness of four mnemonics including imagery, the link method, the peg word method, and the loci method. 150 Purdue undergraduates participated in the study. They were assigned to five groups. They received five conditions involving imagery, the link method, the peg word method, the loci method, and rehearsal instruction. To conduct the study, 80 high-imager words were used. The words were divided into four successive lists of 20 words. Each group of participants received 20 words each session. An instant recall and delayed tests were administered to all five groups. The results of the experiment indicated that the peg word method and the loci method groups achieved the greatest results on instant and delayed recall tests. They also supplied best ordered recall, whereas the link method was somehow less effective, indicating that the forgetting of one list caused disorder in recalling other items. Moreover, the peg word method, the loci method, and the link method supplied similar recall levels by the free-recall criterion. It is worth noting that although the peg word method and the loci method groups recalled more words than the link

method group, the link method group performed better than the participants who received imagery and rehearsal conditions. The link method group recalled words in their correct order much better than rehearsal and imagery conditions.

Cornoldi and De Beni (1991) investigated groups of instructed and non-instructed students using the loci method to memorize and learn various passages. In their experiment, the loci group utilized the loci method, whereas the control group used the usual rehearsal approach. 42 university students were divided into 2 groups in terms of sex and age. The experimental group included 13 subjects hearing the passage and 9 reading it. The control group involved 10 subjects hearing the passage and 10 reading it. The students did not have knowledge of psychology, memory improvement or mnemonics. In this experiment, a passage containing 2100 words was used. The passage was about the discovery of an old vase at Pompei. It contained descriptions, the procedure of the discovery of vase, various ideas about the origins of vase, and several arguments. So, this was appropriate for using loci. The experimental or the loci group was instructed to use the loci mnemonic. Students received instruction about the loci and were asked to make mental images and to use 20 loci they knew. They were asked to memorize the passage using the loci method. The control group coded the information semantically and rehearsed it. It was emphasized that memory scores were according to the correct recall of both information and its order of presentation. In the study stage, half of the students listened to the passage (oral presentation) and about half of them read the passage (written presentation). Next, an interpolated calculation and written free recall tasks

were administered. Afterwards, students were interviewed by the experimenter to check that the loci method and rehearsal instructions had been correctly conducted. The scoring system was based on different understandings and explanations given by experts. Cornoldi and De Beni concluded that using the loci mnemonic was more effective on memorizing passages than the control condition.

2.6. Argument Mapping

An argument consists of a set of claims with well-structured associations between them to support or reject claims and opinions (Patterson, 2007). An argument is composed of a set of statements that involve a claim and some reasons, and these reasons support each other for the claim. Arguments are presented to support each of the reasons and the reasons of supporting arguments (Hoffmann, 2009).

Prose is the suitable form of representing ideas, but it does not represent the structure of an argument (Twardy, 2003). In contrast, diagrammatic arguments are replaced by prose version (Elliman, Macintosh, & Irani, 2006). A prose argument can be separated into several arguments and their components. A reason includes a series of claims that support each other (Twardy, 2003). An argumentation represents the structure of an argument map in such a manner that includes a set of arguments (Hoffmann, 2009).

It seems that argument mapping has appeared after the nineteenth century with the practice of Richard Whately in a logic textbook in 1936. The early emergence of argument mapping was seen by Wigmore, the legal theorist, who developed detailed

designs to show legal evidence in the early 20th century (Van Gelder, 2009). A philosopher called Stephen Toulmin promoted argument mapping in the mid-century so that argument mapping came regular in textbooks subsequently. Due to the accessibility of computers and software, it was rapidly improved in 1990s. Robert Horn has raised large improvements in the argument mapping technique (Van Gelder, 2009). For nearly a century, an argument mapping approach has been used as the visualization technique of difficult issues (Elliman, Macintosh, & Irani, 2006).

Twardy (2003) defines an argument map as the two-dimensional representation of argument structures consisting of a box and arrows diagram that looks like a tree with several branches. According to Van Gelder (2009), argument maps are plans that are drawn to explain "boxes and arrows" practice. These boxes refer to statements and arrows related to relationships and connections such as evidential support. Elliman, Macintosh, and Irani (2006) note that boxes and connecters (arrows) are formed diagrammatically, and these boxes contain a summary of a section and icons.

Argument maps are visualization formats for coherent and reasonable structures of arguments (Ostwald, 2005). Argument maps are mental image tools that are used for comprehending, assessing and evaluating arguments (Davies, 2011). To show the structure of arguments, students require accurate argument mapping (Twardy, 2003).

Davies (2011) designed an argument map using a claim at the top of the map following a set of reasons and purposes. Ostwald (2005) holds that each claim and reason are placed in boxes and connected to each other with some lines connecting boxes, colours, and their specific locations. According to Twardy (2003), the boxes

include claims, opinions or contentions and are arranged to support or oppose the reasons. Elliman, Macintosh and Irani (2006) believe that in such a manner, the reader can understand visual forms of the arguments and their structures easily. Twardy (2003) notes that the ultimate conclusion can be finally accepted or rejected by its reasons or objections and the basic claim may be unsupported.

There are various ways to make an argument map: Argument mapping can be constructed at three levels of theory, visualization of claims and technology (Van Gelder, 2009).

In the first level of building an argument map, developing visual convention arguments must be based on the theory. Argumentation theory and related areas such as informal logic, critical thinking, and speaking put a certain meaning on the theoretical format of argument maps. Argumentation theory distinguishes relationships, claims, values, and creates principles for controlling the structure of argument map so that it can influence theoretical issues to supplementary research (Van Gelder, 2009). An argument map indicates well-associated relationships between the claims and the clarity of reasons to facilitate critical thinking (Conlon & Gregory, 2007). Argumentation is useful for considerations and decisions on true claims. It increases logical stability of the user's attitude and evaluates one's arguments effectively (Ostwald, 2005). Using logical reasoning, argumentation involves group associations or particular individual views or specific topics. The structure of argumentation entails discussions or debates (Rinner, 2006). Argument mapping has a significant role in improving the value of community debates, policy

making procedures, and climate change issues (Moor, Park, & Croitoru, 2009). Developing an argument map helps a real style of debate and creates a stimulus structure to provide new contributions (Conlon & Gregory, 2007).

In the second level of making an argument map, Conlon and Gregory (2007) believe that argument mapping may not solve the debate but in contrast, clarify ideas and thoughts behind arguments through map, box and arrows, claims, reasons, colours, icons, and connections between them. According to Van Gelder (2009), the task of the method designer is to make a decision on how to show the support of one statement for another; hence, the designer must select different dimensions such as shapes, colours, lines, labels, icons, and space to indicate the semantic relationships of the propositions. Conlon and Gregory (2007) hold that various colours of the parts of an argument map support the order of different aspects of the argument. Van Gelder (2009) notes that generated maps express effective communications, argument structures, and connected issues.

In the third level, argument mapping requires accessible technologies such as pen and paper or whiteboards, but these apparent technologies have some restrictions themselves. For example, they cannot make obvious sophisticated diagrams or revise diagrams (Van Gelder, 2009). Different forms of mapping are applied for educational contexts and prevent the problem of cognitive excess. Argument mappings and software packages are new trends to improve knowledge and educational purposes (Davies, 2011). The Rationale Software facilitates argument mapping. It gives practical articles on argument mapping and critical thinking (Ostwald, 2005).

Computer-based argument mapping improves students' critical thinking skills, identifies how they make errors, and presents solutions to remove their errors (Twardy, 2003).

Argument mapping has several characteristics. According to Davies (2011), argument mapping indicates inferential connections between statements or propositions. Van Gelder (2009) holds that since argument mapping deals with informal reasoning and real world arguments, it shows noticeable difference between formal logics such as Venn diagrams.

One important characteristic of argument mapping is that students can use argument mapping to show their understandings of various debates. They may visualize complex ideas through making maps of arguments (Davies, 2011).

Although argument mapping is similar to mind mapping and concept mapping, the difference is the focus on reasonable, clear or inferential connections between statements (Van Gelder, 2009). It is noteworthy to know that argument maps are different from mind maps and concept maps in aspect of details, level of accuracy, and inferential connections (Davies, 2011).

A new developed technology is to generate complicated argument mappings via particularly designed computer tools and online argumentation devices such as Araucaria, Compendium, Cisive, SEAS, and Debate graph. These technologies may cover the demerits of manual ones (pen and paper or whiteboards) (Van Gelder, 2009).

The evaluation of an argument map may guarantee teachers of the strength of argument mapping structure and balance the strength of reasons or objections, and well-associated claims. Additionally, questions such as ‘is this a good reason to support the claim above?’ or ‘is this a good objection to disprove the claim above?’ or ‘is this claim a good reason for the claim above?’ facilitate making decisions to accepting or rejecting the claim (Patterson, 2007).

It is worth noting that although the presentation of content and ideas such as newspaper, books, articles or even students’ essays is prose, finding well-structured reasons of the prose is much more complex. So, the argument mapping approach is required to determine best reasons, comprehend the structure, and evaluate the claims. The pictorial representation of the diagram helps determine claims as opinions or contentions, reasons, and objections. Argument mapping shows a well-associated structure between different claims; this means that an argument mapping indicates whether a reason supports another reason or supplies arguments to show the falseness of the opinion. Argument mapping enables us to evaluate the mapping process in such a manner that it indicates true claims; those claims support the reason or the objection to support or show that it is a mistake (Patterson, 2007).

Argument mapping applies to all sorts of arguments (Twardy, 2003). Argument mapping has several advantages to give logical understanding of argument structures and complex issues (Ostwald, 2005). It represents the structure of an argument and argumentative activities such as reasoning, drawing meanings from facts, debates, discussions, and cases (Van Gelder, 2009). Argumentation maps can be useful to give

a general view of issues, statuses, previous arguments, and stakeholders' arguments (Moor, Park, & Croitoru, 2009).

Argument mapping copes with informal or inductive logics that people have in routine processes (Ostwald, 2005). A professional designer can enhance his clarity, information, public speaking powers and sensible evaluations through making an argument mapping (Van Gelder, 2009).

Students can use argument mapping to learn concepts, figure out the way of mapping arguments and boost their reasoning skill (Van Gelder, 2009). Argument mapping enhances critical thinking skills and cognitive abilities. Argument mapping also visualizes complicated arguments and debates to improve students' thinking process and evaluation (Patterson, 2007).

Argument mapping has also crucial applications in different areas. Horn (2000) holds that the mapping technique can also facilitate education. It supplies methodological and procedural tools as well as reliable maps in real and important areas. According to a number of philosophers, argumentation maps can be utilized to diagram several major debates in the study of consciousness by neurobiologists, psychologists, and philosophers, in the area of ethics, political philosophy, public policy issues, and topics related to the philosophy of biology. According to Van Gelder (2009), over the past years, argument mapping has appeared as a useful tool in academic, education and workplaces, policy, and team-work online mapping. Moor, Park and Croitoru (2009) believe that they can also be used to visually examine the results of difficult argument structures, argument processes, and public debates.

Using argument mapping with clear structure enhances critical thinking skills (Twardy, 2003). Argument mapping is a powerful tool to improve critical thinking skill, decision making, communication skill, and assessment of complicated debates (Van Gelder, 2009). Still another application of argument maps is that since arguments can include group efforts, cooperation, and decision making, argumentation maps may supply visual representation of debates such as urban planning; hence, they show clear links between arguments and geographic objects they refer to (Rinner, 2006).

In addition, argument mapping shows manipulation on humankind's cognitive history; it even offers extensive changes in informal reasoning and argumentation via computer-supported argument mapping (Van Gelder, 2009).

Several studies have investigated the effectiveness of argument mapping on humanities such as philosophical debates, legal studies, critical thinking skills, financial accounting, and marketing and society (Davies, 2011; Davies, Carrington, Chen, Kaur, & Neville, 2011; Horn, 2000; Patterson, 2007), but the effect of this technique on vocabulary learning has rarely been studied.

A study conducted by Szpektor and Dagan (2009) investigated a new framework for improving Word Net-based inferences over predicates with the use of argument mapping. Word Net is a helpful tool for lexical inference. Szpektor and Dagan suggest a real Argument-mapped Word Net (AmWN) to represent argument mappings for inferential relations and Word Net's relations (such as verb-noun, verb-verb entailment and cause). To combine manual and corpus-based information, the

mappings were populated. A test set was prepared based on IE bench mark. After testing Word Net and AmWN, the results indicated that AmWN enhances Word Net-based inference recall.

2.7. Concept Mapping

Novak and Canas (2008) define concept mapping as a graphical tool for knowledge organization and presentation. Pishghadam and Ghanaizadeh (2006) hold that in creating concept maps, concepts, words or phrases as nodes are placed in boxes. Links are presented to connect structures between nodes. Labels or arrows represent these links. A fixed link also connects two concepts or propositions. Novak and Canas (2006) believe that concept maps are composed of linking words with lines that indicate important and useful relationships, statements, and propositions; concept mapping shows one or more than one word for one concept within a node or box.

Concept maps are organized in such a manner that concepts are shown within boxes and are connected by fixed relationships; two related concepts construct a statement or meaning unit. The hierarchical organization of the structure of concept maps helps general concepts be placed at higher levels and specific concepts be located at lower levels. It is interesting to know that a concept map by itself does not have meaning; rather, two related concepts with fixed words or connecting phrases can supply an important statement or meaning unit (Villalon & Calvo, 2011).

Novak and Canas (2008) refer to three important characteristics of concept maps. First, concept maps have hierarchical or organizational structure between words,

concepts, well-chosen linking words, and suitable propositions. Crucial concept maps usually include 15 to 25 concepts that are used for the selected domain. The most inclusive and general concepts are put at the higher levels of the map whereas more specific details are arranged at the lower levels of the hierarchical structure. Each concept map is represented for a specific area of knowledge and the hierarchical structure of the concept map is dependent on the context in which that knowledge is being applied. The second feature of a good concept map is context. Contexts identify the hierarchical structure of the concept map; so identifying a part of a text, a laboratory or field activity and particular problem or question can create a good context. A focus question is the best factor to construct a good context because its reference deals with some particular questions to answer or a problem the concept map seeks to solve. Third, cross-links are significant features of concept maps. Cross-links can be defined as relationships or links between concepts in various parts of the concept map. Cross-links indicate how a concept in a specific domain of knowledge is represented in the form of a map and how it is associated with another concept in another part of the map. In a good concept map, the hierarchical structure specifies new cross-links.

Brussow and Wilkinson (2007) hold that concept mappings have various advantages in teaching, learning and assessment practices in higher education. According to Novak and Canas (2008), one of the most important advantages of concept mapping is the facilitation of assessment procedures. Using concept mapping, evaluators may assess learning more effectively.

Novak and Canas (2008) believe that a good concept map can establish an effective relationship between the most general inclusive concepts at the top of the map and the most specific details at the end of the map. Therefore, in curriculum or course planning, macro-maps and micro-maps are constructed. A macro-map indicates major ideas or concepts in the curriculum planning, whereas a micro-map shows the most specific instructional parts of the program. Using concept mapping helps students learn materials and researchers generate new knowledge. Concept mapping makes administrators construct structures easily and help manage organizations. At the same time, concept mapping may make reflection slower on changed and unnoticed actions (Kinchin, Cabot, & Hay, 2008).

Concept mappings have applications in various domains. According to Novak and Canas (2008), instruction, evaluation and national achievement tests can utilize concept maps as a powerful evaluation tool. Another useful application of concept maps is in curriculum or course planning. Concept maps include teaching crucial concepts, and the hierarchical structure of concept maps helps represent instructional materials.

Concept mapping is an effective technique in science education, but the informal application of relations and names make concept mapping seem informal and lead to ambiguity. To develop concept mapping, a new approach is required, which is referred to as refined concept mapping, and is a developmental tool over traditional concept mapping (Kharatmal & Nagarjuna, 2010).

Concept mapping is applied as a cognitive mental image or learning activity through envisaging perceptual comprehension at various levels of the learning process. Concept mapping can also be used as a tool for developing cognitive and meta-cognitive skills in reading and writing assignments (Villalon & Calvo, 2011).

A number of studies have been conducted to investigate the effectiveness of concept mapping. In a study by Sutherland and Katz (2005), a methodological approach for organizational learning was developed through concept mapping. With regard to psychological and sociological foundations of concept mapping, using concept maps can be useful for comprehending sophisticated systems in intra- and inter-personal relationships at the same time. Their study identified conceptual comprehension of students' interest in using input from both teacher and student groups. The participants of the study included two separate stakeholders (students and teachers' groups) from two MSIP (Manitoba School Improvement Program) secondary schools. MSIP is a non-governmental agency with 10 years experience in Canada. Teachers with various grade levels and course proficiency and students in grades 10 and 12 were used as the participants of the study. Using MSIP, Sutherland and Katz investigated the usefulness of concept mapping teaching as a transformative method to build a definition of students' engagement. Students' engagement is always a crucial aim of school improvement. MSIP supplied a ready-made context with which concept mapping was utilized. They used concept mapping in two ways: one was that using concept mapping related to students' learning and course plan. The other was the application of concept mapping associated to the evaluation of the

program and planning. To draw a basic concept mapping, the participants of each group had to create their own statements of students' engagement definitions; afterwards, they brainstormed their ideas. Two stakeholders used concept mapping as a process of organizing general ideas and concepts to evaluate the argument. Teaching concept mapping extended the understanding of the framework to apply for future program planning and evaluation. Concept mapping was shown to be a transformer process that brought different ideas, values and views of stakeholders together to form concepts and to clarify sophisticated structures.

In another study, Pishghadam and Ghanaizadeh (2006) investigated the impact of concept mapping as a prewriting activity on EFL learners' writing ability. They examined the role of concept mapping as a facilitator to help EFL students organize and create ideas in writing. The participants of the study included 20 female students at high proficiency level. They were randomly divided into two groups, namely experimental group and control group. The experimental group used concept mapping technique as a prewriting activity for writing tasks, whereas the control group did not use concept mapping during the prewriting stage. Based on predetermined criteria, two raters compared the results of scores of pre-tests and post-tests for the two groups. The results of study indicated that using the concept mapping technique in the experimental group as a prewriting activity improved learners' writing ability, quantity and quality of creating, organizing and associating ideas. Moreover, concept maps created a graphical outline for the paper and specified

gaps in the material to stimulate questioning and critical thinking. They helped decide inappropriate ideas to control the topic.

In line with these studies, Novak and Canas (2006) examined the ability of first and second grade children to learn fundamental science concepts through concept mapping. Concept mapping describes clear changes in children's conceptual understanding. Novak and Canas developed the application of concept mapping to other areas such as knowledge elicitation and combination of concept mapping with the World Wide Web (WWW), thus extending the potential benefits of concept mapping. This led to the Cmap Tools used in universities, grammatical agencies, schools, and corporations. Integrating concept mapping with software programs and new technologies supplied a new concept mapping. This new form of concept mapping dealt with the learning environment, helped students construct their own knowledge domain, and provided valuable learning. Findings indicated that developing concept mapping tool was due to two reasons: one reason was to show children's perceptual understanding. The other reason was to observe clear changes in the concept and propositional structures that built those comprehensions. So, concept mapping is useful for both education and human activity.

A number of studies have also examined the usefulness of concept mapping in assessment. In a study, Brussow and Wilkinson (2007) examined concept mapping as an assessment tool and a creative learning technique. The examination lasted over two years. The study started with the description of the structure of learning, the notion and role of concept mapping in teaching, learning, teamwork learning, and

conceptual change. A two-cycle action research procedure was used as the experimental design of their study so that cycle one was considered as the examination stage to collect data carefully and to have impact on cycle two. This two-fold design encompassed both quantitative experimental study with descriptive parts and qualitative examination strategies. Initially, a quantitative examination including test and exam scores examined the usefulness of concept mapping and then a qualitative investigation (questionnaire) was used. The qualitative phase investigated learners' perceptions and understandings on the efficacy of concept mapping. Quantitative and descriptive results indicated that concept mapping is an effective tool to high achievement and perceptual development. Furthermore, learners showed positive beliefs toward concept mapping. Since the concept mapping technique facilitated achievement and developed the principle of assessment for learning, the findings verified the application of concept mapping as a creative learning and assessment strategy.

In another study, Ritchhart, Turner and Hadar (2008) investigated concept maps as measurement tools to explore students' conceptions about the thinking process. The study included 239 students (39% girls and 61 % boys) from an Australian school. The students created concept maps as part of their routine classrooms and under the direction of their teachers. To examine concept maps, the concept map was purified at the allocated time through a prompt to support students' responses in different ways including Associative Responses, Emotional Responses, Strategic Responses, and Meta Responses. Ritchhart, Turner and Hadar utilized two ways to analyse

students' maps. The results of study revealed that through concept maps, students' comprehension of thinking improved with age and classroom culture.

2.8. Mind Mapping

Mind mapping is a new technique developed by learning researchers in 1960s. Tony Buzan, writer of 'improving mental skills and enhancing memory and learning', is the initiator of mind mapping (Murley, 2007). Jelger and Haefeli (2007) define mind map as a diagram to indicate associated ideas, words, and tasks. Monet, Bennett and Rolheiser (2001) hold that mind mapping as an analytical process of information can be generated by creative combinations of pictorial, colours, words, codes, and connectors. According to Douma, Ligierko and Romano (2009), mind mapping is a productive way to the visual presentation of complex issues and graphical teaching of difficult topics.

Users may utilize mind maps to remember information. They draw mind maps using a big picture with the main topic in the centre and its subtopics around the main topic. The radiators of the main or central topic make the subtopic close to it as well as sub-subtopics close to the main topic. Mind mapping indicates cohesive connections and new information. Clarity and cohesive relations among outline make the mind map more effective and comprehensible (Murley, 2007).

With respect to the above definition and characteristics of mind mapping, mind maps have also potential benefits over traditional designs and presentations (Murley,

2007). Douma, Ligierko and Romano (2009) believe that traditional or manual mind maps on paper allow high customization.

Mind mapping is a space saving tool which helps a large bulk of information compress into a single page (Wolff, 2004). Mind mapping is also a motivating method for students to summarize complex information and organize ideas visually. It helps students' understandings of what they study through visualizations and colours (Monet, Bennett, & Rolheiser, 2001). It is evident that mind maps include different colours and pictorial images to show different topics in order to facilitate memory power and recall (Wolff, 2004). To develop memory retention, mind mapping represents associated ideas and connections using images, symbols, and colours. Mind maps make the pictorial indication of ideas visible in a relational context (Murley, 2007).

Mind maps can be a useful tool in teaching presentations and to make one's presentation understandable to audiences. An explicit mind map always makes presentations and contexts accessible so that students can refer to it whenever it is possible (Murley, 2007).

Moreover, since mind mapping is an organic and flexible method, users can put new ideas in any direction and draw lines to connect each section. Thus, mind maps are used for brainstorming when the user is presented with a lot of details (Wolff, 2004). Since mind maps are flexible and understandable, they enhance creativity, organization, productivity and memory (Murley, 2007). Mind mapping can also be

used to create structure visually or categorize ideas graphically, and facilitate problem solving (Wolff, 2004).

Mind maps have also important applications. According to Wolff (2004), Buzan believes that normal methods of note taking and recording ideas cannot meet students' needs in sophisticated information, whereas mind maps record information in such a manner that they show the hierarchical structure of brain with which it is much easier to memorize and recall items. Douma, Ligierko, and Romano (2009) hold that mind maps help students take notes in class, review information for the exams, and organize difficult research.

The applications of mind maps can range from note taking, brainstorming, studying before an exam, creating hierarchical and cohesive relations between ideas as well as collecting and indicating individual's arguments when involved in academic controversy (Monet, Bennett, & Rolheisr, 2001). Since mind maps can be used in brainstorming, these brainstorming can encompass lists of networks, contacts for researching options, evidence of your abilities, preparing the structure of a CV, application forms, and preparing ideas and answers for interviews (Wolff, 2004). Mind maps help gather sets of ideas and create good brainstorming. They present the brainstorming in a large picture using links to connect ideas. In this case, mind mapping software can be a helpful source to represent brainstorming (Murley, 2007). It is worth noting that mind mapping arranges the hierarchical structure of information; hence, mind mapping can be used in various tasks such as

brainstorming, note taking, document drafting, and project planning (Beel & Langer, 2011). Mind maps are also useful tools in management (Murley, 2007).

Another application of mind maps is to provide various learning styles with which learners gain information better through diagrams and visual forms than through written text. Mind maps can activate the right hemisphere of students who cannot distinguish and identify the details of the context to supply crucial ideas (Jacobson, 2004).

One of the applications of mind mapping is the broad use in research and writing process. To integrate sophisticated information from large sources into a single document, mind mapping is required to present a big picture containing main topics and sub-topics of articles, briefs and reports. Since researching and writing last for weeks and may distract writers, mind mapping is a powerful tool to retrieve and organize information into a coherent document (Murley, 2007).

Two other effective applications of mind maps are career planning and job hunting (Wolff, 2004). Mind mapping can also help law librarians take concepts to organize and envisage complex information (Murley, 2007).

Web-based technologies such as on line mind maps are used to facilitate distance and on- line education. On-line mind maps and concept maps involve various domains ranging from distance education, cultural challenges, global economy and factors influencing climate change (Douma, Ligierko, & Romano, 2009).

Although a number of studies have been conducted to investigate the usefulness of mind mapping in various areas, the effect of this technique on vocabulary learning has rarely been studied. Beel, Gipp and Olaf Stiller (2009) conducted a study in the field of mind mapping. They believe that mind maps are helpful tools in planning and monitoring research papers. Their study offered just an outline of ideas and keywords retrieved from mind map to improve academic search engines. Keyword-based search is a branch of academic search engines with which the user enters keywords to find all the documents that include the keywords. The keywords may be extracted from a mind map to improve academic search engines. Academic search engines use these keywords to increase the categorization of articles. Beel, Gipp and Olaf Stiller compared this idea with typical excerpts and found that mind mapping had weak data availability and data strength but high timelines.

To conclude, there have been massive studies to investigate various aspects of vocabulary and vocabulary learning strategies. With respect to the afore-mentioned studies, several studies have been separately conducted on the effects of the selected presentation techniques. However, there is a paucity of research on the comparison of the effects of these techniques together on L2 vocabulary comprehension and production. Therefore, there exists a gap here, and to bridge this gap, the present study seeks to investigate the effects of selected mnemonic strategies involving the keyword method, the peg word method and the loci method as well as mapping techniques consisting of argument mapping, concept mapping and mind mapping as visual instructional tools on L2 vocabulary comprehension and production.

Chapter Three: Empirical Analysis

3.1. Introduction

The present study aimed to investigate the effects of the selected presentation techniques (the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping) on L2 vocabulary comprehension and production. This chapter reports the methodology of this study. It encompasses a full description of the participants, materials and instruments as well as procedures applied for data collection and analysis.

3.2. Participants

The participants of the present study were 151 Iranian female students from a public pre-university school in Chahar dange, Islam shahr. They were in the pre-intermediate level of language proficiency. The students were assigned to six groups and each group received one of the selected presentation techniques randomly. Group A (n=20), group B (n=23), group C (n=22), group D (n=28), group E (n=30) and group F (n=28) received the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping techniques, respectively.

3.3. Materials and Instruments

The materials and data collection instruments used in this study were as follows:

3.3.1. Pre-test

A pre-test including 30 items in multiple choice format was utilized to homogenize the participants as well as to determine their language proficiency level. To this end, a standard language proficiency test (KET or Key English Test) was administered (See Appendix A).

3.3.2. Word Knowledge Pre-test

One of the materials in the present study was a Pocket Persian-English Dictionary edited by Emami (2005). This dictionary was developed and compiled in the Research Unit of Farhang Moaser. Since all vocabulary items had to be the same and appropriate for the afore-mentioned techniques, this dictionary was used to select 180 vocabulary items for presentation in the instructional treatment sessions. Most of the chosen words were concrete and a few were abstract (See Appendix C). The target words were contextualized in sentences to form a word knowledge pre-test. Oxford dictionary and teacher-made sentences were used to get samples of the sentences containing these words.

So, the word knowledge pre-test (a checklist) used in the study included 180 vocabulary items chosen from the Pocket Persian-English Dictionary contextualized

in 130 sentences. The target words were bolded and underlined in each sentence and the students were asked to write the meaning of the words in Persian. The aim of this test was to elicit unknown words for the two post-tests in question and to make sure that the students did not have knowledge of them in advance (See Appendix B).

3.3.3. Post-tests

At the end of the experimental period, two post-tests were used in two formats:

- The multiple choice format test including 30 items was utilized as a vocabulary comprehension post-test to assess the effects of the selected presentation techniques on vocabulary comprehension (See Appendix D).
- 30 items in the fill-in-the-blank format were used as a vocabulary production post-test to measure the effects of the selected presentation techniques on vocabulary production (See Appendix E).

3.4. Procedures

Initially, 199 students with the above-mentioned characteristics participated in the present study. Before introducing the instructional treatment, a standard 30-minutes pre-test (a KET test) including 30 items in multiple choice format was administered to homogenize the participants and to determine their language proficiency level. The mean and standard deviation of the scores were computed. Those participants whose score was more than one standard deviation above or below the mean were excluded

from all the subsequent analyses. The results of the pre-test revealed that 151 students were homogenous; they constituted the participants of the study. They were in the pre-intermediate level of language proficiency.

After making sure that the students were homogenous, the word knowledge pre-test (checklist) was administered to ensure that the students had no prior knowledge of the target words. The checklist involved 180 bolded and underlined vocabulary items which were contextualized in 130 sentences. The words were chosen from the Pocket Persian-English Dictionary. Most of the sentences were selected from Oxford dictionary and some were teacher-made. The time allocated for the pre-test was 40 minutes. As a result of this test, of the total of 180 vocabulary items, 60 words were eliminated from the two post-tests because they were familiar for the participants. The remaining 120 unknown words were selected for inclusion in the post-tests of the study.

Subsequently, the students were assigned to six groups and each group was randomly assigned to one of the treatment conditions. In the first session, a full explanation of the selected techniques (the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping) was presented to each group of participants. The instructional treatment lasted for 9 sessions, and one more session was allocated to administering the post-tests. Learning sessions were held twice a week; each session lasting 45 minutes. The words were divided into nine successive lists of 20 words. Every session, 20 new words were taught according to the selected technique to each group and a brief review regarding

the respective technique was given to improve the quality of the learning treatment. Each group of students were required to work on new words at home and bring back their works to the class and ask their questions. The teacher's job was to correct students' errors. Here is a description of the appointed techniques:

The Keyword Method

The keyword mnemonic method is used to enhance vocabulary learning in two stages. In the first stage, it creates an acoustic similarity through associations between the foreign word (L2) and L1 keyword; in the second stage, it generates an imaginary link via the visualization of the L1 keyword interacting with the L1 translation or definition of the foreign word (Atkinson & Raugh, 1974; Griffith, 1980).

The first session included familiarizing this group with the experiment and giving a full explanation of the keyword method procedures. Each session, the students were presented with 20 new words. The teacher provided associated Persian keywords, gave useful examples of the keyword method stages and made memorable mental images of the Persian keyword to the Persian definition of the English word. The students used the supplied keywords or created their own keywords and mental images.

The Peg word Method

The members of this group received clear description of the peg word mnemonic method. This technique can be used for all ages and any proficiency levels. In the

first session, the teacher presented a list of appropriate peg words for the experiment. The selections of peg words (rhyming words) were based on the meaning of the new words and the ability to make memorable images. The selected peg words were a set of concrete words that were arranged in numerical order from 1-10 twice. The students utilized the peg words provided or generated their own rhyming words and images. They were asked to keep the peg words for each session.

Every session, they divided 20 words into two sets. The first set included 1-10 new words and the second set also involved 1-10 vocabulary items. The students were required to learn each set of words through making associations between the new word and its respective peg word and then to create mental images of the new word. To this end, the teacher gave helpful examples of the main process. To ensure that the students learned new words, they were asked to write the procedure of the peg word method for new words at home and bring it back for correction for the next session.

The Loci Method

The loci method is a mnemonic technique to enhance vocabulary learning. Students received instruction about the loci method technique and how to recite and retrieve words using this mnemonic strategy. In each session, 20 new words were divided into two 10-word sets. Students created a set of clear mental locations for new words. They were required to write those places beside the two sets of words

that were arranged from the items 1-10 twice. They were asked to visualize the respective word to its applicable location. The teacher used various examples using abstract and concrete words to help students.

Argument Mapping

Argument mappings are the visualization formats for the logical structures of arguments (Ostwald, 2005). An argument map illustrates the structure of an argument or issue. It looks like an upside-down tree (Conlon & Gregory, 2007). Argument maps are the pictorial representation of argument structures. They are defined as the semantic networks of argument nodes connected by meaningful relations. The semantic network structure is useful to create dependencies between map nodes and answer parts (Moor, Park, & Croitoru, 2009).

The argument mapping technique was explained to the participants of this group. 20 words were given to the participants each session. It was the students' responsibility to create logical statements and reasonable claims using new words. These statements could be their personal views or specific topics. The students drew boxes that included claims, opinions or arguments following a series of reasons to accept or reject them. These boxes were connected by lines which showed the hierarchical structure of their argument maps. Next, they put the most crucial claim at the top of the map and presented a set of reasons to support or reject the claim**.**

Concept Mapping

Concept maps involve concepts within circles or boxes. These concepts are connected by links which show their cohesive relationships. Linking words or linking phrases are the words on the line which specify the associations between the two concepts (Novak & Canas, 2008).

The concept mapping group received the same words each session. The aim was to organize and create cohesive relationships between all words and memorize them effectively. When a new word was presented to the participants, they placed the new word in a circle or box at the top of the map. Next, they utilized words in previous word lists that were in the category of the new word. For example, this category could be concrete words such as the name of birds, food, places, objects, wild animals or abstract nouns. The participants used arrows to connect two words. These arrows were presented to generate links or cohesive structures within a concept map. Using new words, the teacher gave useful examples in creating concept maps. The students were asked to follow the above-mentioned procedure and bring back their concept maps for correction.

Mind Mapping

Mind mapping is the creative and productive way of recording ideas, concepts and complex information (Wolff, 2004).

The mind mapping technique was instructed to the participants. To encourage students to utilize mind mapping, the teacher explained some of the advantages of this new innovative technique such as note taking, brain storming, studying before an exam and research papers. They wrote the main word in the centre; afterwards, they drew thick branches that contained crucial ideas or topics. The thick branches were divided into thin branches with subtopics.

It was necessary to check the reliability of the two post-tests before administering the post-tests in question. The reliability of the two post-tests was estimated using the KR-21 formula. The reliability indices of the vocabulary comprehension post-test and the vocabulary production post-test turned out to be .56 and .66, respectively.

At the end of the experimental period, the two post-tests were administered to examine the effects of the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping on L2 vocabulary comprehension and production.

A 30-item multiple choice vocabulary comprehension post-test was administered to measure the effects of the above-mentioned techniques on vocabulary comprehension. The time limit for the test was 40 minutes.

To assess vocabulary production, the fill-in-the-blank format test comprising 30 items was administered to investigate the effects of the same techniques on vocabulary production. In this test, the first letter of the word was given to facilitate the production of the target words and to prevent the participants from using the

possible synonyms of the target words. The allocated time for this test was 40 minutes.

3.5. Data Analysis

Two separate one-way ANOVA procedures were utilized to analyse the obtained data and to answer the proposed research questions. One examined the effects of the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping on vocabulary comprehension, and the other one investigated the effects of the same techniques on vocabulary production.

Chapter Four: Results and Discussion

4.1. Introduction

This study attempts to investigate the differences in the effectiveness of six selected presentation techniques involving the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping on enhancing L2 vocabulary comprehension and production. The two proposed research questions in chapter one and the quantitative results of the participants' performance on vocabulary comprehension and production post-tests are discussed in this chapter. Furthermore, tables and figures are also used to display the results of statistical analyses.

4.2. Investigation of the first research question

The first research question aimed to investigate the effects of the selected presentation techniques on L2 vocabulary comprehension. To this end, a one-way ANOVA procedure was used. Table 4.1 contains the descriptive statistics on vocabulary comprehension.

Table 4.1: *Descriptive Statistics for the ANOVA on Vocabulary Comprehension*

Groups	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Keyword	20	19.40	3.18	17.90	20.89
Peg word	23	21.95	3.18	20.57	23.33
Concept mapping	30	17.90	3.55	16.57	19.22
Loci method	22	20.86	2.67	19.67	22.05
Argument mapping	28	15.64	3.88	14.13	17.15
Mind mapping	28	18.07	3.53	16.69	19.44
Total	151	18.76	3.93	18.12	19.39

As it is shown in Table 4.1, the peg word method group has the highest mean ($\bar{x}$= 21.95), followed closely by the loci method group ($\bar{x}$= 20.86), the keyword method group ($\bar{x}$= 19.40), the mind mapping group ($\bar{x}$= 18.07) and the concept mapping group ($\bar{x}$= 17.90). The participants of argument mapping technique have the lowest mean ($\bar{x}$= 15.64).

In order to see whether the observed mean differences among the selected groups are statistically significant, the one-way ANOVA procedure was used. Table 4.2 shows the results of the ANOVA procedure.

Table 4.2: *The Results of the ANOVA on Vocabulary Comprehension*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	648.08	5	129.617	11.192	.000
Within Groups	1679.33	145	11.582		
Total	2327.41	150			

Based on Table 4.2, the observed F value and the significance level (F= 11.192, P < 0.05) show that there are statistically significant differences among the six groups. So, the first null hypothesis is rejected. To locate the differences between the means, the post-Hoc Scheffe test was utilized. The results are given in Table 4.3.

Table 4.3: *Post-Hoc Multiple Comparisons of Means for Vocabulary Comprehension*

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Keyword method	Peg word	-2.55	1.04	.309	-6.06	.95
	Concept mapping	1.50	.98	.801	-1.81	4.81
	Loci method	-1.46	1.05	.857	-5.01	2.08
	Argument mapping	3.75*	.99	.018	.39	7.11
	Mind mapping	1.32	.99	.878	-2.03	4.69
Peg word	Concept mapping	4.05*	.94	.004	.87	7.23
	Loci method	1.09	1.01	.948	-2.33	4.51
	Argument mapping	6.31*	.95	.000	3.08	9.54
	Mind mapping	3.88*	.95	.008	.65	7.11
Concept mapping	Loci method	-2.96	.95	.094	-6.18	.25
	Argument mapping	2.25	.89	.278	-.75	5.27
	Mind mapping	-.17	.89	1.000	-3.18	2.84
Loci method	Argument mapping	5.22*	.96	.000	1.94	8.49
	Mind mapping	2.79	.96	.148	-.47	6.06
Argument mapping	Mind mapping	-2.42	.90	.218	-5.49	.64

*. The mean difference is significant at the 0.05 level.

As it can be seen in Table 4.3, the difference between the keyword method group and the argument mapping group is statistically significant, indicating that the keyword method group performed better than the argument mapping group. Similarly, the mean differences between the peg word method group and the concept mapping group, the peg word method group and the argument mapping group and finally the peg word method group and the mind mapping group are statistically

significant, suggesting that the participants of the peg word method group have outperformed their counterparts in the other three groups.

In addition, the difference between the peg word method group and the loci method group is statistically insignificant. Furthermore, although there is a difference between the means of the concept mapping group and the loci method group, the difference is statistically insignificant. Although the loci group performed better than the concept mapping group, there is only a trend towards a meaningful difference. Based on the obtained results, there are no statistically significant differences between the concept mapping and the mind mapping groups. The implication is that the participants' performance was more or less similar.

The results further indicate that the difference between the means of the loci method group and the argument mapping group is significant. The loci method group outperformed their counterparts who received argument mapping.

As it can be observed in Table 4.3, the differences among the effects of other techniques are statistically insignificant, indicating that the participants' performance in those groups was similar on the vocabulary comprehension test.

Figure 4.1 graphically represents the effects of the six techniques on vocabulary comprehension more conspicuously.

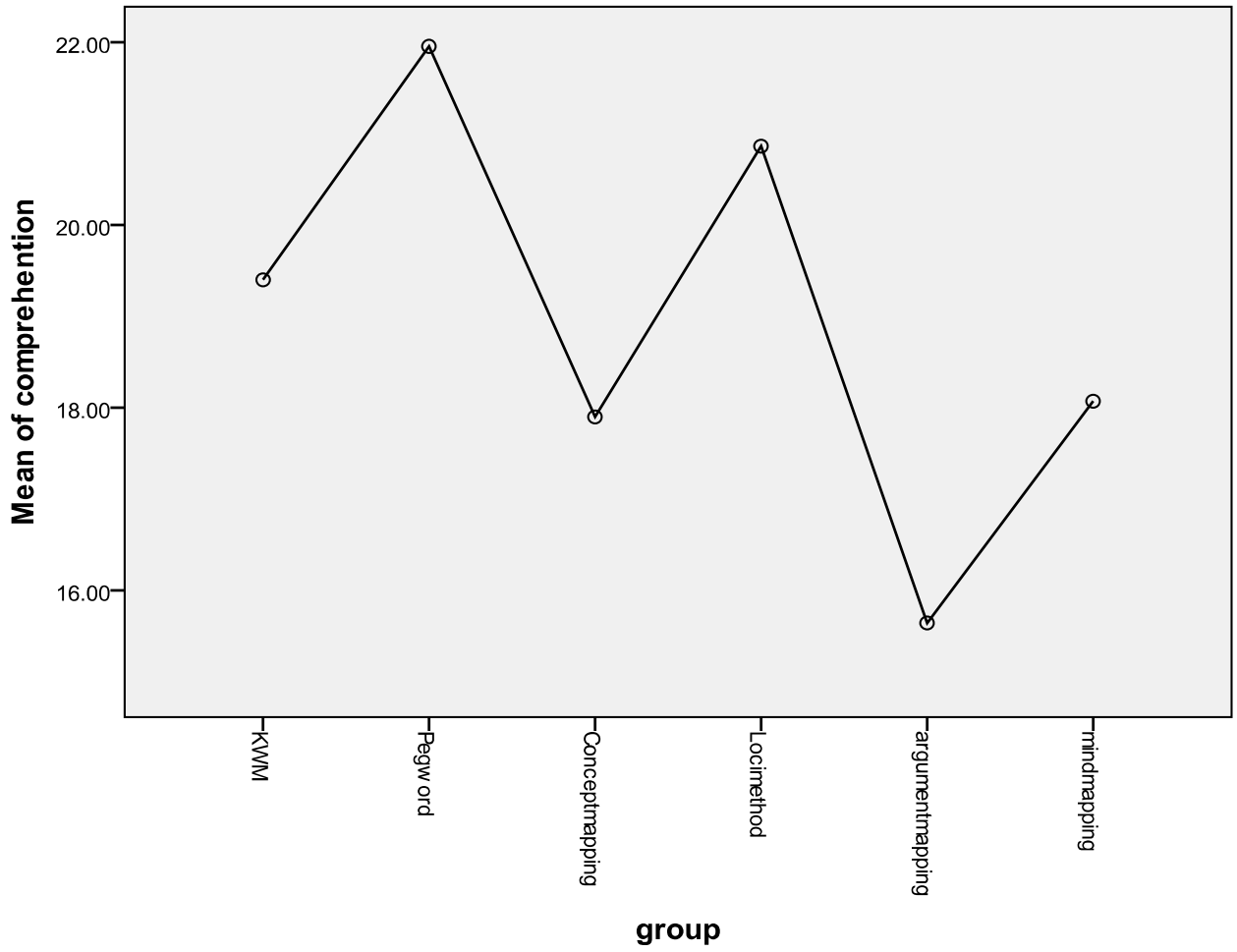


Figure 4.1 *Performance of the Participants on the Vocabulary Comprehension Test*

4.3. Investigation of the second research question

The second research question aimed to investigate the effects of the selected presentation techniques on L2 vocabulary production. To this end, another one-way ANOVA procedure was used. Table 4.4 displays the descriptive statistics on vocabulary production.

Table 4.4: *Descriptive Statistics for the ANOVA on Vocabulary Production*

Groups	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
Key word	20	16.60	2.74	15.31	17.88
Peg word	23	20.65	3.54	19.11	22.18
Concept mapping	30	12.86	2.50	11.93	13.80
Loci method	22	20.22	3.90	18.49	21.95
Argument mapping	28	19.32	3.99	17.77	20.86
Mind mapping	28	16.64	3.87	15.14	18.14
Total	151	17.51	4.41	16.80	18.22

Based on the above results, it can be observed that the peg word method group has the highest mean ($\bar{x}$= 20.65), followed closely by the loci method group ($\bar{x}$= 20.22), the argument mapping group ($\bar{x}$= 19.32), the mind mapping group ($\bar{x}$= 16.64) and the keyword method group ($\bar{x}$= 16.60). It can be seen that the concept mapping group has the lowest mean ($\bar{x}$= 12.86) in comparison with other groups.

In order to see whether or not the observed mean differences among the groups are statistically significant, another one-way ANOVA was used. Table 4.5 presents the results of the ANOVA procedure.

Table 4.5: *The Results of the ANOVA on Vocabulary Production*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1165.82	5	233.16	19.25	.000
Within Groups	1755.88	145	12.11		
Total	2921.70	150			

As it can be seen in Table 4.5, the observed F value and the significance level (F=19.25, P < .05) are indicative of statistically significant differences among the

effects of the six techniques. Thus, the second null hypothesis is also rejected. Another Post-Hoc Sheffee test was used to locate the differences among the groups. Table 4.6 summarizes the results of the post-hoc comparisons.

Table 4.6: *Post-Hoc Multiple Comparisons of Means for Vocabulary Production*

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Keyword	Peg word	-4.05*	1.06	.016	-7.64	-.46
	Concept mapping	3.73*	1.00	.020	.3441	7.12
	Loci method	-3.62	1.07	.050	-7.25	.00
	Argument mapping	-2.72	1.01	.218	-6.15	.71
	Mind mapping	-.04	1.01	1.000	-3.48	3.39
Peg word	Concept mapping	7.78*	.96	.000	4.53	11.03
	Loci method	.42	1.03	.999	-3.07	3.92
	Argument mapping	1.33	.97	.869	-1.97	4.63
	Mind mapping	4.00*	.97	.007	.70	7.31
Concept mapping	Loci method	-7.36*	.97	.000	-10.65	-4.06
	Argument mapping	-6.45*	.91	.000	-9.53	-3.36
	Mind mapping	-3.77*	.91	.006	-6.86	-.69
Loci method	Argument mapping	.905	.991	.974	-2.43	4.25
	Mind mapping	3.58*	.99	.027	.23	6.92
Argument mapping	Mind mapping	2.67	.93	.148	-.45	5.81

*. The mean difference is significant at the 0.05 level.

Based on Table 4.6, there are statistically significant differences between the keyword method group and the peg word method group. It can be concluded that the peg word group performed better than the keyword group. Similarly, the difference between the keyword group and the concept mapping group is statistically significant with the keyword group outperforming the concept mapping group. In addition, the results also revealed that the difference between the keyword group and the loci method group is statistically significant, indicating that the loci group functioned

better than the keyword group. It is worth noting that there are no statistically significant differences between the keyword method group and the mind mapping group as well as between the keyword method group and the argument mapping group. The implication is that the participants performed similarly.

Moreover, the results show that the mean differences between the peg word group and the concept mapping group as well as the peg word group and the mind mapping group are statistically significant. The participants of the peg word method performed better than their counterparts who received concept mapping and mind mapping techniques. A close look at Table 4.6 shows that although there is a difference between the means of the peg word group and the loci group, the difference is statistically insignificant. Meanwhile, the mean differences between the concept mapping group and the loci, argument mapping and mind mapping groups are statistically meaningful. It may be concluded that the concept mapping is less effective than the loci method, argument mapping and mind mapping techniques.

Likewise, the difference between the loci method group and the mind mapping group is statistically significant, indicating that the loci group performed better than the mind mapping group. The observed mean differences among the effects of other techniques are statistically insignificant. The following graphical representation shows the effects of the six techniques more clearly.

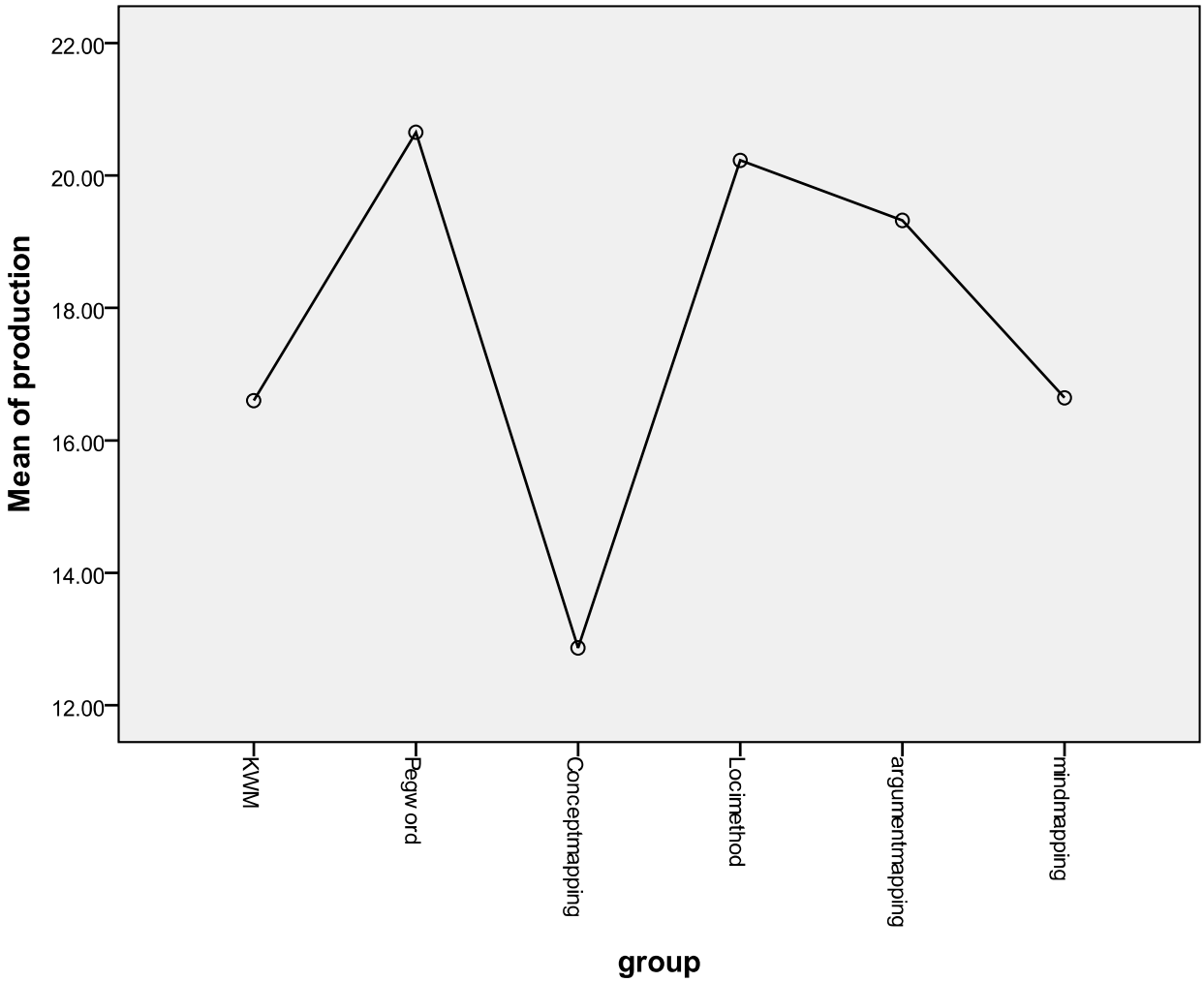


Figure 4.2 *Performance of the Participants on the Vocabulary Production Test*

4.4. Discussion

The present study attempted to investigate the differences among the effects of the selected presentation techniques involving the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping on L2 vocabulary comprehension and production. The findings of this study demonstrate

that the mean differences among the groups are statistically significant on both vocabulary comprehension and production tests.

Based on the findings of the present study, the peg word method group has the highest mean among all groups on both vocabulary comprehension and production tests. The loci method group has the second highest mean on both tests. This indicates that the peg word method and the loci method groups functioned better than the keyword mnemonic and mapping techniques including argument mapping, concept mapping and mind mapping on L2 vocabulary comprehension and production. It may be concluded that the peg word method and the loci method help students boost their vocabulary comprehension and production. The obtained results also indicate that the differences between the means of the peg word method group and the loci method group are not statistically significant on both tests. The implication is that the performance of the participants in both groups was similar on vocabulary comprehension and production although the peg word method group were a bit higher than the participants who received the loci method.

The findings of Bower and Reitman (1972), similar to the findings of this study, indicated that the loci group and the peg word group (the progressive elaboration group) had similar effects on learners' recall. Moreover, this finding is in line with the findings of Roediger (1980), who reported that the peg word and the loci method learners had the same recall levels. They recalled more words than the other mnemonic subjects such as the link and imagery conditions. In Roediger's study, the peg word and the loci methods supplied good retrieval cues through rhyme process

and a set of locations, respectively. In addition, the peg word method and the loci method equally enabled the learners to recall words in the correct order of input. However, the peg word learners were more successful at recalling particular numbered items. Unlike the finding of this study, in which the peg word method group performed slightly better than the loci method group on vocabulary comprehension and production, Roediger (1980) found that the participants of the peg word group were a bit poorer than the participants of the loci method on both instant and delayed tests.

This finding is also similar to that of Wang and Thomas (2000), who found that the peg word method and the loci method groups performed similarly. The participants of the peg word method and the loci method did better than those who used traditional or rehearsal technique. The performance of the peg word and the loci learners was the same as adult learners who created their own visual-based strategies.

The findings of the present study show that the keyword method group has the third highest mean after the peg word method and the loci method groups on vocabulary comprehension, but a low mean on vocabulary production test. The keyword method group had a poor performance on both tests. This finding indicates that the peg word method and the loci method groups outperformed the participants who received the keyword method. The keyword method did not help students improve vocabulary comprehension and production.

This finding is in contrast with the results of the study by Richmond, Cummings and Klapp (2008), who found that the keyword mnemonic learners were more

successful than the loci, the peg word and the free study learners. In their study, the keyword mnemonic was the only effective mnemonic strategy to transfer under both specific and general transfer conditions.

Like this study, in which there is no significant difference between the peg word method and the loci method groups on vocabulary comprehension and production, Richmond, Cummings and Klapp (2008) showed that there were no differences between the loci method group, the peg word method group and the free study condition in recognizing the uses of specific and general transfer tasks.

The findings of this study also show that the keyword method is more effective than concept mapping on vocabulary production because the keyword mnemonic group performed better than the participants who received concept mapping. Moreover, the keyword method is more effective than argument mapping on vocabulary comprehension because the performance of the keyword method group was better than the argument mapping group. It is worth noting that the performance of the keyword mnemonic group was slightly better than the mind mapping group on vocabulary comprehension. Conversely, the mind mapping group performed a bit better than the keyword mnemonic group on vocabulary production test.

Based on the obtained results of the present study, the concept mapping group had a low mean on vocabulary comprehension, and the lowest mean among all groups on vocabulary production, suggesting that concept mapping is one of the least effective techniques on L2 vocabulary comprehension and production. Similarly, the mind mapping group had the fourth lowest mean of the six groups on both vocabulary

comprehension and production tests. Thus, mind mapping technique is not very effective on L2 vocabulary comprehension and production. This finding is different from Douma, Ligierko and Romano (2009), who indicated that online mind maps and concept maps are productive instructional tools to draw students' attention and interest, and to teach sophisticated concepts and topics. Concept maps and mind maps facilitate diagramming of complicated issues. These maps help students take notes, study before an exam, and organize sophisticated research.

Based on the findings of the present study, argument mapping and mind mapping are more effective than concept mapping on vocabulary production. This indicates that the participants of argument mapping and mind mapping outperformed their counterparts who received concept mapping.

The findings of the study also indicate that the argument mapping group has the lowest mean among all groups on vocabulary comprehension, but the third highest mean after the peg word method and the loci method groups on vocabulary production. This indicates that argument mapping is one of the least effective techniques on L2 vocabulary comprehension and not very effective on production either. It is worth noting that the argument mapping technique needs higher educational knowledge and must be applied for complex issues.

Horn (2000) believes that since argument mapping is used to diagram the complicated debates, it is an effective tool to indicate sophisticated philosophical debates and to show the status of arguments, how, where, what, and why they have been made. Rinner (2006) also holds that argument maps are useful for discussions

between professionals and community participations, geographic arguments, planning debates, special decision makings, and Geographic Information System (GIS) which gives geographical factors such as spatial and attribute data.

Therefore, it may be concluded that argument mapping should be utilized for higher levels to show the structure of complicated debates. This could explain why it did not turn out to be effective on a lower level of lexical learning.

There are various factors accounting for such findings as well as the differences between the findings of this study and those of other similar studies. One possible reason which may account for such meaningful differences may be partially due to the fact that in the present study, each selected technique was compared with other techniques, whereas other studies have usually compared each of the techniques only with a control group.

The obtained results of this study confirm that the peg word method and the loci method are very effective and successful visual instructional tools to improve L2 vocabulary comprehension and production. One possible reason for this may be due to satisfaction or positive beliefs of the participants for using the peg word and the loci method procedures. It needs to be noted that the effect of the above-mentioned techniques on vocabulary learning may also be largely influenced by the cultural setting.

Another reason may be that the selected mapping techniques including argument mapping, concept mapping and mind mapping require more training time, helpful

examples, and instructions on how to utilize the respective mapping technique in educational settings properly. This accounts for the lower level of achievement of the participants of these groups.

Still another factor is that the participants of the present study were at pre-intermediate proficiency level, whereas the demand of the selected mapping techniques may have been higher than the level of the participants. They usually require participants with higher educational knowledge or proficiency level.

One other factor contributing to the obtained results may have been the participants' familiarity with the implemented techniques. In fact, the selected mapping techniques were not very familiar in our educational system in comparison with other methods. This novelty could have generated either enthusiasm or confusion.

Chapter Five: Conclusion and Implications

5.1. Introduction

In this chapter, the summary of the findings of the present study will be given. Moreover, pedagogical implications of the study, limitations and delimitations as well as suggestions for further research will be supplied.

5.2. Conclusion

The present study sought to investigate the effects of the selected presentation techniques including the keyword method, the peg word method, the loci method, argument mapping, concept mapping and mind mapping on L2 vocabulary comprehension and production. The intent of the two research questions was to examine if there are significant differences among the effects of the afore-mentioned techniques on vocabulary comprehension and production. The results of vocabulary comprehension and production tests revealed that both hypotheses were rejected. So, the implication is that the mean differences among the selected techniques were significantly different on both vocabulary comprehension and production tests.

Based on the obtained results, the peg word group achieved the highest mean among all the groups on both vocabulary comprehension and production tests. The

participants who received the loci method had the second highest mean on both tests. The keyword group had the third highest mean on vocabulary comprehension; they had poor performance on vocabulary production. With respect to the results, the argument mapping group had the lowest mean on vocabulary comprehension. The concept mapping group had a low mean on vocabulary comprehension, and the lowest mean on vocabulary production. The participants who received mind mapping had a better performance in comparison with the concept mapping group on both tests.

From an educational perspective, mnemonic instructional methods such as the peg word method and the loci method are very effective and valuable visual training tools. The results of this study corroborate the viability of mnemonic instructions in different languages and various fields.

The findings of the present study also showed that despite significant advantages of mapping techniques such as argument, concept and mind mappings as successful visual educational tools, they failed to help students to achieve good results in comparison with the other three techniques. Such failure may be partly due to the fact that they are not very common and accepted in our educational system.

5.3. Pedagogical Implications

The findings of this study may have pedagogical implications for teachers and learners.

Teachers should stimulate students' motivation and enthusiasm for various vocabulary learning strategies, with the understanding that there is a need to improve self-taught or learner-centred instruction in the educational system.

Teachers should also familiarize students with the advantages, applications and procedures of visual educational techniques to enhance vocabulary learning and recall. To this end, they can utilize useful concrete examples to indicate the procedures of the respective techniques more explicitly and fan the flame of the enthusiasm for it.

From an educational perspective, the findings of this study may have important implications for both educators and students. It may be beneficial for them to apply visual vocabulary training techniques such as the studied mnemonic methods and mapping techniques to provide a logical understanding of specific contexts, different materials and sophisticated issues or debates.

5.4. Limitations and Delimitations

The present study, like all other studies, had some limitations and delimitations. Care must be exercised in generalizing the results to other contexts because several context-specific factors might have influenced the outcome of this study.

One factor may be the proficiency level of participants. The participants of the present study were at pre-intermediate level. Other participants at other proficiency levels may respond differently to the use of these techniques. This could be

particularly true about elementary level learners who, due to their low proficiency, may prefer more teacher-centred instructional treatments.

Another factor may be attributable to gender differences and students' fields of study at pre-university schools. This study was conducted only with female students. It is worth noting that gender differences and fields of study at school were not taken into consideration as variables in the present study.

Still another possible factor which could have influenced the findings of this study may be the length of the instructional treatment. The treatment lasted only 9 sessions and 45 minutes each session. This was for practical reasons. It could be argued, however, that the effectiveness of some of the techniques might have been influenced partially by their novelty. This implies that the learners might have needed a period of normalization (getting used to) the presentation technique. So, the results might have changed if the study could be continued for a longer period of time.

The number of participants in the present study can be considered as another limitation. Only 151 students participated in this study.

This study was carried out in an EFL context. This may explain part of the differences between the findings of this study and those of other studies carried out mostly in ESL context. Nonetheless, the findings of this study cannot be generalized to ESL contexts.

5.5. Suggestions for further research

The following areas of research are suggested for those who are interested in carrying out further research in the area of vocabulary teaching techniques.

The present study aimed to examine the effects of the selected presentation techniques on L2 vocabulary comprehension and production. Further studies can compare the effects of each selected technique with other techniques not investigated here. Further studies can also be conducted on other mnemonic strategies and different mapping techniques.

This study was performed with a relatively small sample of participants. Further research can investigate the effects of the same techniques with larger samples.

Moreover, the present study was conducted on pre-intermediate females. So, further studies can examine the effect of the same techniques on different genders (male or male and female) and upper or lower proficiency levels.

In this study, the average age of the participants was 18. Further studies can be done with participants at different age levels.

This research was done in a public pre-university school. Further investigations can be conducted in different educational settings including private schools, various language institutes, and different universities.

All in all, the present study may only have scratched the surface of the issue. But the hope is that it may also have fanned the flame of interest in other researchers.

After all, the limitations of the present study coupled with the areas of controversy between the findings of this study and those of the previously-conducted studies warrants further research in a not well-understood area in need of further exploration.

References

Anderson, A. C., & Nagy, W. E. (1993). The vocabulary conundrum. *Center for the Study of Reading, 570,* 1-22.

Asgari, A., & Ghazali Bin, M. (2011). The type of vocabulary learning strategies used by ESL students in university Putra Malaysia. *English Language Teaching, 4*(2), 84-90.

Atay, D., & Ozbulgan, C. (2007). Memory strategy instruction, contextual learning and ESP vocabulary recall. *Journal of Science Direct: English for Specific Purposes, 26,* 39-51.

Atkinson, R. C., & Raugh, M. R. (1974). An application of the mnemonic keyword method to the acquisition of a Russian vocabulary. *Journal of Experimental Psychology: Human Learning and Memory, 1,* 126-133.

August, D., Carlo, M., Dressler, C., & Snow, C. (2005). The critical role of vocabulary development for English language learners. *Learning Disabilities Research & Practice, 20*(1), 50–57.

Bagus Subekti, N., & Lawson, M. j. (2007). Vocabulary acquisition strategies of Indonesian post-graduate students through reading. *International Education Journal*, *8*(2), 485-496.

Bakken, J.P. & Simpson, C. G. (2011). Mnemonic strategies: Success for the young-adult learner. *The Journal of Human Resource and Adult Learning, 17*(2), 79-85.

Baltes, P. B., & Kliegl, R. (1992). Further testing of limits of cognitive plasticity: Negative age differences in a mnemonic skill are robust. *Developmental Psychology, 28*(1), 121-125.

Bastanfar, A., & Hashemi, T. (2010). Vocabulary learning strategies and ELT materials: A study of the extent to which VLS research informs local course books in Iran. *International Education Studies, 3*(3), 158-166.

Beel, J., Gipp, B., & Olaf Stiller, J. (2009). Could mind maps be used to improve academic search engines? *Proceedings of the World Congress on Engineering and Computer Science, II,* 1-3.

Beel, J., & Langer, S. (2011). An exploratory analysis of mind maps. *In Proceedings of the 11th ACM Symposium on Document Engineering.* USA: California, Mountain View. Retrieved June7, 2012 from http://docear.org/.../An%20Exploratory%20Analysis%20 of %20Mind%20Maps%20--%20preprint.pdf

Benge, C. & Robbins, M. E. (2009). Using keyword mnemonics to develop secondary students' vocabularies: A teacher's action research. *Journal of Language and Literacy Education [Online], 6*(1), 93-104.

Bower, G. H., & Reitman, J. S. (1972). Mnemonic elaboration in multi-list learning**.** *Journal of Verbal Learning and Verbal Behavior, 11,* 478-485.

Brüssow, S. M., & Wilkinson, A. C. (2007). *Generative learning and assessment strategies: An investigation into concept-mapping.* Retrieved May 6, 2012 from http://creative commons.org/licenses/by-nc-sa/3.0/

Chen, C. M., & Chung, C. J (2008). Personalized mobile English vocabulary learning system based on item response theory and learning memory cycle. *Computers & Education, 51,* 624–645.

Conlon, T., & Gregory, S (2007). *Representations of conception: Towards a repertoire for thinking and learning.* Retrieved June 10, 2012 from http://www.parlog.com/shared/ roc.pdf

Cornoldi, C., & De Beni, R. (1991). Memory for discourse: Loci mnemonics and the oral presentation effect. *Applied Cognitive Psychology, 5,* 511-518.

Crammer, D. (1986, March). Teaching the vocabulary of a text. *Newsletter, VII* (2), 58-6.

Crutcher, R. J. (1990). *The role of mediation in knowledge acquisition and retention: Learning foreign vocabulary using the keyword method* (ICS Tech. Rep. No. 90-10). University of Cornoldo: Institute of Cognitive Science.

Davies, M. (2011). *Computer-aided argument mapping: An educational revolution? New media, new literacies, and new forms of learning.* London: Institute of education. Retrieved August 21, 2012 from http:// blogs. ubc.ca/ newliteracies /files/ 2011/ 12/ Davies.pdf

Davies, M., Carrington, M., Chen, R., Kaur, J., & Neville**,** B. (2011). The effectiveness of single intervention of computer-aided argument mapping in a marketing and a financial accounting subject (0003). *Higher Education Research and Development, 30*(3), 1-5**.**

Dóczi, B. (2011). Comparing the vocabulary learning strategies of high school and university students: A pilot study. *WoPaLP, 5,* 138-158.

Douma, M., Ligierko& J. Romano (2009). Creating online mind maps and concept maps. *25th Annual Conference on Distance Teaching and Learning.* Madison: Wisconsin. Retrieved June15, 2012 from http://www.uwex.edu/disted/conference/Resource_library/ proceedings/09_20011.pdf

Elliman, T., Macintosh, A., & Irani, Z. (2006). Argument maps as policy memories for informed deliberation. *In Proceedings of the European and Mediterranean Conference on Information Systems. European and Mediterranean Conference on Information Systems (EMCIS).* Costa Blanca: Alicante

Ellis, N. C., & Beaton, A. (1993). Psycholinguistic determinants of foreign language vocabulary learning. *Language Learning, 43*(4), 559-617.

Ellis, N. C. (1995). The psychology of foreign language vocabulary acquisition: Implication for CALL. *International Journal of Computer Assisted Language Learning (CALL).* In D. Green & P. Meara (Eds.), *Special issue on cognitive aspects of second language acquisition* (pp. 1-28). UK: University of Wales Bangor.

Gani Hamzah, M. S., Kafipour, R., & Kumar Abdullah, S. (2009). Vocabulary learning strategies of Iranian undergraduate EFL students and its relation to their vocabulary size. *European Journal of Social Sciences, 11*(1), 39-50.

Griffith, D. (1980)**.** The keyword method of vocabulary acquisition: An experimental evaluation. *Army Research Institute for the Behavioral and Social Sciences, 439,* 1-41.

Grin, P. (2005). Improving memory strategies by using the method of loci. Student Success 100. *Annual Review of Sociology, 24*(1), pp. 1-5.

Hai-peng, H., & Li-jing, D. (2007). Vocabulary acquisition in multimedia environment. *US-China Foreign Language, 5*(8), 55-59.

Harvey, P. D. (1983). Vocabulary learning: The use of grids. *ELT journal, 37*(3), 243-246.

Hasbún, L. (2005). The effect of explicit vocabulary teaching on vocabulary acquisition and attitude towards reading. *Actualidades Investigativas en Educacion, 5*(2), 1-21.

Hoffmann, M. (2009). *Visualizing ethical controversies and positions by logical argument mapping (LAM): A manual.* Retrieved July 12, 2012 from http:// smartech.gatech.edu/ bitstream/handle/1853/30188/wp50.pdf

Horn, R. E., (2000, November). Teaching philosophy with argumentation maps. *Newsletter of the American Philosophical Association.* Retrieved June 10, 2012 from http//www. stanford.edu/~rhorn/a/topic/phil/artclTeachingPhlsphy.pdf

Jacobson, M. H. S. (2004). Learning styles and layering: Using learning theory to organize thinking and writing. *Journal of the Association of Legal Writing Directors, 2,* 27-72.

Jelger, C. & Haefeli, O. (2007). *Mind mapping in scientific writing. Scientific Writing Seminar SS07.* Retrieved May 14, 2012 from http://informatik.unibas.ch/lehre/ss07/cs304 /_ Downloads/MindMapping.pdf

Jiang, J. (2002). Form-meaning mapping in vocabulary acquisition in a second language. *SSLA, 24,* 617-637.

Joe, J. (1998). What effects do text-based tasks promoting generation have on incidental vocabulary acquisition. *Applied Linguistics, 19*(3), 357-377.

Keskinkiliç, G. & Sünbül, A. M (2011). The effects of mnemonic keyword method on science lessons: Access and attitude of students. *International Journal on New Trends in Education and in their Implications, 2*(4), 1-8.

Kharatmal, M., & Nagarjuna, G. (2010). Introducing rigor in concept maps. In M. Croitoru, S. Ferr´e, & D. Lukose (Eds.), *Homi Bhabha Centre for Science Education (TIFR),* (pp. 199–202). India: Mankhurd, Mumbai 400 088.

Khosravizadeh, P., & Mollaei, S. (2011). Incidental vocabulary learning: A semantic field approach. *Broad Research in Artificial Intelligence and Neuroscience (BRAIN), 2*(3), 20-28.

Kinchin, I. M., Cabot, L. B., & Hay, D. B. (2008). **[**Original Article.] Using concept mapping to locate the tacit dimension of clinical expertise: Towards a theoretical framework to support critical reflection on teaching. *Journal compilation: Learning in Health and Social Care, 7*(2), 93–104.

Kuolee, C. (2010). An overview of language learning strategies. *ARECLS, 7,* 132-152.

Laufer, B. (1997). What's in a word that makes it hard or easy: Some intra-lexical factors that affect the learning of words. In N. Schmitt & M. McCarthy (Eds.), *Vocabulary: Description, Acquisition and Pedagogy,* (pp. 140-155). Cambridge: CUP.

Lawson, M. J., & Hogben, D. (1996). The vocabulary-learning strategies of foreign-language students. *Language Learning, 46*(1), 101-135.

Li, X., & Brand, M. (2009). Effectiveness of music on vocabulary acquisition, language usage, and meaning for mainland Chinese ESL learners. *Contributions to Music Education, 36*(1), 73-84.

Lindenberger, U., Kliegl, R., &. Baltes, P. B. (1992). Professional expertise does not eliminate age differences in imagery-based memory performance during adulthood. *Psychology and Aging, 7*(4), 585-593.

Llinares, G., Leiva, B., Cartaya, N., & St. Louis, R. (2008). Acquisition of L2 vocabulary for effective reading: Testing teachers' classroom practice. *The Reading Matrix, 8*(2), 55-69.

Maria, R., & Catalan, J. (2003). Sex differences in L2 vocabulary learning strategies. *International Journal of Applied Linguistics, 13*(1), 54-77.

Mastropieri, M.A., & Scruggs, T.E. (1998). Enhancing school success with mnemonic Strategies. *Intervention in School and Clinic, 33*(4), 201-208.

McCabe, J.A. (2010). *Integrating mnemonics into psychology instruction. Instructional Resource Award Recipient*. Goucher College: Department of Psychology. Retrieved September 18, 2012 from http://www.teach psych.org/otrp/resources/mccabe11.pdf

Monet, B., Rolheiser, C., & Bennett, B. (2001). *An explanation of mind mapping. The Artful Science of Instructional Integration.* Toronto: Bookation Inc. Retrieved August 8, 2012 from http://www.york.ca/NR/rdonlyres/.../An+Explanation+of+Mind+Mapping.pdf

Moor, A., Park, J., & Croitoru, M. (2009). *Argumentation map generation with conceptual graphs: The case for ESSENCE.* Retrieved May 17, 2012 from http://hal-lirmm.Ccsd. cnrs.fr /docs/00/41/06/27/PDF/croitoru-essence.PDF

Murley, D. (2007). [Technology for everyone…] Mind mapping complex information. *Law Library Journal, 99*(1), 175-183.

Nation, P. & Waring, R. (1997). Vocabulary size, text coverage and word lists. In N. Schmitt & M. McCarthy (Eds.), *Vocabulary: Description, Acquisition and Pedagogy* (pp. 1-19). United Kingdom: University of Cambridge.

Nemati, A. (2009). Memory vocabulary learning strategies and long-term Retention. *International Journal of Vocational and Technical Education, 1*(2), 014-024.

Nikolova, O. R. (2002). Effects of students' participation in authoring of multimedia materials on student acquisition of vocabulary. *Language Learning & Technology, 6*(1), 100-122.

Novak, J. D., & Cañas, A. J. (2006). The origins of the concept mapping tool and the continuing evolution of the tool. *Information Visualization Journal, 5*(3), 175-184.

Novak, J. D., & Cañas, A. J. (2008). *The theory underlying concept maps and how to construct and use them* (Tech. Rep. IHMC Cmap Tools). Florida: Institute for Human and Machine. Retrieved September 11, 2012 from http://cmap.ihmc.us/Publications/ ResearchPapers/TheoryUnderlyingConceptMaps.pdf

Ostwald, J. (2005). *A guide to argument mapping materials.* Eastern Connecticut State University: Critical Thinking Workgroup. Retrieved May 2, 2012 from http://www. jostwald.com/ArgumentMapping/GT%20argument%20mapping.doc.

Oya, T., Manalo, E., & Greenwood, J. (2009). The influence of language contact and vocabulary knowledge on the speaking performance of Japanese students of English. *The Open Applied Linguistics Journal, 2*, 11-21.

Patterson, F. (2007). Provoking students into thinking. *COMPAKlegal studies, 1,* 79-83.

Pellicer-Sánchez, A., & Schmitt, N. (2010). Incidental vocabulary acquisition from an authentic novel: Do things fall apart? *Reading in a Foreign Language, 22*(1), 31–55**.**

Pigada, M., & Schmitt, N. (2006). Vocabulary acquisition from extensive reading: A case study. *Reading in a Foreign Language, 18*(1), 1-28.

Pishghadam, R., & Ghanizadeh, A. (2006). On the impact of concept mapping as a prewriting activity on EFL learners' writing ability. *IJAL, 9*(2), 1-26.

Raugh, M. R., & Atkinson, R. C. (1974). A mnemonic method for the acquisition of a second-language vocabulary. *Psychology & Education Series, 224,* 1-88.

Raugh, M. R., Schupbach, R. D., & Atkinson, R. C. (1975). *Teaching a large Russian language vocabulary by the mnemonic keyword method* (Tech. Rep. 256). California, Stanford University: Institute for Mathematical Studies in the Social Sciences.

Richmond, A. S., Cummings, R., & Klapp, M. (2008). Transfer of the method of loci, pegword, and keyword mnemonics in the eighth grade classroom. *Researcher, 21*(2), 1-13.

Rinner, C. (2006) Argumentation Mapping in Collaborative Spatial Decision Making. In S. Dragicevic & S. Balram (Eds.): *Collaborative GIS,* (pp. 85-102). University of Toronto: Department of Geography, Idea Group Publishing. Retrieved September 18, 2012 from http://www.ryerson.ca/ ~crinner/pubs/ chapter_rinner _final2_web.pdf

Ritchhart, R., Turner, T., & Hadar, L. (2008). Uncovering students' thinking about thinking using concept maps. *Running Head: Uncovering Students' Thinking, 24*(2), 1-27.

Roediger, H. L. (1980). The effectiveness of four mnemonics in ordering recall. *Journal of Experimental Psychology: Human Learning and Memory, 6*(5), 558-567.

Rupley, W. H., Logan, J. W., & Nichols, W. D. (1999). Vocabulary instruction in a balanced reading program. *Reading Teacher, 52*(4), 336-346.

Sánchez, A., & Manchón, R. M. (2007). Research on second language vocabulary acquisition and learning: An introduction. *International Journal of English Studies* (*IJES), 7*(2), vii-xvi.

Saran, M., & Seferoğlu, G. (2010). Supporting foreign language vocabulary learning through multimedia messages via mobile phones. *Journal of Education*, *38*, 252-266.

Sedita, J. (2005). Effective vocabulary instruction. *Insights on Learning Disabilities, 2*(1), 33-45.

Shefelbine, J. L. (1990).Student factors related to variability in learning word meanings from context. *Journal of Reading Behavior*, *XXII* (1), 71-97.

Sorbi, A. (2010). The relationship among word knowledge, word prediction and reading comprehension. *International Journal of Language Studies (IJLS), 4*(1), 1-28.

Sutherland, S., & Katz, S. (2005). Concept mapping methodology: A catalyst for organizational learning. *Evaluation and Program Planning, 28*, 257–269**.**

Swartzendruber, K. (2007). The picture word inductive model and vocabulary acquisition. *Proceedings of the 3rd Annual GRASP Symposium.* Wichita State University: Wichita, KS.

Szpektor, I., & Dagan, I (2009). Augmenting word net-based inference with argument mapping. *Proceedings of the 2009 Workshop on Applied Textual Inference.* Singapore: Bar-Ilan University, Department of Computer Science.

Taguchi, K (2006).Should the keyword method be introduced in tertiary foreign language classrooms? *Electronic Journal of Foreign Language Teaching, 3*(1), 22-38.

Twardy, C. R. (2003). *Argument maps improve critical thinking: Teaching philosophy.* Australia: Monash University. Retrieved September 7, 2012, from http://www.csse. monash.edu.au/~ctwardy

Van Gelder, T. (2009). What is argument mapping? In H. Pashler (Ed.): *Encyclopaedia of the Mind*, (pp. 1-3). Thousand Oaks, CA: Sage.

Villalon, J., & Calvo, R. A. (2011). Concept maps as cognitive visualizations of writing assignments. *Educational Technology & Society*, *14*(3), 16–27.

Wang, A. Y., & Thomas, M. H. (2000). Looking for long-term mnemonic effects on serial recall: The legacy of simonides. *The American Journal of Psychology*, *113*(3), 331-340.

Wolff, J. (2004). *Mind mapping.* University of Derby Career: Development Centre (CDC). Retrieved September 7, 2012 from http:// www.soton.ac.uk

Wu, W. S. (2005). Use and helpfulness rankings of vocabulary learning strategies employed by EFL learners in Taiwan. *Journal of Humanities and Social Sciences*, *1*(2), 7-13.

Wu, L. (2009). *Incidental English vocabulary studying in L2 learning: A study of learning and teaching vocabulary in a Chinese college.* MA thesis. Kristianstad University College: The School of Teacher Education. Retrieved May 2012, from http//www.hkr.diva-portal.org/smash/ get/diva2:224699/FULLTEXT01

Wyra, M., Lawson, M. J., & Hungi, N (2007). The mnemonic keyword method: The effects of bidirectional retrieval training and of ability to image on foreign language vocabulary recall. *Learning and Instruction, 17*, 360-371.

Yi Lin, F., & Cheng, C. k. (2008).The combined effects of the keyword method and phonics instruction on 5th graders' English vocabulary learning in Taiwan. *English Teaching & Learning, 32*(3), 71-114.

Yu-Ling, L. (2005). *Teaching Vocabulary Learning Strategies: Awareness, Beliefs, and Practices. A survey of Taiwanese EFL senior high school teachers.* MA thesis. University of Essex: Department of Language & Linguistics. Retrieved May 2, 2012 from http:// www. english.tyhs.edu.tw/epaper/epaper9/thesis_eng.pdf

Appendixes

Appendix A: KET Test (Key English Test)

Name …… Class Number …….. Group Number……

1. There are 24 hours in …….. .

a) day b) night c) week d) year

2. Come to my desk and …….. me your book, please.

a) take b) get c) bring d) carry

3. Could you ……. the situation to me again?

a) tell b) explain c) talk d) excuse

4. Bill loves repairing cars and he wants to be to train to be a …….

a) painter b) mechanic c) doctor d) teacher

5. Can you help me …….. a new dress for the party?

a) decide b) try c) choose d) look

6. All the children at the school have to …… a uniform.

a) wear b) put c) use d) carry

7. Jack's not well. I think we should call an …… .

a) ambulance b) illness c) accident d) engine

8. Are you ready to …… your meal now, sir?

a) demand b) ask for c) order d) explain

9. I stopped gardening when the rain started. I didn't want to get …….. .

a) dry b) warm c) windy d)wet

10. Don't …… to post my letters for me.

a) remember b) forget c) regret d) remind

11. I'd like to work …… and learn about different country.

a) foreign b) abroad c) strange d) another

12. Can I help you ……. your homework.

a) do b) make c) turn d) work

13. When I went through customs, nobody ……. my passport.

a) checked b) controlled c) looked d) watched

14. After …… an hour she finally found her pen.

a) looking after b) looking for c) looking at d) looking out

15. We ***sometimes*** go to the movies on weekends.

a) always b) usually c) now and then d) finally

16.My favorite subject is at school was ……. because I love learning about numbers.

a) art b) mathematics c) history d) geography

17. Tehran is the ……. of Iran.

a) capital b) head c) lead d) start

18. Did you like to …… by airplane.

a) fly b) flight c) flee d) way

19. If you like to know the ……. of the underline word, please look it up in dictionary.

a) mean b) spell c) adverb d) syllabus

20. The shooting star is a …… particle.

a) large b) tiny c) visible d) usual

21. Horac Mann has been …. the father of Public Education.

a) called b) entitled c) told d) said

22. The …….. of space exploration started in the 1960s.

a) period b) era c) spell d) age

23. They were …… so they went to restaurant.

a) hungry b) thirsty c) fat d) angry

24. Could you help me to show the …….. of this city?

a) way b) path c) street d) road

25. This test is ……. for me to solve it.

a) hard b) easy c) visible d) clear

26. You need ……. to make an omelette.

a)apples b)eggs c) rice d) pepper

27. Please don't make ……. so much. I am studying.

a) noise b) happy c) cry d) shame

28. Ahmet comes from Turkey. His language is ……. .

a) Arabic b) Turkish c) Persian d) Irish

29. Can I have a …… ticket to Tehran?

a) turn b) back c) long d) far

30. My hand is dirty. I should …… it.

a) wash b) brush c) tidy d) clean

Appendix B: Word Knowledge Pre-test

Name: ***Group:***

1. The **gardener** was anxious about the blossom of flowers.
2. You should carry this **barn** by **car**.
3. We crossed the **bridge** over the river Windrush.
4. **Fleece** is the wintry cloth of **sheep.**
5. **Thunder** crashed in the sky.
6. The **house** is built on the side of a **hill** overlooking the river.
7. This **cottage** is small to live in it.
8. You can **bake** a cake in **oven**.
9. I bought two loaf of **bread** for breakfast.
10. Your sheep are hungry, they can eat these **weeds.**
11. A small brown and grey bird, common in many parts of the world called **sparrow**.
12. Birds use their **bills** for biting meats and eating **seeds.**
13. It was time for the sheep to be **shorn**.
14. My father puts his wallet on his **bag**.
15. The **room** in which we live is very nice.
16. **Vultures** feed the corpse of other animals.
17. A small soft round **fruit** with shiny red or black skin and a stone/pit inside called **cherry.**
18. We need some **logs** for fire.
19. The children were playing in the **yard** at the front of the school.
20. **Maize** is very nourishing.
21. My friend, Sara was **ill** today.
22. John enjoys eating **melon.**
23. A castle perched high on the **cliffs** above the river.
24. I bought new **pants**.
25. We visited towns and **villages** all over Spain.
26. My father bought an **orange** for me.
27. Children usually like juicy tasty **peach.**
28. The **tulips** on **land** give me a sense of tranquillity.
29. The boy threw **stones** towards the **crow** and the group of **pigeons**.
30. A **sack** is a large bag with no handles, made of strong rough material or strong paper or plastic, used for storing and carrying, for example **flour**, coal, etc.
31. Nobody feel pity for **poor.**
32. Venomous **snakes** spit and hiss when they are cornered.
33. Fishermen use **hook** to fish.
34. It would be better to transport the goods by **railroad** rather than **by road**.
35. **Grasshopper** is an insect with long back legs, that can jump very high and that make a sound with its legs.
36. There are massive numbers of **wasps** in the world.
37. **Pool** can be defined as a natural small **pond**.
38. **Grass** is a beautiful cloth of nature.
39. **Flute** can be regarded as an art.

40. The art of potter is pottery and **jar.**
41. **Bud** is the sign of the birth of flower.
42. **Wolfs** are fierce animals with **teethes** to bite **deer.**
43. **Arrow** shone like diamond in her **hand.**
44. The **fox** attacked to the **rooster** and caught it.
45. I saw a **rabbit** in our garden which was eating **carrot**.
46. I saw a **jackal** which was hidden within **bushes**.
47. Early morning **mist** patches will soon clear.
48. **Bees** were buzzing in the clover.
49. **Asses** are hard-working animals.
50. The cooker put the lamb and the meat of **duck** in the **pot** and added a **pitcher** of water.
51. This **pasta** is delicious.
52. It seems that **rook** is always mourning.
53. **Looby-loo** is beautiful game for children.
54. **Frog** can jump over and over.
55. **Fig** and **medlar** are nourishing fruits which have medical property.
56. There is a nice **mole** on my **foot.**
57. The mother added **cinnamon** to the **fungus** to make delicious **food** for the **meal**.
58. **Leech** adhered to her **finger** like **glue**.
59. **Mosquito** causes scratch and redness.
60. Having a taste like that of a **lemon** or of fruit that is not ready to eat is called **sour**.
61. **Primroses** are used in medicines.
62. The shepherd guided the **oxen** to the stable.
63. Most of affluent eat **sturgeon.**
64. **Panthers** are fierce animals with precious **shell**.
65. The mother added a **cup** of **vinegar** to make picked baby aubergines.
66. Using **scissor**, the shepherd arranged the mane and tail of a **horse**.
67. Some believed that **fairy** is a factious story.
68. The **ship** **sank** in the depth of **ocean** slowly.
69. The **breeze** caresses the **wooden** **boat** to **float** on **sea**.
70. The bird opened its **plumages.**
71. The Himalayas are the largest **mountains** in the world.
72. **Zinc** is a bluish-white metal.
73. An injured **boar** **jingled** in the jungle.
74. Bandar Anzali has a beautiful **lagoon** which attracts tourists.
75. I travelled by **plane.**
76. A new **modern** satellite has been **put into** **orbit** around the **earth**.
77. The dried leaf of the bay tree that is used in cooking as an herb is called **bay leaf.**
78. **Sharks** are dangerous for **fish.**
79. Various **crabs** have been seen in Australian **beaches**.
80. The **hunter** shoots towards the **giraffe**.
81. The **barber** had cut my hair.
82. A **moss** is a very small green or yellow plant without flowers that spreads over damp surfaces, rocks, trees, etc.
83. The flights of wide **gooses** create a beautiful view.

84. Your **visage** looks beautiful.
85. When she ran away from a dog, suddenly her **heels** broke.
86. Wild animals like **tigers** and different birds such as **parrots**, **falcons**, and **apes** with various specious keep in the **zoo**.
87. Many women are afraid of **rats**.
88. The lion is the **king** of the jungle.
89. God created **man**, and he called his name.
90. If you have pain, you can rub a **cream** on your skin.
91. The patient's **heart** stopped beating for a few seconds.
92. It is raining, you should wear **waistcoat**.
93. We buy our fruit and vegetables **at the market**.
94. The cars and **trucks** manufactured by **factories.**
95. The **castle** which you see belongs to **queen** of England.
96. This **rug** is suitable for our house.
97. The boss warned the miners no to enter into **mine** without permission.
98. I see crowds of football **fans.**
99. Avoid using perfumed **soaps** on sensitive skin.
100. The line **shuffled** forward a little.
101. **Candy** reminds me the sense of childhood.
102. **Caps** are worn especially by men and boys, often as part of a uniform.
103. A hotel for people who are travelling by car, with space for parking cars near the rooms called **motel**.
104. The line of hair above the eye called **eyebrow**.
105. She wasn't **fazed** by his comments.
106. A long **hollow** pipe made of metal, plastic, rubber, etc, through which liquids or gases move from one place to another is called **tube**.
107. They treat their mother like a **servant.**
108. The **club** has voted to admit new members.
109. The incident seems destined to become a mere **footnote** in history.
110. This skirt needs some new **elastic** in the waist.
111. A long seat for two or more people usually made of **wood** is called **bench**.
112. He **pointed/aimed the gun** at her head.
113. He applied different **cards** to advertise his **fridge**.
114. The troops are all in **billets**.
115. The aim of **tests** is to demonstrate the students' progress.
116. The ice **cracked** as I stepped onto it.
117. Most passengers are waiting for **train** at the railroad.
118. She could just see **by the light of** the candle.
119. I bought a camera with an adjustable **lens**.
120. Some believed that **metro** is faster than car.
121. The **dish** was broken.
122. They located the ship by **radar**.
123. **Roof** is awning the house.
124. **Watch** shows time.
125. I saw a **cat** following a mouse.

126. **Hollyhocks** have sweet smell
127. This shirt isn't **big** enough.
128. The **door** is **knocked.**
129. I bought some **sausage**.
130. The fields were divided by stone **walls**.

Appendix C: Target Words

Word	Definition	Keyword in Persian
1. gardener	بارغبان	گاردریل
2. bridge	پل	برج
3. hill	تپه	فیل
4. thunder	رعد	تند (سریع)
5. bread	نان	برنج
6. sparrow	گنجشک	پارو
7. cottage	کلبه	کپه
8. barn	انبار	بار
9. weed	علف	بید
10. seed	دانه	سیب
1. shear	پشم چیدن	شیر (حیوان)
2. fleece	پشم	ریس
3. sheep	گوسفند	شیر
4. room	اتاق	بوم
5. bake	پختن	کیک
6. yard	حیاط	آرد – یاس
7. cherry	گیلاس	چای
8. melon	خربزه	بابون
9. lemon	لیمو	لیوان
10. maize	ذرت	لیز

Word	Definition	Keyword in Persian
1. cliff	صخره	کلفت
2. village	روستا	ویلا
3. orange	پرتقال	نارنج
4. peach	هلو	پیچ
5. wasp	زنبور	اسب
6. pool	برکه	پول
7. fruit	میوه	فروش
8. beach	ساحل	پیچ- بچه
9. fish	ماهی	ریش
10. hook	قلاب	خوک
1. flute	فلوت زدن	فوت
2. jar	کوزه	جاز
3. crow	کلاغ	کراوات
4. stone	سنگ	ستون
5. snake	مار	اسنک
6. grasshopper	ملخ	تراس
7. bud	غنچه	باد
8. road	جاده	رود
9. pigeon	کبوتر	پیجامه
10. sack	ساک	سنگ

Word	Definition	Keyword in Persian
1. arrow	پیکان- تیر	اره
2. rabbit	خرگوش	رباط
3. fig	انجیر	دیگ
4. carrot	هویج	کارتن
5. jackal	شغال	چنگال
6. foot	پا	بوت
7. grass	چمن- علف	ارس – هرس
8. bush	بوته	موش
9. wolf	گرگ	گلف
10. fox	روباه	فکس
1. food	غذا	هود
2. fungus	قارچ	پونس
3. cinnamon	دارچین	سینی
4. pot	دیگ	مات
5. pitcher	پارچ	پیچ
6. bag	کیسه	بند
7. breeze	باد خفیف	فریز
8. rook	کلاغ سیاه	خوک
9. duck	مرغابی	لاک
10. cat	گربه	چت

Word	Definition	Keyword in Persian
1. door	در	دور(زدن)
2. ill	بیمار	فیل
3. wood	چوب	دود
4. roof	سقف	بوف
5. bee	زنبور	بال
6. medlar	ازگیل	مداد
7. looby-loo	بازی چرخ و فلک	لوبیا
8. leech	زالو	پیچ
9. rooster	خروس	روستا
10. poor	فقیر- بیچاره	مور
1. flour	آرد	بلور
2. cup	فنجان	قاب
3. vinegar	سرکه	انگور
4. ox	گاو	واکس
5. sour	ترش	شور
6. mosquito	پشه	ماسک
7. scissor/horse	قیچی / اسب	سوزن / پرس
8. shell	پوست	شل
9. ass	خر	اسب
10. hand	دست	بند- قند

Word	Definition	Keyword in Persian
1. fairy	پری	پری
2. see	دریا	پری
3. sturgeon	ماهی خاویار	تور
4. sink	غرق شدن- در آب فرو رفتن	سنگ
5. primrose	پامچال	رز
6. frog	قورباغه	خاک
7. hollyhock	گیاه ختمی	فوک
8. crab	خرچنگ	تب
9. tulip	لاله	تالاب
10. jingle	جیغ زدن	جنگل
1. lagoon	مرداب	واگن
2. pond	برکه	پوند
3. moss	گیاه خزه	بز
4. bill	منقار	فیل
5. bay leaf	برگ بو	لیف
6. float	شناور بودن	فلوت
7. mountain	کوه	مانتو
8. mist	مه	خیس
9. goose	غاز	بوس
10. earth	زمین	خرس

Word	Definition	Keyword in Persian
1. ocean	اقیانوس	اشک
2. shark	کوسه	پارک
3. falcon	باز (پرنده)	بالکن
4. plumage	پرهای پرنده	فلامینگو
5. panther	پلنگ	پنجه
6. teeth	دندان	تیز
7. meal	وعده غذا	میله
8. boar	گراز	دوئل
9. vulture	لاشخور	ویلچر
10. zoo	باغ وحش	قو
1. hunter	شکارچی	آنتن
2. knock	قفل	لاک
3. ape	میمون	ایل
4. parrot	طوطی	پر
5. candy	آبنبات	قندی
6. rat	موش	چت
7. deer	گوزن	تیر
8. mole	خال	مرغ
9. giraffe / tiger	زرافه / ببر	زرافه / تانکر
10. big	بزرگ	دیگ

word	Definition	Keyword in Persian
1. queen	ملکه	کنیز
2. king	شاه	کنیز
3. ship	کشتی	شیک
4. man	انسان	مین
5. plane	هواپیما	پلیکان
6. cream	کرم (لوازام آرایش)	کرم
7. visage	رخ (چهره)	ویزا
8. land	زمین	لندور
9. factory	کارخانه	فاکتور
10. mine	معدن	مین
1. castle	قلعه	کاسه
2. barber	آرایشگر	باربر
3. pasta	رشته فرنگی (ماکارونی)	پیتزا
4. waistcoat	بارانی	کت
5. rug	فرش	رنگ
6. soap	صابون	آب
7. heart	قلب	کارد
8. watch	ساعت	پارچ
9. truck	کامیون	کراک
10. market	بازار	پارکت

word	Definition	Keyword in Persian
1. fan	بادبزن	فن
2. cap	کلاه	کپک
3. sausage	سوسیس	سس
4. motel	مسافرخانه	هتل
5. boat	قایق	بز
6. eyebrow	ابرو	آبرو
7. wall	دیوار	وال
8. faze	شک	فاز
9. tube	لاستیک	توپ
10. footnote	پاورقی – یادداشت	نت
1. servant	خدمتکار	سرویس
2. shuffle	راه رفتن وپای کسی را روی زمین کشیدن	شوفر
3. bench	نیمکت	فنچ
4. club	باشگاه	کلیپ
5. pants	شلوار	بند
6. elastic	کش	پلاستیک
7. card	کارت – برگه	کارد
8. heel	پاشنه	میخ
9. glue	چسب	گلو
10. finger	انگشت	رینگ

word	Definition	Keyword in Persian
1. house	خانه	حوض
2. billet	پادگان	بیل
3. log	بار	فوک
4. car	ماشین	بار – مار
5. railroad	راه آهن	ریل
6. gun	اسلحه	خان
7. test	امتخان کردن	تز
8. crack	ترک	ترک
9. train	قطار	ریل – تریلی
10. zinc	فلز روی	زنگ
1. metro	مترو	متر
2. oven	فر – آون	آهن
3. dish	بشقاب ماهواره	فیش
4. light	نور- روشنایی	لامپ
5. lens	عدسی	لنز
6. fridge	یخچال	فریز
7. modern	پیشرفته	مد
8. hollow	پوک	آلو
9. radar	رادار	مدار
10. orbit	چرخش	توربین

Number	Peg Words or rhyming words
One	John, bun, mud, mother
Two	Shoe, boot, student, food
Three	Tree, beat, feed, seed, bee, see
Four	Door, goat, boat, road, crow
Five	Hive, cry, buy, eye, bite, pie
Six	Sticks, cheeks
Seven	Heaven, vesture, tent
Eight	Gate, date, pay
Nine	Vine, pine, eye, buy, cry, bite
ten	Hen, bet, bell, bed

Appendix D: Post-test A (Vocabulary Comprehension)

A. Answer to the following multiple choice tests **Name:** **Group:**

1."**.....**" in Eastern Canada are generally located next to lakes, rivers, or the ocean in forested areas.
a. castles **b**. mines **c.** factories **d.** cottages
2. A **…….** is an agricultural building used for storage and as a covered workplace. It may sometimes be used to house domestic animals or to store farming vehicles and equipment.
a. log **b**. barn **c.** cottage **d**. pot
3. Generally **.....** are small, fleshy, brown-grey birds with short tails and stubby, powerful beaks. Most species of them commonly live in agricultural areas, and for several human settlements are primary habitats.
a. sparrows **b.** falcons **c**. geese **d**. pigeons
4. The beak **.....** or rostrum is an external anatomical structure of birds which is used for eating and for grooming, manipulating objects, killing prey, fighting, probing for food, courtship and feeding young.
a. hook **b.** eyebrow **c**. bill **d.** visage

5."**.....**" is applied to any plants that grow and reproduce aggressively. They have ideal locations for growth and reproduction.

a. primrose **b.** bush **c**. weed **d.** hollow

6. Corn or **.....** is a cereal crop that is grown widely throughout the world in a range of agro ecological environments. All parts of it can be used for food and non-food products.

a. mine **b.** maize **c**. medlar **d.** meal
7. ..... are a safe land transport system when compared to other forms of transport and its era in the United States began in 1830.
a. planes **b.** tubes **c**. trucks **d**. railroads
8. The **.....** was always a symbol of martyr. It was a topic for Persian poets as far back as the thirteenth century.
a. tulip **b.** primrose **c**. mountain **d**. bush
9. ..... are insects which prefer to eat grasses, leaves and cereal crops and many of them will eat from multiple host plants in one day.
a. wasps **b**. grasshoppers **c**. mosquitoes **d.** falcons
10. Safety **…….** are designed to be used in various forms of re-enactment combat, to reduce the risk when shot at people.
a. hooks **b**. rugs **c**. radars **d**. arrows

11. The word **.....** has been historically used to refer to many small- to medium-sized species of the wolf division of mammals.
a. jackal **b**. boar **c.** panther **d.** ox
12. ..... is a phenomenon caused by small droplets of water suspended in air and it can occur as part of natural weather or volcanic activity, and is common in cold air above warmer water.
a. sour **b.** mist **c.** lagoon **d**. vinegar
13. Wounded **.....** howl or **.....** to assemble the group (usually before and after hunts), to pass on an alarm (particularly at a lair place), to locate each other during a storm or unfamiliar territory and to communicate across great distances.
a. panthers, shuffle **b.** wolves, jingle **c.** giraffes, shear **d**. boars, sink

14. To break without complete separation of parts is a definition of **.....**
a. hollow **b.** faze **c.** knock **d**. crack

15. With the invention of the telescope and microscope there was a great deal of experimentation with **.....** shapes in the 17th and early 18th centuries trying to correct chromatic errors seen in them.
a. glue **b**. log **c**. radar **d.** lens

16. .....is a valuable source of food and energy for all sorts of wildlife and organics and many types of animals such as cattle, sheep, horses, and rabbits.

a. bush **b**. primrose **c**. grass **d**. medlar

17. .....have a long nose (a complex tongue) that enables them to obtain the nectar from flowers.

a. crabs **b.** bees **c**. mosquitoes **d.** frogs

18. .....is generally a simple dish, but comes in large varieties because it is an adaptable food item and is so beloved in the nation of Italy as a stable food.

a. pasta soup **b.** duck soup **c**. medlar soup **d.** goose soup

19. .....are distinguished from similar members of the crow family by the bare grey-white skin around the base of the adult's beak in front of the eyes with black feathers often showing a blue or bluish-purple sheen in bright sunlight.

a. wasps **b.** mosquitoes **c**. rooks **d.** falcons
20. The **.....** is a spice obtained from the inner bark of several trees that is used in both sweet and spicy foods.
a. cinnamon **b.** vinegar **c**. sour **d.** medlar
21. Many **.....** species are poisonous to humans, with toxicities ranging from slight digestive problems or allergic reactions as well as hallucinations to severe organ failures and death.
a. fleece **b**. fairy **c**. fungus **d.** faze

22. ……. or blood suckers are segmented worms which live in freshwater environments, while some species can be found in earthy and aquatic environments, as well.

a. frogs **b**. crabs **c**. mosquitoes **d.** leeches
23. Globally **…….** fisheries are of great value, primarily as a source for caviar, but also for flesh.
a. sturgeon **b**. duck **c.** goose **d**. frog
24. The origin of Earth's **…….** is still unknown though they are believed to have first appeared in the Hadean period and may have been the point of origin for the emergence of life.
a. mountain **b**. ocean **c.** lagoon **d**. stone
25. The pattern and colours of **…….** vary between species and subspecies of birds and can also vary between different age classes, sexes, and season.
a. fairy **b.** shell **c.** elastic **d.** plumage
26. ……. is an essential mineral of exceptional biologic and public health importance since chemically similar to magnesium, because its ion is of similar size.
a. shell **b.** log **c.** zinc **d.** radar
27. If eaten whole **…….** are spicy and have a sharp, bitter taste. They are used in soups, stews, meat, seafood and vegetable dishes.
a. primroses **b.** bay leaves **c**. meals **d**. medlars
28. Woodland gardens in many parts of the world can include a carpet of natural **……..**
a. mosses **b.** bushes **c.** primroses **d.** medlars
29. When hunting large prey **…….** prefer to bite the throat and use their extremely powerful paws to hold onto the prey, often simultaneously wrestling it to the ground.
a. boars **b.** tigers **c.** oxen **d.** giraffes
30. Over the years, **…….** have been used in many experimental studies, which have added to our understanding of genetics, diseases, the effects of drugs, and other topics that have provided a great benefit for the health and well-being of humankind.
a. ducks **b**. apes **c.** rats **d**. Pigeons

Appendix E: Post-test B (Vocabulary Production)

B. Fill in the following blanks. **Name:** **Group:**

1. When the desired temperature is reached within the heating instrument, the food is placed inside and **ba.....** for a certain amount of time.
2. The **ch……..** fruits of commerce are usually obtained from a limited number of species.
3. Cl…….. are common on coasts, in mountainous areas, escarpments and along rivers.
4. In modern Western society, males customarily wear **p……..** and not skirts or dresses.

5. Cr…….. are now considered to be among the world's most intelligent animals.
6. A particular characteristic of many **vu……..** is a bald head, devoid of normal feathers. They feed the corpse of other animals.
7. Fl…… is the main ingredient of bread, which is a stable food, for many cultures.
8. All **sn……..** eat small animals including lizards, small calf small mammals, birds, eggs, fish, snails or insects.

9. A **po……** is a body of standing water either natural or man-made that is usually smaller than a lake.

10. B…… may be specialized to develop flowers, or may have the potential for general shoot development.
11. R…… will occasionally make a patterned series of clucks to attract hens to a source of food; the same way a mother hen does for her chicks.

12. The **ca……...** is a root vegetable, usually orange in colour, though purple, red, white, and yellow varieties exist.
13. Some animals use **te……** for hunting or for defensive purposes and the shape of it is related to their diets.

14. Cooling is a popular food storage technique in developed countries so that a **fr……** maintains a temperature a few degrees above the freezing point of water.

15. The shoe **h……** is used to improve the balance of the shoe, increase the height of the wearer, and alter posture or other decorative purposes.

16. A **bil……** is a term for living quarters to which a solider is assigned to sleep.

17. Hol……. seeds only need to be planted right below the soil.
18. D……hunting is a popular activity in the U.S. and generates income for states and the federal government from the sales of licenses, permits and tags.

19. The **a……** has been used as a working animal for at least 5000 years.

20. Generally **pit…..** has a handle, which makes pouring liquid easier.

21. The **fi……..** fruits, important as both food and traditional medicine, contain substances, sugars, vitamins A and C, acids and enzymes.

22. Mo…… is a small innate growth on the human skin, usually slightly raised and dark or red and sometimes hairy.

23. The human **f……** and ankle is a strong and complex mechanical structure containing exactly 26 bones.

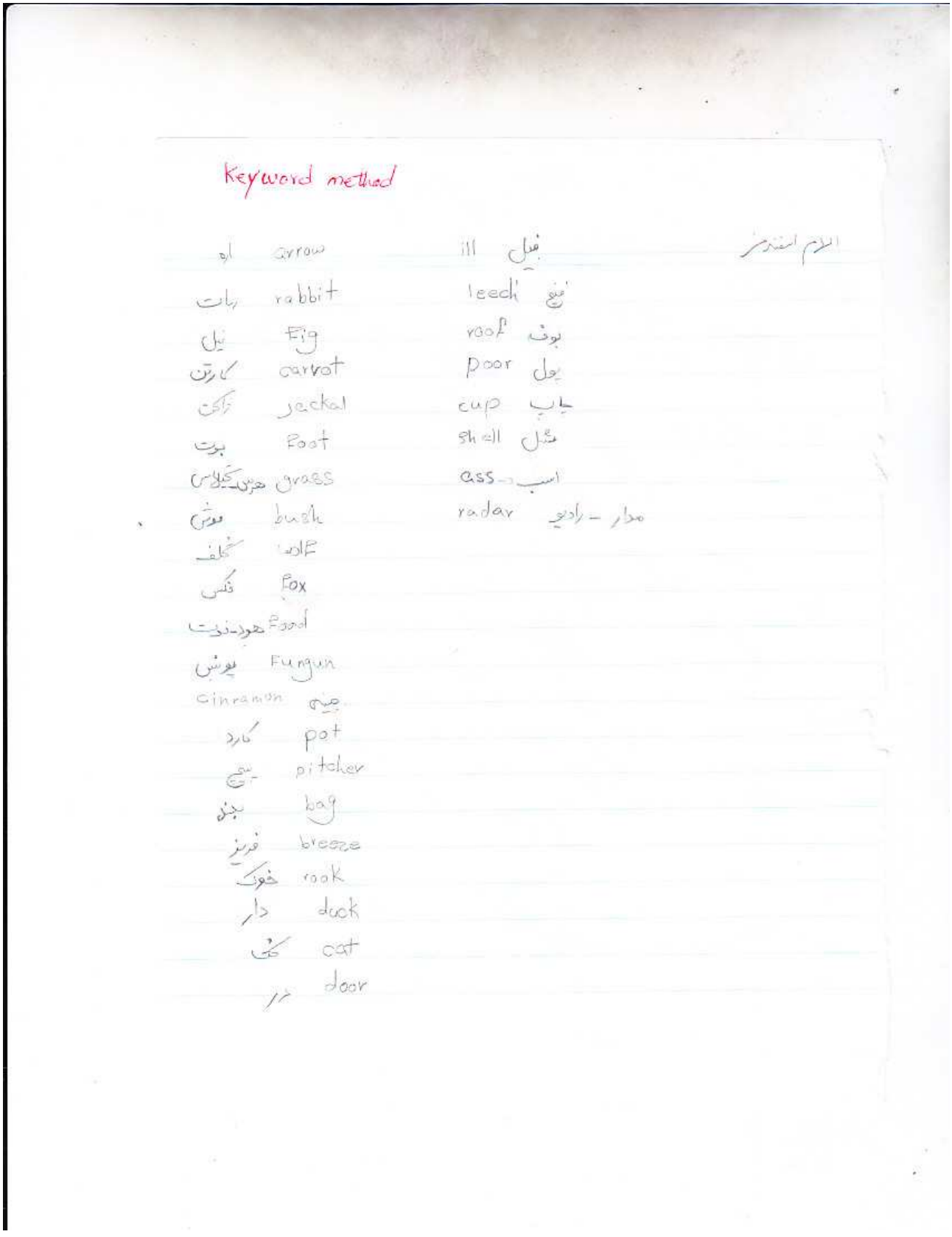
24. Sci….. are used for cutting various thin materials, such as paper, cardboard, metal foil, thin plastic, cloth, rope and wire.

25. An onshore afternoon wind, caused by warm air rising over the land in sunny weather is named **br……..**

26. Some species of **sh……..** are able to detect as little as one part per million of blood in seawater.
27. The most important components of most **par…..** diets are seeds, nuts, fruit and some kind of plant material.
28. A **wai……..** has a full vertical opening in the front which fastens with buttons or snaps.
29. People have used **w……** for millennia for many purposes, primarily as a fuel or as a construction material for making houses, tools, weapons, furniture, packaging, artworks, and paper.

30. Although the seashore is most commonly associated with the word **be……..**, it is found by lakes and alongside large rivers, as well as by the sea or oceans.

Appendix F: Samples of the Selected Presentation Techniques



Keyword method

اره	arrow	ill	فیل	الام اسفندمز
رمات	rabbit	leech	فنیع	
نیل	Fig	roof	بوف	
کارتن	carrot	poor	پول	
زاکت	jackal	cup	چاپ	
بوت	Foot	shell	مثل	
هرس-گیلاس	grass	ass	اسب	
موش	bush	radar	مدار - رادیو	
کلف	wolf			
فکس	Fox			
هود-فوت	Food			
پوش	Fungun			
cinramon	چینی			
کارد	pot			
پیچ	pitcher			
بند	bag			
فریز	breeze			
خوک	rook			
دار	duck			
کک	cat			
در	door			

Subject: peg word method

Year: Month: Day:

1. arrow = The box of Jhon's arrows is lost.

2. rabbit = That student has a cute rabbit.

3. fig = we have fig trees in our backyard.

4. carrot = I saw carrot bushes in the road.

5. jackal = That crazy man buy wild animals for his children, like jackals and wolfs.

6. foot = when I put my foot on sticks, suddenly a snake came out of that.

7. grass = I think heaven is full of trees, flowers & grasses.

8. bush = In front of the gate is full of bushes and flowers

9. wolf = A wolf is sleeping behind a pine tree.

10. fox = Foxes eat birds and small animals like hens and rabbits.

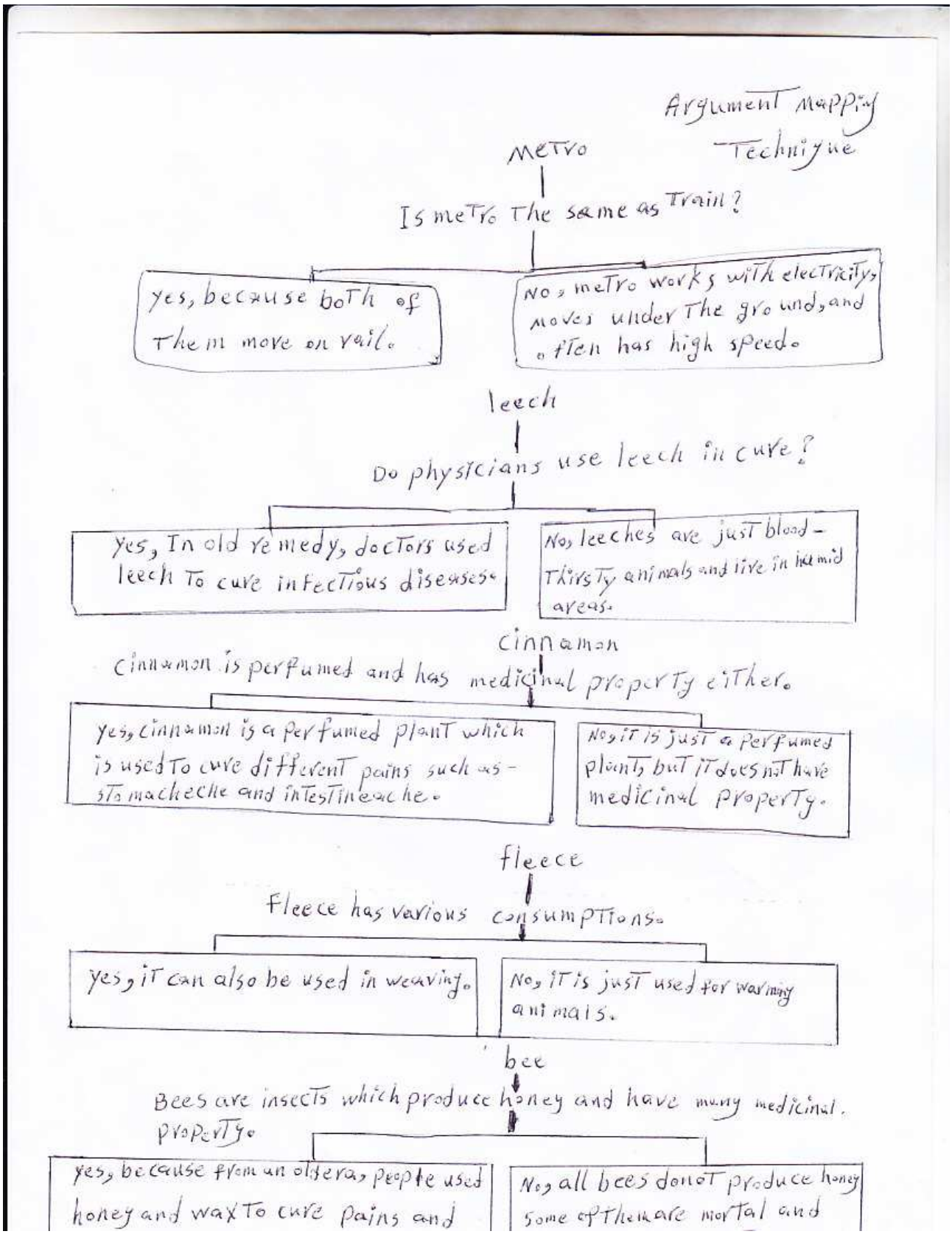
The loci method

gardner , bridge , hill , thunder , bread ,
sparrow , cottage , barn , weed , seed

A gardner lived in a beautiful village . An old bridge seperated the village from gardens and hills. The gardner listened to the thunder . He threw a pieace of bread outside of window . A group of sparrows flied toward the cottage . Next, he went to the barn and picked up a bunch of weeds for sheeps and some seeds for hens.

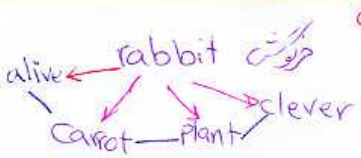
queen , king , ship , man , plane

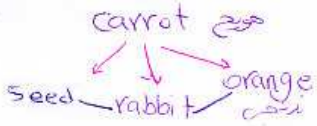
The queen and the king decided to traval by a ship to meet a man who was the owner of a huge factory in the world . He was the constructor of moelern planes .

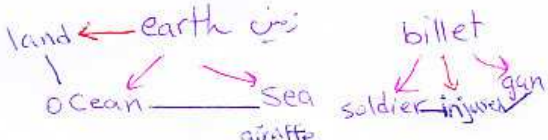

Argument Mapping Technique
Metro
Is metro the same as Train?
yes, because both of them move on rail.
No, metro works with electricity, moves under the ground, and often has high speed.
leech
Do physicians use leech in cure?
yes, In old remedy, doctors used leech to cure infectious diseases.
No, leeches are just blood-thirsty animals and live in humid areas.
cinnamon
cinnamon is perfumed and has medicinal property either.
yes, cinnamon is a perfumed plant which is used to cure different pains such as - stomacheche and intestineache.
No, it is just a perfumed plant, but it does not have medicinal property.
fleece
Fleece has various consumptions.
yes, it can also be used in weaving.
No, it is just used for warming animals.
bee
Bees are insects which produce honey and have many medicinal property.
yes, because from an oldera, people used honey and wax to cure pains and
No, all bees donot produce honey some of them are mortal and

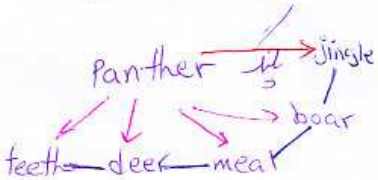
-:Behnaz Khosrojerdi:- -:"4" riazi:-

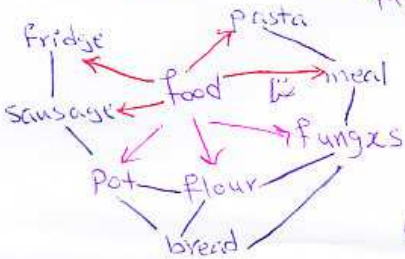
Concept mapping

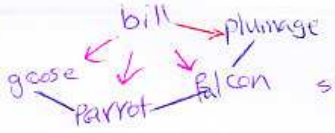


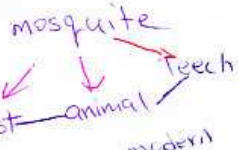


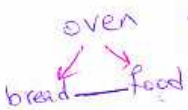


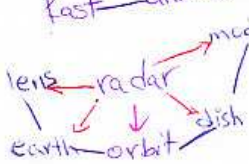


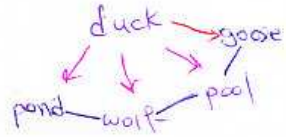


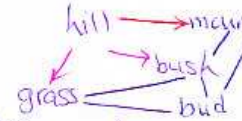


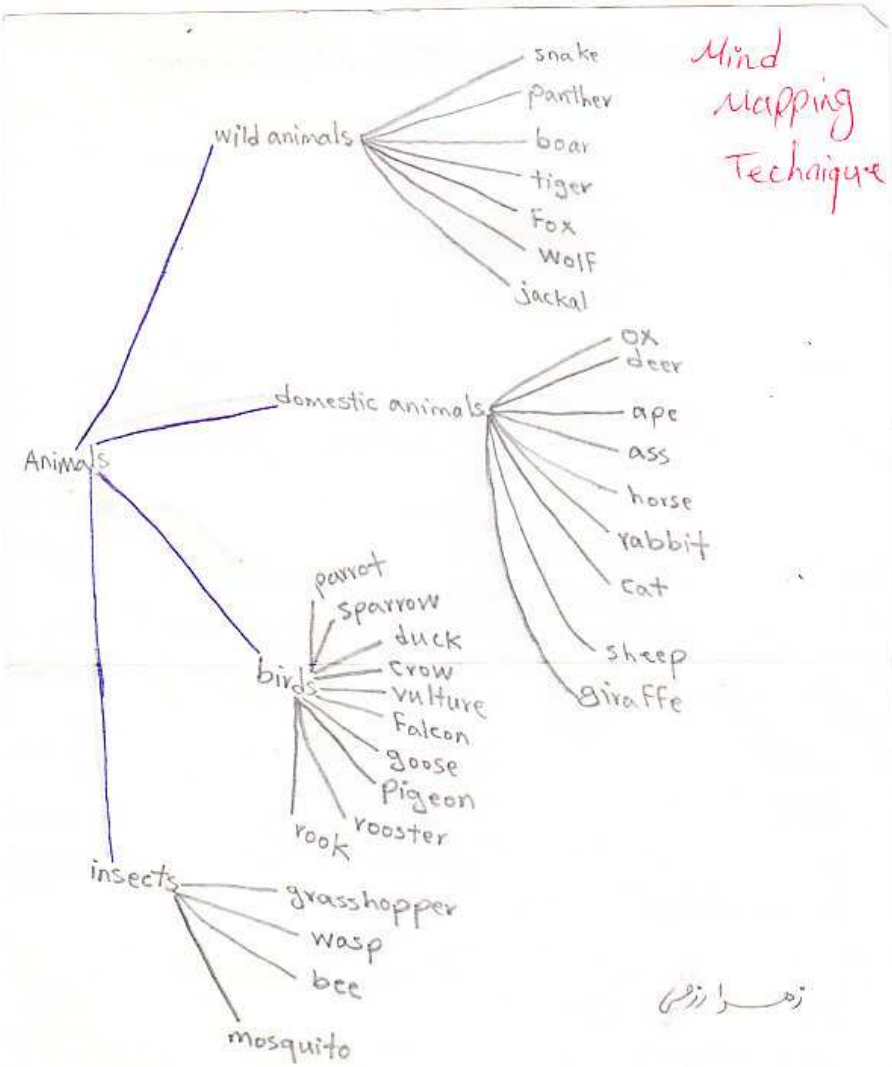











Mind Mapping Techaique
Animals
wild animals
snake
panther
boar
tiger
Fox
Wolf
jackal
domestic animals
ox
deer
ape
ass
horse
rabbit
cat
sheep
Giraffe
birds
parrot
sparrow
duck
crow
vulture
Falcon
goose
Pigeon
rooster
rook
insects
grasshopper
wasp
bee
mosquito
زهرا رزمی