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The Effectiveness of Mind Mapping in Teaching Vocabulary
Case Study: First Year Secondary School Learners at Salmi Ibrahim Secondary School - Khanchela

A Research Paper in Partial Fulfillment of the Requirements for a Master's Degree in Language and Culture

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Dedications

In our fears, in our tears; in our joy, in our peace, we thank you Allah for being with me when nobody else was.

We dedicate this work to our parents whose faith exceeds our own also to our sisters and brothers.

To the treasured friends who stood by our sides through the highs and lows.

To all of you, a mere thank you will never suffice for all that you have given me.

God from my sincere feelings, I ask you to afford them the best of health and prosperity.

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ABSTRACT

It goes without saying that vocabulary is a crucial element in language acquisition and communication in any language. In a matter of concern, Algerian English as a Foreign Language learners face a significant problem in recalling the necessary vocabulary for an effective comprehension and production. That is why, learners need new memory techniques to help them store and retrieve vocabulary. This research attempts to introduce and test a new tool in the field of vocabulary teaching and learning known as "mind mapping". It will focus on the effectiveness of this strategy in improving vocabulary mastery for Algerian first-year secondary school learners of English. This research paper constitutes of two chapters. The first chapter is dedicated to describe the concept of vocabulary and to introduce mind mapping as a technique to teach vocabulary. The second chapter focuses on collecting and analysing data and arriving at conclusions. To collect data, an experimental study was applied on thirty pupils at Salmi Ibrahim secondary school in Khanchela, who contributed in the hypothesis testing.

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General Introduction

In teaching English as a foreign language, vocabulary plays a significant role in developing the learners' both receptive and productive skills. However, learning and memorizing new vocabulary is a challenging task for EFL learners. The restrictions the latter encounter are due mainly to the traditional methods of teaching vocabulary such as providing synonyms, antonyms, and repetitive practices. Algerian teachers, as a matter of concern, are facing a serious problem in teaching vocabulary. Laraba (2007) stated clearly that vocabulary is, alarmingly, the most problematic task Algerian learners of English face today (p.02).

Researchers have indicated that mind mapping is one of the most effective tools that help the learners associate background knowledge with newly learned information. In this learning strategy, the learner uses images, colours, symbols, and so on. The drawing of the mind mapping requires the use of both sides of the brain and as Buzan (1986) demonstrated the more the two hemispheres of the brain are used together the better the memory functions.

In this piece of research, we will investigate whether visual clues in a mind mapping would enhance the knowledge, retrieval and retention of vocabulary.

Statement of the Problem

In a recent research, Beck (2002) concluded that all the available evidence indicates that there is little emphasis on the acquisition of vocabulary in school curricula. In Algeria, traditional ways of teaching vocabulary, such as word explanation, synonyms, antonyms, and word list are frequently used. These methods are one of the direct causes why learners forget the vocabulary they learn as soon as they leave the classroom. In a questionnaire by Yahoui (2012), it appears that using visual representation, synonyms and antonyms are widely used (p. 51). This might be among the reasons why many students still

face the problem of forgetting the items as soon as they get out the class room. Thornbury (2002) argued that about 80 percent of what is learnt is lost within one day (p. 26). Actually, this might be due to using the left brain only (Oxford, as cited in Dièm, 2011, p.02). In an attempt to find a solution to the already mentioned problem, the technique of mind mapping will be tested to see the extent to which it can be an effective tool to enhance EFL learners' mastery of vocabulary.

Aim of the Study

The present piece of work aims at:

• Investigating the effect of mind mapping on the teaching of vocabulary for first year learners at Salmi Ibrahim Secondary School – Khanchela.

• Convince both teachers and learners of the effectiveness of this tool in enhancing learners' knowledge and retrieval of vocabulary.

Research Questions and Hypothesis

This present piece of work aims at answering the following questions:

• To what extent does mind mapping affect the level of vocabulary acquired by Secondary School pupils?

• Does the use of mind mapping technique help raising Secondary School vocabulary of the second language?

Based upon the questions above, we hypothesize that:

• If mind-mapping technique is applied in EFL classes, learners' ability to acquire and retrieve vocabulary will remarkably improve.

Research Methodology

In conducting this research, we will present experimental lessons to first year secondary school learners in Khanchela. The pupils will be divided into two groups. Both groups will undertake a pre-test for the sake of testing their vocabulary knowledge in the second language. When treatment takes place, the first group (the controlling group) will be taught vocabulary lessons using mind mapping like using definitions and synonyms. The second group (the experimental group) will be taught using the method of mind mapping. Shortly after, the two groups will be given the same post-tests to check the retrieval of the learnt vocabulary items. One week later, a similar post test will be made to test the pupils' long-term memory.

Research structure

This research paper is divided into two chapters: the theoretical chapter and the practical chapter. A general introduction comes first to represent the essential elements in the research.

The theoretical chapter contains two main sections about the two variables. The first will tackle the concept of vocabulary and vocabulary teaching in EFL, while the second will be devoted to Mind Mapping and its use as a technique in teaching vocabulary.

The practical chapter, in its first part, will describe the methodology followed and show the procedures of analysing the data. The second part will deal with analysing the findings of the research which will lead to proving or disproving the research hypothesis. This paper will end up with a conclusion.

Chapter One: Literature Review

Introduction

This chapter will be devoted to an overview of literature related to the research topic. This theoretical framework will serve as a solid basis for the research paper. It sheds light on the concepts of vocabulary and vocabulary teaching in Algeria. It later studies the concept of mind mapping and its implementation as a technique to teach vocabulary.

Section One: The Importance of Vocabulary in Foreign Language Learning

It is almost impossible to overlook the paramount importance of vocabulary in language teaching and learning. It is the currency of communication and a common tool for developing the four language skills (reading, writing, listening and speaking). For the majority of learners, the ultimate goal of studying is to be able to communicate in a new language. That is why vocabulary is perhaps the most significant tool a teacher can offer to their students so as to help them function in today's complex social and economic society. However, in the Algerian context, teaching vocabulary is becoming a periphery. English courses in the Algerian schools typically include required courses on grammar and phonology while vocabulary is dealt with incidentally. This causes a considerable shortage of learners' vocabulary which hampers their ability to communicate even if they master grammar rules and have the ability to generate ideas. Communicating in any language entails knowing a wide range of its vocabulary, and grammar would follow through practice. The new approaches in the field of FLL stress the concept that speaking a foreign language effectively rather than accurately is more important, for language is a means to convey meanings through vocabulary. As a result, more focus should be given to this pivotal element of language through diversifying the techniques and strategies in teaching and learning it.

1. Definition of Vocabulary

In learning a foreign language, vocabulary plays a very crucial role. Vocabulary links the four skills together. Yet agreement on a common definition for "vocabulary" seems to be unreachable, as each linguist or scholar gives his/her own definition for the term. Thus, there have been many definitions provided for this term. According to Cambridge Advanced Learner's Dictionary, vocabulary is defined as:

a) All the words known and used by a particular person.

b) A list of words with their meaning

c) All the words in a particular language

According to Collins English Dictionary, vocabulary is defined as:

a) All the words contained in a language

b) A range or system of symbols, qualities or techniques constituting a means of communication or expression.

As for the operational definition, linguists do not agree on a single definition for the term vocabulary. According to Carter (1998), a word is a set of related letters that hold a meaning. (as cited in Kharkhachi, 2013, p.05).

According to Cambridge Advanced Learners' Dictionary, Vocabulary items known by a particular person are divided into two groups; receptive and productive (as cited in Macounova, 2007, p 11.). Receptive vocabulary or passive vocabulary is a set of all the words, which are understood at reading or listening but are not used in speaking or writing. Whereas , productive or active vocabulary is a set of words that are not only understood, but also used in the spoken and the written form of the language. The passive vocabulary

repertoire is larger than the active one, but the more we use a particular vocabulary item, the more it becomes an item of the active vocabulary repertoire.

Vocabulary, hence, is an important element in learning a foreign language in general and English in particular. Wilkins (1972) claimed that if we spend most of our time studying grammar, our English would not improve very much. Learners would see most improvements, if they learn more words and expressions .He added: “We can say very little with grammar, but we can say almost everything with words”. (as cited in Thornbury, 2002, p 13.)

2. Types of Vocabulary

Many academics classify vocabulary into two categories: active and passive vocabulary. Harmer (1991) differentiates between these two types of vocabulary. The first variety of vocabulary is related to the material the students have been introduced to, and which they are supposed to apply in real-life situations. The second one, however, alludes to the words which the learners will perceive when they hear them, yet which they will most likely not have the capacity to articulate. Haycraft (1978) demonstrated two sorts of vocabulary, in particular, receptive vocabulary and productive vocabulary.

• Receptive Vocabulary

Receptive vocabulary comprises words that students perceive and comprehend when they are utilized as a part of setting, and which they cannot produce yet. It is vocabulary that students perceive when they encounter in pursuing content but do not utilize it in speaking and composing (Stuart, 2009).

• Productive Vocabulary

Productive vocabulary is the words that the students comprehend and can articulate accurately and utilize efficiently in speaking and writing. It includes what is required for

receptive vocabulary in addition to the capacity to talk or compose at the fitting time. In this manner, productive vocabulary can be tended to as a dynamic procedure on the ground that the students can create the words to express their ideas to others (Stuart, 2005).

3. The Importance of Learning Vocabulary

During the first part of the twentieth century, several scholars were working on ways to lighten students' vocabulary learning journey. They first developed principles of presenting common vocabulary and limited the number of new words in any text (Schmitt, 2000). However, an effective vocabulary learning method is not the one that limits words to the minimum, but which helps memorizing as much vocabulary as needed. Hadfield (1999) explained that remembering new words is hard. Students have to go through three distinct processes. They need to stick the definition of the word in their brains. They have by one means or another to make the word their own, and they need to utilize the word inventively in a setting by themselves.

In the event that language learners invest the majority of their energy contemplating language structure, their English won't enhance in particular. They will see most change if they take in more words and collocations. They can convey some information with grammar, yet they can state nearly anything with word. Students first need to grasp a considerable set of words, and then recall them (Thornbury, 2002).

Many language instructors have admitted that the most challenging part of any language course is vocabulary. Regardless of how well the learner masters syntax, regardless of how effectively the pronunciation of FL is articulated, and without words to express an extensive variety of implications, communication in a FL just cannot occur in any meaningful way. It is extremely overwhelming to realize that the vocabulary of English is comprised of hundred thousand words.

The numerous Language teaching methodologies from grammar-translation method to the communicative approach never addressed vocabulary in any principled way. Yet, as Schmitt (2000) demonstrated, lexical knowledge is central to communicative competence and to the acquisition of a second language. In fact, vocabulary and lexical units are at the core of learning and communication.

As one of the fundamental pillars of any language, vocabulary plays a major role for learners in acquiring a language (Cameron, 2001). Harmon, Wood, and Keser (2009) as well as Linse (2005) stated that students' vocabulary mastery is a critical part of their language development. Despite the fact that it has been disregarded for quite a while, researchers have progressively been turning their attention to vocabulary, such as Carter and McCarthy (1988), Nation (1990), Arnaud and Bejoint (1992), Huckin, Haynes and Coady (1995), Coady and Huckin (1997), Schmitt (1997, 2000) and Read (1997).

Vocabulary knowledge is frequently seen as a basic apparatus for EFL students on the ground that a restricted vocabulary in a foreign language obstructs effective transmission of ideas. Schmitt (2000) emphasized that “lexical knowledge is central to communicative competence and to the acquisition of a second language” (P. 55). Nation (2001) additionally depicted the connection between vocabulary storage and language use as integral: learning vocabulary empowers language use and, alternately, language use prompts an expansion in vocabulary knowledge. The significance of vocabulary is shown day by day in and out of the school. In classroom, for instance, the most accomplishing learners have usually the most adequate vocabulary.

Researchers such as Laufer and Nation (1999), Maximo (2000), Read (2000), Gu (2003), Marion (2008),Nation (2011) and others have understood that learning vocabulary is basic for effective foreign language use, and assumes an essential part in the development of

the four language skills (i.e. listening, speaking, reading, and writing). Rivers and Nunan (1991), moreover, asserted that the acquisition of a sufficient vocabulary is fundamental for fruitful second foreign language use. It's clear that without a broad vocabulary, we will be unable to utilize the structures and capacities we may have learned for intelligible communication.

Research also has demonstrated that foreign language readers depend intensely on vocabulary information and the absence of that knowledge is the chief and the biggest difficulty for them to overcome (Huckin, 1995). In writing, when the language learner has a concept or idea that we wish to express, we need a store of words from which we can choose to express this notion or idea. ‘‘When students travel, they don't carry grammar books, they carry dictionaries’’ (Krashen, as cited in Lewis, 1993, p.25). Numerous language specialists contend that vocabulary is a standout among the most essential if not the most critical parts in learning a foreign language, and EFL educational programs must mirror this. Wilkins (1972) stated, ‘‘there is not much value in being able to produce grammatical sentences if one has not got the vocabulary that is needed to convey what one wishes to say’’ (P.97).

It's hardly possible to employ any grammatical or other type of linguistic knowledge in communication or discourse without a certain level of vocabulary mastery. Lately, vocabulary has gained a quintessential position, thanks to corpus studies and the emphasis on the role of lexical units in learning and communication. Vocabulary, indeed, is a crucial part for EFL learners. Teachers should employ various strategies to ease vocabulary acquisition. For example, they may tend to give explicit explanations and synonyms of the words, or use role-plays or multi-media to increase exposure. Various educational and academic surveys have shown positive relationships between vocabulary learning strategies and learning outcomes (Gu, 2010).

Learners very often tend to use repetition as the main procedure for vocabulary acquisition (Ellis & Beaton, 1993). On the contrary, learning vocabulary by reciting words is slow and ineffective (Li, Yang & Chen, 2010). To improve the effectiveness of remembering definitions, other methods should be employed such as the keyword technique (Lawson &Hogben, 1998). Memory procedures which were viewed as effective mental devices have additionally been examined. As showed by Sozler (2012), they can ease up recalling and understanding using acronyms, pictures and spider maps.

4. Vocabulary Mastery

With a specific end goal to comprehend speech, vocabulary is significant to be mastered by the student. Proficiency in vocabulary is expected to express our thoughts and to have the capacity to comprehend other individuals' words. According to Webster (1992) mastery alludes to:

a) The authority of a master: dominion,
b) The upper hand in a contest or competition; superiority, ascendancy
c) Possession or display or great skill or technique,
d) Skill or knowledge that makes one master of a subject..

Hornby (1995) characterizes mastery as the entire knowledge or the complete skill. From that definition, mastery implies complete learning or considerable expertise that makes somebody excellent at a specific subject.

The specificity of any person's vocabulary learning relies upon the individual and his/her inspiration, wants, and requirement for the words (Hatch and Brown, 1995). Vocabulary mastery has a lot to do with the colossal ability in understanding and producing expressions of a particular language (Rivers, 1989). Therefore, the greatest obligation in expanding the learning is in the individual himself/herself. The accomplishment in

augmenting the vocabulary mastery requires their own particular inspiration and enthusiasm on the expressions of words of a language. From the definition above, we can infer that vocabulary dominance is a person's expertise in utilizing expressions of a language that is procured in light of their own interests, needs, and inspiration.

5. How Vocabulary is Remembered

Thornbury (2002) stated that learners do not only need to learn many vocabulary items, but to remember them. Memory is such a perplexing entity to the point that numerous analysts recognize different frameworks inside it. Seeing how our memory functions is extremely helpful in finding suitable approaches to teach vocabulary. Instructors should know the procedure of memory so that to comprehend their students reactions to the data learnt.

According to Thornbury (2002), a number of principles should be considered so that to guarantee that the word moves into long term memory. These principles are summarized as follows:

• Repetition: the rehearsal of the word when it is in the working memory. Repetition can be both conscious and unconscious.

• Retrieval: recalling the word from memory makes it easier to be recalled later.

• Spacing: teaching words should be done together not separately.

• Pacing: gives learners the opportunity to learn through steps like organizing and reviewing already presented vocabulary items.

• Use: using words helps in their retrieval. This goes hand in hand with the principle of “use it or lose it.”

• Imaging: associating a word with a mental image.

• Attention: a considerable attention is also required to keep the information in the long-term memory.

Thornbury (2002) viewed that remedy against forgetting is recycling. He argued that research shows that if learners see or use the word differently at many times, they would learn it better (p.27). Memory, however, is also associated with the theory of using both sides of the brain. A more effective functioning of the brain necessitates a homogenous and coordinate work of both hemispheres of the brain.

6. Teaching Vocabulary

Vocabulary is one of the main aspects in learning a foreign language. It's hardly disagreeable that having a limited vocabulary is a barrier which restrains students from learning a foreign language. Additionally, when learners do not know how to enlarge their vocabulary, they often gradually lose interest in learning (Fauziati, 2005). Teaching words is, indeed, an essential element in learning a language as languages are based on words (Thornbury, 2002). It is relatively difficult to learn a language without words since communication between people depends on words. Since both teachers and understudies concur that obtaining the necessary amount of vocabulary is a focal factor in instructing a language, teaching vocabulary is one of the most discussed parts of EFL teaching (Walters, 2004). Nevertheless, when the teaching and learning process takes place, problems would appear to the teachers. The latter usually have problems of how to teach students in order to produce positive results. Teachers should definitely look for the appropriate techniques, which will be implemented to the students. Moreover, an effective teacher should be trained well enough to employ various and up-to-date techniques. It is an essential requirement that teachers master the material in order for students to understand and have an interest in them.

Due to the fact that many teachers are not confident enough about the best practice in vocabulary teaching, recent research indicates that teaching vocabulary may be problematic. On various occasions, teachers do not know where to begin to form an instructional emphasis on word learning (Berne &Blachowicz, 2008). For this matter, Brown (1994) suggested some guidelines that should be taken into consideration by teachers in dealing with vocabulary lessons. The guidelines consist mainly of devoting some time to teaching vocabulary in context, replacing bilingual dictionaries, developing strategies for learners, and engaging in unplanned vocabulary teaching. Other studies, however, have focused on planned teaching of vocabulary. Research conducted on how to teach vocabulary concluded that teachers can design a vocabulary lesson and choose the words they want their students to learn based on their needs and interests.

Nation (2000) studied steps in teaching vocabulary and stated that teachers must consider three main points: sequence, selection, and presentation. He pointed out that teachers must take into consideration two types of sequences: levels of vocabulary, like the academic and the technical, and the ordering of words in a given syllabus. As for selecting, there are two main factors guiding teachers in the selection of vocabulary, which are frequency and range. Finally, teachers should also take into account different ways of presenting vocabulary items. These ways and techniques of presenting vocabulary might differ depending on several factors like the topic, the classroom size, and the audience.

7. Techniques to Teach Vocabulary in Algeria

For Thornbury (2002), “learning vocabulary is a matter of remembering” (p. 13). He also affirmed that used vocabulary-learning techniques depends on several factors: learners’ level, items’ familiarity and difficulty. In Algeria, be that as it may, these components appear not to be thought about. Similar strategies are utilized paying little mind to students'

background knowledge or level of difficulty. Among the different techniques available to teach English vocabulary, a few strategies are, for the most part, utilized by EFL instructors in Algeria. Berrabah (2014) outlined these strategies as listed below:

• Verbal explanation: this technique includes giving synonyms and using various examples and illustrations. In addition, many teachers usually translate. Yet, Fadel (2005) stated that translation and the other verbal techniques like synonyms, antonyms, and explanations have to be used only when the other means have failed to convey the message (p. 53).

• Pictures and realia: many Algerian teachers use pictures of objects especially at the beginner level. They also use real objects in the classroom to make pupils understand the meaning better. The different kinds of pictures can be flash cards, wall pictures, photographs, or illustration in a textbook (Kharkhachi, 2013, p.34).

• Dictionaries: teachers use dictionaries and ask their pupils to look for the meaning of new vocabulary items. In addition to English dictionaries, bilingual dictionaries are often used in English classes.

8. Vocabulary Selection

The estimated number of vocabulary items a native speaker of English should learn differs according to the level of education. McCarten (2007) found out that "estimates for native speakers vary between 12000 and 20000 words depending on their level of education" (p.01). This large number presents a challenge for most second and foreign language learners who, generally, do not have time and opportunity to learn the words of English in the same way as native learners do. Thus, researchers and scholars suggested different criteria to help syllabus designers and teachers in deciding on the most important vocabulary items that learners need. Millington and Siegel (2013) said that selecting certain lexical items for

inclusion in a course or on a vocabulary list is often the responsibility of a syllabus designer generally, or of an individual teacher in particular (p.14).

Gairns and Redman (1986) proposed frequency, need and level, cultural factors and expediency as the criteria that would assure a good selection of vocabulary (as cited in Fadel, 2005, p.50). Frequency words are those items which are frequently used in speech and in writing. Thus, they should be taught first. As far as need and level are concerned, the items should be useful for the learner and should correspond to his mental level. For instance, concrete words should be taught at lower levels and abstract words at higher levels.

In teaching vocabulary, teachers should carefully select words that correlate with the learner's cultural background (McCarten, 2007, p.04). For instance, some words are very important in some societies and cultures: whereas, other societies do not require them. Vocabulary items, which are easy to be memorized, spelled and uttered; grammatical terminology and activity instructions should have the priority in teaching. Learners need these types of vocabulary items in order to understand better the different learning tasks as well as the teacher and the classmates.

Other criteria in selecting vocabulary include: productivity, validity, and teachability. (MacWhinney, 1986). Productivity is about words that can produce more words when adding affixes, for example hope/hopeful/hopeless. Validity, on the other hand, is about words of current usage. Old-fashioned or out of date words are avoided. Teachability criterion is about words, which are easily demonstrated and taught, so they ought to be taught first.

9. Challenges facing learning vocabulary

Vocabulary has been acclaimed to be EFL learners' major source of problems (Meara, 1980). This suggests that the open-endedness of vocabulary systems is regarded as a reason of difficulty by learners. Another possible cause is that, unlike syntax and phonology,

vocabulary lacks the basic rules the learners may follow to acquire and develop their language competence. In other words, it is unclear in EFL vocabulary learning what rules to apply or which vocabulary items to be learned first. Oxford (1990) also claims that vocabulary is “by far the most sizeable and unmanageable component in the learning of any language, whether a foreign or one’s mother tongue, because of tens of thousands of different meanings” (p. 39). Despite such challenges that EFL learners face, they still have to deal with it in their examinations as ‘‘vocabulary has traditionally been one of the language components measured in language tests’’ (Schmitt, 1999, p.189). Besides, numerous students see foreign language acquisition (FLA) as absolutely a matter of learning vocabulary, and in this manner they devote a major part of their time to remembering sets of EFL words and depend on their bilingual lexicon as an essential informative asset. As an outcome, language instructors and applied linguists now generally admit the significance of vocabulary learning and are investigating methods for promoting it effectively.

Section Two: Mind Mapping

Mind mapping is a technique that requires not only writing but also drawings and pictures. This technique is very common and applicable in several domains such as business, biology, marketing, chemistry and alike. As long as mind mapping has been widely adopted in many fields, there is a possibility that it can be explored in teaching English vocabulary. This section will describe the concept of mind mapping, its requirements and applications.

1. Definitions of Mind Mapping

Mind mapping as a term was first popularised by the English psychologist and author Tony Buzan in the 1960's. However, as a practice, it traces back its roots to the 3rd century. The practice of Mind mapping has long been present in the diaries of thinkers, educators, philosophers, psychologists, and others who needed thorough reasoning before drawing conclusions. Porphyry of Tyre is thought to be the first to use mind mapping to explain Aristotle's Categories that indicate "a species is defined by genus and a differencia." (Guerrero & Ramos, 2015, p.87) Another early adopter of mind mapping was Leonardo da Vinci whose notes are the best illustration of this technique through his use of pictures, drawings and diagrams. "Sometimes I come across people who suggest that Leonardo da Vinci invented mind mapping...yet this great artist and thinker did not use colours schematically in his diagrams." (Buzan, 2018, p.96) Historians have discovered many traces of mind mapping after DaVinci. However, it was not until the late 1960's that Tony Buzan popularised it through his book "*Use Your Head*". Buzan introduced the concept of mind mapping to the whole world after his book was translated to twelve languages. In his book, he explained the concept and even established a set of rules on how to apply it.

Tony Buzan has always been interested in developing techniques to refine the work of the brain. By studying psychology, memory and neuro-linguistics, he succeeded in achieving his

ambition. He demonstrated how effective the use of pictures and colourful drawings in note taking is. Buzan could develop the technique of mind mapping with a set of principles and rules to apply. Scott Green, (2014, P.1) defines a mind map as "A web-like structure composed of words, pictures or images and lines created with the sole intention of visual organisation of information"

In his website,https://www.tonybuzan.edu.sg/about/mind-maps/, Tony Buzan defines mind mapping as: "A mind map is a powerful graphic technique which provides a universal key to unlock the potential of the brain. It harnessed the full range of cortical skills- word, image, number, logic, rhythm, colour and special awareness- in a single, uniquely powerful manner."

2. Principles of Mind Mapping

The technique of mind mapping is strongly linked to the work of the memory. Tony Buzan (1993) demonstrated that there are three factors in developing memory through mind mapping which are: “emphasis, clarity and association” (p.79). So, as to have a universal mind mapping, Buzan set rules for each factor.

- The first factor is "**emphasis,**" it is illustrated through:
    a. **Putting a Central Image**: it is essential to have an image at the heart of the mind map illustrating the main idea or topic. A key word can be used as well; however, it should stand out through the use of colours.
    b. **Using Pictures**: pictures make use of both visual and linguistic skills; thus, they are to be used throughout above the branches.
    c. **Using Many Colours**: It is necessity to use colours while mind mapping. The same colour must be given to the same branch and its sub-branches. For instance, if the mind map contains three main branches coloured red, black and white, it would be inappropriate to put an image with a dominant red on the white main or sub-branch.

d. **Using Dimensions**: drawing words with dimensions give them the form of pictures. Dimensions make the words special, more appealing and easily recalled. The word "peace" bellow is written with three dimensions, and the difference from the normal style is very obvious.

Figure 01: The Use of Dimensions in Mind Maps (The Mind Map Book, p.98)

e. **Using Synaesthesia**: while mind mapping, it is very important to refer to the five senses.

f. **Varying in Size of Paining, Line and Image:** the items included in the mind map are not all f equal importance. It is their size and colour that reflect their importance; the bigger the word the more the emphasis.

- The second factor in developing memory using mind maps according to Buzan (1993) is "**using association**". Its rules are:

a. **Using Arrows**: arrows are the most common way of relating items in note taking. They make the link between the different items easier and help avoiding repetition. For instance, if an item_ already explained_ appears again in the mind map, it can be simply associated to its explanation using an arrow.

b. **Using Colours**: using colours as a semantic representation is very helpful. For example, the red colour may be used to signify fire, the green to represent nature and the blue to refer to oceans and so on.

c. **Using Codes**: a code in a mind map is any meaningful shape that can substitute a word. Instead of writing the words "star" and "heart" for instance, it is easier to draw them: 

- The last factor in memory development is **"clarity"**. The laws governing it according to Buzan (1993) are:

  a. **Using One Key Word Per Line**: mind maps are based on singular words. The latter may have different interpretations; thus, each word should be written on a separate branch to provide the possibility to e linked to other sub-branches using arrows.

  b. **Making the Branch Length Equal to the Word Length**: words are written on branches. If the word is short, the branch carrying it should be short as well and vice versa. It is inappropriate to have the same length of the branch to the two following words: "cat" and "interconnectivity".

  c. **Making the Central Branches Thicker**: the mind map contains main and sub lines or branches. To give the viewer the impression that a particular line is a main line, it should be drawn thicker than the sub-line.

  d. **Keeping the Paper Horizontal**: if the paper is put in the horizontal form, there will be much space to draw the mind map on, so the latter will be more organised.

  e. **Keeping the Writing Upright**: it is highly recommended that the branches are to be drawn on the right and left of the central image, neither above nor under it.

3. Types of Mind Maps

Although there is one common set of laws to follow while mind mapping, the types of mind maps vary. This variety is not based on the structure of the map, but rather on the purpose it is drawn for. Buzan (1993), distinguished between different types of maps and here are some of them.

- **The Dyadic Mind Map**: it is opted for to have a definitive decision in a dilemma. I n this case, the two choices are written and associated to their features. By the end, each element would have its description which helps making a clear decision. Reviewing the mind map makes it even easier to decide.
- **The Mnemonic Mind Map**: this type aims basically at enhancing the work of the memory. It is the most common type of mind maps. "It is the unique combination of images and colours that significantly improve memory." (Buzan,1993, p.183)
- **The Polycategoric Mind Map**: "This type aims at organizing one's own ideas and the other people's as well." (Buzan, 1993, p.138). It is a multi-branched mind map that involves descriptive and analytical ideas.
- **The Creative Thinking Mind Map**: unlike the other types which aim at organizing ideas, this type aims at producing as many creative ideas as possible. "This enables to find out ideas which lie on obscurity of one's thinking." (Buzan, 1993, p.184).

4. Applications of Mind Mapping

According to its founder, the technique of mind mapping can be used in all aspects of life. Buzan (2018) summarised its applications in the following Mind Map.

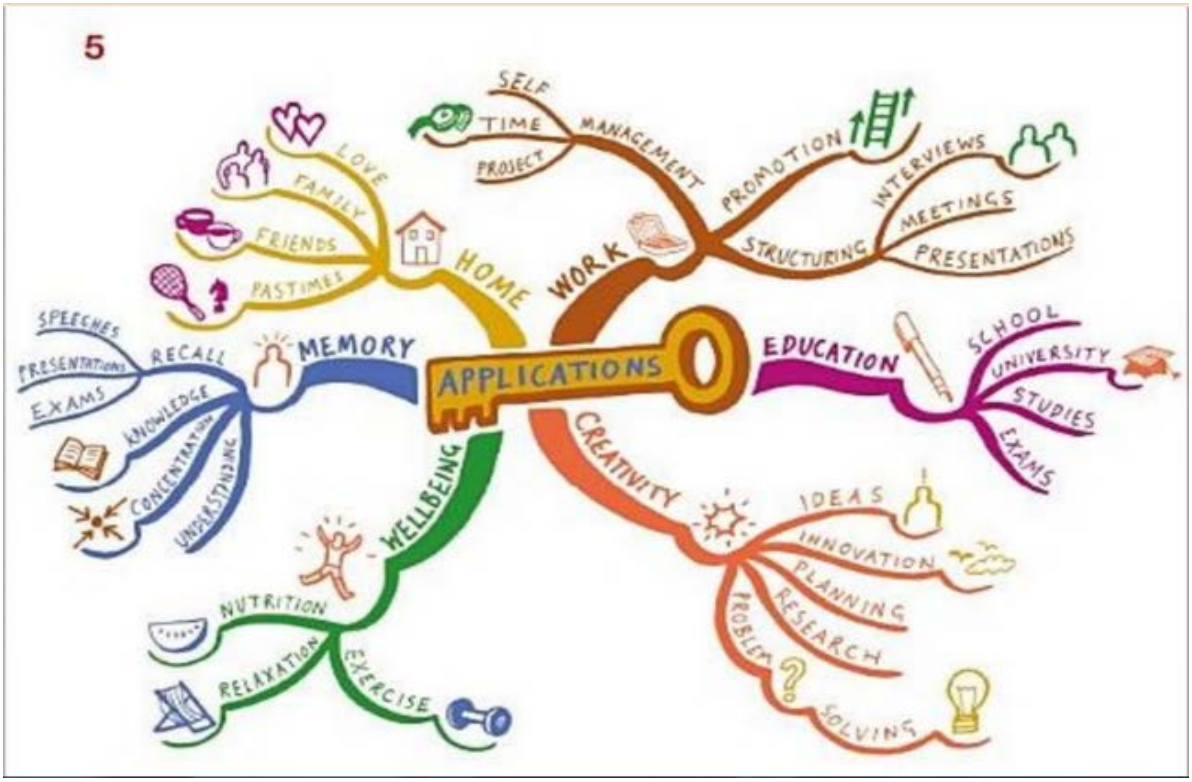

Figure 02: A Mind Map Summarising the Applications of Mind Mapping (Buzan, 2018)

5. Mind Mapping and Memory

Mind mapping, according to its founder and users, is a very effective technique in enhancing the performance of the memory. Since its popularisation in the seventeenth, it could gradually gain a good position in the area of studying and brainstorming. Green (2014) stated "Mind mapping is getting more popular as the years go by. Compared with the traditional methods of brainstorming, studying and linear note taking, mind mapping is said to be 15% to 20% more effective in enhancing memory and improving learning." (p.02) This, as Buzan (2013) demonstrated, attributed to the fact that mind mapping takes into consideration two factors related to the brain: **the functions of the brain and the work of its hemispheres.**

a. The Functions of the Brain

Buzan (2013) distinguished between five functions of the human brain all pivoting around memory. These five functions are:"

- **Receiving**: The brain receives information via your senses- hearing, smell, taste, sight and touch.
- **Storing**, it retains and stores the information and is able to access it on demand.
- **Analysing**: Your brain recognises patterns and likes to organise information in ways that make sense: by examining information and questioning meaning.
- **Controlling**: The brain controls the way you manage information in different ways, depending upon your state of health, your personal attitude and your environment.
- **Outputting**: The brain outputs received information via our thought, drawing, movement, and all other forms of creativity." (Buzan, 2013, p03)

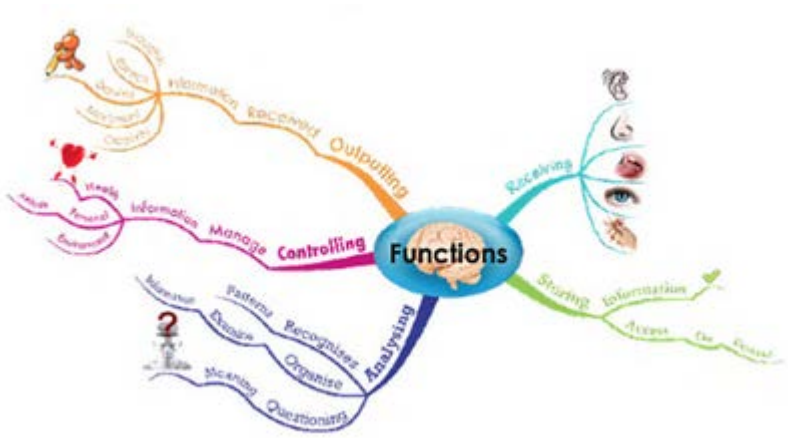

Figure 03: Mind Map of the Brain's Major Functions (Buzan, 2013, p.119)

The human brain receives a flood of information from the surroundings. If all the stimuli received from the outside world were transmitted by the billions of neurons that zap around one another, this network of nerve cells would clog up quickly. Mayor (2011) demonstrates that the

brain uses filtering strategies to avoid stimuli overload. He explains that sensory information arelost deliberately and what get through make it to the short-term memory. Miller (1956) discovered that the short-term memory can only hold up to seven chunks of information (words, digitals, letters...). So, for a piece of information to be stored in the long-term memory, it should be memorable, unique, recalled and linked or chunked. Mind mapping as a technique that targets the short-term memory, helps incorporating all the former characteristics to make a piece of information stored in the long-term memory.

- **Memorable**: The physical creation of the Mind Map helps visualizing it. The data that the Mind Map provides are in the same field of sight and that what makes it memorable. It is in the "mind's eye". That is to say, the brain is continuously scanning the data which is in its field of vision on one page rather hidden in the ream of pages.
- **Unique**: The information which stands out is the more likely to be remembered. If the information is highlighted, coloured and accompanied with a picture or a drawing, it will be easily stored and retrieved. In addition, if it is linked to a personal event_ especially if it was positive or funny_ it is more likely to stand out in the mind.
- **Recalled**: It is true that the physical creation of the Mind Map helps recalling it. However, the creation should be enforced by repetition. Because Mind Maps are drawn in an organized way, they can be reviewed and easily memorized.
- **Linked/ Chunked:** The memory has an associative and nature. That is to say, all concepts in the mind are linked, and whenever a concept is recalled, the others related to it are activated. This is what is known as Semantic Networks. Mind mapping, through the use of branches and arrows, helps chunking similar ideas and concepts making them easier to remember.

b. The Work of The Brain's Hemispheres

The human brain is composed basically of two hemispheres each is responsible for certain cognitive functions. "From the moment we were born, both hemispheres started to specialize with different tasks being associated with either side of the brain. This process of the left and right brain controlling different thinking functions is called 'lateralisation'" (Buzan, 2013. p.04). While the left hemisphere operates on logic (numbers, words, linearity...etc.), the right hemisphere is responsible for imagination (colours, pictures, dimensions...etc.). It was long thought that the two sides of the brain function separately. However, both hemispheres work dependently when performing certain activities. Reflecting on these, Buzan (2013) developed the technique of mind mapping. According to him, while mind mapping, both logical and creative sides of the brain work together for a much richer way of problem solving and decision making. Using key words and hierarchical structure stimulates the left side, and the use of colours, images and curved lines activates the right side of the brain. So the strategy of mind mapping takes the qualities of both hemispheres of the brain and integrates them dynamically for a better performance. This process of combining the two sides is termed by Buzan as "Radiant Thinking". (Buzan, 2013, p11) "As the term suggests, thoughts radiate towards like the branches of a tree, the veins of a leaf or the blood vessels of the body that emanate from the heart." (Buzan, 2013, p.11) One of the strengths of mind mapping is that is focuses on the associative quality of the brain. "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."(Buzan, 2013, p11). Intrinsically, therefore, mind mapping is designed to work in the same way that the brain does.

6. Mind Mapping and Vocabulary Teaching

Research has found that there is a heavy link between short-term memory and vocabulary acquisition. As any other information, vocabulary items are first held in the working memory. If it is manipulated and processed, it will be stored in the long-term memory through the already existing lexical items. For a lexical item to be stored it needs to be memorable, recalled, unique and linked. Mind mapping through the use of colours, pictures, arrows and branches gives the lexical item all what it takes to be remembered. In addition, the branches which radiate from the central idea or topic provide enough explanation and illustration. This feature is not exclusive to individual words; it includes pairs and groups of words as well such as collocations and phrasal verbs.

a. Collocations

Mind mapping can be a greatly helping tool in teaching collocations. A collocation is" a pair or group of words that are often used together" (McCarthy & Odell, 2000, p.02). In a grammar course, a teacher can write the image-like word "collocations" in the board. From this central word, several branches with different colours radiate. On each branch, he writes a word from which sub-branches radiate carrying the possible words with which the word on the main branch would collocate. (**See figure 04**)

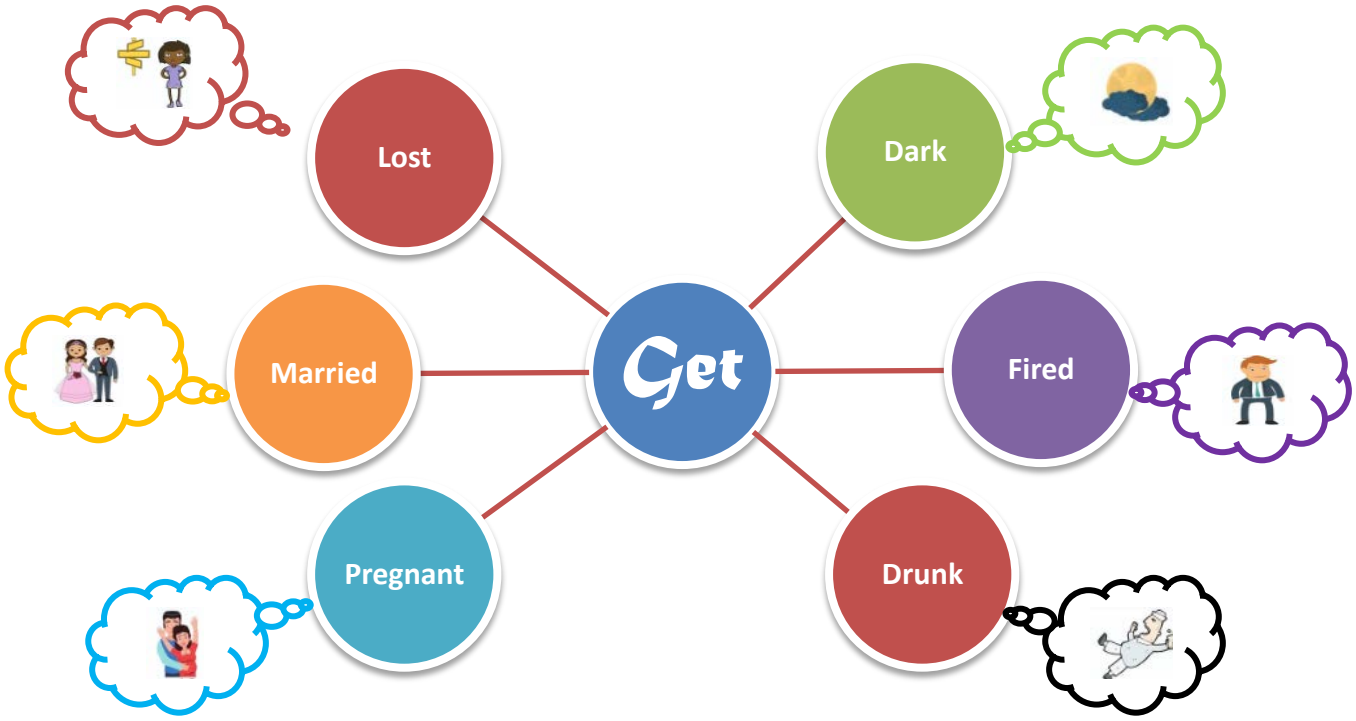

Figure 04: Teaching Collocations through Mind Mapping (McCarthy & Odell, 2000, p.03)

b. Phrasal Verbs

Mind mapping can be very effective in teaching phrasal verbs. The latter are "verbs which are formed with two arts or more (a verb and an adverb or preposition)" (Wyatt, 2006, p.03). A teacher can deliver the lesson of phrasal verbs through writing a verb in the middle of the board from which colourful branches radiate each carrying a preposition or an adverb. He may also attach sub-branches to provide explanation. (**See figure 05**)

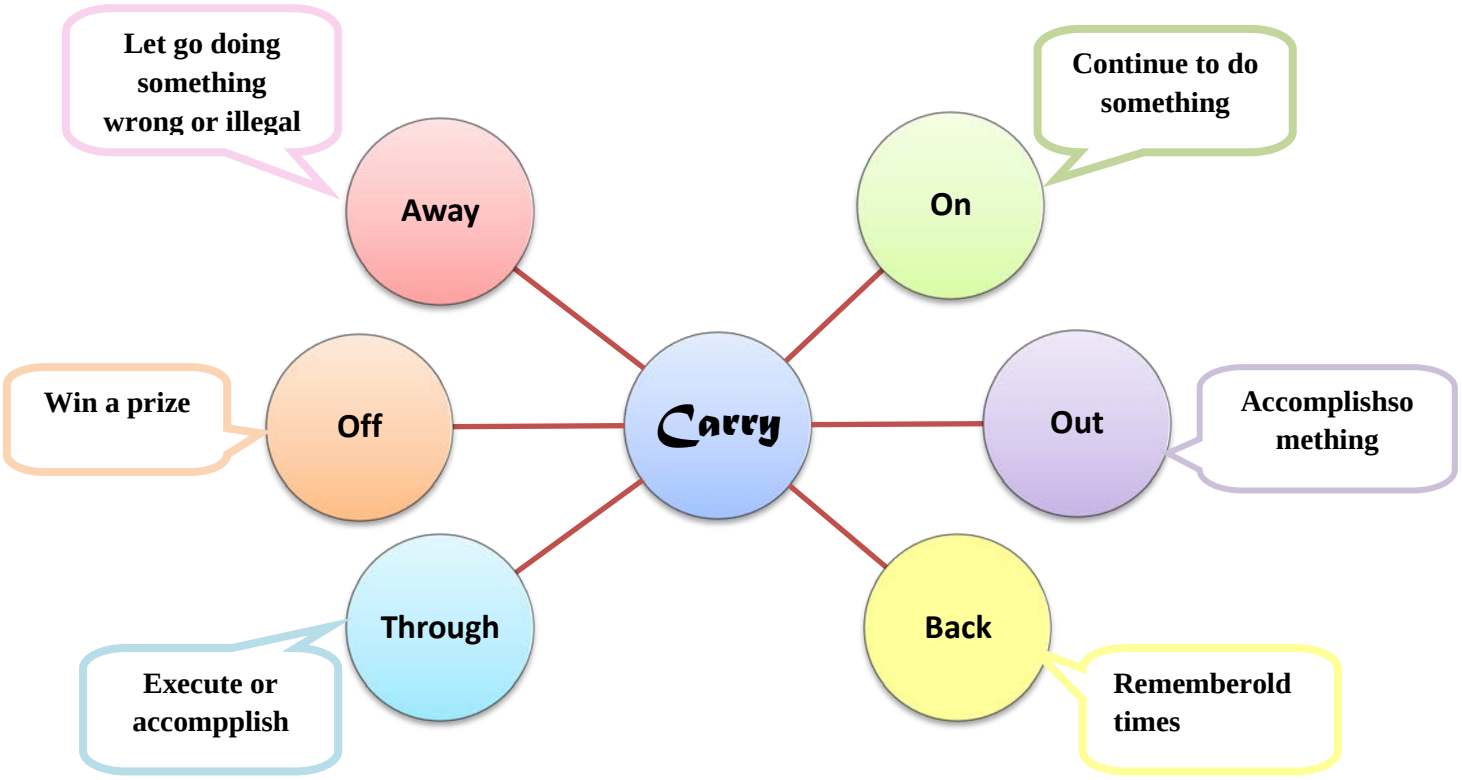

Figure 05: Teaching Phrasal Verbs through Mind Mapping (Wyatt, 2006, p.06)

7. Teaching Vocabulary through Mind Mapping in Algeria

Mind mapping has been recently introduced to Algeria. That is why, only a few teachers are aware of this modern technique. In the field of education, unfortunately, mind mapping is almost absent except for some summaries published for the Baccalaureate students in some subjects like science, physics, mathematics and Islamic education.

English in Algeria is a foreign language. It, just like many other subjects, has got no share of this newly introduced technique. The designers of the Algerian school book of English still follow the traditional method of presenting grammar lessons with readymade rules and conclusions. Thus, Algerian students opt for conventional ways of studying, linear note taking and memorizing. Vocabulary in the Algerian school book of English_ for almost all grades_ is

presented in a very traditional, non-innovative ways such as synonyms, antonyms, word lists and translation to Arabic. This is likely why Algerian teachers of English are facing a serious problem in finding the appropriate techniques to teach vocabulary effectively.

Conclusion

This chapter has dealt with the literature related to the two basic concepts of the study which are **vocabulary** and **mind mapping**. Vocabulary is, of no doubt, the core of any language. Its performance reflects the speakers' mastery of the language. Thus, the search for the most suitable and efficient ways of teaching it must be the focus of educators and teachers. One of the techniques that can be of a great use in teaching vocabulary is mind mapping. This technique which integrates both logical and imaginative sides of the brain can facilitate the task for the teachers and learners as well. The learner can use it as funny and organized way of note taking and revision. The teacher, as well, can use it not only to plan for his lessons, but also to teach all aspects of the English language especially vocabulary. The following chapter will apply the technique to teach vocabulary in an Algerian secondary school context.

Chapter Two: Field Work

Introduction

This chapter presents the field work of this research paper. It starts with describing the research method, population of the study, the tools of investigation and the submission of the tests. The findings will be analysed and discussed in relation to the theoretical framework. This chapter seeks to check the hypothesis of the research.

1- Research Method

When choosing the appropriate method for any research, some criteria should be taken into consideration, among which are the aims and nature of the subject under investigation, as well as the population and the gathered data. Hence, a quantitative research is used due to the nature of the subject being investigated that requires numerical representation and analysis in tables, graphs and figures. For this reason, a pre-test, three different trial lessons and two post-tests were chosen as methods to answer the questions of this research and check the validation of the set hypothesis.

2- Study Population

For the experiment of this study, a thirty-pupil group was chosen. This group is at first year secondary school scientific stream at Salmi Ibrahim Secondary School in Khanchela, east of Algeria, during the academic year 2020/2021. The participants have been studying English for five years: four years at the middle school and one year at the secondary school. The population was divided into two sub-groups fifteen for each, in order to receive different treatments. The division took place according to a pre-test to ensure equal groups in term of cognitive capacity. The reason behind choosing first year pupils is that they are

at the beginning of a new stage which is the secondary school in which they need new and advanced vocabulary to be used in writing and speaking.

Group	Number of Pupils	Boys	Girls
Control	15	5	10
Experimental	15	6	9
Total	**30**	11	19

Table 01: Sample of the Study

3- Tools of investigation

To collect the necessary data, case study was opted for as a tool of investigation. To start with, a pre-test was applied to check learners' level and mastery of vocabulary and to divide them fairly, also to have equivalent groups in term of cognitive capacities. Then, three trial lessons were presented following two different methods of teaching for two sub-groups of the same group to assert that they receive different treatments. Finally, two post tests were administered to check the learners' retrieval of vocabulary and to test the formerly set hypothesis.

4- Procedure

In conducting this research, three experimental lessons were presented to first year secondary school learners in Khanchela. The pupils were divided into two subgroups (fifteen in each) after being introduced to a pre-test. The first group (the control group) was taught vocabulary lessons using definitions and synonyms only. The second group (the experimental group) was taught using the method of Mind Mapping. Shortly after, the two groups were given the same post-

tests to check the retrieval of the learnt vocabulary items and to check their short-term memory. One week later, a similar post test was administered to test the pupils' long-term memory.

4.1. Pre-test

We conducted a pre-test at the beginning of the experiment to establish a subject knowledge baseline and then we related it to the end of the course tests to look at knowledge added. Berry (2008) stated:

> Pre-tests are a non-graded assessment tool used to determine pre-existing subject knowledge. Typically pre-tests are administered prior to a course to determine knowledge baseline, but here they are used to test students prior to topical material coverage throughout the course. While counterintuitive, the pre-tests cover material the student is not expected to know, but serve as a motivational tool and a 'road map' for the students, resulting in improved course performance. (p.19)

Our testees were required to write a paragraph about nature to assess their vocabulary mastery and luggage, also to have an idea about their knowledge of the given theme (nature). Accordingly, they were divided in two equal groups where each group includes the same number of excellent, average or low-achiever pupils.

4.2. Trial Lesson One: Global Warming

So as not to cause confusion for the learners, the trial lessons were relevant to the unit of the textbook which was entitled "Back to Nature." The vocabulary items presented in this lesson were equally relevant to **earth and sea disasters**.

4.2.1. Description of Lesson One for the Control Group

The lesson was presented as a "Listening and Speaking" sequence. The control group listened to a radio interview in which the issue of global warming was discussed. They were asked to take notes and answer comprehension questions about the different natural disasters caused by global warming. Whenever a new vocabulary item was encountered, the teacher explained it and the learners wrote it on their copybooks. To check their understanding, the pupils were asked to provide examples using the newly-learnt vocabulary items. (See Appendix 01)

4.2.2. Description of Lesson One for the Experimental Group

The same lesson was presented to the experimental group using the technique of Mind Mapping. The teacher warmed up the learners by showing them pictures of some natural disasters and asked them to discuss what they see. Then, the teacher stuck a picture representing global warming on the board. From the picture, two main branches of two different colours radiated: one carrying "sea disasters" and the other "earth disasters". From these main branches, sub-branches radiated carrying natural disasters. To check the learner's understanding, the teacher erased the sub-branches and asked the students to recall them guided by the description.

The main branch and its sub-branches in this mind map had the same colour. The main branches were made thicker to show that they were important. Symbols and drawings were used to make the map attractive.

4.3. Trial Lesson Two: Animals

In the previous lesson, the vocabulary items were categorised into two categories only to introduce the learners to the notion of chunks. The second trial lesson, however, presented six categories of animals. The categories are**mammals, sea animals, birds, reptiles, insects and amphibians.**

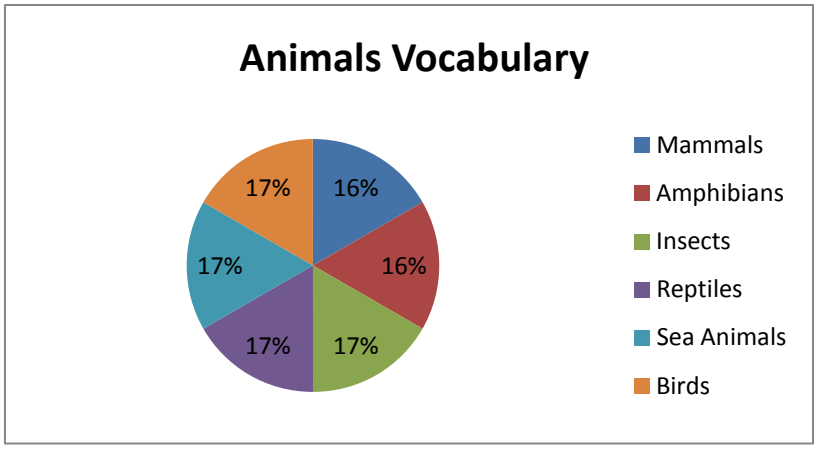

Figure 06: Vocabulary of Trial Lesson Two

4.3.1. Description of Lesson Two for the Control Group

The teacher warmed up the learners through a discussion about pollution and asked if the human beings were the only creatures suffering from it. When the learners answered that animals suffer too, the teacher asked them if they can name some animals. The teacher, then, drew a table with six columns representing the six categories of animals (mammals, sea animals, birds, reptiles, insects and amphibians). All the animals the learners mentioned were classified in the table and whenever there was a new animal or vocabulary item the teacher explained it. (**See Appendix 03**)

4.3.2. Description of Lesson Two for the Experimental Group

The teacher starts the lesson with the same warm up of the control group. Then, he stuck a picture on the board representing animals and asked the learners to name the animals they knew. The teacher asked about the common features of the animals the pupils mentioned. For instance, **cats and dogs** give birth to babies not eggs and feed them from their bodies so they are "mammals". The same thing was done with other species: birds, insects, reptiles, insects, sea animals and amphibians. All these species were carried on main branches radiating from the main picture each with a different colour. Sub-branches radiated from the main branches carrying the animals belonging to each category and their common characteristics. The main

branch and its sub-branches in this mind map had the same colour. The main branches were made thicker to show that they were important. Symbols and drawings were used to make the map attractive. To check the learner's understanding, the teacher erased the sub-branches and asked the students to recall them guided by the description.

4.4. Trial Lesson Three: Food

Relating it to the theme of the unit which is nature, the last trial lesson presented vocabulary items about food. Similar to the previous lesson, this lesson had six categories representing the different types of food: **fruits, vegetables, meat, drinks, dairy products and nuts.**

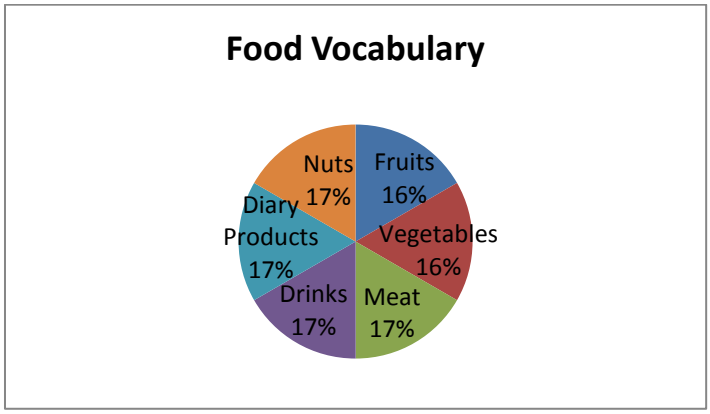

Figure 07: Vocabulary of Trial Lesson Three

4.4.1. Description of Lesson Three for the Control Group

For this group, the lesson was presented as a "Reading and Writing" sequence. The learners were provided with a text to read and comprehension questions to be answered. The main question to be considered was "Read the text and derive the food items." The teacher then drew a table on the board with six columns of the different types of food and categorised the food elements mentioned in the text and the ones provided by the learners. Whenever there is a new vocabulary item, the teacher explained it. To check their understanding, the pupils were asked to provide examples using the newly-learnt vocabulary items. (**See Appendix 05**)

4.4.2. Description of Lesson Three for the Experimental Group

The teacher showed the learners a picture representing "nature" and asked them to guess what it is about then asked them what nature provides humans with to survive. When the leaner answered food, the teacher stuck a picture representing different types of food on the board. The learners were asked to name the types of food they knew. The teacher then drew six branches radiating from the main picture carrying the six types of food: **fruits, vegetables, meat, drinks, dairy products and nuts.** The learners were asked to name all the food items they knew and write them on the mind map carried by sub-branches. The main branch and its sub-branches in this mind map had the same colour. The main branches were made thicker to show that they were important. Symbols and drawings were used to make the map attractive. To check the learner's understanding, the teacher erased the sub-branches and asked the students to recall them guided by the description.

4.5. Test Design

The tests of the investigation were administered to thirty pupils in a first-year secondary school scientific group. The first test was submitted directly after presenting the three trial lessons to check the learner's short term memory (See Appendix 07). The second post test was submitted fifteen days after to check the learner's long-term memory (**See Appendix 08**).

4.6. Test Results and Discussion

In this section, the results of both the control group and the experimental group in the two post-tests will be analysed and discussed.

4.6.1. Scores of the Control Group in Post-test One

The following table illustrates the scores of the control group in the first post-test.

Vocabulary Categories	Correct	Wrong
Earth Disasters	02	13
Sea Disasters	03	12
Mammals	00	15
Insects	01	14
Birds	01	14
Amphibians	04	11
Sea Animals	01	14
Fruits	05	10
Vegetables	03	12
Grains	01	14
Meat	03	12
Dairy Products	06	09
Nuts	01	14
Drinks	08	07
Total %	**18.57%**	**81.42%**

Table 02: The Results of the Control Group in Post-test One

The table above demonstrates the result of the control group in the first post-test.The criterion of scoring is answering correctly to all the questions of each category. According to the results, the number of the students who answered correctly was far below the average. While eight out of fifteen pupils could answer correctly in the category of drinks, none scored in the category of mammals. The percentage of pupils who answered correctly is **18.57%** which reflects that the control group's short-term memory is acceptable in general.

4.6.2. Scores of the Experimental Group in Post-test One

The following table demonstrates the score of the experimental group in the first post-test.

Vocabulary Categories	Correct	Wrong
Earth Disasters	04	11
Sea Disasters	05	12
Mammals	02	13
Insects	05	11
Birds	02	13
Amphibians	08	07
Sea Animals	05	11
Fruits	06	11
Vegetables	05	10
Grains	02	13
Meat	03	12

Dairy Products	07	08
Nuts	03	12
Drinks	10	05
Total %	**28.57%**	**71.42%**

Table 03: The Result of the Experimental Group in Post-test One

The table above demonstrates the results of the experimental group in the first post-test. The criterion of scoring is answering correctly to all the vocabulary items of each category. According to the data collected, more than a quarter of the pupils answered correctly. Whereas two participants only could answer the category of mammals, ten pupils succeeded in answering to all the vocabulary items of the category of drinks for it contained three items only (juice, mineral water and ice tea). All the fourteen categories were answered by two or more pupils and no category was left unanswered. The percentage of the pupils who answered correctly is **28.57%** which is a considerable number which reflects that the learners' short-term retrieval is quite good.

4.6.3. Control Vs Experimental Group in Post-test One

The chart summarises the results of both groups in the first post-test. Though the experimental group scored better, the results of both groups were quite satisfactory. Accordingto the groups' performance in this test, it can be said that their short-term retrieval of vocabulary is good to a certain extent.

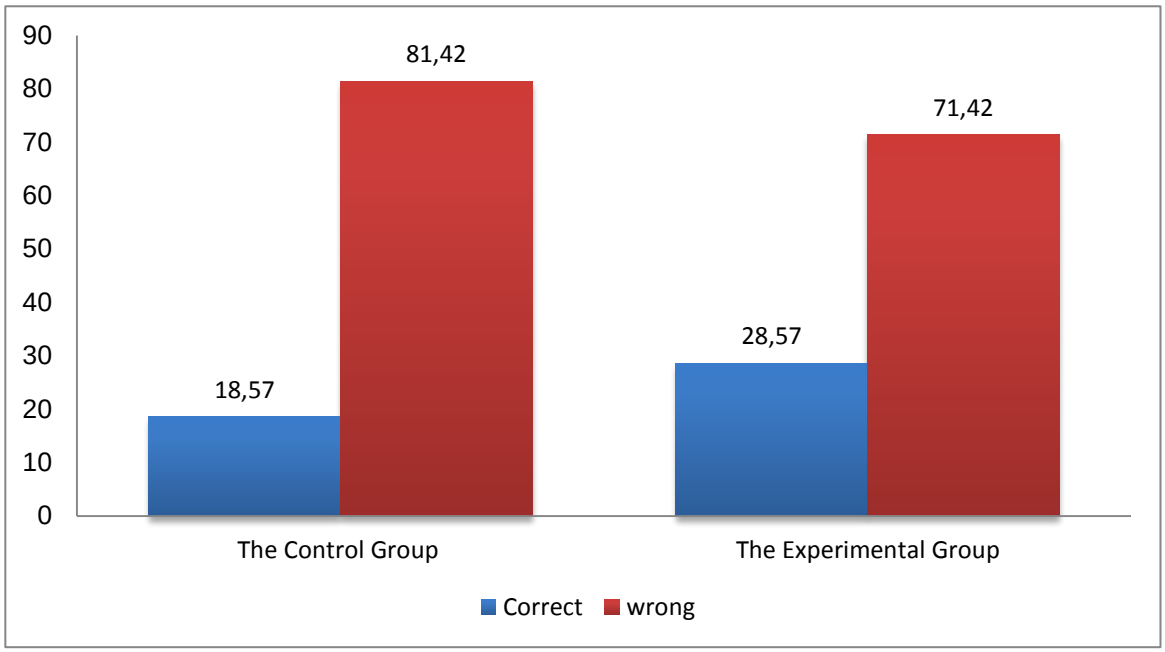

Figure 08: Control Vs Experimental Group in Post-test One

4.6.4. The Results of the Control Group in Post-Test Two

The following table illustrates the scores of the control group in the second post-test.

Vocabulary Categories	Correct	Wrong
Global warming	04	11
Mammals	03	12
Insects	05	10
Birds	02	13
Amphibians	04	11
Sea Animals	06	9

Fruits	03	12
Vegetables	04	11
Grains	05	10
Dairy Products	06	09
Nuts	01	14
Drinks	07	08
Total %	**27.77%**	**72.22%**

Table 04 : The Results of the Control Group in Post-test Two

The table above represents the data collected from the second post-test. Though the pupils achieved a progress in comparison to the first test, the results of the control group in the final test were not good enough. Only two could answer correctly in the category of **birds** while only one answered in the category of **nuts** though the items were present in the firsttest. The percentage of the correct answers is **27.77% ,**which reflects an acceptable level of long-term recall of vocabulary.

4.6.5. The Results of the Experimental Groupin Post-Test Two

The following table illustrates the scores of the experimental group in the second post-test**.**

Vocabulary Categories	**Correct**	**Wrong**
Global warming	07	08

Mammals	06	09
Insects	07	08
Birds	05	10
Amphibians	06	09
Sea Animals	06	09
Fruits	04	11
Vegetables	05	10
Grains	11	04
Dairy Products	07	08
Nuts	06	09
Drinks	09	06
Total %	**43.88%**	**56.11%**

Table 05: The Results of the ExperimentalGroup in Post-test Two

The table shows the results of the experimental group in the second post-test. The data demonstrate that the pupils of this group could achieve a remarkable progress if comparing their results to first post-test. None of the categories was answered correctly by less than four pupils which is a very good rate. The percentage of the pupils who scored is **44%** which is almost the half of the experimental group. This percentage shows that the long-term memory of this group is efficient.

4.6.6. Control Vs Experimental Group in Post-test Two

The chart represents the results of both the control and the experimental group in the second post-test. It is clear that the two groups achieved a progress in comparison to the first test though the experimental group's results are much better.This progress indicates that the pupils'long-term is more active than their short-term memory.

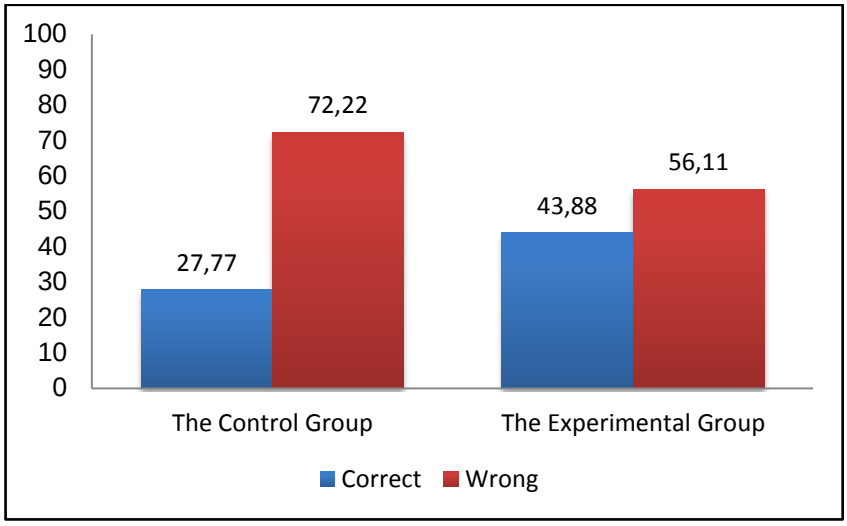

Figure 09 : Control Vs Experimental Group in Post-test Two

4.7. Comparison with Similar Studies

Many studies have been conducted in the field of vocabulary and mind mapping. The results of the research paper in hand ties well with previous studies wherein they almost all prove that mind mapping is a significant tool in teaching vocabulary. Though the procedures of conducting the experiment varied from one research to another, the common tool between all the researches is an experiment by using quantitative data approach which is the most appropriate to this topic. A study conducted by Kurniawati (2011), showed that after using mind mapping to teach vocabulary, the learners' result in the first post-test improved by**9.75%** compared to their results in the pre-test of the first cycle; and improved by **15.28%** in comparison to the results of the second cycle. These findings led the researcher to conclude

that "through mind-mapping strategy, students can improve their vocabulary mastery during teaching/learning English" (Kurniawati, 2011, p96). In another study by Pua, Li, Lui and Cheng (2013), a similar pattern of results was obtained. The results revealed that the students' performance after being taught using mind mapping enhanced by **10%** to **26%.** This confirmed that mind mapping is "a technique for facilitating knowledge acquisition and retrieval through the use of visual clues such as images, errors and colours" (Pua, Li, Lui and Cheng.2013, p.80). Dosen (2016) in a similar research concluded that mind mapping is "effectipve to improve the students' ability in vocabulary mastery." (p.90).

Although different study populations and methods of investigation were used in collecting data, one result prevailed in all the discussed studies. They all confirmed that mind mapping is an effective tool in enhancing learners' mastery of vocabulary.

5. Pedagogical Implications

From our examination on the adequacy of the mind mapping procedure in vocabulary teaching and learning, the following proposals are suggested to offer proper setting to students and educators for vocabulary teaching:

- Teachers should know about the procedures utilized inside the classroom. They should change the out-dated teaching methods and opt for an assortment of present day techniques, which consider students' interests and power of innovation.
- Teachers also need to utilize mind mapping in basic exercises so students would grasp its rules and steps in a comfortable environment. When learners figure out how to mind map, instructors would then be able to apply the procedure in teaching vocabulary.

6. Recommendations for further studies

On the basis of the previous discussion and results, the study validates the main hypothesis which suggeststhat Mind Mapping is an effective tool in enhancing learners' mastery of vocabulary.Therefore, the following recommendations are suggested in order to be usedfor a better integration of Mind Mapping in EFL classes

a. To achieve better results regarding mind mapping in the Algerian context, it would be better if researchers conduct similar experiments but on large samples.
b. The Ministry of Education should work on the implementation of Mind Mapping at all educational levels for the sake of meeting learners' needs, interests and demands.
c. Teachers should cope their methods and try to make learners at the center of the learning process.
d. They should integrate Mind Mapping in the instructions and activities they use
e. Further studies should be conducted on how to integrate Mind Mapping in EFL classes to achieve better results.

Conclusion

This chapter was devoted to the practical part of the study wherein the description of the population of the study and the experiment were presented and the results were analysed and discussed. Regarding the findings of the investigation, the theoretical information about mind mapping are valid. This modern technique plays an effective role in the storage and retrieval of English vocabulary. Ergo, the hypothesis of this research is confirmed and the effectiveness of mind mapping as a tool to teach vocabulary for EFL fist-year secondary school learners is validated.

General Conclusion

Failing to remember the newly learned vocabulary is a typical issue experienced by EFL students. This obstacle discourages both teachers and learners, and pushes specialists and researchers to examine the reason behind it. Presenting an effective and newly developed technique might be valuable in memorizing and retrieving as much vocabulary as possible. The mind mapping technique can be a compelling method in teaching vocabulary for first year secondary school students.

The first chapter in this research paper dealt with the theoretical side of the study. It began with literature review related to the idea of vocabulary and featured the strategies utilized as part of instructing vocabulary broadly speaking and those which are utilized as a part of the Algerian setting specifically. Afterward, the chapter presented the concept of mind mapping and its basics, tools and its application in the teaching-learning process.

The second chapter was the field work in which the hypothesis “If Algerian secondary school learners of English apply mind-mapping, their ability to acquire and retrieve vocabulary will remarkably improve” was tested through the experiment. In conducting this research, we presented experimental lessons to first year secondary school learners in Khanchela. The pupils were divided randomly into two subgroups, the experimental group was taught using mind mapping and the control group using traditional methods. Then both groups were given post tests.

The lessons and the tests were described and analysed based on the pupils’ accomplishments. The obstacles experienced over the span of the experiment and the pedagogical implications were additionally indicated.

Mind mapping is definitely a helpful tool in vocabulary instructing. The collected data demonstrates that it can be an effective method in teaching vocabulary for first year secondary school classes in Algeria. The results acquired in the experimental group, which received the

treatments, were higher than the results of the control group both short term and long term. In this manner, the hypothesis suggested was confirmed. Besides, this study can be further researched with the goal that the procedure of mind mapping can be implemented in the Algerian context.

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Appendices

Appendix 01: Plan of Lesson One for the Control Group

Level: First Year	**Pedagogical Materials**: The textbook, the blackboard
Unit: Back to Nature	**Sequence:** Listening and Speaking

Objective: By the end of the lesson, students will be able to
1- Listen to an interview and answer interpretation and comprehension questions.
2- learn new vocabulary items related to global warming

Time	Phase	Activity	Teacher's Role	Learners' Role	Rationale
15 mns	**Warm Up**	**Pre Listening**	- The teacher asks the students to remind them of the title of the unit. - The teacher asks:"What are the natural changes and who is responsible for them?" - The teacher asks:"What is the main consequence of these changes?" - The teacher asks the learners to answer interpretation questions.	- Sts answer:"Back to Nature" - Sts interact and express their opinions**.** -The learners answer: "Global warming."	-To introduce the listening passage through a class discussion.
30 mns	**Lesson Presentation**	**Listening**	- The teacher reads a radio interview and asks students to check their answers on the interpretation questions - Whenever there is a new vocabulary item, the teacher writes it on the left side of the board and explains it. The new vocabulary items are**:"blizzard, drought, earthquake, flood, hurricane, sandstorm and tsunami"**	- Students check their answers and write them on their copybooks -Students write the new vocabulary items on their copybooks.	-Lesson presentation is essential to introduce the vocabulary items that the learners will be tested on
10 mns	**Evaluation**	**Post Listening**	-The teacher asks the pupils to give their own examples using the newly learnt vocabulary	-The learners form sentences using the new vocabulary items.	-The teacher can evaluate the learners understanding through their examples.

Appendix 02: Plan of Lesson One for the Experimental Group

Level: First Year	**Pedagogical Materials**: The textbook, the blackboard, pictures
Unit: Back to Nature	**Sequence:**

Objective: By the end of the lesson, students will be able to

3- learn new vocabulary items related to global warming through applying the technique of Mind Mapping

Time	Phase	Activity	Teacher's Role	Learners' Role	Rationale
15 mns	**Warm Up**	**Discussion**	- The teacher shows the learners some pictures of natural disasters and asks them to name them if they know what they are. - The teacher asks about the reason behind these phenomena. - The teacher relates climate change to global warming and explains the phenomenon	-Pupil**s** interact and try to name the natural disasters in the picture and are welcomed to name others**.** -The learners answer: "Climate change."	-To involve the learners into the teaching-learning atmosphere
30 mns	**Lesson Presentation**		- The teacher sticks a picture on the - board representing global warming. The picture is the central topic of the mind map. - The teacher draws 07 branches from the central image and writes a name of a natural disaster on each branch - The new vocabulary items are**:"blizzard, drought, earthquake, flood, hurricane, sandstorm and tsunami"** - Sub branches radiates from the main branches carrying the vocabulary items related to each natural disaster. - -Pictures, symbols, and colours will be used with each item.	- Pupils are given the same picture to be stuck on their copybooks. - Pupils give the names of the natural disasters depending on the discussion during the warm up. -Pupils participate in giving the vocabulary items they know (snow, sand, lava, water, wind, oceans...)	-Lesson presentation is essential to introduce the vocabulary items that the learners will be tested on

10 mns	**Evaluation**	**Post Listening**	- The teacher cleans the sub-branches, pictures and symbols of each vocabulary item and asks pupils about their meaning.	-The learners close their copybooks and try to remember the meaning of each vocabulary item.	-The teacher can evaluate the learners understanding through asking about the meaning of the words cleaned.

Appendix 03: Plan of Lesson Two for the Control Group

Level: First Year	**Pedagogical Materials**: The textbook, the blackboard, pictures
Unit: Back to Nature	**Sequence:**

Objective: By the end of the lesson, students will be able to

4- learn new vocabulary items related to animals through applying the technique of Mind Mapping

Time	Phase	Activity	Teacher's Role	Learners' Role	Rationale
15 mns	**Warm Up**	**Discussion**	- The teacher asks the learners about the types of pollution discussed so far in the unit. - The teacher asks:" Are human beings the only living creatures who are suffering from the consequences of pollution?' - The teacher asks the learners then to name the animals they know.	-Pupil**s** interact and give the types of pollution: water, soil, air... -The learners answer: "Animals and plants suffer too" - Pupils participate to name the different animals they know.	-To involve the learners into the teaching-learning atmosphere
30 mns	**Lesson Presentation**	**Discussion**	- The teacher draws a table on the board. Each column representing a species. Then they name the different animals belonging to each species and give their common characteristics. - Te species to be explained are: **fish, mammals, reptiles and amphibians**	-Pupils try to guess about the common features to categorise each species. Pupils can ask about the different species	-Lesson presentation is essential to introduce the vocabulary items that the learners will be tested on

10 mns	**Evaluation**		- The teacher asks the pupils to use the new vocabulary items in writing examples.	-The pupils write examples using the newly learnt vocabulary items.	-The teacher can evaluate the learners understanding through their examples.

Appendix 04: Plan of Lesson Two for the Experimental Group

Level: First Year	**Pedagogical Materials**: The textbook, the blackboard, pictures
Unit: Back to Nature	**Sequence:**

Objective: By the end of the lesson, students will be able to

5- learn new vocabulary items related to animals through applying the technique of Mind Mapping

Time	Phase	Activity	Teacher's Role	Learners' Role	Rationale
15 mns	**Warm Up**	**Discussion**	- The teacher asks the learners about the types of pollution discussed so far in the unit. - The teacher asks:" Are human beings the only living creatures who are suffering from the consequences of pollution?' - The teacher asks the learners then to name the animals they know.	-Pupil**s** interact and give the types of pollution: water, soil, air... -The learners answer: "Animals and plants suffer too" - Pupils participate to name the different animals they know.	-To involve the learners into the teaching-learning atmosphere
30 mns	**Lesson Presentation**	**Discussion**	- The teacher sticks a picture on the board reflecting animals. The picture is the central topic of the mind map. - The teacher asks about the common features of the animals the pupils mention. For instance, cats and dogs give birth to babies not eggs and feed them from their bodies so they are "mammals" - The same thing would be done with other species: birds, insects, fish and amphibians. - Colours, picture and symbols should be used with each item	- Pupils are given the same picture to be stuck on their copybooks. - Pupils try to guess about the common features to categorise each species.	-Lesson presentation is essential to introduce the vocabulary items that the learners will be tested on

10 mns	**Evaluation**		- The teacher cleans the sub-branches, pictures and symbols of each vocabulary item and asks pupils about their meaning.	-The learners close their copybooks and try to remember the meaning of each vocabulary item.	-The teacher can evaluate the learners understanding through asking about the meaning of the words cleaned.

Appendix 05: Plan of Lesson Three for the Control Group

Level: First Year	**Pedagogical Materials**: The textbook, the blackboard and a text.
Unit: Back to Nature	**Sequence: Reading and writing**

Objective: By the end of the lesson, students will be able to

6- Learn new vocabulary items related to food.

Time	Phase	Activity	Teacher's Role	Learners' Role	Rationale
15 mns	**Warm Up**	**Pre Reading**	- The teacher asks the students: "What is the main theme of the unit?" - The teacher asks:"What does nature provide humans with to help them survive?" - The teacher asks to name the food we can get from nature.	- Sts answer:" Nature" - Sts interact and express their opinions. -The learners answer: "Water and food."	-To introduce the listening passage through a class discussion.
30 mns	**Lesson Presentation**	**Reading** **Post Reading**	- The teacher provides the learners with a text and asks them to read it silently and derive all kinds of food mentioned. - The teacher draws a table with three columns: **fruits, vegetables, meat, drinks, dairy products and nuts.** And whenever there is a new vocabulary item the teacher explains it.	- Students read the text and do the task -Students write the table of the new vocabulary items on their copybooks.	-Lesson presentation is essential to introduce the vocabulary items that the learners will be tested on
10 mns	**Evaluation**	**Discussion**	-The teacher asks the pupils to give their own examples using the newly learnt vocabulary	-The learners form sentences using the new vocabulary items.	-The teacher can evaluate the learners understanding through their examples.

Appendix 06: Plan of Lesson Three for the Experimental Group

Level: First Year	**Pedagogical Materials**: The textbook, the blackboard, pictures
Unit: Back to Nature	**Sequence:**

Objective: By the end of the lesson, students will be able to

7- learn new vocabulary items related to food through applying the technique of Mind Mapping

Time	Phase	Activity	Teacher's Role	Learners' Role	Rationale
15 mns	**Warm Up**	**Discussion**	- The teacher shows the learners a picture representing nature and asks them to guess what it is about. - The teacher asks them what nature provides humans with to survive.	-Pupil**s** interact and try to give their interpretation about the picture**.** -The learners answer: "Water, air, food..."	-To involve the learners into the teaching-learning atmosphere
30 mns	**Lesson Presentation**		- The teacher sticks a picture on the board representing the different types of food. The picture is the central topic of the mind map. - The teacher draws 04 branches from the central image and writes a type of food on each branch**(fruits, vegetables, meat, drinks, dairy products and nuts**) - Sub branches radiates from the main branches carrying examples. - -Pictures, symbols, and colours will be used with each item.	- Pupils are given the same picture to be stuck on their copybooks. - Pupils give the names of fruits, vegetables....they know.	-Lesson presentation is essential to introduce the vocabulary items that the learners will be tested on

10 mns	**Evaluation**	**Post Listening**	- The teacher cleans the sub-branches, pictures and symbols of each vocabulary item and asks pupils about their meaning.	-The learners close their copybooks and try to remember the meaning of each vocabulary item.	-The teacher can evaluate the learners understanding through asking about the meaning of the words cleaned.

Appendix 07: Post-test One

Vocabulary Test 1 (post-test1)

- **Secondary School:** Salmi Ibrahim — **Group**: A ☐
- **Time**: 60 minutes — B ☐
- **Name**: ……

Dear lovely students, we will be grateful if you do the following activities for us as part of a research experiment.

Activity One: Match the pictures with the words:

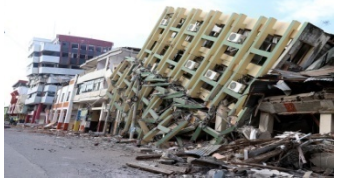
A 

B 

C 

D 

E 

F 

1. **Drought** ……
2. **Landslide** ……
3. **Earthquake** ……
4. **Flood** ……
5. **Hurricane** ……
6. **Tsunami** ……
7. **Volcanic eruption** ……
8. **Blizzard** ……

G 

H 

I 

J 

K 

L 

Activity Two:

A. Circle the correct answers: Who am I?

1. I have a sharp beak, feathers and claws. I am a……..

a. a kangaroo b. a puffer fish c. an eagle

2. I have both a long neck and long legs. I am……..

a. a giraffe b. a panda c. a crocodile

3. I have hooves and horns and I carry a bell under my neck. I am……..

a. a bear b. a goat c. a rhino

4. My ears are huge, my skin is grey, and I have tusks too. I am ……

a. a puma b. a rabbit c. an elephant

5. I have a brown fur, claws, and I can be dangerous. I am…….

a. a pigeon b. a lion c. a sheep

6. I am the fastest animal on land. I have spotted fur. I am ……

a. a cheetah b. a tiger c. a dog

7. **I am a small animal, I live in the water and on the land, and I have a smooth skin. I am….**

a. a salmon b. a frog c. a seahorse

8. I am a reptile; I have a log body and no legs. I am….

a. a snake b. an octopus c. a worm

B. Write the equivalent word of the following sentences:

- It has a flat face and large eyes ……..
- A plant-eating insect with long back legs …….
- A young horse …….
- A male cow ……..
- A large fish with sharp teeth ……
- A black and white sea bird which can't fly …….

C. Label each animal with its appropriate name:




A…… B …… C…… D ……..

<u>Activity 3:</u>

A. Classify the following list of food items into their appropriate category:

Grains	Meat	Nuts	Dairies	Vegetables	Fruits

Juice **Rice** **Pear** **Zucchini** **Beef** **Peanut** **Grappes** **Cheese**

Navy bean **Walnut** **Wheat** **Pineapple** **Lentils** **Cucumber** **Green tea**

Fish **Milk** **Cherries** **Cauliflower** **Almond** **Broccoli** **Barely**

Mineral water **Pork** **Pistachio** **Margarine**

B. Label the following food items:




A ……..…… B …….. C …….. D ……

Appendix 08: Post-test Two

Vocabulary Test 2 (post-test2)

Secondary School: Salmi Ibrahim Group: A ☐

Time: 60 minutes B ☐

Name: …….

Dear lovely students, we will be grateful if you do the following activities for us as part of a research experiment.

Activity 1: Classify the list of animals below into their appropriate categories.

Mammals	Birds	Fish	Insects	Amphibians

Deer	Parrot	Sardine	Bee	Penguin	Frog	Monkey
Shark	Hamster	Sparrow	Turtle	Bat	Butterfly	Jellyfish
Bear	Horse	Salmon	Hawk	Goldfish	Fly	Goose	Tuna

<u>Activity 2</u>: In each of the following extracts, there is an animal which is spelled wrongly. Spot it and correct it.

1. The onstrich is the fastest animal on two legs……

2. The hawl is a strong large bird which catches small animals to eat……

3. Lamps were gamboling around in the spring sunshine……

4. A whal is a large sea animal which breathes air through a hole at the top of its head……

5. Flogs make a low noise called a croak. ……

6. The tartle is an animal, with shell, that lives in or near water …….

7. The ladybag is a small insect with red and black spots ……..

8. The ont is a small insect that lives under the ground ……

<u>Activity3:</u> Fill in the blanks with the words in the box

Pistachio -Strawberry - Milk - Orange - Cheese - Rice - Eggplant Watermelon - Pepper - Cashew

- A large round fruit with dark green skin, and a lot of black seeds. ……
- A white liquid produced by cows, gooses or sheep. ……
- A small nut from a tropical American tree which can be eaten
-An oval purple vegetable which is white inside and which is usually eaten cooked ……
-A small juicy red fruit which has small brown seeds on its surface……..
-A round sweet fruit which has an orange, thick skin and leaves on the top……
-A vegetable that is usually green, red or yellow, and is hollow with seeds in the middle…….
- A food made from milk; it can be either firm or soft and white or yellow. …….
- A nut with a hard shell which contains a green seed that can be eaten …….
- The small seeds of a particular type of grass, which are cooked and eaten as food especially in Korea and China ……

<u>Activity 4:</u> Complete the sentences with the most suitable word:

Fertilizers	**Global Warming**	**Sandstorms**	**Pollution**	**Blizzard**
Renewable	**Hurricane**	**Earthquake**	**Climate**	**Carbon Dioxide**
Wind Energy	**Tsunami**	**Drought**	**Flood**	

a) If the earth heat keeps increasing,……..will be impossible to stop.
b) Air ……is a problem for all of us.
c) The gas formed when carbon is burned in called…….
d) The products farmers use to help their crops grow are called …….
e) ……is a violent wind which has a circulate movement.
f) When strong winds carry huge amounts of sand……happen.
g) It is raining heavily, we expect the river to……..
h) In their trip to Canada, the boys got stuck in a…….for six hours.
i) When earthquakes occur under the sea,,……hits the earth.
j) In 2011,……. destroyed much of Boumerdas.
k) …….occurs when there is little or no rain for a long period of time.
l) ...…….is one of the …… sources of energy that may save earth from global warming.
m) ……..change is one of the effects of global warming.