

*The Effectiveness of Using an e-Mind Mapping Software Based Program in Developing Faculty of Education 2<sup>nd</sup> Year English Majors' Vocabulary Acquisition and Use*

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**Abstract**

**T**he present study was conducted to investigate the effectiveness of using an e- Mind Mapping Software based program in developing vocabulary acquisition and use of second year English majors at the Faculty of Education. A pre-post control group research design was used to achieve the research objectives. Sixty students were randomly divided into two groups: the treatment and the non treatment groups. The treatment group students were trained in the e-mind mapping based program to develop their vocabulary acquisition and use. The non treatment group students were taught the same content through the conventional method of teaching vocabulary. Tools of the study included needs assessment questionnaires to determine the sub skills of vocabulary acquisition and use that were most needed by second year English majors, a training program in vocabulary skills, a pre-post test in vocabulary acquisition, and a pre-post test in vocabulary use. Analysis of data obtained by students (using t- test) revealed that the treatment group significantly surpassed the non treatment one in the post performance of the tests. Discussion of these findings, recommendations and suggestions for further research are presented.

**Key Items: Vocabulary acquisition - Vocabulary use -**

**Introduction:**

The ability to recognize vocabulary is important for effective English learning. However, learning and memorizing

new vocabulary is a challenging task for students learning English as a foreign language (EFL). Students' limited vocabulary has restricted their capacities in learning English, especially in terms of reading and writing competencies. The conventional way of teaching and vocabulary learning strategy such as providing word explanations and repetitive practices is not effective for students.

Abdul Aziz (2016) mentioned that vocabulary is central to English language teaching and learning because without sufficient vocabulary students cannot really understand others or express their own opinions and creativity. It is very beneficial to learn vocabulary as it is essential for communication. If students do not understand the meaning of words, they will not be able to speak, write and translate anything in English. Thus, without basic vocabulary skills, students can not come out with good writing. These vocabulary skills are equally important to enable students to do well in the examinations. For that, a strong effort should be made to enable students to be better in their vocabulary skills. When students do not understand at least 90% of the words in a text, they do not adequately understand what they read (Sedita, 2005).

Research suggests that students acquire 2,000 to 3,500 new words a year and know the meaning of approximately 50,000 words by the time they graduate from high school (Graves, 2009; Lehr, Osborn, and Hiebert, 2004). Brown (2000) states that "vocabulary forms the building block of any language. Vocabulary is "a core component of the language proficiency and provides much of the basis for how well learners speak, listen, and write" (in Richards & Renandya, 2002, p. 255). Without having a comprehensive body of vocabulary and clear-cut strategies for acquiring new vocabulary, learners often fail to fulfill their potentials and may lose their enthusiasm in using opportunities available around them.

According to Nation (2001:4): "learning vocabulary is a cumulative process and that it must be deliberately taught, learned, and recycled. This is critical for several reasons: 1)

learners need to encounter the words in a variety of rich contexts, often requiring up to sixteen encounters, 2) learners remember words when they have manipulated them in different ways, so variety is essential for vocabulary teaching, and 3) learners forget words within the first twenty-four hours after class, so it is important to follow up a vocabulary lesson with homework that recycles the words"

In spite of this, Ghazal, (2007) mentions that "teaching vocabulary is mostly considered an addition to teaching grammar or simply a by-product of language teaching and communicative functions for many years. Since the mid-1990s, things have changed. The role of vocabulary knowledge has been recognized by theorists and researchers. Accordingly, numerous types of approaches, techniques, exercises and practice have been introduced into the field of teaching vocabulary. In other words, vocabulary has gained a higher status with greater interests from researchers, teachers and material designers".

Saleh (1997:12) argues that "the success in mastering a language is determined by the size of the vocabulary one has learned." But it is not only important how many words are learned but also how many words are remembered (Thornbury, 2002: 33). Involvement in word remembering, knowledge of memory sensory has an important value.

Learning new items involves storing them first in short-term memory, and afterwards in long-term memory. There are many factors affecting word storage such as the way words are presented, word frequency or how words are recycled. Moras (2001) suggests memory strategies to aid learning. These include:

- a. creating mental linkages (grouping, associating, placing new words into context).
- b. applying images and sounds (using imagery, semantic mapping, using keywords and representing sounds in memory).
- c. reviewing well in structured way.

- d. employing action (physical response or sensation or using mechanical techniques).

From these memory strategies, words can be stored in one's long-term memory. Moreover, it is believed that language learners only use their left-brain to acquire vocabulary as it is said that left brain is for logical and rational thinking, including words and languages. The right brain is for feeling, imagination rules, symbols or images; in other words, it is for creativity and visualization. Therefore, learners need to balance the use of both hemispheres of the brain to think perfectly and get the best results of learning vocabulary (Oxford, 1990).

Mind maps and diagrams are suggested for both memory sensory strategies and the theory of left and right brain combination in learning language. To use mind maps and diagrams is to apply images so that language items can reach long-term memory as well as to stimulate the whole brain by appealing to both creative and logical sides of the brain. Mind maps and diagrams allow students to clarify their thoughts by categorizing and grouping related ideas. As Thornbury (2002) says, "***Acquiring a vocabulary requires not only labeling but categorizing skills.***"

Li, Lui & Cheng (2010) mention that "vocabulary is a basic tool for developing language skills. The development of learning strategies is a critical milestone in our school". In their study, they used mind-mapping techniques that can be easily learnt and applied by learners. Mind-mapping is not a new idea. It has been adopted in writing although not widely in the teaching of vocabulary. They believe that mind-mapping could motivate students to learn through the use of colorful pictures and drawings. Visual clues in a mind map may enhance the knowledge retrieval and retention processes.

For Kisicek, Boras, and Bago (2010) "designing educational contents in and for the electronic environment with the help of information technology was a great opportunity to involve students in a creative learning process. Cultivating lifelong

learning skills in undergraduate students through the collaborative creation of digital knowledge maps was observed (Hanewald, 2012). The author indicates that the open-ended nature of mind maps has given students greater control while developing lifelong learning skills. According to Kotcherlakota, Zimmerman, & Berger (2013:252), "mind maps help students clarify their thinking and lay the foundation for in-depth expertise related to their research focus, review of the literature, and conceptual framework"

Furthermore, Ono, et al, (2014:780) emphasize that the mind-map picture gives the presenters the opportunities of promoting a new awareness, various kinds of discoveries, and a deeper reflection about their works. They come to the conclusion that their "system can be incorporated into Learning Management Systems (LMS), and it has a large potential for further use in a distant learning environment to capture an overall reaction from the audience all over the world"

As Hofland (2007) mentions, "mind mapping is a way that provides L2 learners with more meaningful repetitions and retention of the new words in any target language". By using pictorial and graphical design, mind mapping can provide a more vivid teaching atmosphere which promotes memory retention as well as the motivation of the learners (Liu, Zhao, & Bo, 2014).

Liu (2016) thinks that mind mapping can promote teaching efficiency and improve students' practical application ability, cultivate students' good thinking habits, aims at application of mind mapping in college English vocabulary teaching, puts forward three effective ways, namely teachers formulate mind mapping, encourages students to make mind mapping, and carries out network teaching.

Beare (2017) says that Mind Maps are one of his favorite tools for helping students learn new vocabulary. He also frequently uses Mind Maps to think creatively in other projects that he is working on. Mind Maps help students to learn visually.

## What is Mind Mapping?

Mind mapping is a highly effective way of getting information in and out of the brain. It is a creative and logical means of note-taking and note-making that literally "maps out" one's ideas.

All mind maps have some things in common. They have a natural organizational structure that radiates from the center and use lines, symbols, words, color and images according to simple, brain-friendly concepts. Mind mapping converts a long list of monotonous information into a colorful, memorable and highly organized diagram that works in line with the brain's natural way of doing things.

One simple way to understand a mind map is by comparing it to a map of a city. The city center represents the main idea; the main roads leading from the center represent the key thoughts in the thinking process; the secondary roads or branches represent one's secondary thoughts, and so on. Special images or shapes can represent landmarks of interest or particularly relevant ideas.

The great thing about mind mapping is that ideas can be put down in any order, as soon as they pop into the head. One is not constrained by thinking in order. Simply, throw out any and all ideas, then worry about reorganizing them later. The Mind Map is the external mirror of your own *radiant* or natural thinking facilitated by a powerful graphic process, which provides the universal key to unlock the dynamic potential of the brain.

### Benefits of Teaching with Mind Maps:

Buzan and Buzan (1993:232) explain, "Benefits of teaching with mind maps:

- a. They automatically inspire interest in the students, thus making them more receptive and co-operative in the classroom.

- b. They make lessons and presentations more spontaneous, creative, and enjoyable, both for the teacher and the students.
- c. Rather than remaining relatively rigid as the years go by, the teacher's notes are flexible and adaptable. In these times of rapid change and development, the teacher needs to be able to alter and add to teaching notes quickly and easily.
- d. Because mind maps present only relevant material in a clear and memorable form, the students tend to get better marks in examinations.
- e. Unlike linear text, mind maps show not just the facts but the relationships between those facts, thus giving the students a deeper understanding of the subject.
- f. The physical volume of lecture notes is dramatically reduced."

### **How to Make a Mind Map**

- Think of your general main theme and write that down in the center of the page. i.e. Food
- Figure out sub-themes of your main concept and draw branches to them from the center, beginning to look like a spider web.
- Make sure to use very short phrases or even single words.
- Add images to invoke thought or get the message across better.
- Try to think of at least two main points for each sub-theme you created and create branches out to those.

### **Mind Maps for Collocations:**

Beare (2017) mentions that a vocabulary activity that mind maps can really help with is learning collocations. Collocations are words that are commonly used together. For example, take the word "information". "Information" is a very general term, and we have all sorts of specific types of information. "Information" is also a noun. When working on collocations with nouns there are

three main areas of vocabulary to learn: adjectives/verb+noun/noun + verb. Here are the categories for mind map:

- Adjective + Information
- Information + Noun
- Verb + Information
- Information + Verb

### **Phrasal verbs with mind maps. (Springer, 2014)**

For example, write down the phrasal verb “make up” in the circle. Then, draw lines to the various definitions of “make up”: “create,” “lie,” “apologize,” “put on cosmetics,” “do something better the next time.”

### **Memorize the different forms of a verb.**

An example is “to write” (which you should write in the circle). Then, connect lines to different forms of the verb “to write”: “write,” “writing” (present-tense verb), “written,” “wrote,” “writing” (as a noun).

### **Background of the problem**

The importance of vocabulary in (EFL) learning process has been widely recognized. Much of the research indicates that enlarging language vocabulary has been one of the objectives of many EFL learners. When learning English, students in a teaching context, try hard to improve their vocabulary knowledge. However, students have to cope with many difficulties in learning vocabulary, especially in memorizing and recalling the word meanings.

Low vocabulary proficiency makes an obstacle for them in acquiring language knowledge and participating in the activities in class. It is frustrating when they discover that they cannot communicate effectively because they do not know enough words. Students usually forget the words they learnt or fail to use words communicatively. They cannot get words into long-term memory and recall them when necessary. Although they spend most of their time learning vocabulary, the results are disappointing. One of the reasons for students’ low vocabulary



retention and retrieval can be addressed as their learning habits. Their learning habits such as writing down words on a piece of paper, learning words by heart, heavily depending on wordlists in textbook, passively waiting for teacher's explanation of new words seem to be ineffective and make them bored with learning vocabulary. In order to memorize new items, students often use rote memorization techniques.

As students reported, they used to write down the words for several times, to speak aloud the words and to make sentences with words. They admitted that they fail to recall most of the words they had learnt before as there were no clues. It can be seen that students' bad memory is due to lack of appropriate vocabulary memorizing strategies. They are not provided with different vocabulary learning techniques and are not encouraged to use them. They also have no chance to work with words in a deeper process. This is a pity because working with words can be enjoyable and satisfying for learners. The questions posed to teachers of English are how to help students memorize words effectively and how to motivate them in vocabulary lessons. Teachers can encourage their students to systematically record vocabulary that they taught in class. They also provide them with strategies to transfer this record into their long-term memory so that each item is added to the stock of words and phrases that they can understand and use when necessary.

To shed light on the problem of the students' deficiency in vocabulary acquisition and use, EFL staff members specialized in teaching the "reading" course were informally interviewed. They asserted that vocabulary acquisition and use, though needed by college students, are rarely practiced. Vocabulary items are mostly dealt with whenever there is a reading passage. They also mentioned that the most important skills that should be developed by college students are training them to recognize and use vocabulary items. This state of affairs was more emphasized by reviewing the literature. Most authors and research workers emphasize that traditional language programs regard vocabulary learning as a means of language study more than as a means of

obtaining information and communicating ideas. Therefore, the present study was undertaken to investigate the effect of developing vocabulary acquisition and use via e-mind mapping software.

### **Theoretical Background:**

Each bit of information entering the brain, every sensation, memory or thought, which incorporates every word, number, code, food, fragrance, line, color, image, beat, note and texture can be represented as a central sphere from which radiate tens, hundreds, thousands, even millions of hooks.

Each hook represents an association, and each association has its own infinite array of links and connections. From this gigantic information processing ability and learning capacity derives the concept of Radiant Thinking of which the Mind Map is a manifestation. The brain's Radiant Thinking pattern may thus be seen as a gigantic Branching Association (Buzan, 2000). Mind mapping is a highly effective way of getting information in and out of the brain. Mind mapping is a creative and logical means of note-taking and note-making that literally "maps out" ideas.

All Mind Maps have some things in common. They have a natural organizational structure that radiates from the center and use lines, symbols, words, color and images according to simple, brain-friendly concepts. Mind mapping converts a long list of monotonous information into a colorful, memorable and highly organized diagram that works in line with your brain's natural way of doing things.

The great thing about mind mapping is that you can put your ideas down in any order, as soon as they pop into your head. You are not constrained by thinking in order. Simply, throw out any and all ideas, then worry about reorganizing them later. While it is absolutely possible to mind map the old-fashioned way with a pen and paper, why not take advantage of the technology age and save yourself some much needed time?

## **The Use of Images in Mind Maps**

It is commonly accepted that images convey much more information than a key word or even a whole sentence. But there are other reasons you should use them too:

### **Memory:**

Novak (1998) points out that Mind Maps summarize information into visual symbols. They help to remember that information.

### **Creativity:**

According to Margulies (2004), before students learn a language, they visualize pictures in their minds which are linked to concepts. Unfortunately, once children are trained to write only words in one color on lined paper, their creative channels and mental flexibility diminishes. Images keep this creativity fired up.

### **Impact:**

Presenters who used visual language were perceived by the audience as more effective than those using no visuals – they were clearer, more concise, more interesting, more professional, and more credible.

## **Using Key Words**

Buzan (2007) has always been passionate about using key words in Mind Maps rather than phrases or a collection of words. He states that a key word is essentially a word that will trigger as much relevant meaning as possible. So by using key words in your Mind Map, you open up your thinking and stimulate your mind to dig deeper and see greater detail on thoughts that were previously vague. This can be a difficult process when the key word is trapped in a sentence. It's also far easier to remember single words and striking headlines than to remember long sentences.

Mind Mapping brings together your left brain (words, logic, numbers, linearity) and right brain (curves color, creativity, images, space) which dramatically increases the mind power. By

using both cortical sides simultaneously you are maximizing your brain's potential. The more you integrate left and right brain activities, the more the brain's performance becomes synergetic. This means that each cortical skill enhances the performance of other areas so that the brain is working at its optimum (Sperry, 1968).

### **Associations and Connections:**

Mind Maps are based on associations and connections. Once ideas are displayed in Mind Map form, patterns of thought can be easily examined revealing similarities and linkages between information in different parts of the map. By encouraging people to link apparently different ideas and concepts in this way, Mind Mapping actually promotes divergent and highly creative thinking (White and Gunstone, 1992).

### **The Memory Technique of "Chunking"**

Our short-term memory is on average only capable of storing seven items of information and chunking can help us use this storage space more effectively (Glass and Holyoak, 1986).

### **Radiant, Organic Structure – works just like your brain**

In a Mind Map, information is structured in a way that mirrors exactly how the brain functions- in a radiant rather than linear manner. The brain likes to work on the basis of association and it will connect every idea, memory or piece of information to tens, hundreds and even thousands of other ideas and concepts (Anokhin, 1973)

### **The Concept of Radiant Thinking**

Mind Mapping on the other hand, is the external expression of Radiant Thinking and so provides a limitless, more natural and efficient way of using your brain (Buzan and Buzan, 1994). Beginning from a central focal point, you can work outwards to record ideas in a random yet organized fashion which matches your brain's thinking patterns. The radiant structure of a Mind Map also encourages you to continue thinking for longer times. (Ornstein, 1991)

Research on learning has uncovered that the connection-building and individual sense-making benefits of Mind Maps are vital to the improved understanding of abstract concepts (Roth & Roychoudhury 1992).

What's more, the process of manifesting your thinking in a visual way requires a more active level of motivation and involvement (Novak, 1998). As a result, Mind Mapping promotes more meaningful learning than learning by rote or simply memorizing facts and figures.

### **The Power of Images and Icons**

Using imagery stimulates the brain's visualizing capacity which brings enormous creativity benefits and enhances the memory's storing and recalling capabilities. Images convey more information than any amount of words that you could legibly fit into a single Mind Map so your notes can be as brief and compact as possible.

### **The steps of making a mind map ( adopted from: Buzan .2005:4)**

- a. **Starting from the middle** to give freedom to the brain to spread in all directions and to express it more freely and naturally.
- b. **Using picture** for the central idea to become more interesting, and to help students to concentrate, and activate their brains.
- c. **Using colour** to make Mind Map livelier, adding energy to Creative Thinking, and be fun.
- d. **Connecting the main branches** to the central picture and connect the second and third level of branches to the first and second level, and so on. Why? Because the brain's work is based on association. Brain is happy to link two (or three, or four) things at once. If we connect the branches, we will be easier to understand and to remember.
- e. **Drawing curved connective lines.** Why? Because the straight lines will bore the brain.

- f. **Using one key word for each line** .Why? Because a single key word gives more power and flexibility to the Mind Map.
- g. **Using the picture**. Why? Because like a central picture, each picture has the meaning of a thousand words.
- h. Learning vocabulary is a crucial part for EFL learners. Teachers use
- i. different strategies to facilitate vocabulary acquisition. For example, they may provide explicit explanations and synonyms of the words, or use role-plays or multi-media to increase exposure. Some articles and books have shown positive relationships between vocabulary learning strategies and learning outcomes. Gu (2010) has studied the nature of the former in this connection. Students often use repetition as an important procedure for vocabulary acquisition (Ellis & Beaton, 1993).
- j. However, learning vocabulary by reciting words is painful and ineffective (Li, Yang & Chen, 2010). To enhance the effectiveness for recalling definitions, additional procedures should be used, such as the keyword technique (Lawson & Hogben, 1998). Memory strategies which were regarded as powerful mental tools have also been studied. As illustrated by Sozler (2012), they can facilitate remembering and understanding through the use of acronyms, words and images.

### **The Use of Mind Mapping:**

Mind-mapping can be used in different learning and thinking processes.

People make use of various colors, images, symbols and arrows, etc. to associate and connect ideas. Buzan (1996) mentions that the drawing of mind maps requires the use of both sides of the brain and therefore can increase productivity and memory retention. The strong visual appeal of mind maps can speed up the learning process and help students to memorize and recall information effectively (Brinkmann, 2003). Also, the

more personalized the mind maps, the more easily the learner could retrieve information (Buzan & Buzan, 2000).

In the education sector, mind maps are commonly used for note making, creative thinking, report writing and decision making (Li, Yang & Chen, 2010). As illustrated by Wen (2006), graphic learning helps to promote learning motivation and develops self-learning abilities. The use of graphic learning by students can enhance their reading and writing skills. Through mind-mapping, learners develop their “personalized” maps with pictures and colorful lines that stimulate their interests and creativity and consequently their competences in reading and writing (Wang, 2007).

As stated by Li, Yang & Chen (2010), mind-mapping is useful for the building of knowledge and understanding, ideas association and vocabulary learning.

### **The Efficacy of the Mind Map Study Technique**

A study conducted by Farrand, Hussain and Hennessey (2002), aimed to examine the effectiveness of using the Mind Map technique to improve factual recall from written information, looking at whether Mind Mapping overcomes many of the limitations of more conventional study techniques. It was concluded that “Mind Maps provide an effective study technique when applied to written material” and are likely to “encourage a deeper level of processing” for better memory formation.

### **Mind Maps as a Classroom Exercise**

Mind Mapping is an active and collaborative learning tool that allows an educator to move beyond the traditional ‘chalk and talk’ style of teaching. Results from an in-class exercise (Budd, 2004) which introduced a group of students to Mind Maps and then a topic to Mind Map, supported the idea that students are engaged in active learning. In particular, students with higher scores for a ‘doing’ learning style agreed that they learned a lot from the Mind Map exercise.

## **The use of Mind Mapping in Teaching and Learning**

In a study by Boyson (2009), the use of Mind Maps in teaching and learning was examined in three different ways:

1. Using Mind Maps as a note-making tool in developing the teacher's own subject knowledge
2. Using Mind Maps to present information to students in lessons.
3. Introducing Mind Mapping as a note-making format for students

## **The steps of teaching vocabulary by using e-mind maps were as follows:**

- a. Showing the mind map to the students.
- b. Explaining the central idea or word and its relationship with other ideas or words.
- c. Giving the examples of words taught in sentences.
- d. Writing a new central idea or word on the middle of blackboard.
- e. Asking the students to find other ideas or words related to the central idea or word given.
- f. Asking the students to explain the relationship between the central idea or word and other ideas or words.
- g. Asking the students to use the words acquired in sentences.
- h. Checking the students' understanding of the vocabulary discussed by giving them some questions.

## **The results of the student survey revealed that:**

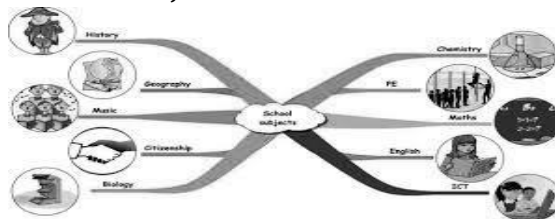
\* More than 80% of students agreed that Mind Mapping might help them to remember information.

\*72% of students agreed that Mind Mapping helped them to know how each topic fits into a subject.

\*More than 68% said they would use Mind Mapping for revision.



\*More than 75% of respondents said they would like to use Mind Maps in other subjects.



## Studies Related to Mind Mapping and Vocabulary Acquisition and Use

Remembering new words is often not an easy job for learners. That is why teachers try to utilize various techniques to present new words to them. In a paper presented by Baleghizadeh and Naeim (2011), semantic mapping is introduced as a vocabulary presentation technique, which is believed to help learners remember words better as they see the connections among them in a map. This claim is verified through running a single-subject study, using two semantic maps. Although the results confirmed that semantic mapping fosters vocabulary retention, no conclusive assertion is made due to the nature of the study given the contradictory results reported in the literature.

The findings of the data analyses of a study conducted by Mamura (2011) show that (1) Mind mapping can help the teacher to present vocabulary items; (2) Mind mapping can help the students to improve their abilities in memorizing English vocabulary items; (3) The student's improvement in memorizing English vocabulary gives a good effect to the improvement in mastering English vocabulary; (4) Aspects in mind mapping such as imagination and association can help the students understand the words and memorize them in a short time; (5) The kind of the activities given can explore the use of vocabulary items learned in the classroom; (6) The use of time duration is effective to control the students in finishing their works on time; (7) There is an increase of average scores of 1.9052 from 6.5862

(pre-test) to 8.4914 (post test). According to the t statistic, the difference is significant at  $p < 0.05$ .

Fadhilawati (2013) carried out a collaborative action research to improve the vocabulary achievement of high school students using mind mapping and five reviewing patterns proposed by Buzan (2009). The subjects were 35 students. The data of the research included qualitative and quantitative data. The finding showed that the implementation of mind mapping and 5 reviewing patterns could improve the students' vocabulary achievement, from the mean score of 55.66 to 80.57.

Sahrawi (2013) tries to find out the effectiveness of mind mapping in teaching English vocabulary. This study was conducted in the academic year 2012/2013 where the population was eighth grade students with a total number of 112 students. The data show the difference between pre-test and post-test. The average achievement of the students' pre-test was 46.28 and 86.14 in the post-test.

It is true that vocabulary is central to language teaching and learning and is of paramount importance to a language learner. An article by Shakouria, et al. (2014) attempts to find out and compare the effects of two vocabulary teaching methods on Reading ability of 60 students. Experimental group received implicit vocabulary teaching while Control Group instructed through explicit vocabulary teaching. During the online lessons different explicit vocabulary presentation techniques were used including mind-mapping. The teacher utilized an inferred method for teaching vocabulary implicitly which means students were supposed to guess the words from the passages by using context clues. The results of t-tests and ANCOVA for the comparison of the effect of implicit and explicit instruction on reading comprehension through online sessions indicated that there was no significant difference in the two methods.

Yanti, (2014) investigates whether Mind Mapping technique has any significant effect on the Eight Grade students' Vocabulary Mastery.

The research is experimental and its design is quasi experimental which uses control group pre-test-post-test design. Participants are two classes of 60 eight grade students taken as the control and the experimental groups. The hypothesis was accepted as the computed t- value (9.25) is significant.

Al Jarf (2015) presents a model for enhancing EFL freshmen students' vocabulary with mind mapping software. Results of a vocabulary pretest showed that students majoring in translation had several weaknesses such as poor vocabulary knowledge, faulty pronunciation, inability to connect pronunciation with the written form, relating words to their parts of speech, poor spelling, and inability to categorize words into groups sharing the same semantic features and others. This article shows EFL instructors how mind mapping software can be used to help students learn vocabulary effectively. Results showed significant differences in vocabulary acquisition as revealed by the posttest.

This study of Heidari<sup>1</sup> and Karimi<sup>1</sup> (2015) attempt to explore the effect of mind mapping on vocabulary learning and retention. To fulfill this purpose, 40 male first-grader high school students from two intact classes were selected and randomly assigned to the experimental and control groups, each including 20 male students. A vocabulary pre-test was administered to the groups. As for the experimental group, vocabulary was taught by a myriad of mind mapping options such as color, symbols, keywords, design, images, and chunks. The control group was taught through conventional techniques such as translation into L1 and provision of synonyms and antonyms. Then, a posttest was administered. The major finding of the current study was that teaching English vocabulary through the use of mind maps could help the experimental group outperform the control group on the delayed posttest.

The study by Buran. & Filyukov (2015) aims to describe meaningful, powerful and effective tools used to encourage technical students to apply mind mapping techniques in the language classroom. For this purpose, they overview the previous studies and describe the implementation of mind mapping techniques in the learning process. The results show that mind maps help students solve problems, brainstorm

creative ideas, remember new vocabulary, take notes, enhance their reading skills, organize the tasks and prepare presentations. This study concludes that mind mapping technique is considered an up-to-date, creative, useful and available tool for students, educators and researchers.

Bahadori<sup>1</sup> and Gorjian (2016) investigate the role of mind mapping software in using vocabulary among EFL pre-intermediate students. Sixty EFL learners were chosen and divided into two groups each having thirty participants. The experimental group was trained through the Mind Mapping software from Xmind.net website as treatment. Eight reading passages were covered in ten sessions. The control group received conventional instruction on learning vocabularies including definitions, explanation and translation. Results show that the learners who used the mind mapping software outperformed the control group. However, both groups showed progress in learning vocabulary. Comparison of the groups' pre and post-tests show that the experimental group performed better than the control group ( $p < 0.05$ ).

Abdul Aziz (2016) conducted a study that aims at identifying whether or not the use of mind mapping technique increases the vocabulary list of the students and to know the difference in vocabulary list increment among the students. The quasi experimental research study employed pre and post test for both control and experimental group. It was found that mind mapping technique helped to improve students' vocabulary list.

Erniyati's (2016) study aims to describe: (a) the teaching process by using mind mapping technique, (b) students' vocabulary and writing paragraph ability, and (c) the students' response toward the use of mind mapping technique in learning. The participants were 23 female students. The research was conducted in three cycles each consisting of three meetings. The researcher used observation, field note, questionnaire and tasks in collecting the data. Findings of this research revealed that the teaching and learning process by using mind map was more interesting and students gave participation more than before;

they were enthusiastic in recalling and brainstorming the words related to the topic given.

Yunus, and Chien aim to investigate students' perceptions on the use of mind mapping strategy in their MUET (Malaysian University English test) writing. To achieve the aim of the study, a questionnaire was used to collect both quantitative and qualitative data. Students with different achievement in MUET were selected to participate in the study. The analysis of the data indicates that most students had positive perceptions of the use of mind mapping strategy in enhancing their writing skills. The use of mind mapping helps students plan their writing, have a deeper level of understanding of the writing topics and promote creativity in writing. The findings of the study are hoped to provide insights to the students, teachers and curriculum designers to integrate mind mapping strategy in ESL classes.

### **Statement of the Problem:**

Out of the results obtained from the pilot questionnaire, it became evident that 2<sup>nd</sup> year English Majors need to develop their vocabulary acquisition and use. Reviewing literature, mind mapping is found to be an effective technique for achieving this purpose. Therefore, the present study was an attempt to investigate the effectiveness of using e-Mind Mapping Software Technique in developing Faculty of Education 2<sup>nd</sup> Year English Majors' vocabulary acquisition and use.

### **Objectives of the Study:**

The present study was conducted to achieve the following objectives:

1. developing vocabulary acquisition of 2<sup>nd</sup> year English Majors at Minia Faculty of Education through an e-mind mapping software program .
2. developing vocabulary use of 2<sup>nd</sup> year English Majors at Minia Faculty of Education through an e-mind mapping software program .

### **Hypotheses of the Study:**

The following hypotheses were tested:

1. There would be a statistical significant difference between means of scores obtained by the subjects of the treatment and the non treatment groups in the post performance on the Vocabulary Acquisition Test (favoring the treatment group).
2. There would be a statistical significant difference between means of scores obtained by subjects of the treatment and the non treatment groups in the post performance on the Vocabulary Use Test (favoring the treatment group).

### **Significance of the Study:**

The conventional methods of teaching vocabulary are observed to be of limited value in producing efficient language learners. Therefore, the present study was undertaken to examine the effectiveness of a program based on e-mind mapping software technique in developing vocabulary acquisition and use of 2<sup>nd</sup> year English majors at the Faculty of Education.

Research shows that e-mind mapping technique is a viable and potentially successful mode for acquiring and using vocabulary.

The literature reviewed also indicates that e-mind mapping technique is gaining more and more ground among foreign language learners and teachers. This positively contributes to the learning of foreign languages. Aspects of this contribution are:

- Helping students strengthen their linguistic skills by positively affecting their learning style and by helping them build effective learning strategies.
- Making it possible for students to learn by doing things and to become the creators of their own learning.
- Developing students' language skills, problem solving skills, creative thinking, and collaborative work.

- Departing from the conventional ways of teaching and learning vocabulary.
- Encouraging students to organize their thought.

In addition to the above contributions of the previous research, the present study was expected to be significant in constructing a program particularly directed to pre service teachers to enhance their vocabulary acquisition and use. Besides, course designers and instructors will find it useful and effective in the programs of teacher preparation.

### **Delimitations of the Study:**

1. The study was delimited to (60) 2<sup>nd</sup> year English majors at the Faculty of Education, Minia University. The program would help them have sufficient practice during second, third, and fourth years and would help them to better perform the tasks required for studying in the English department. It was supposed that the skills of vocabulary acquisition and use that they would develop at the university would support them in their future profession as teachers.
2. Vocabulary acquisition skills were limited to the sub skills that are most needed by 2<sup>nd</sup> year English majors and these were decided upon after administering a questionnaire on a sample of those students, TEFL staff members, and experts. These skills are: identifying word collocations, compound words, idioms and phrasal verbs, guessing the meaning from context, identifying collective nouns, and confusing words, checking parts of speech, identifying words with multiple meanings, guessing the meaning of a word through synonyms, and antonyms, checking the meaning that fit the word context, identifying word derivatives, different prefixes and suffixes, different expressions of certain words, lexical fields, and parts of a word.
3. Vocabulary use skills were limited to the sub skills that were most needed by 2<sup>nd</sup> year English majors and these

were decided upon after administering a questionnaire on a sample of those students, TEFL staff members, and experts. These skills are: Using the new words in sentences from their own, spelling the new words correctly, giving the synonyms and the antonyms of the word, drawing the word mind map, giving words related to the new word, using the words in new contexts, using the different forms of the word as a noun, a verb, an adjective, and as an adverb, using collocations, modal verbs, educational idioms, and phrasal verbs in context and guessing the meaning of words from context.

### **Definitions of Terms:**

#### **Mind Mapping:**

According to Budd (2004:36) "a mind map is an outline in which the major categories radiate from a central image and lesser categories are portrayed as branches of larger ones"

(Buzan, 2006:6) stated that "Mind-map is a highly effective way of getting information in and out of the brain. Mind-mapping is a creative and logical means of note-taking and note-making that literally maps out ideas.

According to **Springer** (2014) "A **mind map**" is a tool for learning new things like vocabulary words and expressions. Mind maps essentially work in a similar way that our brains do-by organizing a list of items into categories.

The researchers operationally adopted the definition of Springer (2014).

#### **Vocabulary:**

According to Sofa (2011:2), "Vocabulary is the study of the meanings of words, how the words are used, root words, prefixes, suffixes and analogies."

Hanson and Padua (2011) define vocabulary as words we use to communicate in oral and print language.



**Vocabulary Acquisition:**

Beck & McKeown, (1991) define vocabulary acquisition as learning and understanding new terminology to such a degree that it can be used accurately in oral and written communication. Nordquist (2016) defines it as the process of learning the words of a language. The researchers operationally adopted the definition of Nordquist (2016).

**Methodology****Research Design**

A quasi experimental pretest-posttest control group design was employed. An e-mind mapping program, for developing vocabulary acquisition and use, was developed by the researchers and used with the randomly chosen treatment group, whereas, conventional word lists teaching method was used with the randomly chosen non-treatment group. Thirty male and female students enrolled in the 2<sup>nd</sup> year in 2016- 2017 Academic Year formed the treatment group and another 30 formed the non-treatment group. The data of the study were gathered by pre-post vocabulary acquisition test and vocabulary use test. The treatment group was trained using the e-mind mapping software training program.

**Variables of the Study:****Independent Variable:**

An e- Mind Mapping program for developing vocabulary acquisition and use.

**Dependent Variables:**

1. Developing students' vocabulary acquisition.
2. Developing students' vocabulary use.

**Control Variables:****1-Age:**

The age level of the participants ranged between 17 and 18.6 years old with approximately the same number in each

group. Table (1) shows no significant difference between the two groups as t -value (0.05) is not significant at .05 level. See table (1):

*Table (1) t-value Result of Participants' Age*

Group	Subjects	Mean	SD	DF	t-value
Treatment	30	221.13	5.45	58	*0.05
Non-treatment	30	221.20	4.52		

\* Not significant at .05 level

## 2- Years of Studying English:

Students in both groups studied English for 13 years, from primary one till the end of first year –University level.

## 3-Level of performance in the pre-vocabulary Acquisition test:

Table (2) below shows no significant difference between the two groups in the pre vocabulary acquisition test since t-value (0.43) is not significant at 0.05 level. See table (2).

*Table (2) t-value Result &  $\eta^2$  between mean scores of the Treatment and non-Treatment Groups in the Pre- Vocabulary Acquisition*

No	group	Mean	SD	tvalue	R	$\eta^2$
30	Treatment	27.10	5.58			
30	Non-treatment	26.50	5.07	*0.43	0.74	0.18

\*Not Significant at 0.05

## 4- Level of performance in the pre-vocabulary use test:

Table (3) below shows no significant difference between the two groups in the pre test since t-value (0.89) is not significant at 0.05 level.

*Table (3) t-value Result &  $\eta^2$  between mean scores of the Treatment and non-treatment Group in the Pre- Vocabulary Use Test*

No	Group	Mean	SD	t-value	$\eta^2$
30	Treatment	24.03	4.41	0.89*	0.35
30	Non-treatment	24.97	3.5		

Not Significant at 0.05

### **Instruments of the study:**

The researchers developed the following Instruments:

- A needs assessment questionnaire in the vocabulary acquisition skills.
- A needs assessment questionnaire in the vocabulary use skills.
- A Vocabulary Acquisition Test.
- A Vocabulary Use Test.

The following is a description of the different Instruments :

### **1- The needs assessment questionnaires on the vocabulary acquisition and use skills.**

These questionnaires aimed at specifying the vocabulary skills that are most needed by 2<sup>nd</sup> year English majors. Building the questionnaires went through the following steps:

- Reviewing the literature related to the field of vocabulary skills.
- Building up the questionnaires following these steps:
  - a. stating the objectives of the questionnaires.
  - b. stating the sub skills.
  - c. identifying the opinions of the jury members through preliminary questionnaires .

### **Validity of the questionnaires:**

Seven TEFL specialists, the jury members, approved the face validity of the questionnaires, their suitability and necessity for the participants.

### **2- A Test in Vocabulary Acquisition Skills**

#### **Objectives:**

This test was designed to:

1. assess second year English majors' performance in vocabulary acquisition skills,

2. ensure equality between the two groups through piloting, and measure the degree of improvement after the course is over.

### **Test Construction:**

The acquisition test consisted of thirty items representing the most important objectives of the program.

### **Item Type:**

1. **Part 1:** Multiple choice items .( Questions 1 to 20)
2. **Part 2:** Multiple choice items (Questions 21 to 30)
3. **Part 3:** Identification items ( Questions 31 to 35 )
4. **Part 4:** antonyms ( Questions 36 to-40)
5. **Part 5:** matching ( Questions 41 to 45)
6. **Part 6:** affixes (Questions 46 to 50)

### **D- Scoring:**

One point was given for each test item. The total score is (50) points.

### **Validity of the Test:**

A group of 30 2<sup>nd</sup> year English majors were selected for the pilot study. The test was submitted to a jury of 7 qualified and experienced TEFL specialists. Their suggestions were taken into consideration. The jury members confirmed the suitability and applicability of the test.

### **Face Validity of the Test:**

The test was submitted to a jury of qualified and experienced EFL and TEFL specialists. They were requested to judge the linguistic stating of the items, appropriateness, applicability, and fitness of the items for the participants, and how far the items measure the program objectives. Their suggestions were taken into consideration. They confirmed the suitability and applicability of the test.

### The Internal Consistency of the Test Items:

The validity of the test was determined by computing internal consistency of each item. This was calculated by using (Pearson correlation formula).

Correlation coefficient ranged from 0.41 to 0.67. See Table (4):

**Table (4) Internal consistency of Vocabulary Acquisition Test Correlation,  $\eta^2$  & Alpha between individual question and the total test**

Qs	Q1	Q2	Q3	Q4	Q5	Q6
R	*0.68	*0.51	*0.45	*0.30	*0.41	*0.44
$\eta^2$	**0.95	**0.93	**0.93	**0.90	**0.89	**0.89
Alpha	**0.97	**0.82	*0.52	*0.56	*0.60	*0.62

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

### G- The Reliability of the Test:

The test was administered to thirty first year English Majors. The data obtained was computed to calculate the reliability coefficient. The reliability coefficient (0.97) was determined by the test - retest method. According to McQueen and Knussen (1999) test- retest reliability is the simplest and most direct method for demonstrating the test reliability. Thus the reliability coefficient of this test is considered within the acceptable range. See table (5).

**Table (5) Correlation Coefficient Between Mean Scores of the Test-re-Test of Vocabulary Acquisition**

	Mean	S.D	r	Alpha
Test	33.00	5.76	*0.97	0.96
Re-test	32.86	5.52		

\*Significant at 0.01

### Testing Time

During piloting the test, the researcher calculated time taken by each student finishing the test and the average was found to be 90 minutes. Thus the testing time is one and half hour.

## Item Analysis

### a- Item Difficulty

Responses to individual items were analyzed to determine item difficulty index of this test. The difficulty index of each item ranged from 0.35 to 0.50 . Hence, the difficulty index of the items of this test is acceptable. See Table (4).

### b- Item Discrimination Power:

Item Discrimination was calculated to determine how well each item discriminates between high and low achievers. To achieve this purpose, the researcher separated the highest and the lowest scores on the test. The discriminating items are those answered correctly by more of the higher group than of the lower one. Discrimination power ranged between 0.42 and 0.71. Facility index ranged between 50 to 57. See Table (6).

*Table (6) Indices of Difficulty, Facility & Discrimination of the Vocabulary Acquisition Test*

N	High	Low	Fac	Dis	Diff
1	5.0	1.0	0.64	0.43	0.36
2	6.0	1.0	0.64	0.43	0.36
3	5.0	1.0	0.57	0.57	0.43
4	5.0	2.0	0.57	0.57	0.43
5	5.0	1.0	0.50	0.43	0.50
6	6.0	2.0	0.50	0.71	0.50

## 2-A Test in Vocabulary Use Skills

### Objectives of the test

This test was designed to:

1. assess 2<sup>nd</sup> year English majors' performance in the Vocabulary Use Test .
2. ensure equality between the two groups through piloting .
3. measure the degree of improvement after the course is over.

### Construction of the test

The **vocabulary use** test consisted of 50 questions (10 parts) of different instructions. They represent different

objectives. The test score is the number of questions answered correctly.

### **Item Type:**

1. Part 1: forming sentences (Parts of speech 1-5).
2. Part 2: forming sentences (phrasal verbs- idioms- and collocations questions 6-11).
3. Part 3: choose (questions 12-20).
4. Part 4: matching – forming sentences – (questions 21-25).
5. Part 5: matching – forming sentences – (questions 26-30).
6. Part 6: matching – forming sentences – (questions 21-35).
7. Part 7: rearranging letters to form words and then sentences –36-40 .
8. Part 8: guessing meaning of words (Questions 41-43).
9. Part 9: Multiple choice (questions 44-45).

Part 10: Complétion (questions 46-50)

### **D- Scoring:**

The score is simply the total number of correctly marked answers. One point is given for each test item. The total score of this test is (50).

### **Validity of the Test**

The test was submitted to a jury of seven experienced TEFL specialists. Their suggestions were taken into consideration. The jury members confirmed the suitability and applicability of the test.

### **Face Validity of the Test:**

The vocabulary use test was constructed on the basis of the specific objectives included in the training program. The test was submitted to a jury of qualified EFL and TEFL specialists. They were requested to judge the linguistic stating of the items, appropriateness and fitness of the items for the participants, and how far the items measure the program objectives. Their

suggestions were taken into consideration. They confirmed the suitability and applicability of the test.

### Internal Consistency of the Test:

The validity of the test was determined by internal consistency of each item by using (Pearson correlation) formula. Correlation coefficient ranged from 0.01 to 0.73. See table (7).

*Tabl (7) Internal consistency of Vocabulary Use Test Correlation,  $\eta^2$  & Alpha between individual questions and the total test*

Qs	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10
	Q.1-5	Q.6-11	Q.12-20	Q.21-25	Q.26-30	Q.31-35	Q.36-40	Q.41-43	Q.44-45	Q.46-50
R	0.73	0.57	0.69	0.31	0.37	0.43	0.39	0.02	0.01	0.14
$\eta^2$	0.94	0.92	0.89	0.89	0.91	0.91	0.85	0.91	0.83	0.88
Alpha	0.64	0.74	0.88	0.67	0.63	0.65	0.69	0.31	0.59	0.36

### G- The Reliability of the Test:

The test was administered to thirty first year English Majors. The data obtained was computed to calculate the reliability coefficient. The reliability coefficient of the test score (0.95) was determined by the test-retest method and is considered by McQueen and Knussen (1999) to be within the acceptable range. See Table (8).

*Table (8) Coefficient Correlation of the test-re-test of the Vocabulary Use.*

No		Mean	S.D	R
30	Test	28.87	4.49	*0.95
30	Re-test	28.30	4.63	

Significant at 0.01

### Testing Time:

In the pilot study, time taken by each student was recorded and divided by the whole number of students taking the test. Time duration amounted to two hours.



## Item Analysis:

### a- Item Difficulty:

Responses to individual items were analyzed to determine item difficulty index of this test which range from 0.33 to 0.59. Hence, the difficulty index of the items of this test is acceptable. See table (9).

### b- Item Discrimination Power:

Item Discrimination was calculated to determine how well each item discriminates between high and low achievers. To achieve this purpose, the researcher separated the highest and the lowest scores on the test. The discriminating items are those answered correctly by more of the higher group than of the lower one. Discrimination power range between 0.35-59. The results revealed that there is a discriminating power of the items of the test. See Table (9).

*Table (9) Item Difficulty and Discrimination of the Vocabulary Use Test*

No.	Diff Index	Disc. Power	No.	Diff Index	Disc. Power
Part 1	0.52	0.35	Part 6	0.54	0.35
Part 2	0.45	0.37	Part 7	0.59	0.34
Part 3	0.33	0.35	Part 8	0.42	0.44
Part 4	0.50	0.35	Part 9	0.54	0.49
Part 5	0.52	0.45	Part 10	0.52	0.35

## Procedure Followed in Teaching the Treatment Group

1. The session began by face to face interaction. The instructors posed a question to arouse students' interest and motivation.
2. The instructors started by presenting the title, "mind mapping and vocabulary acquisition and use", to the participants. They tried to identify students' prior knowledge about mind mapping and vocabulary acquisition and use through some leading questions.

3. The instructors showed participants the steps of drawing mind maps and the vocabulary content of the program.
4. Participants accessed the topic online through the following steps:
  - a. answering questions and drawing mind maps. They were required to send their created mind maps to the instructor via the site to be estimated.
  - b. participant were required to respond to the online activities of different types (missing parts of mind maps, completion, making comparisons...).
  - c. Participants started chatting with the instructor and with each others to clarify points of difficulty.
  - d. They accessed the following site: <https://www.facebook.com/groups/1610125102336549/>
  - e. They were asked to use three or more colours per central image.
  - f. They were instructed to use variations of size of printing, lines, and images.
  - g. They used organized and appropriate spacing.
  - h. They were instructed to make line length equal to word length and to use associations.
5. They were given the chance to see their peers' created maps through the closed group work online.
6. They had to answer online activities and assignments.
7. They were able to create different and interesting shapes of mind maps, and received feedback from the instructors.
8. Those who could work better and faster were rewarded.
9. at the end of the session students were given a chance to use the acquired words in meaningful sentences to be sure that they could use the acquired vocabulary in correct context.

## **Procedure Followed in teaching the non Treatment Group**

1. The researchers taught the non treatment group.
2. Students were given the same vocabulary content as that of the treatment group.
3. Content was presented in the form of lists to be kept by heart.
4. The session began by giving an introduction about the importance of learning vocabulary and the necessity of knowing how to use them.
5. They were given written activities and home assignments.

## **Features available only to the online program:**

- Drawing any number of mind maps on the same page.
- Using available shapes of the central idea.
- Using images from any site or link.
- Adding nodes to each branch of the mind map.
- Using any shapes of flowchart inside mind map program.
- Drawing a sketch on any part of mind map.
- Using different shapes of branches.
- Saving mind maps in PDF form.
- Saving mind maps as an image.
- Saving mind maps in a document.
- Sharing mind maps on face book.

## **Findings:**

The findings of this study were obtained from the vocabulary tests, then the data was analyzed in order to find out whether teaching vocabulary through mind mapping to the treatment group is effective.

Hypothesis (1) predicted that there would be a significant difference between mean scores of the treatment and the non treatment groups (in favor of the treatment group) on the vocabulary acquisition test.

Analysis of data obtained using t-test shows that the treatment group achieved a higher degree of improvement than the non-treatment group on the acquisition test since t-value (0.89) is significant at (0.05) level and beyond. Thus the first hypothesis is confirmed. Table (9) presents a summary of the analysis of the data obtained on the post vocabulary acquisition test.

Table (9) below shows the results obtained on the post test of vocabulary use of both the treatment and the non-treatment groups. The calculated t-value (12.16) is significant at 0.05 level. Eta squared is (0.98). This means that the treatment group outperformed the non treatment one and that the training program is effective in enhancing vocabulary acquisition of the participants.

**Table (10) t-value result &  $\eta^2$  between mean scores of the Treatment and non-treatment Group in the Post- Vocabulary Acquisition Test**

No	group	Mean	SD	t-value	$\eta^2$
30	Treatment	43.47	5.42	12.16	0.98
30	Non-treatment	26.77	5.02		

Significant at 0.05

Table (11) below shows a comparison between mean scores of the non-treatment Group in the pre-post- Vocabulary Acquisition Test t- value (0.20) is not significant at 0.05 level. This result indicates that the non- treatment group did not show any significant improvement when they followed the traditional method of teaching.

**Table (11) t-value between mean scores of the non-treatment Group in the pre-post- Vocabulary Acquisition Test**

No	non-treatment	Mean	SD	df	t-value	$\eta^2$
30	Pre	26.50	5.07	58	0.20	0.018
30	Post	26.77	5.02			

Hypothesis (2) predicted that there would be a significant difference between mean scores of the treatment and the non treatment groups ( in favor of the treatment group) on the post vocabulary use test.

Analysis of data obtained using t-test shows that the treatment group achieved a higher degree of improvement than the non-treatment group on the vocabulary use test since t-value (16.98) is significant at (0.05) level and beyond. Thus the second hypothesis is confirmed.

Table (12) presents a summary of the analysis of the data obtained on the post vocabulary Use test of both groups. This result shows that the second hypothesis is confirmed.

**Table (12) t-value of Scores Obtained on the Post Test of vocabulary use of Both the Treatment and the Non-Treatment Groups**

Test Vocab use	Total Score =50	Treatment Group(30)		Non Treatment Group (30)		DF	t-value	$\eta^2$
		Mean	SD	Mean	SD			
		42.73	4.18	25.03	3.75	58	*16.98	0.97

\*Significant at 0.05 level

Table (13) Table presents a summary of the analysis of the data obtained on the post vocabulary Use test of both groups. This result shows that the second hypothesis is confirmed as t-value (16.58) is significant at 0.05 level. This result indicates that the treatment group could achieve higher in the post test due to the application of the e-mind mapping program.

**Table (13) t-value &  $\eta^2$  between mean scores of the Treatment Group in the Pre-post- Vocabulary Use Test (no.30)**

No	Treatment	Mean	SD	DF	t-value	$\eta^2$
30	Pre	24.03	4.41			
30	Post	42.73	4.18	58	16.58*	0.98

\*Significant at 0.05 level

Table (14) below presents a summary of the analysis of the data obtained on the pre-post vocabulary Use test of the non-treatment group. This result shows that the Non treatment group could not achieve progress in the post test due to the application of the conventional method of teaching.

**Table (14) *t*-value &  $\eta^2$  between mean scores of the Non-Treatment Group in the Pre-post- Vocabulary Use Test**

No	Treatment	Mean	SD	DF	t-value	$\eta^2$
30	Pre	24.97	3.56	58	0.07*	0.1
30	Post	25.03	3.75			

\* Not Significant at 0.05 level

### **Discussion:**

In learning English, one of the factors is the poor mastery of vocabulary knowledge. The students lack a stock of the words. The students who have little knowledge of vocabulary will face some difficulties to understand the written language and oral language. Thornbury, (2002:13) say, "If you spend most of your time studying grammar, your English will not improve very much. You will see most improvement if you learn more words and expressions. You can say very little with grammar, but you can say almost anything with a word." The students may get some difficulties in learning a language if they have limited number of vocabularies. Saleh (1997:12) argues, "The success in mastering a language is determined by the size of the vocabulary one has learned." Thornbury (2002:23) adds "The learner needs not only to learn a lot of words, but to remember them." To master all the language skills, vocabulary knowledge is important.

There are many techniques of making the students interested in what they are learning especially in learning vocabulary. Brown (1994:48) says, "Techniques are the specific activities manifested in the classroom that are consistent with a method and therefore in harmony with an approach as well." Mind mapping is believed as one of the techniques or activities which can be used in teaching vocabulary which involve the essential idea and encourages memorizing vocabulary easily.

The study reveals that the use of mind mapping technique in developing vocabulary acquisition and use provides an active role for students, while the instructor becomes a facilitator and a coordinator, helping the students while creating the mind maps. The most significant results of this study have shown that mind maps are useful for solving problems, brainstorming the ideas, learning new vocabulary, taking notes, improving reading skills and preparing presentations.

The study also reveals that the e-mind mapping program aiming to improve students' ability to increase their vocabulary acquisition and use had a tremendous positive impact on the participants as compared to

Chalk and talk method. Analysis of the individual scores showed that there was an increase in their scores in the post test as compared to the pre test. In addition to that there is a significant difference between and within groups.

The researchers hope that the result of this research can give information about the level of the students' vocabulary list and the researchers hope that by using mind mapping in teaching vocabulary will be useful for the teachers, the students and the researchers.

### **1. for the teacher**

The result of this research can support the English teachers to apply this method in teaching vocabulary and teachers can change their ancient methods to the new methods that are more interesting.

### **2. for the Students**

The results of this research can motivate the students to improve their vocabulary skills. Teaching vocabulary through mind mapping can make the students relaxed and funny in following teaching learning process.

### **3. for the Researchers**

The researchers will understand more about mind mapping and will know deeply about teaching vocabulary using mind mapping.

Analysis of the individual scores shows that there is an increase in their scores in the post test as compared to the pre test. In addition to that there is a significant difference in scores of subjects between and within groups. There is an improvement in their band marks in the post test as compared to the pre test. Comparison shows that samples in the treatment group (after post test) performed well as compared to samples in the control group (before pre test).

This study strongly recommended that this technique (mind-mapping) is used to increase students' vocabulary list especially in sentence construction. Building sentences must be improved significantly among the students in order to help them do well in writing. One of the many ways to improve sentence construction is to propagate the use of mind-mapping. The intervention program was designed to train students to use mind-map to prompt them to think and solve problems together and as a guidance to increase their vocabulary list. The findings of this study provide significant input to teachers and language practitioners on the importance of using mind-mapping for better understanding in vocabulary. The study provides an avenue for teachers to be more creative in finding alternative and cheaper means to improve students' performances in vocabulary list and also language learning. Because of the importance of the understanding in vocabulary, effort must be made to improve students' vocabulary list by using the mind-mapping skills.

The study concludes that the use of mind-mapping has a significant impact on the students' performances in vocabulary list. Undoubtedly, results gained from the quantitative data are clear empirical evidence that the programme works effectively.

### **Comments given by the treatment group students**

Immediately after the vocabulary assessment, a dialogue was conducted with the research group students. All of them indicated that they liked to draw mind maps in the lesson and enjoyed the supplementary classes every week. One of the students said, 'Drawing an e-mind map in the class is fun and can



help me to memorize new words. They have learnt to create their own mind maps for learning vocabulary and doing their writing exercises. They hoped that the e-mind-mapping technique could be adopted in the regular classes in future.

### **Observation by the Researchers**

Drawing attention to the lesson by using the mind-mapping technique was easy. Students expected the teacher to draw on the blackboard in different colors. In their own mind maps, they provided new 'meaning' to the vocabulary with different drawings and word association. They could master the vocabulary after seeing the teacher's demonstration without asking for explanations. Students liked drawing and reviewing the mind maps they had drawn in earlier lessons. They could also recall the vocabulary with its meanings and spelling in the next lesson.

Reflecting on the results of the present study, the researchers concluded that the use of mind maps to aid vocabulary building is an effective way to help students learn vocabulary. It gives them an alternative way to memorize new words instead of rote memorization. Students have gained more confidence in using English after the introduction of mind maps." They were interested in exploring how to adopt mind-mapping in regular lessons.

### **Conclusion**

As observed in this study, students can become more confident with the mastery of vocabulary. Learning to do so, however, is regarded as one of the most problematic areas by language teachers (Ceik & Toptas, 2010). The typical repetition strategy for learning vocabulary items may not be effective for all. Other strategies are required to facilitate vocabulary acquisition.

It also became evident that Mind-Mapping is a technique for facilitating vocabulary acquisition and use through the use of visual clues such as images, arrows and colors. Through this study, we found that helping students to create personalized,

colorful and interesting mind maps could ease their difficulties to acquire and recall the vocabulary for a longer period of time. Teaching and learning by mind-mapping is fun because they help to motivate students to study and use new words regularly. Besides, the skills of drawing mind-maps are easy to manage. All students could apply the strategy for learning new vocabulary. Regular practice with mind maps diagrams can encourage the learners to apply the technique in their own learning process. In addition, positive impacts have also been reflected by students' English learning results. Overall, mind mapping as a vocabulary learning strategy is effective for our students with average performance.

### **Suggestions and further improvement for the use of mind mapping in teaching vocabulary in class**

To reinforce the effectiveness of learning vocabulary in the English classroom, students may be asked to draw mind maps either individually or together after the teaching of vocabulary.. Then, the students can use the created mind maps to write or tell a story. It is also useful for students to practice their writing and speaking skills.

Regular practice is needed for the mastery of mind-mapping techniques.

Once students have learnt the technique, they can apply the skills smoothly to memorize vocabulary and organize ideas for their writing tasks. However, there is no single strategy suitable for all. We need to investigate if the techniques can apply to students with different levels of competence. Various learning strategies should be adopted to cater for individual differences in the classroom.

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