A Brain Based Approach for Teaching English Language Vocabulary to ESL Learners:

An Investigation Based on Arabic-speaking Learners

المنهج المرتكز على الدماغ لتعليم مفردات اللغة الانجليزية للطلبة الناطقين باللغات الاخرى:

دراسة اكاديمية استقصائية اجريت على الطلبةالناطقين باللغة العربية

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Abstract

This dissertation focuses on the low attainment of L2, second language, vocabulary acquisition by grade 12 Arab learners of English studying at a public secondary school in Dubai. Learning vocabulary is the core of teaching and learning foreign languages as learners cannot fully master the L2 skills such as listening, speaking, reading and writing without having a highly advanced lexical competence.

Accordingly, this dissertation implements the brain based approaches and strategies in order to enrich L2 vocabulary teaching and learning processes. In addition, it adopts the mixed research method that is the use of both the quantitative and the qualitative approaches for exploring the problem of the students' L2 vocabulary low attainment by grade 12 Arab learners at Al- Maarif Secondary School in Dubai. Therefore, the findings and the recommendations of this dissertation have a practical pedagogical importance as they present practical brain based teaching methodologies that enhance the teachers' and the learners' experiences of teaching and learning L2 vocabulary.

To conclude, the key findings and the empirical studies of this study show that the brain based approach is proved to be effective in treating the problem of L2 vocabulary low attainment. Markedness has also been proven to be a useful analytic tool in analyzing the current situation of teaching and learning L2 Vocabulary. Thus, the recommendations of this dissertation can be implemented on all ELS students all over the world due to the universality and the practicality of the brain based approaches and the markedness framework.

الخلاصة :-

إن هذه الرسالة تركز على تدني مستوى تحصيل الطلاب الناطقين باللغة في تحصيل مفردات اللغه الانجليزية كلغة ثانية في إحدى المدارس الحكومية في دبي. إذ أن المتعلمين لايستطيعون اتقان مهارات اللغة الثانية مثل الاستماع, و المحادثة, و القراءة, و الكتابة إن لم يكن لديهم القدر الكافي من المفردات اللغوية.

وبناءً على ما ذكر فإن هذه الرسالة تطبق المناهج و الأساليب التعليمية التي تعتمد في توجهها على فهم منهجية الدماغ التعليمية من أجل إثراء العملية التعليمية التعلمية لمفردات اللغة الأنجليزية. كما أن هذا المشترك الكمي و النوعي من أجل الوصول الى نتائج بناءة تؤدي الى حل مشكلة الرسالة التي تتبنى اسلوب تدني مستوى تحصيل مفردات اللغة الأنجليزية كلغة ثانية لدى طلا ب الصف الثاني عشر في مدرسة المعارف الثانوية. و لذلك فإن نتائج وتوصيات هذة الرسالة لها أهيمة تربوية وعملية كبيرة. اذ أنها تقدم العديد من النظريات و الأساليب التربوية و العملية التي تتناسب مع التعلم الطبيعي للدماغ . مما يؤدي إلى تعزيز خبرات المعلمين و المتعلمين في مجال تعلم وتعليم مفردات اللغة الأنجليزية كلغة ثانية .

وفي الختام فإن نتائج هذه الدراسة تظهر فاعلية المنهج المرتكز على طبيعة الدماغ في مشكلة تدني التحصيل في مفردات اللغة الأنجليزية كلغة ثانية. كما أن معايير الصعوبة أثبتت فعاليتها كأسلوب تحليلي لفهم هذه المشكلة.

Dedication:-

I dedicate this work to my father's soul who consecrated all his life to support me and my ten brothers and sisters as a humble sign of gratitude. I also dedicate it to my mother who also struggled with him to bring up us and secure us the best necessities of life such as housing, health care and education, which were heavy burdens at that time. Moreover, I dedicate my dissertation to my dear brothers Ahmed, Khalid, Nawaf and Mohammed as well as my beloved sister as well as my brother in law Mr. Azzam Abu Salim who are the genuine source of my love and pride as all of them are highly educated and in distinguished positions due to our parents' patience, sacrifice and total consecration to take care of us.

Moreover, I whole heartedly dedicate this work to my beloved wife and my six children engineer Sultan and engineer Mohammed and Dr. Huda as well as my promising lovely children Bara, Leena and Reemo, who are the source of my happiness and the core of my life as they make it really meaningful. They are also the genuine motive for my study and success as they are my sole and utmost consideration for every decision I take in this life.

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Chapter 1

1. Introduction

1. 1. Background

Vocabulary is the core of Language teaching and learning for many considerations. First of all, it is the expressive tool that conveys all types of messages as no learner can understand or send a message without having the lexical competence for dealing with it. However, a message can be conveyed and understood without having the correct structural layout or without being aware of the grammatical issues underlying this message. Additionally, the lack of vocabulary can undermine the progress and the development of all human activities as it limits the comprehension of any human activity. Thus, the question of teaching L2 vocabulary has drawn the attention of many educationalists which has led to exploring the area of L2 vocabulary teaching and learning from different perspectives. Some of the theories focus on the classifications of vocabulary that is what kind of vocabulary to teach and which approach to use for processing them.

The strategies for teaching and learning L2 vocabulary have been an active field of different discussions and studies which have led to a variety of ideas in this field. Some of these ideas are complementary and reciprocal as they are built on a diversity of studies and theories, so they provide practical pedagogical methods. On the other hand, there have been some contradictive views of presenting and teaching L2 lexical items. Some educators adopt lists and rote memorization techniques for teaching L2 vocabulary due to their efficiency and conciseness in presenting the required lexical item in a direct manner. They purport that lists are time-saving techniques as they cater for the learners' precise educational needs directly without any divergence.

 However, other educators argue that context is the sole method of introducing vocabulary because it presents them in meaningful situations. They posit that context can help learners to guess the meaning of new lexical items and to remember them easily thus it activates critical thinking which leads to more robust teaching and learning. They also criticize the listing

techniques as they believe that they may lead to a certain kind of learning which is unlikely to promote acquisition.

1.2. The Scope of the Study

The dissertation discusses the problem of vocabulary low attainment by grade 12 students at Al-Maarif Secondary School for boys in the arts section, which is one of the UAE public education high schools in Dubai. The students' lexical competence is very low for different reasons. Firstly, they are taught in the traditional rote learning and memorization methods without considering contexts. Secondly, another decisive reason for the learners' lack of lexical competence is to the fact that they study all other subjects in Arabic and this in return deprives them from vital sources of L2 vocabulary enrichment. For example, students at the Ministry of Education schools study math, physics, chemistry and history in Arabic; whereas their peers at the private schools study these subjects in English.

The consequences of studying these subjects in Arabic has led to low lexical attainment which has caused a general weakness of the four skills of English as a second language This is clear particularly in speaking due to the lack of enough vocabulary for expressing their ideas and feeling while speaking with other people or when carrying out an interview. Additionally, students' weakness is evident in reading as they get low marks in most reading comprehension classroom assessments due to the lack of lexical competence which limits their ability to understand the L2 texts. Moreover, the learners' weakness in writing is another inevitable result of the low lexical capacity as they cannot write fully developed academic essays.

Consequently, this dissertation focuses on finding solutions to the low achievement of students' attainment in L2 vocabulary. It discusses the relevant theories and strategies that explore the brain learning methods in order to choose the best strategies that coincide with the principles of brain- based learning. In addition, this dissertation adopts the eclectic approach for discussing L2 vocabulary teaching and learning.

Moreover, this dissertation aims in finding the underlying causes of this low achievement and looks for the most practical ways of improving the learners' lexical competence. It studies the academic words lists that are used at the Ministry of Education high schools for enriching the learners' lexical background. These lists are used to prepare students for passing the CEPA

"Common Education Proficiency Assessment", which is a pre-requisite proficiency exam for joining all the higher educational foundations. In addition, this dissertation analyzes the students' cultural background and the adopted teaching methods in order to improve L2 vocabulary teaching methods.

Furthermore, this study discusses the relevant literature including the brain based approach. It also analyzes the L2 vocabulary teaching methodology from different perspectives such as the bathtub effect, and the keywords technique as well as the contextual techniques. These techniques helps to introduce practical strategies for teaching and learning L2 vocabulary based on the brain approach.

In a nutshell, this dissertation explores the problem of low achievement in L2 vocabulary acquisition in two grade 12 sections, section 1 and section 2 at Al- Maarif Secondary for boys in Dubai. It concentrates on understanding and analyzing the problem of low attainment as well as exploring the current methodologies of L2 vocabulary teaching and learning in order to assess and evaluate their implications on the students' achievement.

Finally, this dissertation aims in enriching students' lexical capacities by teaching them the academic word lists which are selected by the Ministry of Education in the UAE so they can pass the CEPA Exam.

1.3. Aims and Objectives

This dissertation has three broad aims. Firstly, to highlight the importance of teaching and learning L2 vocabulary through a brain based approach. Secondly, to contribute to the existing theories of the L2 vocabulary teaching and learning. Thirdly, to implement the markedness framework as an analytical tool

1. 4. Research Questions:-

Based on the aforementioned rationale this dissertation seeks to address the following research questions:-

1. What are the symmetries and asymmetries between the experimental and the controlled groups for the pre and the post tests?

2. What are the symmetries and asymmetries between the scores for each treatment to the experimental group?

3. What is the role of markedness in L2 vocabulary teaching and learning?

1.5 The structure of the Study

The study consists of 6 chapters. Chapter one is the introduction of the study as it discusses the background and the aims of the study. In addition, it introduces the research questions and explains the scope of the study.

Chapter two provides an outline of the relevant literature review. The discussion covers the models of the behaviorist, cognitive and nativitist approaches. Moreover, it focuses on the brain based approaches and the markedness framework, and consider their pedagogical implications.

Chapter three presents the study and provides an outline of the subjects, the setting, as well as the research approaches used in this study. In addition, it explores thoroughly the treatments used in this study in order to address the research questions. Finally, it discusses the procedures and the rationale as well as the ethical considerations of the study.

Chapter four introduces the findings and addresses the research question, while chapter five discusses the wider theoretical and pedagogical implications of the findings. Lastly, chapters six presents the overall conclusion of the study.

Chapter 2

2. Literature Review

Due to the importance of the brain based teaching and learning strategies, many studies have analyzed this vital educational field. Some studies focus on the parts of the brain that are involved in vocabulary teaching and learning processes, while other researchers explore deeply the natural methods used by these parts in learning vocabulary. In addition, other studies deal with the practical ways of designing tasks that are in line with the brain based approaches.

2.1. Theories of L2 Vocabulary Acquisition

There are many theories and approaches for teaching and learning L2 vocabulary that study and analyze deeply L2 vocabulary processing strategies. This study focuses on the cognitive and neuropsychological approaches for exploring the brain based teaching and learning approach and for enriching the currently used approaches.

2.1.1. The Behaviorist Approach

This approach views language from a practical perspective as it considers learning language as an automatic activation of stimuli and response as any other subjects (Skinner, 1957). The intense focus on stimuli and response leads to the development of associative learning that gives a clear idea on certain aspects of language learning and automatization. Randall (2007, p.6) highlights the importance of stimuli and response for automating teaching and learning L2 vocabulary as he contends:

> The central conditions for effective language learning is that of making language
> processing automatic. The tying of a particular stimulus to a response through
> a process of intensive practice is an obvious mechanism for attaining such automatic.

Lightbown and Spada (2004) confirms that behaviorism views language as a kind of building up habits through imitation, continuous and consistent practice which leads to building up deeply rooted habits for learning languages. They claim "Traditional behaviorists believed that language learning is a result of imitation practice, feedback on success, and habit formation."(p. 9). Despite the fact that language learning has more complicated implications than stimuli and response strategy, it has very positive education implementations in teaching and learning L2

vocabulary. Teachers can use the stimuli and response strategy to teach vocabulary in many brain based methods. For example, they can use it to teach parts of speech by using the word "construct" as a stimuli and asking learners to provide a response by providing the noun, the adjective or the adverb. They can also use it to teach lexical items by prompting learners to provide synonyms and antonyms for the same word in different context. In addition, the stimuli and response can be used effectively to exploit the keyword technique (Brown and Perry's, 1991) by providing the stimuli in L2 and the response in the L1; however, this way should be used sparingly for not being too dependent on L1.Moreover the repetition and practice is another behaviorist approach that has a decisive pedagogical importance as it can be used to activate processing and storing L2 vocabulary in the memory. Thus, it agrees with Chomsky's LAD (Language Acquisition Device) that more drilling and repletion leads to more robust teaching and learning because it activates more parts of the brain (in Randall, 2007). In short, the effective use of the stimuli and response as well as the repetition and the practice techniques in different contexts socializes the L2 vocabulary teaching and learning, so it leads to more integration of the L2 vocabulary in the learners' lexical system.

2.1.2. The Nativitist Approach

In response to the inadequacies of behaviorists' understanding and analyzing all the logical processes of language learning, the Innatism Movement came to hypothesize other theories of teaching and learning languages. Chomsky argues that the behaviorist approach cannot cope with all the ideas of the language acquisition as exposure to environment has confusing information and do not respond to all the learners' needs. He confirms the brain which is core of learning as brain is not an empty place, as it is endowed with special part, the LAD that enables learners to learn language naturally. Chomsky posits the LAD or the black box exists in a certain part of the brain and has all the universal principles of learning languages; therefore, children learn their native language at the same age. In fact, this dissertation confirms that the concept of LAD can be used effectively to teach L2 vocabulary as it can be activated to learn lexical items using them in a natural environment and in different contexts based on repetition and drilling. This attitude is supported by Lightbown and Spada who reaffirm the importance of natural exposure for learning languages as they confirm "For the LAD to work, the child needs access only to samples of natural language." (p.16).

2.1.2.1. Krashen's Monitor Model

Krashen's Monitor Model (1982) posits five hypotheses that can be used as practical frameworks for teaching and learning L2 vocabulary.

The Acquisition Learning Hypothesis has a practical impact on the whole educational process since it provides teachers and learners with the basic frames of language natural development skills. Krashen (1982) contends that acquisition is the main part of the educational process as most education occurs in an unconscious and natural way through the natural development of the language skills and the use of language in meaningful contexts. However, he claims that systematic learning or conscious learning has a minor role in language teaching as it does not lead to acquisition. Krashen, in his Monitor Hypothesis, purports that the main function of learning is to control the communication process as it corrects errors and guides acquisition. Richards and Rodgers support this perspective of teaching language as they argue "learning results in explicit knowledge about the forms of a language and the ability to verbalize this knowledge."(p.181). These hypotheses have important practical implications on the brain based approaches of L2 vocabulary teaching and learning. They guide teachers and learners to design certain tasks that make acquiring language natural and reconsider the learning role as a guide not as controller that cripples the brain spontaneous acquisition.

From another perspective Krashen presents the Natural Order Hypothesis which confirms acquiring language is systematic in a natural order as some grammatical items or morphemes are presented before others. He also confirms that errors are natural during the acquisition stage as signs of naturalistic development. In addition, Krashen's the Input Hypothesis posits that comprehensible input is essential for acquiring language naturally. He calls for providing learners with I+1 input that is an input which is slightly beyond the learners' level in order to improve their learning capacities not to challenge them. These hypotheses are of a great educational vitality for L2 vocabulary brain based teaching and learning approaches as they direct teachers to present the unmarked lexical items before the marked ones since they are easier to be processed. In addition the I+1 is also a practical principal that guides teachers and learners to build on the learners' schemas for having more solid and natural acquisition.

Finally, Krashen suggests the Affective Filter Hypothesis which explores the effect of learners' emotional states on acquiring language. He hypothesizes that there is an imaginary filter in the brain consisting of motivation, self-confidence and anxiety that affects the reception of the input. If learners are motivated, self confident and free of anxiety, the filter will be lowered, so the reception of the input will be more effective. This hypothesis guides teachers to mind brain based approach by designing their educational tasks and directing learners to adapt their learning styles to be in accordance with the brain based approaches. For instance, they present the L2 vocabulary gradually according to the structure of phonology and semantics bearing in mind the markedness issue.

2.1.3. The Sociolinguistic Approach

The Sociolinguistic approach examines language in context and considers the role of culture in the teaching and learning. The Inter-Actionist approach of learning languages is one of the sociolinguistic approaches that discuss the interaction between the environment and the learners' mental abilities; but it does not attribute the whole role to the mental abilities. In fact, it gives more importance to the environment because the Inter-actionist approach holds that learning is naturally occurs as a result of constructive adapted environment and the human mental faculties. Piaget (in Lightbown and Spada, 2004) argues that language development cannot happen just in the brain modules, but it usually builds up on the interconnection between a learner and the environment.

From another perspective Vygotsky (1978) supports the inter-actionist presumption presuming that a learner can learn more when interacting with the environment than learning alone. However, Vygotsky disagrees with Piaget as he stipulates that social interaction is the core of inter-actionist approach, while Piaget hypothesizes that the external physical worlds is the core of learning. To clarify his position, Vygotsky posits the Zone of Proximal Development theory that divides learning into a series of educational phases according to the learners' abilities and their relations with an external or more knowledgeable person for learning. On the other hand, Both Piaget and Vygotsky disagree with Chomsky's LAD and Universal Grammar Theory (Randall, 2007) as they give more importance to the social and physical environment in acquiring language. The inter-actionist approach has a psychological and educational importance as it can be activated while teaching L2 vocabulary by linking the lexical item to the

environment represented. In addition, the social interaction approach can be used to link the lexical items to their social contexts. Moreover, teachers can use the social inter-actionist approach to provide an educational social environment based on ZPD, which considers learners' different levels of acquisition for presenting, practicing and using vocabulary in meaningful contexts. Vygotsky sums the inter-actionist teaching and learning arguments as "thought was essentially internalized speech, and speech emerged in social interaction." (p. 23)

2.1.4. The Cognitive Approach

The cognitive approach has a decisive pedagogical importance on L2 vocabulary teaching and learning as it relates the whole process to the learners' mental abilities. Therefore, this dissertation focuses on the main models of the cognitive approach.

2.1.4.1. Spreading Activation Model

This model is suggested by Collins and Loftus (1975) for exploring different types of words and associations. It hypothesizes that lexicons are connected as nodes which are connected in different associations, but these connections are not only based on hierarchal basis, but on other relations such as category and typicality relationships. These associations lead to different types of activation among the connected nodes as one activation in a network leads to another in another association, so the brain can process and give another word from the same connection. For example, if a speaker uses medicine, this word activates doctor, pharmacy, antibiotic and other prototypes of the same association as well as dispenses, cure and treat from another association.

2.1.4.2. The Logogen Model

The Logogen model is a parallel model that contradicts the serial models which hypothesize that lexical items are processed in a serial manner. This model, presented by Morton (1969), purports that each word stored in the lexicon has its own entry or Logogen which has all the characteristics for identifying and recognizing words. Logogen model hypothesizes that the human brain processes words in parallel manner, so it can deal with many words in different context at the same time. This model has been highly supported by the connectionist theories lately developed by Coltheart (2001) to have a broader concept as an information- gathering

device. It hypothesizes that Logogen are activated if the incoming information from the senses matches their level as each Logogen has its own thresholds depending on certain factors such as frequency. It also posits that when the received lexical items match the threshold of Logogen it causes some kind of activations of or firing of this Logogen which leads to an effective semantic access.

The Logogen model has a crucial pedagogical importance as it directs teachers to diversify teaching lexical items according to the brain based strategies. It presumes that more frequent words should be taught first in order to fire the Logogen to activate the semantic access for the less frequent words because they require more work for coping with the higher Logogen threshold of the less frequent words. In additions, learners must know that less frequent words need more repetition and practice to trigger their logogens and be activated in the brain. To sum up, Morton's logogen model agrees with Forester's model that logogens are important and practical accesses for the visual and the auditory inputs of the semantic input. It also supports the markedness theory that marked lexical items need more efforts to be activated and used than the unmarked ones.

2.1. 4.3. Anderson's ACT Model

It is one of the most important models of processing language that explains how the learnt experiences are changed into the automatic knowledge. This model presents two types of memory that are the declarative and the production memory which explain the change of the conscious learnt information into automatic knowledge. It shows different ways of learning L2 vocabulary as it proposes that although repetition is an important issue in learning vocabulary, it is not enough to have an automatic learning. Moreover, this model highlights the importance of focused learning in order to understand the sounds and the pronunciation of words. Later on, this knowledge will be gradually automatic by building up certain connections in the sound production in the neuron-motor routines through various repetition techniques. Moreover, ACT model explains the ways of changing the information from lower order to the higher order thinking as repetition tranfers the lexical items from the declarative to the procedural and to the automatic knowledge in the long term memory.

This model has a practical pedagogical importance as it guides teachers and learners to exploit brain potentialities in teaching and learning L2 vocabulary. It shows the stages of processing a newly learnt word from mere knowledge into automatic usage by pointing out the importance of attention to receive and store it in the declarative knowledge. Then, it explains that a certain word is changed into a procedural one by doing a lot of repetition using a variety of exercises which leads to the automatization. Thus, learners can access and learn these vocabulary items from the declarative memory without passing through the procedural memory which naturalizes l2 vocabulary production.

2.2. Research Framework

Based on the literature review it can be seen that the pre-mentioned approaches of the L2 vocabulary acquisition have important pedagogical implications especially the cognitive approach. Consequently, the main focus of this study will be on the brain-based approach.

2.2.1 Brain based approach

Brain based approach has an important pedagogical importance as it makes learning coinciding with the natural ways of learning. It helps teachers and learners to readapt their learning and teaching methods by basing their educational concepts on neurology out of the rigid traditional teaching methodology.

2.2.1.1. The Principles of Brain-Based Learning

A set of principles of brain based learning have been formulated by Caine and Caine (1998) that have important implications on the learners and the educators.

The first principle is that brain is a parallel processor that can do a variety of activities at the same time as it can learn, maintain the social manners and keep the human being alive simultaneously. This has important pedagogical impacts as educational methodologies should be varied to activate all the brain potentialities since one method is not enough to generate effective learning. Caine (1990) purports that "[…] good teaching should orchestrate all the dimensions of parallel processing, based on theories and […]. As no one method or technique can encompass the variations of the human brain" (p. 66).

The second principle is engaging the entire physiology in learning which implies considering the whole brain tendencies when teaching and learning as shaping the brain depends on different types of studying and learning. Therefore, teachers should consider creating a free stressed teaching and learning environment that minds brain natural development.

Searching for meaning is the third principle of brain learning as the human mind naturally learns the familiar items while searching for innovation at the same time. This has decisive educational implications on L2 teaching vocabulary as teachers should start with familiar words, then move to more challenging words that satisfy the brain curiosity of learning new things. Therefore, there must always be more challenging tasks through systematic differentiated instruction.

In addition, patterning is the fourth principle of brain learning as brain learns meaningful patterns and rejects unrelated separated information. This is because brain assimilates new things and adds it to its learning system. Caine (1998) confirms this trend purporting that "the brain is innately motivated to search for meaning. The search for meaning takes place by patterning."(p.4), accordingly teachers should present information in different ways that help learners to create personal patterns that will be solidly absorbed. This principle is of a clear vitality for teaching L2 vocabulary as teachers should teach them in meaningful contexts or derivatives that allow learners to develop more patterns.

Emotions are the fifth principle of patterning as they influence learning because cognitive attainment is influenced by the learners' feelings and expectancies. In addition, emotions affect memory by helping it to store and retrieve information in more lanes. Therefore, teachers should prepare a supportive emotional environment for learners by creating an appropriate learning atmosphere throughout mutual respect and cooperative learning approaches. This positive emotional environment can be shown in teaching L2 vocabulary by considering learners' interest and needs when selecting the appropriate L2 vocabulary.

Principle six shows the importance of whole brain and part brain teaching and learning as lateralization of the brain is a well known principle. It argues that there are clear differences between left brain and right brain although there is a clear activation between the two parts. Therefore, educators must keep in mind the whole brain and the whole language when teaching vocabulary as more variation of the teaching methods leads to more activation of the brain parts leading to a more solid learning. Caine (1990) supports the brain based L2 vocabulary teaching

and learning methodologies and styles purporting "Good teaching builds understanding and skills overtime […].They derive meaning from each other." (p. 67)

The seventh principle of the brain learning approach is that brain learns focused attention and unfocused perception since the brain is able to learn the things that the learner focuses on or the things that they merely notice. Brain can learn from a statement or a hint, so teachers have to diversify their teaching techniques by using charts and illustrations in order to widen the scope of learning. In addition, teachers should engage learners emotionally when teaching L2 vocabulary in order to activate brain unconscious potentialities for having multidimensional input. From another perspective, learners should consider this principle by diversifying their learning styles to get whole brain learning.

The eighth principle of brain learning is the conscious and the unconscious processes. Caine confirms that most learning happens through unconscious learning as we perceive most information unconsciously and spontaneously through our experiences. In addition, she argues that teaching should be reshaped to make use of the unconscious learning. Caine affirms that active teaching is not so constructive if it does not make use of the students' personal experiences and the role of active learning is merely to review and the control unconscious learning. This principle agrees with Krashen's Learning and Acquisition Hypothesis (Randall,2007) that most learning occurs through natural acquisition and the role of classroom learning is to direct and control it.

The ninth principle of brain based learning hypothesis is that there are two types of memories that should be considered when teaching and learning. The spatial memory system is responsible for storing our experiences naturally and without great efforts. On the other hand, the information processing memory hypothesizes that there are certain systems for rote learning which posits that the new information should be processed before being stored. This division of memory calls for diversifying teaching and learning techniques as rote learning is stressful and partial, so it cannot trigger all learners' acquisition potentialities.

The tenth principle is that learning information occurs best when it is presented naturally and acquired through the spatial memory. Caine purports that we learn the native language effectively because it is learned from different perspectives and absorbed through the natural

acquision process. Thus teachers should use more authentic ways to introduce the targeted information. For example, L2 vocabulary can be introduced in stories or jokes for making utmost use of senses.

The eleventh principle concentrates on the importance of the positive challenge and the harm of the threat in the educational process as the brain works more efficiently when challenged. However, it lost a most of its efficiency, when threatened because the hippocampus works less efficiently. Consequently, teachers should create a challenging and not a threatening environment when teaching by creating relaxed and unstressed educational environment. Thus, the L2 lexical item should be selected in such a way to challenge learners and respond to their needs.

The uniqueness of the brain is the twelfth principle that highlights the importance of learning because it changes the structure of the brain and makes each brain unique. Accordingly, teaching methods should be varied in terms of using visual, tactile and auditory styles. For example, L2 vocabulary can be introduced acoustically, visually and emotionally in well structured contexts to consider the different learning preferences.

To sum up, the brain based approach has an important effect on teaching and learning as it is based on the natural processes. Therefore, the brain based approaches should be considered when designing curricula and teaching materials.

2.2.2. Markedness

The markedness theory is a linguistic theory that has been applied extensively in phonetics and phonology (e.g. Jakobson, 1968); however, its application in L2 vocabulary has been limited (e.g. Yildiz and Ozek, 2009; Ozek and Yildiz, 2012). Markedness can be defined as a level of difficulty discussed in two manners: these are universal frequency and order of acquisition. For instance, frequent and early acquired elements are considered unmarked or easy to be processed, while infrequent and late acquired items are considered marked that are difficult to be presented.

In addition, the markedness constraints are the second manner of discussing markedness which can be identified in terms morphology, syllable count, semantics, margin length and frequency. Firstly, the Morphological constraint focuses on the structure of the words that is whether they

consist of one stem or two stems. For example, the word "mummification" is morphologically marked because it consists of a stem and other suffixes while the word "book" is morphologically unmarked because it consists of one stem. Secondly, the syllable count constraint considers whether the word is monosyllabic or polysyllabic. For instance, the word "presupposition" is a polysyllabic word, so it is considered marked, whereas the word "pose" is a monosyllabic, so it is considered unmarked. Thirdly, the semantic constraint refers to words which have several denotations and connotations. For example, the word "cow" is considered to be semantically marked because it has many connotations according to different cultural backgrounds. It signifies sanctity and a symbol of holiness for the Indians, while it simply implies is a source of food for other nations. On the other hand the word "clock" has a limited denotative meaning as just it indicates a time measuring tool; therefore, it is semantically unmarked. Fourthly, marginal length constrains refers to words that have clusters. For example, the word "strengths" /**strɛŋkθs** /is marked because it has clusters, while the word "car" /**kɑr**/ is unmarked as it has a simple syllable structure with no clusters. Finally, frequency is a crucial type of constraint as it indicates the percentage of the word's occurrence which implies that the infrequent words are considered marked in terms of frequency markedness , but the frequent words the classified unmarked in terms of frequency. For example, the word "excuse" is unmarked in terms of frequency markedness, because it is frequent and can be found in many contexts. However, the word "transformation" is marked in terms of frequency markedness. This form of frequency markedness is shown as it describes the frequency of contemporary American English according to word collocates and thematic lists (Davis& Gardner, 2010, p.47, and p.52).

 Yildiz and Ozek (2012) applied the markedness framework in order to explain the effects of markedness on the acquisition of English L2 vocabulary by Turkish learners. They contend that unmarked forms of language are acquired easier and earlier than the marked ones. They also posit that "any sound which is more widely distributed, more phonetically variable […] are considered to be unmarked". In addition, Yildiz and Ozek's markedness framework has many pedagogical implications on the teaching and learning L2 vocabulary. Firstly, the unmarked words should be taught before the marked ones because they can be acquired easily and can be used a stepping stone for learning the marked lexical items. Secondly, the morphological, marginal length and the syllabic count are the highest ranked markedness constraints.

Furthermore, Yildiz and Ozek's hypothesis of the semantics markedness has important impacts on teaching L2 vocabulary as it shows words should be presented in context. In addition, the frequency constraint is the most essential factor in L2 vocabulary teaching and learning as well as in designing tasks, so it should be the main criterion for selecting and arranging the L2 lexical items in textbooks. Unmarked words in terms of frequency should be the base of presenting L2 vocabulary because they can be easily learnt and can serve stepping stones for integrating and learning the marked words.

To sum up, the study proves that the frequency factor can help learners to overcome all other types of markedness easily; therefore, it should be considered in dealing with any L2 vocabulary processing.

2.3. The Criteria of Knowing a Word

Knowing words criteria have many pedagogical impacts on the methods of teaching and learning L2 vocabulary because they guide both teachers and learners in teaching and learning lexical items effectively and naturally. This dissertation discusses the criteria of knowing words and their effects on the brain based L2 vocabulary teaching approach. In fact, there are four criteria that indicate the degree of knowing a word and the ability of using it in meaningful contexts.

2.3.1. The Phonological Knowledge

The Phonological knowledge is very important for remembering the word and it is best discussed through the Tip of the Tongue phenomenon explored by Brown and McNeil (1966). They purport that speakers remember mainly the initial and the final parts of the words; therefore, learners may produce different words of similar sounds instead of the target words. This phenomenon agrees with Atchison's (1989) Bathtub Effect technique that words are stored in the memory as a person sitting in the bathtub with only the head and the toes are apparent. Accordingly, she argues that it is natural to remember the beginning and the end of words more than the middle of the words. Thus, the Bathtub and the TOT techniques have paramount pedagogical implications as they guide teachers to focus on the initial and the final parts of words phonologically and morphologically when teaching new lexical items. In addition, they direct learners to use the best techniques of remembering words more effectively as they

coincide with brain learning approaches. The concept of the phonological knowledge is highly supported by Randall due to its practical value and feasible implementation in the brain based tasks since he confirms that "[…] the subjects could report different parts of the words; the initial sounds, the final sounds, the number of syllables, and the stress patterns."(p.103).

2.3.2. The Syntactic Knowledge

The syntactic knowledge is vital for L2 vocabulary acquisition because it explicates the storage of words contending that content words or the open set of words are stored in one place and functional or the closed set of words are stored in another store in the brain. This storage is analyzed as a kind of interconnection between words and nodes in the brain hypothesizing that the connections between the content words and the associated words build up the syntactic knowledge through intensive exposure to knowledge. This connection indicates that there are two pathways for storing, processing and retrieving words. In addition, this knowledge posits that there are two relations that organize content words in the memory. The first one is symbolic that is the consideration of the parts of speech in the word whether it is a noun, verb or an adjective and connection of the words of other structural items. For example, the word water as a noun is connected with other structural elements that make up a sentence such as the verbs, other adverbs and prepositions used in the sentence. The second type of knowledge is the conceptual one that focuses on the syntactic knowledge which connects the targeted content words with other related words to build a related concept. Both relations are necessary for teaching and learning L2 vocabulary as the combination of the conceptual and the syntactic can create meaningful sentences.

In fact, the syntactic knowledge has an extreme importance for L2 vocabulary teaching and learning as it helps teachers and learners to use the content words effectively by shaping different relationships with the structural words. It helps teachers to understand the methods of storing and processing lexical items which increase their ability to process and retrieve them. This makes the teaching and learning natural as it takes into consideration the brain processing and storing techniques. For example, they can use the appropriate words with its suitable adjective, verb prepositions to make highly expressive sentences by using different grammatical connections.

2.3.3. The Morphological Knowledge

The morphological knowledge is vital for teaching and learning L2 vocabulary as it gives teachers and the learners a comprehensive idea about the structure of the targeted words. Many L2 words consist of stems and affixes while others have stems only which have different implications on their teaching and learning. The complex structure of the words that is composed of prefixes, roots and suffixes increases the level of their markedness which increases the difficulty of storing, processing and retrieving them. Some theories posit that words of different morphemes are stored in different places, while other theories hypothesize that they are stored in one place in the brain. For example, the word "government" consists of the free morpheme "govern" and the bound morpheme "ment"; therefore, it is difficult, to a certain extent, to be processed and retrieved. On the other hand the "word" book consists of one morpheme; therefore, it can be easily retrieved due to its unmarkedness and the economy of storage.

Moreover, the morphological knowledge is vital for the effective teaching and learning processes as it gives teachers and learners a complete idea about the derivational complexity. They can easily understand the meaning of a word and use it effectively by using the brain decomposition route for highly marked words such as "predetermined" and the holistic route for the frequent unmarked words such as "rich". Randall (2003) sums up the brain bases words processing confirming that:

> The brain may not just use one route exclusively […] both routes can be operated
> in parallel and the one which comes up with the result in the quickest time in any
> particular circumstance will be the ones used first."(p.109).

Both routes have decisive pedagogical effects on the brain based teaching and learning as they help teachers to create more brain based tasks when presenting and teaching new lexical items. With regard to learners, the decomposition route technique is really practical as it guides them to analyze new words and guess their meaning.

In a nutshell, morphological knowledge is one of the cores of brain based L2 vocabulary teaching and learning strategies as it considers the storage, process and words retention of the newly learnt lexical items in the brain.

2.3.4. Semantic Knowledge

Semantic knowledge is also extremely important for understanding the storage and the structure of lexicons as well as their relationship with the outside word. Lexicons are useless if they are not understood and used in their semantic contexts because they cannot convey any message or enrich the learners' lexical competence.

2.3.5. Depth and Breadth of the word Knowledge

August , Carlo, Dressler and Snow (2005) discuss the concept of knowing a word from new perspectives as they purport that learners should know the depth as well as the breadth of L2 vocabulary for having an effective lexical competence. The depth of the word implies the knowledge of its literary meaning, connation, syntactic structures, and its morphological relations as well as its synonyms and antonyms. Therefore, they confirm the importance of the depth of words claiming that "Second language learners have shown to be impaired in depth of the word knowledge, even for frequently occurred words" (p. 51). In addition, they assert the importance of the breadth of words that is being acquainted with other words which are in relation with the targeted words for acquiring the four skills of language. For example, the word "administrate" can be learnt in depth as being acquainted with "administration", "administrative" and other parts of speech. On the other hand, it can be presented in breadth by giving some words like order "personnel", "management" or "employment" that enrich its usage.

The concept of the depth and the breadth of word has many practical implications for teaching and learning lexical items. First, it guides teachers to present L2 vocabulary effectively by focusing on different aspects of meaning, the denotative and connotative, the syntactic and semantic relations. This focus on depth and breadth leads certainly to a solid teaching and learning as learners learn words from different perspectives. In addition, knowing many words reinforces learners' competence as it helps them to carry out the language tasks more easily and to express themselves more effectively.

2.4. Teaching Practices of L2 Vocabulary

The present literature review reveals that there have been limited studies within the UAE contexts that discuss the issue of teaching and learning L2 vocabulary within the brain based and markedness frameworks. The following studies are some examples of the brain based studies

carried by Obaid (2007), Al Zaabi (2007), Eisa (2007) and Al- Neyadi (2007) within the UAE context.

However, these studies have age limited foci and depth as they concentrate only on the primary cycle of 6-12 years old learners. Moreover, they do not provide comprehensive practical treatments to the low achievement problems in the UAE. They just agree on the importance of using games for teaching and learning L2 vocabulary, because they are more remembered and retained in the memory. They do not say how they are processed in the brain and why are games more retained in the brain more than other drills. However, they agree with this dissertation on the importance of using the brain based approach in developing education. The following sections will focus on the overview of the different approaches in the L2 vocabulary teaching and learning.

2.4.1. The Lexical Approach

This approach is innovative and practical for teaching L2 vocabulary learning and learning because it contradicts the traditional grammar translation method that considers grammar the heart of the teaching and learning languages. It is adopted by many theorists and linguists, so it is considered a remarkable shift of focus. For example, Chomsky, the father of contemporary studies in syntax, admits the importance of lexical items as he confirms that "Lexicon-is-prime" in his Minimalist Linguistic' theory. The lexical approach focuses on teaching and learning by chunking the lexical items in order to easily process them in the short memory taking into consideration Miller's magic number and the short term memory limited capacity (Aitcheson,2003). Richards and Rodgers support the concept of chunking words and suggest different ways of such as "… collocations of lexical items and multiple word units." (p. 132). In addition, the lexical approach discusses many kinds of collocations of practical pedagogical implications such as binomials, trinomials, idioms, similes, connectives and conversational gambits.

The lexical approach considers chunking as a psychological educational strategy for word processing that can overcome the brain limited capacity. Moreover, the presentation of other collocations leads to variation of teaching and learning strategies which leads to more constructive educational processes due to the activation of many parts of the brain. Therefore, many educationalists build on the lexical approach for higher order thinking skill teaching and

learning strategies. For example, Krashen confirms the vitality of reading as an abundant source for the enrichment of the of L2 vocabulary input. Other educationalists purport that using computers and databases as other sources of enriching the lexical items and using it for building brain based chunking strategies.

However, the lexical approach is criticized for not a having a learning theory; therefore, Lewis (2000, in Richards and Rodgers) make different assumptions that draw the broad lines of lexical approach learning theory. He proposes that only noticing L2 vocabulary is not enough to process them in the memory and change them from the input into intake because learners need to notice the similarities, differences and examples. These concepts are crucial as they make learning stronger through activating different parts of the brain which agree with Aitcheson's Bathtub effects that using different parts of speech activates different parts of the brain. Furthermore, Lewis calls for teaching words in different contexts and repeatedly for acquisition to occur. This assumption agrees with Chomsky's Innatist language acquisition (LAD) device hypothesis which confirms that more systematic repetition leads to more activation of LAD, consequently causing more transfer of lexical items to the long term memory. Additionally, Lewis' assumption that practicing L2 vocabulary in different occasions and contexts agrees with the behaviorist approach as repetition makes perfect. To conclude, the lexical approach is a practical teaching method as it is based on the brain teaching approaches and techniques.

2.4.2. The Structural Approach

The structural approach views teaching and learning L2 vocabulary from another perspective that differs from the lexical approach. It posits the morphological analysis is a base for learning L2 vocabulary since it is based on dividing the words into prefix, roots, and suffixes which helps learners to extract the meaning. In addition, the structural approach hypothesizes that the word is the core of learning L2 vocabulary as learners start learning them by analyzing the words to elicit the meaning then they move to sentences. Moreover, it focuses on words formation by providing different forms of the word such as nouns, adjectives and verbs which leads to more solid learning. Behlol and Dad (2010) confirm that word formation results in more productive learning as they argue "The words that are generated by the learner can be recalled easily as compared to merely listened or read." (p.126). This hypothesis agrees with Aitcheson's Bathtub Effect of using a variety parts of speech because they activate different parts of the brain. Furthermore,

the structural approach highlights the importance of punctuation marks in teaching and learning vocabulary as they are indicative of certain connotations. For example, full stop indicates the end of the thought while comma implies the continuation the ideas and semi-colon points to the change or the reversal of thoughts.

In fact, the structural approach is very essential for teaching and learning L2 vocabulary as it guides teachers and learner to understand the meaning systematically. It helps them to divide words into its constituent parts as roots, prefixes and suffixes which enable them to elicit the meaning of the words. Additionally, this approach guides teachers to prepare a practical teaching environment by enabling them to prepare a variety of tasks presenting L2 vocabulary from different perspectives. Moreover, it leads to using multi-exposure techniques and engaging learners in educational activities. Behlol and Dad (2010) confirm the importance of learners' participation in learning L2 vocabulary contending that "[…] students should be active in learning of a word. They should not be recipient in word knowledge." (p. 126).

2.4.3. The Conceptual Approach

The conceptual approach concentrates on the use of concept in teaching and learning L2 vocabulary. It hypothesizes that learning the mere literal meaning of the word without linking it to its concept is not enough to be integrated with the previously learnt lexical items; therefore learners will not be able to use it in meaningful context. Scott and Naggy (1997, in Behlol and Dad) argue that

> Learning the meanings of word without conceptual clarity is not enough to
> integrate the new knowledge with the existing one […] does not make the learner
> able to fully comprehend the meanings of the word and get the sufficient skill to
> use it. (p.127)

Accordingly, the conceptual approach sets three main stages for teaching lexical items. First, teachers should introduce the information that learners know about the word, and then they should connect the words to the previously learnt words by activating their schemas. Finally, learners should use the targeted word in meaningful contexts.

The conceptual approach is necessary for L2 vocabulary teaching and learning as it makes the lexical items more natural by connecting them to their referents. In addition, it provides practical steps for presenting and processing the newly learnt vocabulary by using the gradation principle

of starting with pre- learnt knowledge, activating schemas and using the targeted words in meaningful contexts.

2.4.4. The Context Based Approach

The context based approach is considered the most practical approach because it helps learners to elicit the meaning of the lexical items without resorting to dictionaries. It is based on exploiting the contextual clues to help learners to elicit the meanings of difficult words. This approach introduces the meaning of the new words in two types of texts that is the instructional texts and the natural contexts. The instructional texts are written especially to introduce the meaning of the new vocabulary while the natural texts are the ones that focus on communicating the main ideas. According to the context based approach, learners can make use of antonyms, synonyms, referent words, definitions, hyponyms or restatements to elicit the meanings of the new words.

In short, the context based approach fosters in learners the independent learning faculty that helps them to learn the meaning of the new words and to use them in meaningful contexts. It also solves the problem of multi-semantic meanings as some words cannot be identified without being used in contexts. For example, the word book has different meanings according to its contextual use "I need to book a seat" or I need to read this book. However, teachers should be careful when choosing context based texts as they should use as many authentic texts as possible.

2.4.4.1. Static and Dynamic Tasks

 In addition, Shokrpour and Nezahad (2012) discuss the concept of context-based L2 vocabulary teaching and learning from different perspectives as they hypothesize that lexical competence has a decisive effect on mastering all second language skills. They confirm that a person cannot be an efficient learner unless he has a comprehensive lexical ability to master these skills as they contend that "Vocabulary knowledge influences the learners' performance so remarkably that success in all language skills is closely related to it." (p.17) .They divide the context based tasks into static and dynamic in order to present practical types of context based tasks. The static approach highlights the form of the word and presents it in certain linear or especially designed contexts that are learnt consciously. On the other hand, the dynamic approach introduces

vocabulary in less formal tasks such as dialogues or conversations, which make learning spontaneous and less controlled.

Overall, the static and the dynamic types have crucial pedagogical implications as they are complementary. The static type is effective for facilitating the systematic teaching process that act as a guide for teachers and learners. However, the dynamic type is essential as it socializes the use of the targeted lexical items in meaningful and unstressed educational environment. Shokrpour and Nezahad's views of static and dynamic tasks agree with Krashen's approaches of acquisition and learning as both types can be used effectively and complementary to activate different parts of the brain which leads to a more solid language acquisition.

2. 4.5. The Explicit / Implicit Approach

The explicit/ implicit approach distinguishes between two major kinds of teaching practices. The explicit approach is the one that designs certain tasks in order to teach L2 vocabulary by designing some texts such as a story or a dialogue or a role-playing. However, the implicit approach presents L2 vocabulary naturally and unintentially. Rieder (2003, in Choo, Lin and Pandain) defines the concept of implicit learning as "[…] learning vocabulary as a by- product of any activity not explicitly geared towards vocabulary learning."(p. 853). On the other hand, (Hulstijn, 2001, in Choo, Lin and Pandain) defines intentional vocabulary learning as any activity designed particularly and solely to introduce the targeted L2 vocabulary positing that "any activity geared at committing lexical information to memory." (p.853).

Both methods of teaching are practical and important from an open minded point of view as the incidental method helps teachers to build up the learners' lexical competence through ongoing natural teaching and guidance. On the other hand, the intentional approach has its own implications as teachers are supposed to design certain texts in order to introduce L2 vocabulary of specific domain and for specific groups of learners. For example, when teaching some army units military expressions must be the targeted language; therefore, teachers should design certain tasks to present military idioms and expressions in certain contexts.

2.5.3. Word Processing Skills

Jaen (2005) discusses the exploitation of the Keyword technique in teaching and learning L2 vocabulary. It depends on creating a certain link between the new L2 word and its synonyms in the L1 in order to give it a kind of reference and to activate learners' schema. Jaen confirms the importance of the keyword techniques arguing (p. 261)

> One of the most well-known imagery strategies when dealing with new vocabulary is the keyword technique, where students create a link between an L2 word and a formally similar first language (L1) item in order to form a visual image to help memory.

This leads to more a robust education as it internalizes the newly learnt words into the learners' semantic system. However, the keyword technique is criticized for being more appropriate for dealing with concrete words more than the abstract word and for not being effective for long term retention.

From another perspective, Randal supports the trend of making a kind of connections between the two languages and using the L1 vocabulary as means to integrate the L2 lexical items as he argues " In term of the second memory usage in the second language learner, what is important is that this interaction between the two language" (p.123). Randall's hypothesis is supported by (Brown and Perry's, 1991) keyword technique which confirms that L2 vocabulary can be taught more effectively if they are linked with their synonyms in the L1. In fact, both hypotheses are crucial for L2 vocabulary brain based learning and teaching strategies as they direct teachers to build on the learners' schema in terms of integrating the newly learnt lexical items into the learner's lexical storage.

O'Malley and Chamot explore deeply the stages of encoding the linguistic inputs by suggesting four stages for selection. The first stage of learning L2 vocabulary is short listing the L2 vocabulary that interest the learners and sending it to the working memory. The second stage is the acquisition stage when the learners acquire the newly learnt L2 vocabulary and send them to the long term memory for permanent storage. The third stage is the construction stage when the learners connect the newly learnt information to the previously stored items and link it to the learner's past experience. The understanding of the construction stage helps teachers to present L2 vocabulary more practically and naturally as it guides them to make use of the learners' schemas for connecting the recently learnt words with pre-stored ones. The construction stage can be achieved by using (Brown and Perry, 1991) key word technique that links the L2 newly

acquired words with their L1 synonyms. Integration is the fourth stage of processing and decoding the input by making use of the prior knowledge and activating it. This can be achieved by sending the newly learnt L2 vocabulary to the working memory for reinforcing through mingling exercises and to change them from input to intake.

Moreover, Aitcheson (2003) explores brain deeply using that scientific images and technology which confirm the theories of the brain's parts activation while using the language. She posits that, depending PET and FMRI, when a person uses language there is more blood flow in the activated areas than the deactivated areas like other parts of the body. Thus, she hypothesizes that the brain has different special parts responsible for dealing with language and that not all parts of speech are processed in the same manner. Accordingly, she argues that:

> "New techniques has confirmed some points which have long been
> suspected by linguists , such as basic differences between the treatment
> of nouns and verbs, and between different types of verb." (p. 27)

This hypothesis helps teachers to keep in mind brain activation and brain time down which are very important factors for timing the educational tasks. In addition, Aitcheson's confirmation of different processing of parts of speech helps educationalists to consider verbs and nouns as well as other parts of speech when teaching and designing educational tasks. They must diversify their behavioural objectives by teaching L2 vocabulary in different forms as a noun, an adjective and a verb at the same time in order to activate different parts of the brain for getting deeply rooted recognition and production. They should also consider types of verbs when teaching and designing brain based tasks as not all verbs are processed in the same area. In addition, Aitcheson contends that resorting to the dual relationship when responding to certain word such as day and night, husband and wife is of educational vitality as it helps learners to build a strong link between the targeted words. Additionally, she affirms that words webs develop learners' ability as adult learners can elicit noun for noun and verb for verb when retrieving and using them.

 Depending on her previous hypothesis, Aitcheson suggest two main strategies for teaching vocabulary according to the brain based approach. First of all, she calls for adopting the Bathtub Effect arguing that learners remember the beginning and the end of the words more than the middle part. She posits that words are stored in the memory like a person lying in the bath as his head and his feet are the only parts appearing from water. Thus, she claims that:

> People remember the beginnings and ends of words better than the

> middle, as if the words were a person lying in a bathtub, with their
> head out of the water at one end and their feet out at the other.(p. 138).

The Bathtub Effect is practical in teaching and learning L2 vocabulary as it directs teachers to focus on the beginnings and the ends of words because they are remembered easily than the other parts. In addition, Aitchison presents cohort of words strategy for teaching vocabulary as contends that beginnings of the words are the most important part as they trigger a large number or a cohort of words beginning with the same letter or cluster.

This strategy is of a constructive educational importance as it helps teachers to teach words through games that build up more lexical items storage and enrich students' recognition techniques. For example a teacher may begin a word beginning with st, then may get stable, study, student or strategy as stimuli.

On the other hand, Thornbury presumes that second language learners should use the direct mind mapping brain strategy by linking the L2 lexicon to the L1 synonym in order to build on their previous knowledge through utilizing schemas. He argues that "L1 word acts as a stepping stone to the target concept." (p. 19). However, he warns learners and teachers to keep in mind different links when interchanging L1 and L2 as they may face false friends which are the words that look equivalent despite having crucial differences among them in terms of connotation and usage. This direct mapping supports Aitcheson's key word technique of using the L1 vocabulary as a corner stone for teaching the L2 vocabulary.

From another analytical point of view, Sprenger (1999) studies the brain profoundly hypothesizing that the human memory is divided into five types of lanes such as the semantic memory, the episodic memory, the long term, the automatic memory and the emotional memory. These lanes are important pedagogically as they guide teachers to diversify and adapt their teaching methodology and make use of the brain natural learning capacities by using each lane of memory to enrich their teaching strategies.

In addition, Sprenger focuses on the importance of the emotional factor while teaching L2 vocabulary by diversifying the implemented educational and assessment tools. She argues that if students are engaged emotionally in learning vocabulary, they remember more effectively because the recently learnt lexical items will be stored in the emotional lane. Moreover, she strongly suggests using more than one assessment tool such as portfolios, presentation, radio shows as well as the traditional assessment tools in order to engage learners, take care for their needs and explore their talents deeply. She claims that "I provide a variety of teaching styles and

assessments. Understanding and assessing memory lanes give me tools to help students remember and learn- in as many words as possible." (p.67).

Consequently, the storage, the retention, and the retrieval of the newly lexical items more than one part of the memory will be more automatic and spontaneous. For example, processing a word in the semantic memory leads to understanding its meaning, while processing it in the episodic memory gives it a physical dimension. However, storing a word in the emotional lane and linking it to an emotional situation lead to a strong learning retention and retrieval. This idea is highly supported by Jaen who argues that "if we locate a new item in more than one memory lane, the retention will be even stronger" (p. 260). This argument is of a practical educational value as it suggests the vitality of diversifying vocabulary teaching strategies in order to store them in different parts of the memory.

Ghazal, L. (n.d.) confirms that teaching L2 vocabulary should not be confined to teaching lists of words, but it should contain strategies for teaching them. He argues that teachers should understand the concept of lexical competence and should provide learners with certain techniques or strategies that prepare them to be independent learners capable of learning lexical items whenever they encounter or need them. He claims that "lexical competence is far more than the ability to define a given number of words and […] which in turn requires a variety of strategies to gain the knowledge" (p. 85). He thinks knowing a word implies understanding its meaning and identifies the form underlining the its conjugation. In addition, a learner is supposed to know the word's syntactic and situational implications such as spelling, pronunciation and collocations as well as it appropriateness that is the suitable context to be used. For example, the words "start" and "begin" are synonyms; however, they are used in different contexts as it is logical to say starting a car, but it is impossible to say beginning a car.

The next chapter discusses the layout of study as it points out the subjects and the setting as well as the research approaches used in this study. In addition, it explores thoroughly the treatments used in this study to show the effects of brain based approach on L2 vocabulary teaching and learning. Finally, it explains the procedures and the rationale of the study as well as its ethical considerations.

Chapter Three

3. The Study

This study concentrates on the problem of limited lexical competence of Arab learners at a public school in Dubai and the ways of improving their lexical competence. This chapter outlines the subjects and the setting of the study as well as the different adopted treatments. In addition, it discusses the rationale and the procedures utilized to carry out this study.

3.1. Subjects

This dissertation examined the students attending Al- Maarif Secondary School for boys in Dubai. The focus of the study was on the students of grade 12 art sections who were between 17 and 19 years old. They were of the same social background as they lived in Al-Rashidya, Nad Al- Hamer and Al- Muzhir areas which had the same economic and cultural status; therefore, they had the same educational input. I chose forty students in order to have a comprehensive study of teaching and learning vocabulary in these areas. Finally, the subjects were categorized into two symmetric groups of twenty students for each group after setting a pretest as diagnostic exam. (See appendix 4). The next section discusses both groups.

3.1.1. The Controlled Group

The controlled group consisted of twenty students and was taught separately in grade 12 section 3 by a colleague. This group was taught with the traditional approach using the same teaching vocabulary strategies adopted by the Ministry of Education and implemented generally at all the public schools in the UAE. The three first lists of academic word lists were given to the students as mere lists without being accompanied with any texts as it was shown (in appendices 1 and 2). After that the teacher read the lists gradually and gave students the synonyms of the targeted lexical item in Arabic in order to make these lists meaningful to students. He exploited the keyword technique that connected the targeted L2 vocabulary with their L1 synonyms. This was an excellent technique of a very paramount educational value to overcome students' surprise of being faced with these unrelated lists of words which were introduced only at grade 12. The students considered these lists of words meaningless as they were not related to their textbooks and they felt that they were an additional burden. The teacher used to ask students to read the

word lists again and again adopting the rote learning technique for remembering these words and making use of them when setting the CEPA exam. However, there was no clear trend to use these words in meaningful contexts for developing the four language skills. Moreover, the teacher asked students to do some multiple choice exercises in order to check their ability of answering some multiple choice questions that were symmetrical to the CEPA exam. After certain time, the teacher repeatedly read the word lists and asked students to read them and to give their synonyms in Arabic. This type of drilling helped students to remember the words using the rote learning techniques.

In a nutshell, the use of the traditional approach in teaching academic word lists vocabulary was the main cause for the low attainment in L2 vocabulary learning which has had deep repercussions on L2 vocabulary acquisition. First, introducing the target words in lists was very confusing as the students did not know the exact meaning of the word because words were taught out of their contexts. Moreover, some words could be nouns or verbs, so presenting them in a list perplexed students as they did not know which parts of speech the teacher targeted. Furthermore, rote learning was another an outdated technique as students repeated the targeted words many times for learning them by heart for one limited purpose of passing the CEPA exam. This limited students' lexical acquisition as they were not guided to use the targeted lexical items in meaningful contexts. In addition, the use of keyword techniques had its negative implications on students' lexical acquisition, despite its constructive effects on teaching and learning L2 vocabulary. The overdependence on the keywords techniques led to the excessive use of the first language which affected the use of English language in the classroom because it was an easy strategy for teachers and learners to get the meaning directly. However, the excessive use of L1 affected negatively the L2 competence and undermined the critical thinking faculties as learners were spoon-fed. In short, the keyword technique must be used carefully and scarcely in order to activate learners' schemas, but not to be an excuse for practicing L1 instead of L2.

3.1.2. The Experimental Group

 By contrast, the experimental was taught in a different manner by adopting brain based approaches. The main characteristics of the teaching methodologies were the diversity of processing the L2 vocabulary and considering brain based approaches when teaching and learning them.

First of all, the targeted lists were given to experimental group subjects to be kept as a resource, and then they were asked to read the words of lists and to write their meanings in Arabic for activating their schemas and building on their L1 experience. After that, they were given a matching treatment of twenty English words and twenty Arabic words in order to match the word with its synonym (see appendix 5). These helped students to learn better as it engaged them to identify L2 vocabulary in authentic situations. The matching exercise used the keyword technique that connected the words of the L2 targeted vocabulary with their L1 synonyms. However, it did not depend on any kind of repetition, as it used the brain based technique in order to link the L2 vocabulary with their synonyms.

The exploitation of parts of speech was the second treatment used as an input in teaching the new lexical items to the students of the experimental group. They were provided with parts of speech of the targeted words in order to increase their scope of processing and retention as teaching a word from different parts of speech concepts like a verb, an adjective and adverb increased brain activation by engaging different parts of the brain. They were given a word such as" immigrate", and then they were asked to provide its word family or derivations. At the end the students were given as a multiple choice exercise of twenty sentences checking students' recognition and understanding of parts of speech (see appendix6).

In addition, the experimental group received two gaps filling exercises in order to overcome the semantic markedness of the targeted vocabulary. Firstly, they were given a reading passage written in English with ten gaps to be filled with the L2 lexical items. Moreover, these subjects were given another reading passage written in Arabic be filled with 10 L2 targeted words. These text-based exercises were more authentic as they made the teaching and learning more meaningful by providing cognitive clues, through context, for filling in the gaps (see appendices 7 and 8).

Moreover, the experimental group subjects received a special input as the subjects were asked to pinpoint the syllables of the words in order to overcome syllabification markedness. For example, students were given some words like "consequent" or "community", and then they were asked to locate their syllables by placing a dot or a slash at the beginning of each syllable. Later on, a list of twenty targeted words was given to experimental group subjects in order to point out their syllabifications and to show their structure in terms of prefix, stem or suffix (see appendix 9).

Furthermore, spelling was another important input in teaching and learning L2 vocabulary to overcome the marginal markedness. The subjects of the experimental group were presented with many words of different markedness levels and they were asked spell them and they were given oral scaffolding to practice spelling. In addition, they were asked to do a variety of spelling exercises such as providing the missing letters showing clustering and sound combinations. Finally, these subjects were given twenty anagrams and they were asked to rearrange the jumbled letters in order to provide the correct forms of the words. (See appendix 10).

The oral approach was also an effective treatment that was used in this study to make use of the Bathtub technique. Students were required to listen to ten words, then they were asked to rewrite the words or the parts of the words that they could remember (see appendix11). This treatment showed the importance of the Bathtub technique as most of the students remembered the initial parts of the targeted words, while they remembered the final parts of the words to a lesser degree. However, very few of them remembered the middle parts of the targeted words.

3.2. Setting

There is a clear limitation in students' L2 vocabulary attainment at Al-Maarif Secondary School which affects the subjects' attainment in the four skills. This limitation is due to different considerations. Firstly, the subjects learn English only about fifty five minutes a day; therefore, they have a little chance for the acquiring English language naturally. Secondly, Arabic is the dominant language at the domestic and social level in the UAE society , so the subjects speak Arabic most of the time despite the fact that they practice a little English when visiting malls and some touristic destinations. In addition, the nature of the educational system at the Ministry of Education in the UAE is responsible for the limitation in vocabulary attainment as all other educational subjects are taught in Arabic. For example, students study math, physics, history and economics in Arabic; therefore, they are deprived of multi rich resources of lexical items that enrich their mental lexicon. Thus they do not learn any economic, historic or scientific expressions that add up to their semantic storage.

Due to the students' limited vocabulary knowledge, the academic unit at the UAE Ministry of Education has introduced the academic word lists (See Appendix 2) for enriching students' lexical storage and preparing them for the CEPA exam which is a pre-requisite for joining the

establishments of the UAE Higher education. This exam consists of 50 grammar sentences, 40 vocabulary exercises and 30 reading questions designed on multiple choice bases as well as a separate essay writing section. The main academic list consists of ten sublists focusing on the most vital and essential vocabulary for academic study. The Ministry of Education decides to use the first three lists, list one, list two and list three for enabling students to pass the CEPA and increasing their capabilities to pursue their undergraduate studies at the official universities and the higher colleges of technology. The other lists from four to ten are to be used for preparing students for the TOEFL and the IELTS exams.

3.3 Stimulus Selection

This dissertation employed sixty words from the academic word lists as a stimulus in order to address the research questions exploring the issue of grade 12 students' limited attainment in L2 vocabulary at Al- Maarif Secondary School. It aimed in finding the causes of this limitation and provided the appropriate solutions for this case. Consequently, I decided to use the mixed approach consisting of both the qualitative and the quantitive approaches and to implement different treatments so as to explore this low achievement from different perspectives and provide a variety of educational solutions. I adopted a longitudinal study that took eight weeks exploiting different lists of the academic word lists. I used the Cox head's academic world list which had ten word lists as a general resource of L2 vocabulary (see appendix 1). Then, I focused on the three word lists as they were used by the Ministry of Education for preparing the students for the CEPA exam (see appendices 2). They were the core of this dissertation because they were the base for teaching and learning as well as evaluating the subjects' achievement at the end of the research The second kind of stimuli of the research was a list of sixty words shortlisted from the first three academic word lists based on markedness criteria in order to check the causes of low achievements and the types of vocabulary that students find difficult (appendix3). This list displayed the four aspects of markedness that were morphology, syllabification, marginal length and semantics.

3.4. Treatments

This dissertation adopted a variety of treatments in order to carry out the pedagogical studies for both groups. It aims in enriching the teaching and learning process and overcoming the limitation of L2 vocabulary attainment by suggesting different brain based approaches.

No.	Name of the Treatment	Pedagogical Reasons for Usage	Cont.G	Exp. G.	R. Ques.
1.	Pre-test/ post-test	Diagnosis	/	/	1
2.	Matching Exercises	Keyword technique input		/	2-3
3.	Parts of speech Test	Morphological input		/	2-3
4.	Gap filling exercises	Checking semantic markedness		/	2-3
5.	Syllabification exercises	Checking morphological markedness		/	2-3
6.	Spelling exercises	Checking morphological and syllable count markedness		/	2-3
7.	Oral exercises	Checking Bathtub effect		/	2 -3

The study used a multiple choice exam as a pre-test administered to both groups in order to measure students' lexical competence and to be an authentic base for starting the research of this dissertation (see appendix 4). It served as a diagnostic test to show the educational level of the targeted students and to identify the issues of markedness in terms of syllabification, margin length, morphology and semantics. This tool was helpful to understand the reasons of the students' vocabulary limited knowledge and the types of words that lessened student's lexical attainment in vocabulary. In addition, it enabled me to suggest more practical brain based strategies and techniques to teach L2 vocabulary effectively. The most limitation the pretest was using only the multiple choice exercises, which might have had certain inadequacies or unauthentic results. Some students might have answered without understanding the core of the

questions or got the right answer by chance which might have led to some misleading results. However, the multiple choice exercises were used because they were in line with the CEPA exam and the final exams administered by the Ministry of Education to grade 12 students. To readdress the L2 low achievement, I used the following treatments for improving the experimental group L2 vocabulary learning abilities.

Treatment 1. The matching exercise was administered only to the experimental group. It consisted of twenty English words and their synonyms in Arabic checking students' learning new lexical items according to brain based techniques (see appendix 5). It was used to check the input based on the keyword technique as students were required to match the English targeted words with their synonyms in Arabic by drawing lines between them. Matching exercise showed more authenticity as it required more reading and understanding sentences; nevertheless, the possibility of guessing was possible as few students might draw some lines blindly which would certainly affect the preciseness of the results.

Treatment 2. The parts of speech exercise, which was administered only to the experimental group, was a practical tool in order to assess the morphological markedness (see appendix 6). It consisted of twenty multiple choice exercises to evaluate the parts of speech input by choosing the correct form of the word whether it is a noun, verb, adjective or an adverb according to certain contexts. This multiple choice exercise also had some falls because it was not totally precise as the possibility of blind guessing was high since some students might answer without knowing the correct answer. However, the multiple choice exercises were the only types of questions that had been used to test the parts of speech at the public school; therefore, I had to use them to be in coincidence with these assessment tool.

Treatment 3. The gap filling exercise in English was used as practical input for the subjects of the experimental group to overcome the L2 words in terms of semantics markedness. It consisted of a reading passage of ten gaps to be filled with some words selected from the academic word lists (see appendix 7).

Treatment 4. The gap filling exercise in Arabic was a totally different as the reading passage was written in Arabic to be also filled with 10 targeted words from the academic word lists (see

appendix 8). These gaps exercises were very effective because the guessing possibility was very low as students were supposed to read and to understand the passage in order to fill in the gaps.

Treatment 5. The syllabification exercise was a very practical tool in carrying out this study as they were used to check syllabification inputs (see appendix 9). The students of the experimental group were given 20 words and they were asked to point out the constituent syllables by using certain dots to separate the syllables in order to understand the morphology of the targeted words.

Treatment 6. Spelling exercises were also very effective research instruments in this dissertation as they were used to assess the marginal length markedness in term of clustering and sound combinations. The subjects of the experimental group were asked to read twenty anagrams and to rearrange the jumbled words by rewriting the correct forms (See appendix 10).

Treatment 7. The oral exercises were the exploited effectively in carrying out the study of this dissertation as they were highly exploited to check Bathtub effect on teaching and learning L2 vocabulary. Students of the experimental group were asked to listen to twenty words of different markedness levels then they were asked to write what they remembered of these words.

3. 5. Procedure

A total of 40 subjects were short listed from grade 12 art section students at Al-Maarif Secondary School of the same educational, cultural and demographic backgrounds. The students were divided in two symmetrical groups of twenty students, then a pretest was administered to both groups in order to check the semantic background and competence. The pretest focused on 60 words which were selected from the three academic word lists for enriching students' lexical storage and reinforcing their lexical competence (see appendix 3).The results of the pretest were analyzed according to the achievement average that was the percentage of the below the average and above the average students in order to know the students' academic level (see appendix 4). The pretest was analyzed with the markedness criteria as each word was analyzed independently to know the number of students who answered it correctly and the number of students who answered it incorrectly (see appendix12). This analysis added more depth to this study as it guided me to know which types of words were the most difficult and how to deal with each type of difficulty. According to the pretest the two groups of students were categorized into the controlled group and the experimental groups and received different inputs.

3.6. The Research Rationale

This dissertation highlights the importance of teaching and learning L2 vocabulary based on the brain based approaches. Therefore, it discusses the theories of teaching and learning vocabulary and focuses on the brain based strategies for getting a constructive and rewarding teaching methodology. In addition, the demerits of the traditional approach for teaching and learning vocabulary are profoundly explored and compared with the best methods of using the psychological and brain based strategies. Furthermore, the importance of considering the markedness framework is highly confirmed as an analytical tool for L2 vocabulary due to its pedagogical implications. Moreover, the rationale of this dissertation focuses on the diversification of the teaching and learning techniques according to the markedness framework and the brain based approaches because they lead to more brain activation and robust education.

3. 7. Ethical Considerations

The ethical commitment has been an issue of sanctity for me. I have adhered to the British University ethical .First of all, I got the full consent from the educational establishment that would be the target of my research as well as the participants before I started collecting the data or carrying out the research. I also told them about the nature and the objectives of the research in order to be acquainted with all the issues of the research. Additionally, I treated all the participants with the utmost respect in terms of their desires to participate in my study or to decline that participation. Moreover, I undertook all the subjects' names would be kept anonymous and I informed the subjects that their names would not to be disclosed under any circumstances.

Chapter four will present the findings of this study and discuss their wider implications for L2 vocabulary teaching and learning. In addition, it will discuss the treatments used in this study and their effects on changing the prevailing ideas of teaching and learning L2 vocabulary.

Chapter Four

4. Findings

This section discusses the findings of this study by addressing each research question respectively. After that it analyzes the results of the pretests and the posts test and link their results to the research questions. In addition, it studies each treatment of the dissertation thoroughly in order to analyze its results and to display pedagogical implications on the L2 vocabulary teaching and learning. Furthermore, it explains the role of markedness on L2 vocabulary processing.

4. 1. Research question 1

1. *What are the symmetries and asymmetries between the experimental and the controlled groups for the pre and the post tests?*

   The analysis of the pre-test shows clear symmetries between the controlled group and the experimental group. The pre-test was the first instrument that was used as a diagnostic test to check the level attainment of the controlled and the experimental groups. It showed that the attainment of both groups was very low. The students of both groups were below the average since the passing score is 60% for the CEPA and the public schools' final exams. Figures 1 and 2 showed that subjects of both groups were below the average as all of them got below fifty in the pretest exam. If we deleted the extreme value of the controlled group then the two sets would have the same range (the same highest and lowest marks).The standard deviation for the controlled group was slightly better than the experimental group as it is 25. 7 for the controlled group and 25 for the
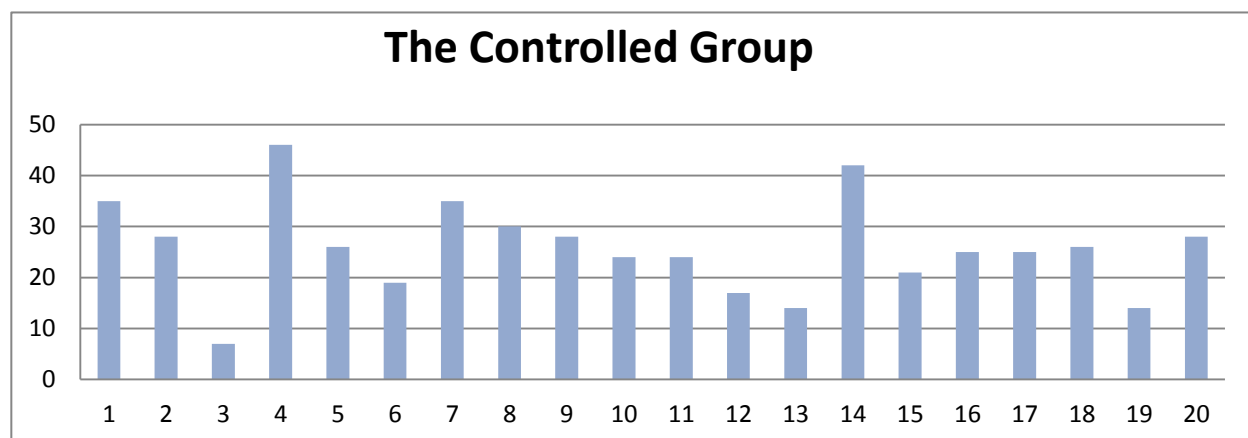
Figure 1:- The pretest controlled group

experimental group. The mean of for the experimental group was close to the mean of the controlled group as it is 9.34203855 for the controlled group and 10. 02628125 for the experimental group. In addition, the range of the controlled group was 32, whereas the range of the experimental group is 28. Thus there was no significant difference between the two groups.
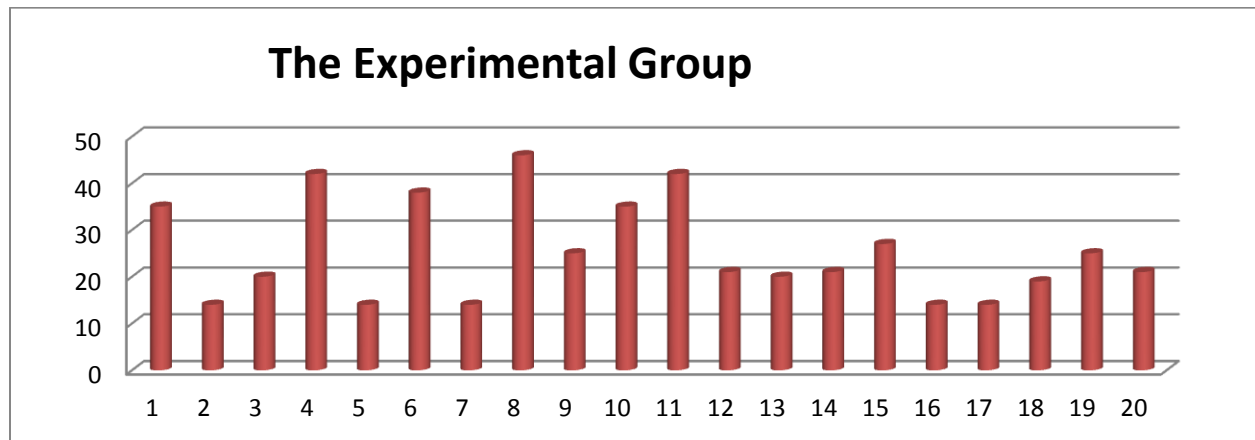
Figure 2;- Pretest experimental group

Furthermore, the pretest showed the marked items are more difficult than the unmarked items. In addition, it indicated that multisyllabic words were highly ranked in terms of difficulty and that semantically marked lexical items were the lowest in difficulty as shown in this ranking below.
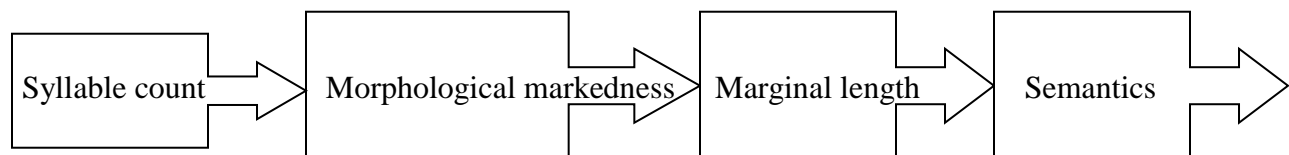
Accordingly, the two groups were taught in two different methods as the controlled group was taught with the traditional manner and the experimental group was taught with the eclectic approach based on brain based approaches.

On the other hand, the findings of the post test showed clear differences between the controlled and the experimental groups (see figure 3 and figure 4). The mean of the experimental group is higher than the controlled group despite that the standard deviation and the ranges approximately were close. In addition, it was clear that 70% percent of the experimental group subjects scored

more than 80%, whereas just 5% of the controlled group scored 80. The findings also showed that despite the clear improvement of the experimental group subjects, the syllabification and morphological length were major fields of difficulty that should be considered when teaching and designing L2 vocabulary tasks.
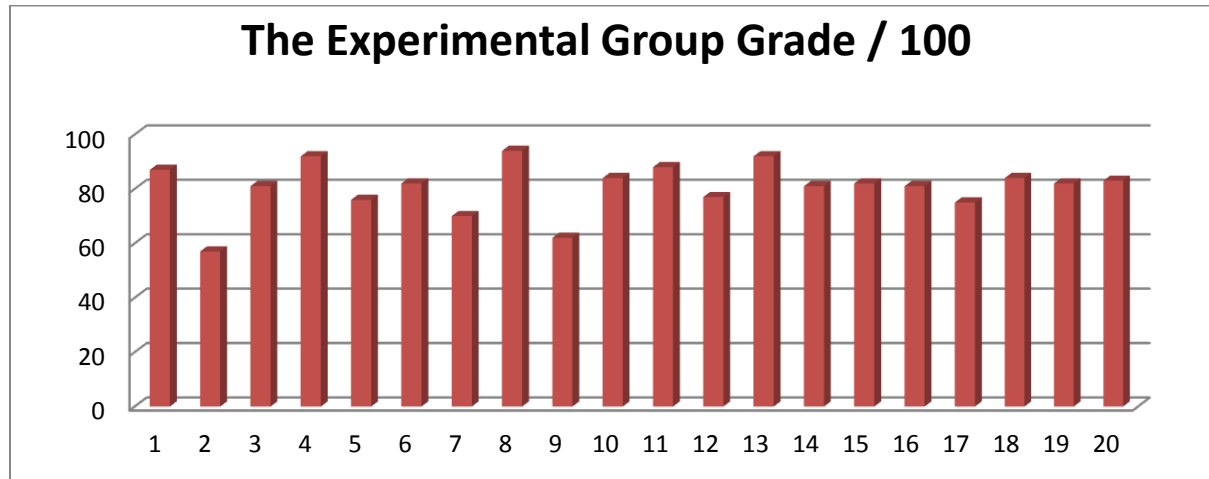
Figure 3. Post test the Experimental Group
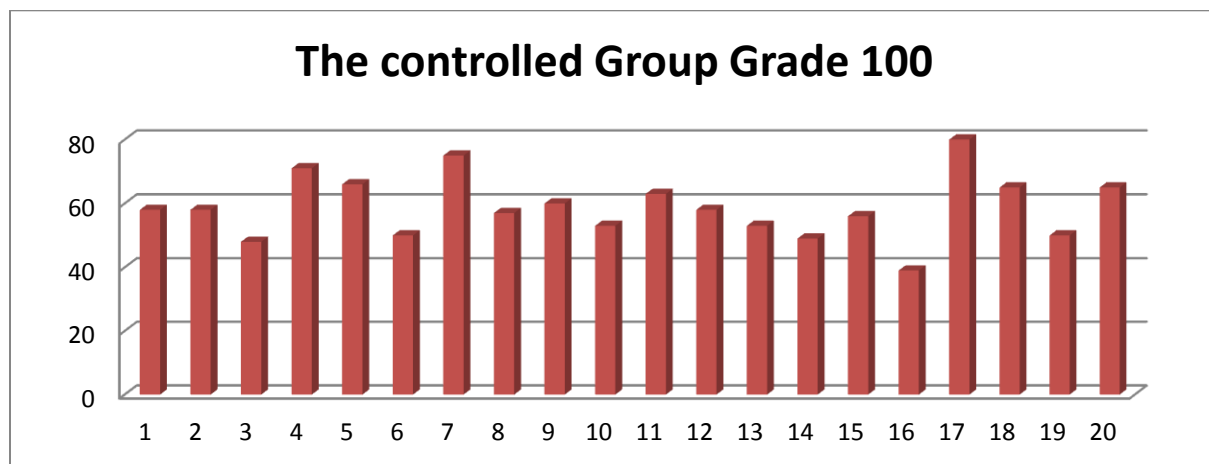
Figure 4: Post test Controlled Group

4.2. Research Question 2

2. *What are the symmetries and asymmetries between the scores for each treatment?*

This study used seven different treatments with the experimental group which showed a variety of educational findings. The findings showed that the marked L2 lexical items were far more difficult than the unmarked items and that they required more time and effort for being taught.

However, the level of difficulty varied according to the type of markedness which was clearly shown the following treatments.

Matching was the first treatment, given to the experimental group. It showed that the multi syllable and the morphologically complex words were more challenging than the unmarked words in terms syllable count and morphology markedness (see figure 5). However, the cognate consideration had a clear effect on words recognition as the words that had cognitive symmetry between the L1 and L2 showed more correct answers as the lexical items that did not have this symmetry. For example, the English word "compute" has the same cognate in Arabic, so the correct answers were much higher. On the other hand the word "significant" did not have any cognate in Arabic, so the score was a little below.
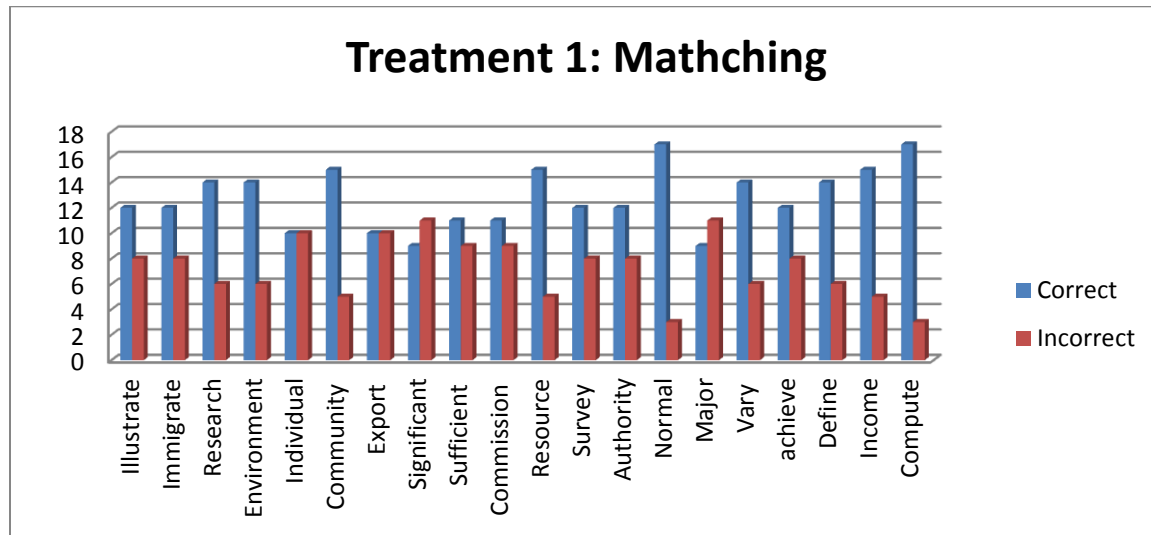
Figure 5. Matching treatment

The Parts of speech exercise was the second treatment for low achievement in this dissertation (see figure 6). The findings also implied that markedness was a crucial issue in teaching and learning L2 vocabulary as marked words were more demanding than the unmarked ones. The syllabic count markedness was a clear problem in this treatment as the correct answers of the word "significant" which is marked in terms of syllable count markedness were fewer than the correct answers of word "vary" which is unmarked. In addition, the cognate issue was a decisive issue as the correct answers of the word "compute" were the highest of all the targeted words due to the cognitive matching with an Arabic synonym. Moreover, the concept of frequency was also

determinant in this research as the subjects provided more correct answers to the word "environment" despite its syllabic and morphological markedness due to its high frequency level as the number of the correct answers were very high.
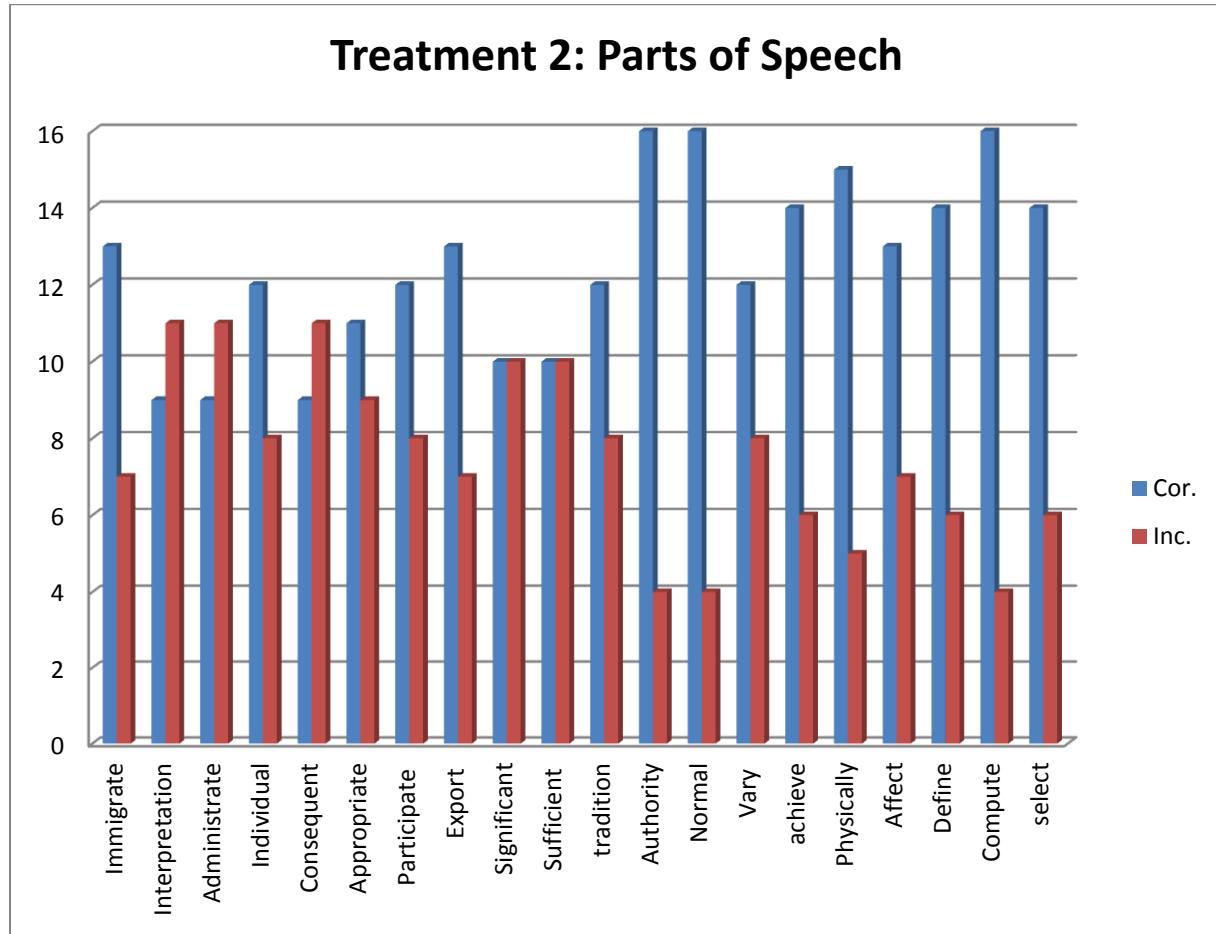
Figure 6: Parts of Speech treatment

Gap filling exercise in English was the third treatment used in this research (see figure7). The finding indicated that the semantically marked words were more difficult than the unmarked words. For example, the word "journal" was answered correctly by more subjects than the word "appropriate" because the word "journal" is unmarked semantically; however, the word appropriate is marked semantically. In addition, the word "journal" enjoys more frequency than the word "appropriate". Furthermore, the findings indicated that the subjects got higher marks of gap filling exercise more than other exercises because the subjects used the context base approach effectively in the gap filling exercise to elicit the meanings of the correct words.
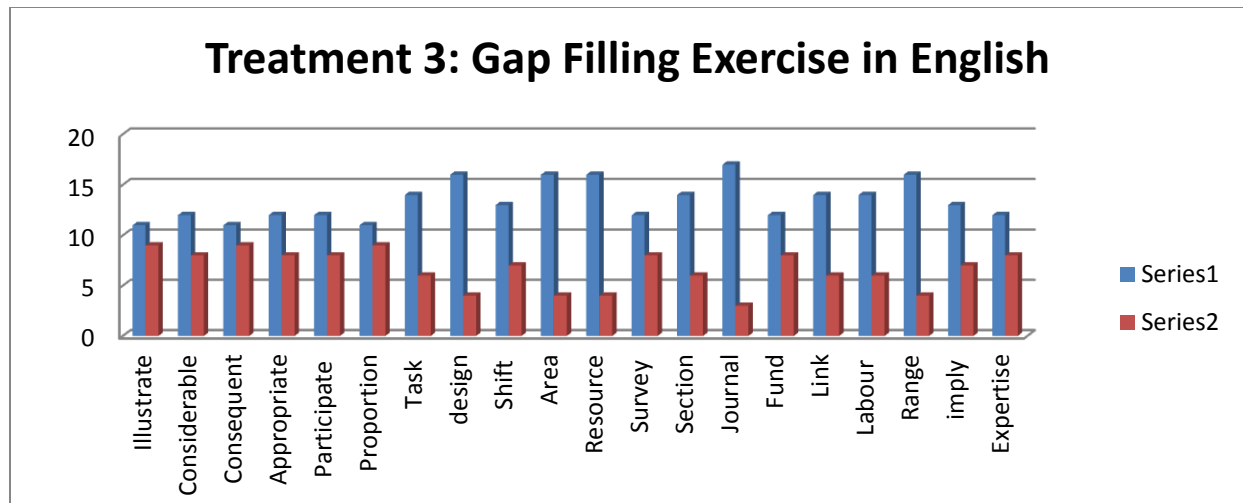
Figure 7:- Gap filling treatment in English

Gap filling exercise in Arabic was the fourth treatment that confirmed the importance of markedness framework in teaching and learning L2 vocabulary (see figure 8). It showed that the marked lexical items were difficult when doing gap filling exercises despite the fact that the text is in L1 and the targeted words were in L2. For example, a greater proportion of subjects answered correctly the word "data" than the word "interpretation" in the text because of markedness issue. As the word "interpretation" is marked in terms of semantics morphology and syllable count. However, the word "data" is unmarked in all markedness types. The gap filling exercises in Arabic indicated the importance of the cognitive symmetry as the words "technique" and "technology" were answered by a higher percentage of subjects because they had cognates in Arabic. Furthermore, the findings of the gap filling exercises in Arabic showed the importance of the based-text approach as having the text in L1 helped the subjects more to overcome some of the markedness constraints. Furthermore, the frequency markedness indicated a clear pedagogical importance as some words were answered correctly and at a higher percentage such as the words "technology" and "physical" despite their markedness because they are unmarked in terms of frequency. Consequently, the administered gap filling exercises proved the importance of taking into consideration the brain based approach and the markedness framework when teaching and learning.
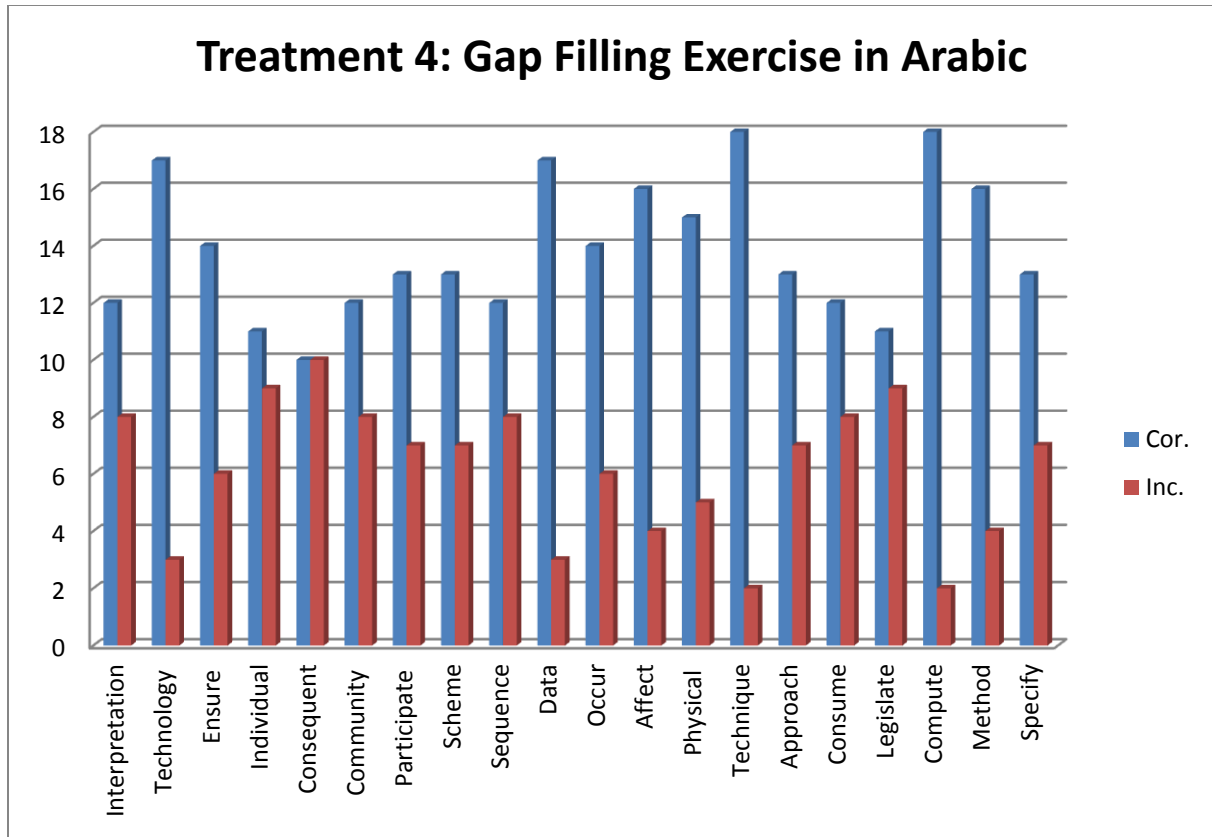
Figure 8:- Arabic Gap Filling Instrument

Syllabification was the fifth treatment used in this study (see figure 9). The findings confirmed the effectiveness of syllable count and morphological length as well as marginal length markedness in answering this exercises. The subjects experienced certain difficulties in identifying the syllables of the marked words such as "illustrate" and "interpretation" since they relatively scored low marks, but their answers were higher in the unmarked words such as "data" and "export". However, the findings supported the effects of cognates as the subjects were able to overcome some markedness problems by using these techniques. For example, the students identified the syllables of the word "technology" at the higher degree despite its syllable count and morphological markedness due to having cognates in L1.
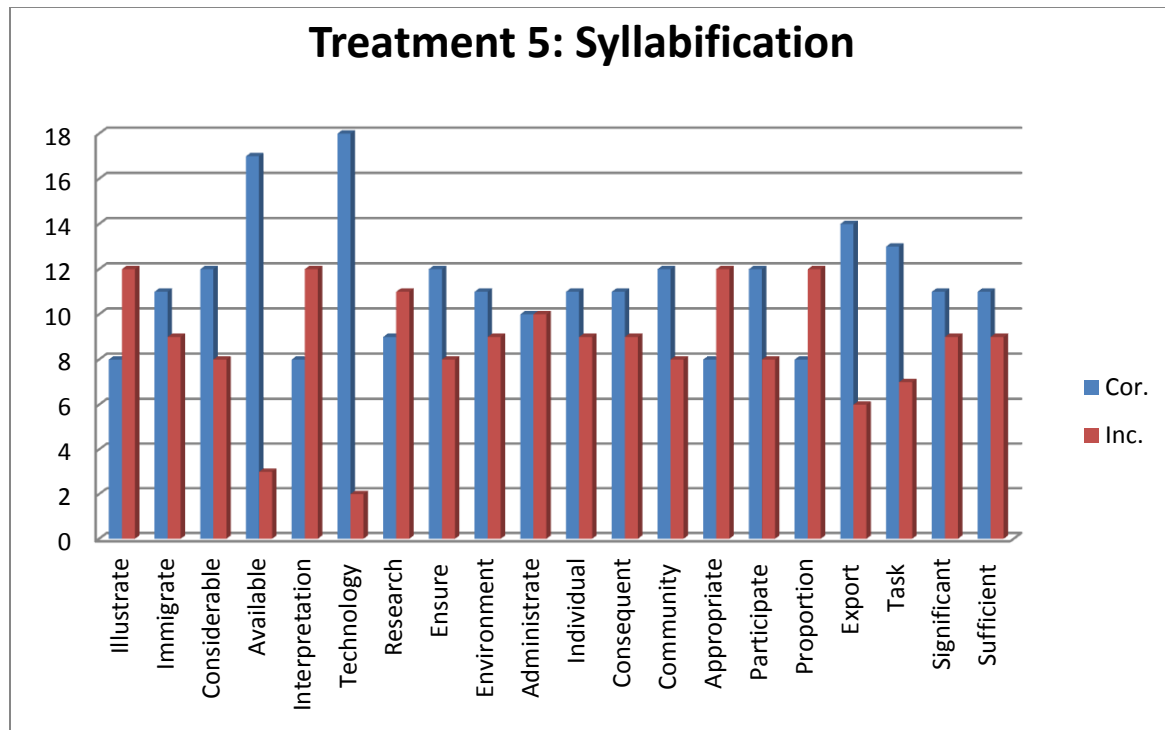
Figure 9: Syllabification Instrument

The findings of the spelling which was the sixth treatment in this dissertation also showed the effect of markedness on the L2 vocabulary teaching and learning (see figure 10). Although there was a clear higher achievement in the spelling activity, but there were also certain variations among the targeted lexical items. The percentage of the correct spelling of unmarked words was higher than the marked ones due to the syllable count, morphological markedness and marginal length which reduced the percentage of spelling some words such as "administrate" and "commission". However, the percentage of spelling the unmarked words such as "define" and "specify" was very high. In addition, the issues of cognate and frequency had a clear influence on the percentage of spelling exercise. For example, the percentage of the spelling of the word "sufficient" was relatively high because of its frequency despite having syllable count, marginal length and morphological markedness. Furthermore, cognitivism was another crucial issue because the words that had certain cognates in Arabic such as "credit", income", "technique" and technology were spelled correctly at a higher percentage than the words which did not have certain cognates in the L1.
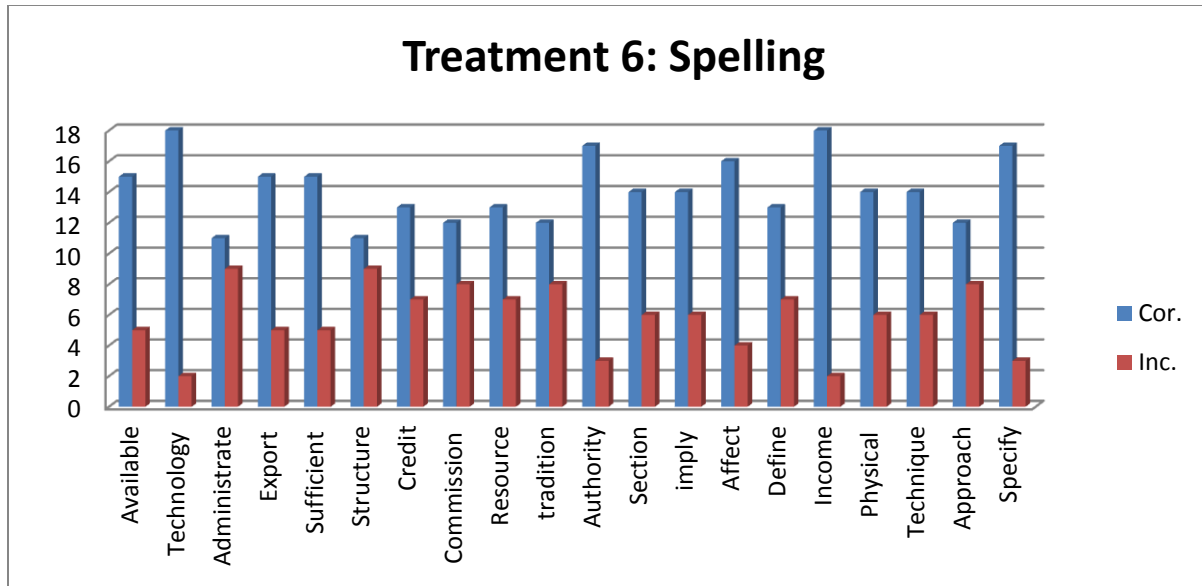
Figure 10: Spelling treatment

The Oral exercise was the seventh treatment in teaching L2 vocabulary teaching and learning (see figure 11). Findings showed that unmarked words were remembered and written more correctly than the marked words due to their markedness in morphology and, syllable count and marginal length. For example, the percentage of remembering the correct orthography of the words "community", "considerable" and "significant" was much lower than that of "income", "range" and "normal" due to the markedness factors. However, the effects of the issues of frequency and cognitivism were clear on the subjects' achievements. For example, the number of the subjects who identified and wrote the words "normal" and "range" were very high due to their frequency.

Treatment 7: Oral Exercises
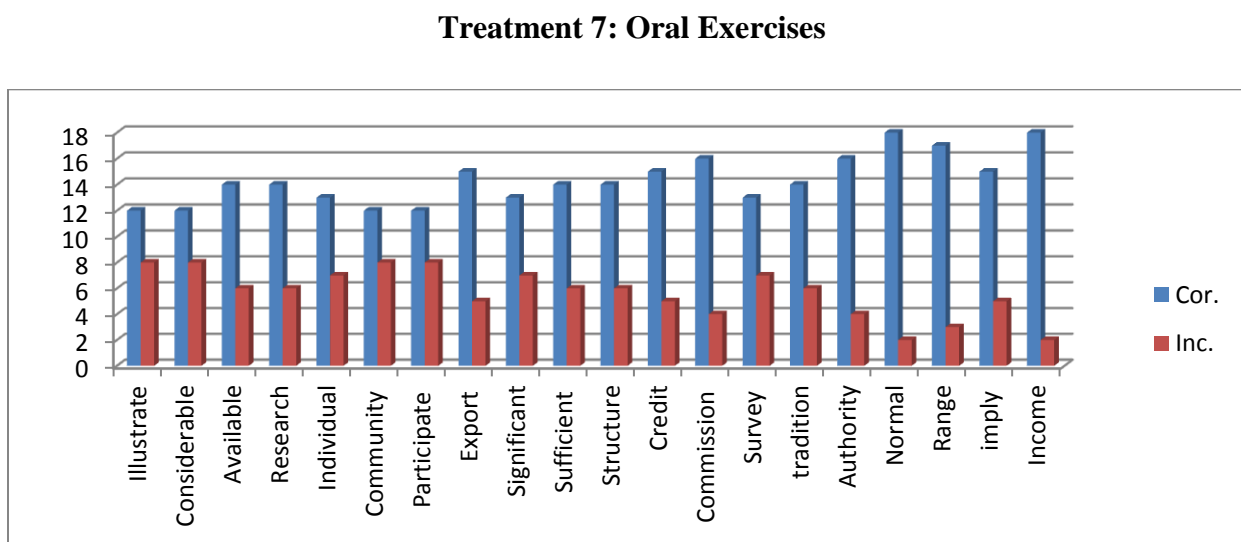
Figure 11:-Oral Exercises

To conclude, the treatments of this dissertation were highly consistent as their analysis showed the importance of considering markedness in teaching and learning L2 vocabulary. They showed that the marked lexical items were more challenging and demanding than the unmarked ones. They required more efforts and diversifications of the teaching and learning techniques because of their syllable count, morphology, and margin length and semantic implications. In addition, the findings of all treatment tasks showed the pedagogical effect of cognitivism of the L1 and L2 on facilitating the L2 vocabulary teaching and learning. Moreover, the pre-mentioned treatments also indicated the pedagogical implications of frequency on acquiring and teaching the L2 vocabulary.

4.3 The Research Question 3

3. What is the role of markedness in L2 vocabulary teaching and learning?

The study showed that markedness had an important role in the L2 vocabulary teaching and learning. The seven implemented treatments indicated that marked lexical items were more challenging and more difficult than that unmarked ones which required more planning and a variety of teaching and learning activities. For example, the marked words were taught in different contexts to be fully presented in accordance with the brain based approach to be integrated and learnt by the subjects. However, the unmarked items were easily taught and learnt by the subjects.

From another perspective, the analysis of the treatment tasks showed markedness types were ranked as follows in terms of difficulty :-

Syllable count >	Morphology >	Marginal length >	Semantics >
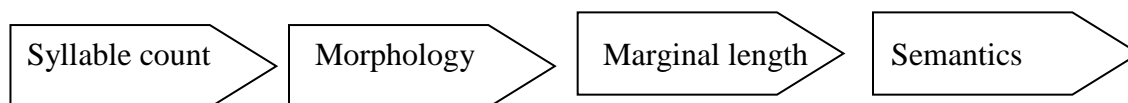
It showed that syllable count was the most challenging type of markedness, while semantics was the least difficult type of markedness constraints. Semantics was treated easily by integrating the targeted lexical items in meaningful contexts which facilitated their processing. Consequently the teaching methodology should be adapted according to the type of markedness.

Chapter 5

5. Discussion

The study discussed very important pedagogical topics as it explored profoundly the problem of low L2 vocabulary achievement at the Ministry of Education high schools in general and at Al-Maarif Secondary School in particular. It used the mixed approach in discussing this deeply rooted problem by exploiting different treatments. First, it used a pretest as a base for diagnosing this problem which showed the controlled and the experimental groups were identical. In addition, this study discussed many educational theories and designed different treatments based on the brain based approach to deal with the low achievement problem.

Matching Exercises were the first treatment used in this study which showed the pedagogical importance of the keyword technique. It indicated the educational impact of making a connection between the newly L2 vocabulary and their L1 synonyms. The results of the treatment indicated higher pedagogical effect of the keyword technique due to using the subjects' schemas in teaching and learning L2 vocabulary.

In addition, the parts of speech treatment discussed the problem of low achievement in L2 vocabulary from another concept. It focused on assessing the subjects' knowledge of nouns, verbs, adjectives and adverbs exploited by Aitchison's hypothesis (2003) that teaching vocabulary tasks should be diversified for exploiting the whole brain potentialities. This exercise showed more achievement and higher scores as teaching all parts of speech engaged different parts of the brain. On the other hand, the multi- gap filling exercises showed more improvement of the subjects' attainment level and displayed the importance of text-based approach in teaching and learning L2 vocabulary. This improvement was due to the engagement of the subjects' schemas in the gap filling exercise in English and more improvement of the gap filling exercise in Arabic due to the use of keyword technique. This exercise showed the importance of semantic markedness as the unmarked words were answered more easily than the marked ones, the subjects got higher in answering the unmarked words than the marked ones.

Furthermore, the dissertation showed the importance Aitchison's Bathtub technique in teaching and learning L2 vocabulary by designing different treatments showing the effect of implementing this approach. Spelling exercise showed that most subjects remembered the initial

parts of the targeted words and to a lesser degree the final part proving the Bathtub effect. Additionally, the oral exercise triggered more varied responses as many words were given when the first letters were initiated in a way coinciding with Aitcheson's words cohort hypothesis. This idea enriched the subjects' lexical storage as it helped them to give many words for the same initiation. Thus, this dissertation presented two important brain based practical approaches in teaching and learning L2 vocabulary.

Moreover, the syllabification treatment added more depth to the brain based approach of L2 vocabulary teaching and learning as it engaged learners totally in the carrying out this treatment. The subjects did a variety of tasks within one task as they not only listened to oral input and but they also marked each word's syllabification. The importance of the markedness constrain appeared clearly in the syllabification exercises as the learners identified the syllables of the unmarked lexical items easily. However, the marked words in terms syllable count posed a pedagogical challenge to subjects as they could not identify some of their syllables.

In addition, this dissertation showed the pedagogical implications of the explicit and implicit approach in designing educational tasks or even textbooks. The explicit approach helped teachers to design certain tasks for special purposes such as designing special books for engineers or soldiers. On the other hand, the implicit approach guided teachers to introduce vocabulary in authentic contexts as learners learn L2 vocabulary as a result of natural acquisition of reading stories and plays.

From another perspective, this dissertation highlighted the practicality of Krashen's Monitor Model and its role in the L2 vocabulary educational process. Teachers should consider the role of acquisition by encouraging their students to acquire the L2 lexical items freely and use learning as a guide and controller. In addition, i-1 input was focused in this dissertation due to its pedagogical impact on teaching and designing tasks as teachers should provide slightly challenging tasks for not frustrating students. Additionally, this dissertation focused on the role of the Affective Filter Hypothesis because of its decisive effect on motivating learners and reinforcing their self confidence. It provided learners with L1 synonyms support in the matching exercises and L1 context support in the gap filling exercises and oral support in the syllabication exercises which motivated them and increased their self confidence.

This dissertation also provided practical methods for teaching vocabulary as it suggested teaching words in depth by presenting all parts of speech and in width for by teaching all the related words. From another point, it presented static approach which implies that vocabulary can be presented in especially designed tasks. For example, a special reading comprehension or a dialogue is made in order to present certain lexical items. On the other hand the implicit approach focuses on presenting the L2 vocabulary in authentic texts such as stories.

Furthermore, the dissertation presented many approaches and models for effectively teaching and learning vocabulary such as the lexical, structural and conceptual approaches. It also presented many models such as the Logogen and the Spreading Activation Models which added more depth to concept of processing L2 vocabulary as it enriched the experience of teachers and learners. These theories and models proved their important pedagogical impacts on L2 processing as the use of the conceptual approach increased the learners' attainment in the matching exercises by joining L2 with their concepts through their synonyms in L1. The Logogen Model was also practical and useful as it helped in clarifying the markedness framework by confirming that unmarked lexical items have lower threshold than the marked ones. This implies that the unmarked words should be taught before the marked one to be a stepping stone in order to trigger their logogen to facilitate their processing. Furthermore, the study showed them practical importance of the Spreading Model that the brain is able to process a certain word and show its different relations like the semantic, syntactic and lexical relations by activating different nodes. For example, the brain can process a word like "government" as a noun, a system of rule and as a subject of a sentence at the same time which has an important pedagogical importance on L2 vocabulary teaching and learning.

Additionally, this study provided vital criteria for identifying a word by highlighting the phonological, syntactic, morphological and semantic types of knowledge which guided learner to assess their lexical competence. Therefore, these types of knowledge should be taken into consideration when teaching or designing educational tasks.

In short, this dissertation discussed and explored many educational theories and approaches that must be considered when teaching and learning L2 vocabulary to all learners. In addition it proved the extreme vitality of the brain based approach in all educational processes.

5.1. The Limitation of the study

This section outlines the research limitations in terms of the topic and the population sample. Firstly, the number of subjects was 40 male students in both groups which caused a certain limitation on scope of the study as research could not integrate female students. The integration of female students could have added more depth to this study and its findings as they their own perspectives and their learning needs. Secondly, most students were homogenous as they were of the same nationality and of the same age. Although this would indicate a kind of strength as it explored the problem of teaching and learning L2 vocabulary in the UAE society, it constituted an important limitation of the research scope. The study could have been more comprehensive, if the cultural background had been more diversified as it would have showed the effect of ethnic differences on the L2 vocabulary teaching and learning. Thirdly, there were a few studies and researches discussing profoundly the problem of teaching and learning L2 vocabulary at the UAE public schools; therefore, I had to refer to other studies in the Arabian Gulf or in other countries. Furthermore, the brain based approach has been only applied recently; therefore, finding resources has required much time and efforts. In short, despite these minor limitations, the study was carried out in an appropriate pedagogically supportive environment.

Chapter 6

6. Conclusion

This dissertation made use of the brain based approach for exploring and finding the appropriate solutions to the problem of low L2 vocabulary achievement at Al- Maarif Secondary school in Dubai. It dealt with this problem from different perspectives in order to present comprehensive and practical treatments.

First of all, this dissertation discussed profoundly the causes of this low achievement in the L2 vocabulary and it proved that rote learning and memorizations strategies were impractical as they did not help students to integrate the newly learnt lexical items in their lexical storage. In addition, these techniques could not transform the newly learnt L2 vocabulary into robust intake because they did not consider the brain based approach of processing them in meaningful contexts.

Moreover, this study adopted the markedness theory in finding solutions to the problem of L2 vocabulary achievement and it also helped to identify the underlying constraints in L2 vocabulary attainments because it proved that marked lexical items were more challenging than the unmarked ones. Additionally, it showed that syllable count was most highly ranked while markedness in terms of semantics was lowest ranked. This had an important pedagogical implication on L2 vocabulary processing in terms of teaching and learning as well as in designing pedagogical tasks. For example, if a teacher is to teach certain L2 vocabulary, more detailed and developed exercises should be used for the words which are marked in terms of syllable count than the words which are marked in terms of semantics.

In addition, this dissertation discussed the main hypotheses, models and approaches of teaching L2 vocabulary in order to present a comprehensive idea about processing them. However, the main focus of this dissertation were the brain based approaches and their implications on the L2 vocabulary. Additionally, the study showed its effectiveness by using many brain approaches such as the keyword technique, the Bathtub technique and the text- based approach in teaching L2 vocabulary.

Overall, this dissertation has a decisive pedagogical importance as it has shown the utility and practicality of brain based approaches in teaching and learning L2 vocabulary. Therefore, the findings of this dissertation require holding many workshops and conferences in order to train teachers to use the brain based techniques in teaching L2 vocabulary effectively. I noticed the importance of the brain based approaches when I presented a presentation entitled "The Role of Memory in L2 Vocabulary Teaching and Learning" in TESOL ARABIA Conference. It attracted the attention of the audience from different parts of the world because they appreciated the practical implications of the brain approach which was discussed thoroughly in this dissertation. They asked many questions about the keyword technique, the text-based approach and the Bathtub technique due to their important educational implementations. In addition, this dissertation confirms that the brain based approaches has caused many changes in syllabus and tasks designs. It has proved that diversification and repetitions are major issues in designing textbooks and tasks in order to make use of the brain learning potentialities as they activate different parts of the brain. Moreover, the use of brain based approach has introduced different criteria of assessment in order to cater for all students' learning needs.

 Furthermore, the introduction of markedness constraints is very crucial in L2 vocabulary teaching and learning for different considerations. Firstly, teachers should be trained to understand the meaning and the types of markedness constraints as well as their implications on L2 pedagogy. For example, they must be fully aware of introducing the unmarked lexical items before the marked items and they should consider the types of tasks to be used for considering each type of markedness. Moreover, syllabus designers should consider markedness when designing textbooks as they should provide certain gradational drills that consider marked and unmarked words in terms of arrangement, repetition and recycling.

To conclude, the brain based approach and the markedness framework should be the corner stone in the L2 vocabulary educational process and in designing textbook. Therefore, more researches should be carried out to better understand brain based approaches. For example, there must be more studies supported by highly advanced technology and carried out by joint teams of educationalists and psychologists in order to discover more of the brain potentialities and make use of them to develop education. In addition, many brain based researches should be recommended to be carried out for studying the L2 syntax profoundly and relating them to the

previous studies carried on L2 vocabulary for having a broader issue of the L2 teaching and learning process. Moreover, many training workshops should be held to train teachers and enrich their expertise in dealing with the brain based approaches, because the majority of teachers and curricula designers have limited concepts of the brain based approaches. From another perspective, more research should be carried for making use of the markedness framework in teaching L2 vocabulary and syntax due to its practicality in teaching these essential components of the language.

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Appendix 1

The Academic Word List

This list contains the 570 word families in the Academic Word List. These words are commonly found in college textbooks. The numbers indicate the sublists of the Academic Word List. Words in Sublist number 1 occur more frequently than words in Sublist number 2. As you review the list, remember that words labeled `1′ are commonly found in academic writing. Coxhead, A. (2000) "A New Academic Word List", TESOL Quarterly, 34, 2, 213-238

SUBLIST 1	**define**	*i*ndividual
analyze	derive	**interpretation**
approach	distribute	involved
area	economy	issues
assess	**environment**	**labour**
assume	establish	legal
authority	estimate	**legislation**
available	evident	major
benefit	**export**	**method**
concept	factor	occur
consist	finance	percent
constitute	**formula**	period
context	function	policy
contract	**identify**	principle
create	**income**	procedure
data	indicate	process
required	**research**	response
role	**section**	sector
significant	similar	**source**
specific	**structure**	theory variable

SUBLIST 2

achieve

acquire

administrate

affect

appropriate

aspect

assist

category

chapter

commission

community

complex

compute

conclude

conduct

consequent

construct

consume

credit

culture

design

distinct

element

equate

evaluate

feature

final

focus

impact

injure

institute

invest

item

journal

maintain

normal

obtain

participate

perceive

positive

potential

previous

primary

purchase

range

region

regulate

relevant

reside

resource

restrict

secure

seek

select

site

strategy

survey

text

tradition

transfer

SUBLIST 3	immigrate	specify
alternative	**imply**	**sufficient**
circumstance	initial	**task**
comment	instance	technical
compensate	interact	**technique**
component	justify	**technology**
consent	layer	valid
considerable	**link**	volume
constant	locate	
contribute	maximize	
convene	minor	
coordinate	negate	
core	outcome	
corporate	partner	
correspond	philosophy	
criteria	**physical**	
deduce	**proportion**	
demonstrate	publish	
document	react	
dominate	register	
emphasis	rely	
ensure	remove	
exclude	**scheme**	
framework	**sequence**	
fund	sex	
illustrate	**shift**	

SUBLIST 4

access	hypothesis	retain
adequate	implement	series
annual	implicate	statistic
apparent	impose	status
approximate	integrate	stress
attitude	internal	subsequent
attribute	investigate	sum
civil	job	summary
code	label	undertake
commit	mechanism	
communicate	obvious	
concentrate	occupy	
confer	option	
contrast	output	
cycle	overall	
debate	parallel	
despite	parameter	
dimension	phase	
domestic	predict	
emerge	principal	
error	prior	
ethnic	professional	
goal	project	
grant	promote	
hence	regime	
	resolve	

SUBLIST 5

academy	fundamental	substitute
adjust	generate	sustain
alter	generation	symbol
amend	image	target
aware	liberal	transit
capacity	license	trend
challenge	logic	version
clause	margin	welfare
compound	medical	whereas
conflict	mental	
consult	modify	
contact	monitor	
decline	network	
discrete	notion	
draft	objective	
enable	orient	
energy	perspective	
enforce	precise	
entity	prime	
equivalent	psychology	
evolve	pursue	
expand	ratio	
expose	reject	
external	revenue	
facilitate	stable	
	style	

SUBLIST 6

abstract

accurate

acknowledge

aggregate

allocate

assign

attach

author

bond

brief

capable

cite

cooperate

discriminate

display

diverse

domain

edit

enhance

estate

exceed

expert

explicit

federal

fee

flexible

furthermore

gender

ignorance

incentive

incidence

incorporate

index

inhibit

initiate

input

instruct

intelligence

interval

lecture

migrate

minimum

ministry

motive

neutral

nevertheless

overseas

precede

presume

rational

recover

reveal

scope

subsidy

tape

trace

transform

transport

underlie

utilize

SUBLIST 7

adapt	foundation	successor
adult	glove	survive
advocate	grade	thesis
aid	guarantee	topic
channel	hierarchy	transmit
chemical	identical	ultimate
classic	ideology	unique
comprehensive	infer	visible
comprise	innovate	voluntary
confirm	insert	
contrary	intervene	
convert	isolate	
couple	media	
decade	mode	
definite	paradigm	
deny	phenomenon	
differentiate	priority	
dispose	prohibit	
dynamic	publication	
eliminate	quote	
empirical	release	
equip	reverse	
extract	simulate	
file	sole	
finite	somewhat	
	submit	

SUBLIST 8

abandon	exploit	terminate
accompany	fluctuate	theme
accumulate	guideline	thereby
ambiguous	highlight	uniform
append	implicit	vehicle
appreciate	induce	via
arbitrary	inevitable	virtual
automate	infrastructure	visual
bias	inspect	widespread
chart	intense	
clarify	manipulate	
commodity	minimize	
complement	nuclear	
conform	offset	
contemporary	paragraph	
contradict	plus	
crucial	practitioner	
currency	predominant	
denote	prospect	
detect	radical	
deviate	random	
displace	reinforce	
drama	restore	
eventual	revise	
exhibit	schedule	
	tense	

SUBLIST 9

accommodate	inherent	subordinate
analogy	insight	supplement
anticipate	integral	suspend
assure	intermediate	team
attain	manual	temporary
behalf	mature	trigger
bulk	mediate	unify
cease	medium	violate
coherent	military	vision
coincide	minimal	
commence	mutual	
compatible	norm	
concurrent	overlap	
confine	passive	
controversy	portion	
converse	preliminary	
device	protocol	
devote	qualitative	
diminish	refine	
distort	relax	
duration	restrain	
erode	revolution	
ethic	rigid	
format	route	
found	scenario	
	sphere	

SUBLIST 10

adjacent

albeit

assemble

collapse

colleague

compile

conceive

convince

depress

encounter

enormous

forthcoming

incline

integrity

intrinsic

invoke

levy

likewise

nonetheless

notwithstanding

odd

ongoing

panel

persist

pose

reluctance

so-called

straightforward

undergo

whereby

Appendix 2   1- 2-3 Ministry of Education Accredited list

Word	Syllables	L1 Synonym	Word	Syllable	Synonym
1. analyze	2	يحلل	47. principle	2	مبدأ
2. analysis	3	تحليل	48. proceed	2	يتقدم
3. approach	2	طريق أو يقترب	49. process	2	عملية
4. area	1	منطقة أو مساحة	50. require	2	يتطلب
5. assess	2	يقيم	51. research	2	بحث
6. assume	2	يفترض	52. respond	2	يتجاوب
7. authority	3	سلطة	53. role	1	دور
8. available	2	متوفر	54. section	2	قسم
9. benefit	2	فائدة	55. sector	2	قطاع
10. concept	2	تصور أو مفهوم	56. significant	3	هام
11. consist	2	يتكون من	57. similar	2	مشابه
12. constitute	3	يشكل	58. source	1	مصدر
13. context	2	نص	59. specific	3	محدد
14. contract	2	عقد	60. structure	2	تركيب
15. create	2	يخلق أو يبدع	61. theory	2	نظرية
16. data	1	معلومات	62. vary	1	ينوع
17. define	2	يعرف أو يحدد	**List 2**		
18. derive	2	يشتق	1. achieve	1	ينجز
19. distribute	3	يوزع	2. acquire	2	يحقق
20. economy	2	اقتصاد	3. administrate	4	يدير
21. environment	4	بيئة	4. affect	2	يؤثر
22. establish	3	يؤسس	5. appropriate	4	مناسب
23. estimate	3	يقدر	6. aspect	2	مجال
24. evident	2	واضح	7. assist	2	يساعد
25. export	2	يصدر	8. category	2	نوعية
26. factor	2	عامل أو سبب	9. chapter	2	فصل
27. finance	2	يمل أو تمويل	10. commission	3	لجنة
28. formula	2	صيغة أو معادلة	11. community	3	مجتمع
29. function	2	عمل أو مهمة	12. complex	2	معقد
30. identify	2	يتعرف أو يحدد	13. compute	2	يحسب
31. income	2	دخل	14. conclude	2	يستنتج
32. indicate	3	يدل على	15. conduct	2	يدير
33. individual	4	فردي	16. consequent	3	تابع
34. interpret	3	يفسر	17. construct	2	يعمر
35. interpretation	4	تفسير	18. consume	2	يستهلك
36. involve	1	يتدخل أو يورط	19. credit	1	رصيد
37. issue	1	موضوع أو قضية	20. culture	2	ثقافة
38. labor	1	عمل	21. design	2	تصميم
39. legal	1	شرعي	22. distinct	2	واضح
40. legislate	3	يشرع	23. element	2	عنصر
41. major	1	رئيسي	24. equate	1	يساوي
42. method	1	طريقة	25. evaluate	2	يقيم
43. occur	1	يحدث	26. feature	2	خاصية
44. percent	2	نسبة مؤية	27. final	1	نهائي
45. period	1	فترة أو مدة	28. focus	1	تركيز
46. policy	2	سياسة	29. impact	2	تأثير

30. injure	2	يجرح	17. deduce	2	يستنتج
31. institute	3	معهد	18. demonstrate	2	يعرض
32. invest	2	يستثمر	19. document	2	وثيقة
33. item	1	شئ أو سلعة	20. dominate	3	يسيطر على
34. journal	2	مجلة	21. emphasis	2	تأكيد
35. maintain	2	يحافظ على	22. ensure	2	يؤكد
36. normal	2	طبيعي	23. exclude	2	يستثني
37. obtain	2	يحصل على	24. framework	2	اطار عمل
38. participate	3	يشارك	25. fund	1	تمويل
39. perceive	2	يتخيل	26. illustrate	3	يوضح
40. positive	2	ايجابي	27. immigrate	3	يهاجر
41. potential	3	طاقة كامنة	28. imply	1	يشير الى
42. previous	3	سابق	29. initial	2	مبدئ
43. primary	2	ابتدائي	30. instance	2	مثال
44. purchase	2	يشتري	31. interact	2	يتفاعل
45. range	1	مدى	32. justify	2	يبرر
46. region	2	منطقة	33. layer	1	طبقة
47. regulate	2	ينظم	34. link	1	يصل
48. relevant	2	يتعلق	35. locate	2	يحدد
49. reside	2	يسكن	36. maximize	2	يزيد
50. resource	2	مصدر	37. minor	1	فرعي
51. restrict	2	يحدد	38. negate	2	ينفي
52. secure	2	يؤمن	39. outcome	2	نتيجة
53. seek	1	يبحث	40. partner	2	شريك
54. select	2	يختار	41. philosophy	3	فلسفة
55. site	1	موقع	42. physical	3	جسدي
56. strategy	2	سياسة	43. proportion	3	نسبة
57. survey	2	استبيان	44. publish	2	ينشر
58. text	1	نص	45. react	1	يتفاعل
59. tradition	2	عادة	46. register	2	يسجل
60. transfer	2	نقل	47. rely	1	يعتمد
List 3			48. remove	2	يزيل
1. alternative	4	بديل	49. scheme	1	خطة
2. circumstance	3	ظروف	50. sequence	2	تابع
3. comment	2	يعلق	51. sex	1	جنس
4. compensate	3	يعوض	52. shift	1	يغير
5. component	3	مكون	53. specify	2	يحدد
6. consent	2	موافقة	54. sufficient	3	كافي
7. considerable	4	معتبر	55. task	1	واجب
8. constant	2	ثابت	56. technical	2	تقني
9. constrain	2	اعاقات	57. technique	2	اسلوب
10. contribute	3	يساهم	58. technology	3	تقنية
11. convene	2	يعقد اجتماع	59. valid	1	صالح
12. coordinate	4	ينسق	60. volume	2	حجم
13. core	1	جوهر			
14. corporate	3	تعاون			
15. correspond	3	يراسل			
16. criteria	3	معايير			

Appendix 3
Stimulus

No.	Words	Marked			Unmarked		
		Words	Correct	Incorrect	Words	Correct	Incorrect
1.	Morphology	Illustrate	12	28	Data	22	18
		Immigrate	8	32	Authority	16	24
		Considerable	0	40	Section	20	20
		Available	4	36	Normal	22	18
		Interpretation	6	4	Journal	24	16
		Technology	4	36	Fund	14	24
		Research	10	30	Link	16	24
		Ensure	4	36			
2.	Syllable counts	Environment	16	24	Labour	17	23
		Administrate	12	28	Major	15	25
		Individual	10	30	Occur	12	28
		Consequent	0	40	Vary	14	26
		Community	12	28	Range	20	20
		Appropriate	6	34	imply	8	32
		Participate	8	32	achieve	12	28
		Proportion	4	36			
3.	Margin	Export	14	26	Physically	18	22
		Scheme	4	36	Affect	19	21
		Task	12	28	Define	18	22
		Significant	0	40	Income	19	21
		Aspect	6	24	Physical	16	24
		Sequence	8	32	Technique	24	16
		Shift	18	32	approach	14	26
		Sufficient	0	40			
4.	Semantics	Area	24	16	Consume	18	22
		Structure	10	30	Legislate	12	28
		Formula	14	26	Compute	22	18
		Credit	18	32	core	19	21
		Commission	8	32	Method	22	18
		Resource	16	24	Specify	13	27
		Survey	22	18	select	15	25
		tradition	16	24			

Appendix 4

Task 1. Pre-Test and Post test

A. Read the following sentences carefully, then choose the best answer for each question by drawing a circle around a, b, c or d:-

1. These pictures are very essential to _____ the construction of these buildings.

A. **illustrate**   B. immigrate   C. administrate   D. Legislate

2. Teachers should consider _____ differences when designing educational tasks.

A. considerable   B. **individual**   C. Normal   D. Available

3. Gulf countries_____ a large quantities of oil to the United States and Other European countries.

A. consume   B. affect   C. **Export**   D. approach

4. First of all you should_____ the problem before staring working out any problem because it is the first step of success.

A. define   B. compute   C. research   D. occur

5. _____ is to be processed by computer before being accredited and approved by the administrative board.

A. Credits   B. Formula   C. **The scheme**   D. Data

6. The _____ headed by two consultants will start the inspection campaign focusing on the health issues.

A. community   B. **commission**   C. section   D. journal

7. If you study hard and do your homework regularly, you will certainly gain a _____ success in your study.

A. major   B. consequent   C. **considerable**   D. normal

8. Teacher are supposed to _____ their teaching strategies and techniques in order to carry out their educational tasks much better.

A. credit   B. immigrate   C. **vary**   D. select

9. Students should _____ their goals before they start studying their lessons.

A. fund   B. imply   C. **specify**   D. link

10. Time management is an effective _____ for doing workbooks without any failure or cramming.

A. survey   B. resource   C. shift   D. **technique**

11. The lawyer needs_____ time to study the legal issue and to prepare his defence before the court starts discussing it.

A. normal   B. consequent   C. physical   D. **sufficient**

12. This clause needs more_____ as it has many difficult phrases and a lot of technical terms.

A. **interpretation**   B. proportion   C. range   D. technology

13. The _____ of the UAE is about 83,000 kilometers, but Abu Dhabi alone is more than 65,000 kilometers.

A. structure   B. **area**   C. community   D. formula

14. The_____ of neglecting exam is very crucial as students, schools and families may suffer greatly.

A. survey   B. community   C. **consequence**   D. export

15. The manager of our company is very pragmatic as he and his team _____ the projects very practically and smoothly.

A. participate   B. consume   C. **administrate**   D. credit

Appendix 5

Treatment 1: Matching

A. Read the following words carefully, then join the words with their synonyms in Arabic by drawing a line between them:-

English	Arabic
Illustrate	ينوع
Immigrate	البيئة
Research	السلطة
Normal	فردي
Authority	يوضح
Environment	البحث
Individual	عادي
Community	يهاجر
Major	يحدد
Vary	كافي
Achieve	هام
Export	ينجز
Significant	يصدر
Sufficient	دخل
Define	رئيسي
Income	استبيان
Commission	مصدر
Resource	لجنة
Survey	مجتمع
Legislate	يشرع
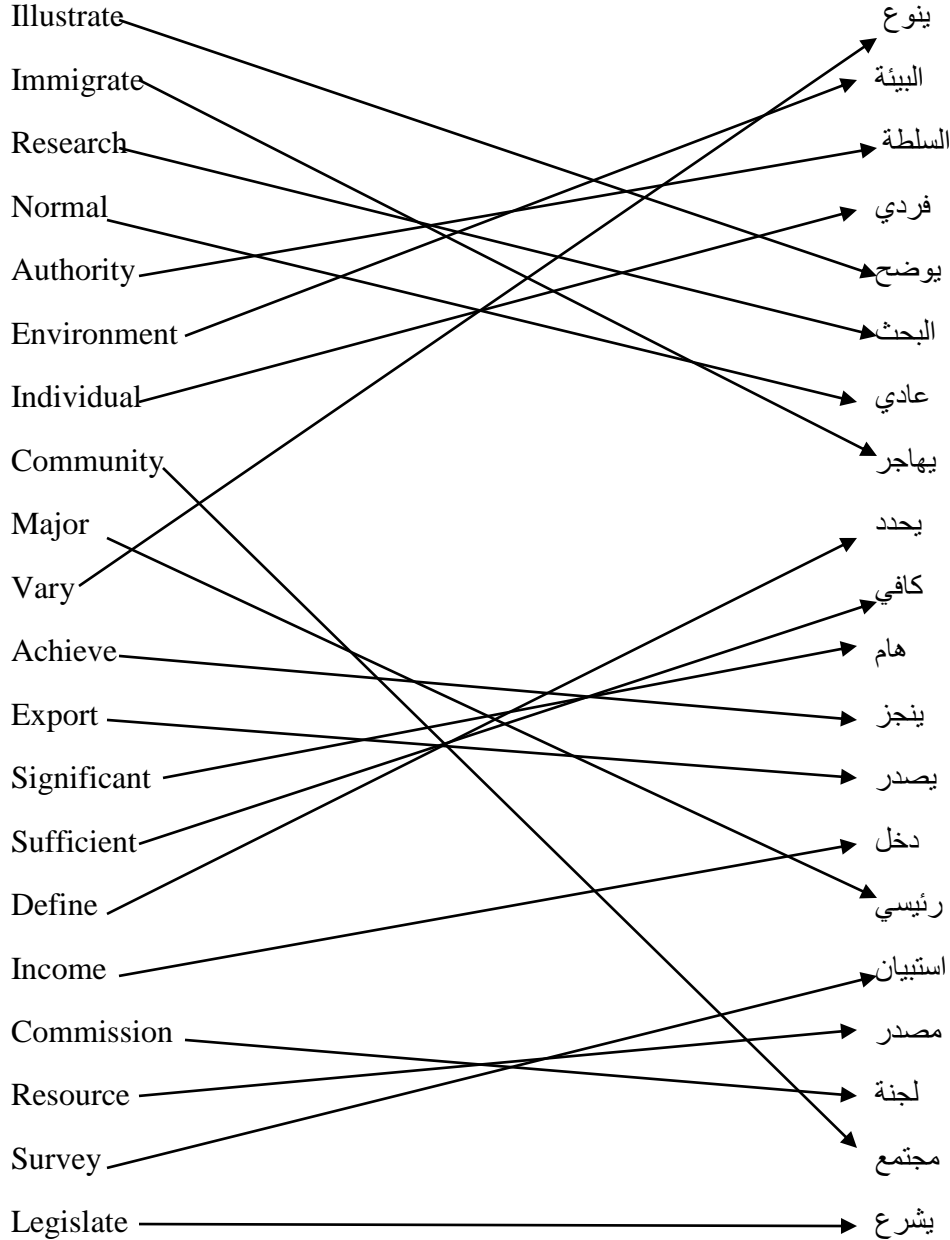
Appendix 6

Treatment 2: Parts of Speech

Read the following sentences carefully, then choose the most suitable answer by drawing a circle around a, b, c or d:-

1. My friend is supposed to get an employment visa, so he must go to the ----------------------- department.

a. immigrant   b. **immigration**   c. immigrate   d. immigrated

2. The UAE government ------------------------- the minister of education to develop official schools by taking all the necessary steps.

a. **authorizes**   b. authority   c. authoritarian   d. author

3. The owner of the company gathered the _____ information about all projects in order to assess his profits and losses.

a. suffice   b. sufficiency   c. **sufficient**   d. sufficiently

4. I wonder if you could _____ the concept of shopaholic to your colleagues as it is not clear.

a. **define**   b. definition   c. definite   d. definitely

5. The _____ committee of the parliament adopted many laws to control the basic salaries for all the government officials.

a. legislation   b. legislate   c. legislative   d. legislator

6. I need a car with a certain_____ in order to cross deserts and visit mountainous areas in different countries.

a. specify   b. **specification**   c. specifically   d. specific

7. The _____ of saturated oily foods must have heart attacks before they get to the ripe old age in most cases.

a. consumption   b. consume   c. **consumers**   d. consumes

8. Working in the field will certainly _____ our health positively in the long run due to fresh air and physical activities.

a. affection   b. affective   **c. affect**   d. affectedly

9. The _____ of oil supports the economy of the Arab gulf countries as it increases their national income to high standards.

a. exports   **b. exportation**   c. exported   d. exporter

10. The UAE is a _____ conservative country as women do not shake hand with men.

a. traditional   b. traditionalist   **c. traditionally**   d. tradition

11. Students should _____ their learning techniques if they want to get high marks and pass with distinction.

a. variable   **b. vary**   c. variation   d. variety

12. Citizens who have patriotic feelings are supposed to _____ in the celebrations of the national day as a sign of loyalty.

a. participate   b. participation   c. participatory   d. participated

13. Students should be_____ fit in order to join the army as fitness is the core of a professional military service.

a. physical   **b. physically**   c. physician   d. physiology

14. Buying a brand new car is the best_____ as it saves our time and efforts.

a. selects   **b. selective**   c. selection   d. selectional

15. The_____ of our company stipulate that the employees should come on time and leave on time for rendering our customers the best service.

a. normal   **b. norms**   c. normality   d. normalize

16. _____ is a well known principle that calls for respecting human personal freedom.

a. **Individualism**   b. Individualistic   c. Individualist   d. Individual

17. The manager circulates many _____ orders to all the departments calling for strict implementations of all the organizational rules.

a. administratively   b. **administrative**   c. administration   d. administer

18. Watching TV has an important _____ in shaping children's ideas and thinking styles which influence their future.

a. significantly   b. significant   c. **significance**   d. signify

19. The police cannot get any _____ to the genuine reason of killing because all the evidences are hidden by the criminal.

a. interpretable   b. **interpretation**   c. interpretive   d. interpret

20. The Egyptian Civilization is a great human_____ due to its rich monuments and mummification techniques.

a. **achievement**   b. achieve   c. achievable   d. achiever

Appendix 7

Treatment 3: Gap Filling Exercises in Arabic

Read the following passage carefully, then fill it with the most appropriate word
from the list below:-

Affect	available	technology	participates
Individual	scheme	consequence	community
Sufficient	interpretation		

طلب المحقق الجنائي من مستشاره**interpretation** للجريمة التي حدثت في العاصمة صباح

امس. اذ أن الاوراق والمستندات **available** لديه غير **Sufficient** لتوضيح جميع ملابسات

الجريمة. بالاضافة الى أن الاراء **Individual** التي لاتستند الى ادلة مادية وانما على تصورات

شخصية لاتوفي بالغرض و لاتقدم أية اثباتات مادية تفيد التحقيق وتساعد في الكشف عن الجناه.

ولذلك اصر المحقق على استخدام **technology** للكشف عمن ملابسات الجريمة من اجل حماية

الافراد و **community** كما أنه أمر أن **participate** العديد من ضباط الامن العام و

الخابرات العامة في وضع **scheme** عمل مناسبه وعملية لمواجهة **consequence** هذه

الجريمة النكراء تاتي من المؤكد بإنها سوف **affect**على امن المجتمع و استقراره.

Appendix 8

Treatment 4: Gap Filling Exercise in Arabic

B. Read the following passage carefully, then fill in the spaces with the most appropriate word from the list below:-

appropriate	consequence	designs	range	participate
illustrate	resources	considerable	expertise	imply

Technology is an important source of education as it exploits many **considerable** tools and pictures to **illustrate** different teaches methodologies. In addition technology provides students with many educational **resources** through the use of the internet which is capable of showing us a wide **range** of teaching and learning sites and aids. Therefore, a lot of educationalists and technicians **participate** in developing a variety of visual and auditory teaching aids of different sizes and **designs** On the other hand, it should be clear that technology is a good servant, but a bad master as using it excessively for the sake of usage is not an **appropriate** education method and will **imply** the lack of educational **expertise** as it can distract learners. To sum up, using technology has a positive **consequence** on the educational process.

Appendix 9

Treatment 5: Syllabification Exercises

Read the following words carefully, then point out the syllables by placing a dot at the beginning of each syllable:-

1.	Illustrate	**il.lus.trate**
2.	Considerable	**con.si.der.able**
3.	Interpretation	**in.ter.pret.ation**
4.	Environment	**en.vir.on.ment**
5.	Individual	**in.di.vid.ual**
6.	Administrate	**ad.min.is.trate**
7.	Consequent	**con.se.quent**
8.	Appropriate	**ap.pro.pri.ate**
9.	Participate	**par.tici.pate**
10.	Sequence	**se.quence**
11.	Proportion	**pro.por.tion**
12.	Structure	**struc.ture**
13.	Commission	**com.mis.sion**
14.	Legislate	**le.gis.late**
15.	Significant	**sig.nifi.cant**
16.	Sufficient	**suf.fi.cient**
17.	Tradition	**trad.ition**
18.	Specify	**spe.cify**
19.	Technique	**tech.nique**
20.	Define	**de.fine**

Appendix 10

Task 6: Spelling Exercises

A. Read the following anagrams carefully , and then rewrite them correctly:-

1. Marnorl   normal
2. Ectffa   affect
3. Bleaivala   available
4. Ersaehcr   research
5. tiosecn   section
6. gloytechon   technology
7. fisepcy   specify
8. vyesur   survey
9. srourec   resource
10. thmdoe   method
11. ciffsuenti   sufficient
12. Tetrisinmda   Administrate
13. ioncommiss   commission
14. itcred   credit
15. ngare   range
16. ytirothau   authority
17. noiditart   tradition
18. tropex   export
19. Reutcutrs   Structure
20. Ymlip   imply

Appendix 11

Treatment 7. Oral Exercises

1. Considerable
2. Structure
3. Individual
4. Available
5. Illustrate
6. Participate
7. Community
8. Significant
9. Sufficient
10. Commission
11. Specify
12. Range
13. Authority
14. Imply
15. Income
16. Export
17. Credit
18. Tradition
19. Survey
20. Method

Appendix 12

Analysis of Treatments

No.	Markedness	Targeted Word	Matching Cor.	Matching Inc.	Parts of Speech Cor	Parts of Speech Inc.	Gap Filling E Cor.	Gap Filling E Inc.	Gap Filling A Cor.	Gap Filling A Inc.	Syllab. Exs. Cor.	Syllab. Exs. Inc.	Spelling Cor.	Spelling Inc.	Oral Exs. Cor.	Oral Exs. Inc.
1.	Morphology / mar.	Illustrate	12	8	-	-	11	9	-	-	8	12	-	-	12	8
		Immigrate	12	8	13	7	-	-	-	-	11	9	-	-	-	-
		Considerable	-	-	-	-	12	8	-	-	12	8	-	-	12	8
		Available	-	-	-	-	-	-	-	-	17	3	15	5	13	7
		Interpretation	-	-	9	11	-	-	12	8	8	12	-	-	-	-
		Technology	-	-	-	-	-	-	17	3	18	2	18	2	-	-
		Research	14	6	-	-	-	-	-	-	-	-	-	-	14	6
		Ensure	-	-	-	-	-	-	14	6	-	-	-	-	-	-
	Morphology/unm.	Data	-	-	-	-	-	-	17	3	-	-	-	-	-	-
		Authority	12	8	16	4	-	-	-	-	-	-	17	3	16	4
		Section	-	-	-	-	14	6	-	-	-	-	14	6	-	-
		Normal	17	3	16	4	-	-	-	-	-	-	-	-	18	2
		Journal	-	-	-	-	17	3	-	-	-	-	-	-	-	-
		Fund	-	-	-	-	12	8	-	-	-	-	-	-	-	-
		Link	-	-	-	-	14	6	-	-	-	-	-	-	-	-
2.	Syllable counts/ mar.	Environment	14	6	-	-	-	-	-	-	11	9	-	-	-	-
		Administrate	-	-	9	11	-	-	-	-	10	10	11	9	-	-
		Individual	10	10	12	8	-	-	11	9	11	9	-	-	11	9
		Consequent	-	-	9	11	11	9	10	10	9	11	-	-	-	-
		Community	10	10	-	-	-	-	12	8	12	8	-	-	12	8
		Appropriate	-	-	11	9	12	8	-	-	8	12	-	-	-	-
		Participate	-	-	12	8	12	8	13	7	12	8	-	-	12	8
		Proportion	-	-	-	-	11	9	-	-	8	12	-	-	-	-
	Syllable counts /unmarked	Labour	-	-	-	-	14	6	-	-	-	-	-	-	-	-
		Major	13	7	-	-	-	-	-	-	-	-	-	-	-	-
		Occur	-	-	-	-	-	-	14	6	-	-	-	-	-	-
		Vary	14	6	12	8	-	-	-	-	-	-	-	-	-	-
		Range	-	-	-	-	16	4	-	-	-	-	-	-	17	3
		imply	-	-	-	-	13	7	-	-	-	-	14	6	15	5
		Achieve	12	8	14	6	-	-	-	-	-	-	-	-	-	-
	Margin/ marked	Export	15	5	13	7	-	-	-	-	14	6	15	5	15	5
		Scheme	-	-	-	-	-	-	13	7	-	-	-	-	-	-
		Task	-	-	-	-	14	6	-	-	13	7	-	-	-	-
		Significant	9	11	10	10	-	-	-	-	11	9	-	-	13	7

3.		Design	-	-	-	-	14	6	-	-	-	-	-	-	-	-
		Sequence	-	-	-	-	-	-	12	8	-	-	-	-	-	-
		Shift	-	-	-	-	13	7	-	-	-	-	-	-	-	-
		Sufficient	11	9	10	10	-	-	-	-	11	9	15	5	14	6
3	Margin/ unmarked	Physically	-	-	15	5	-	-	-	-	-	-	-	-	-	-
		Affect	-	-	13	7	-	-	16	4	-	-	16	4	-	-
		Define	14	6	14	6	-	-	-	-	-	-	13	7	-	-
		Income	15	5	-	-	-	-	-	-	-	-	18	2	18	2
		Physical	-	-	-	-	-	-	15	5	-	-	14	6	-	-
		Technique	-	-	-	-	-	-	18	2	-	-	14	6	-	-
		approach	-	-	-	-	-	-	13	7	-	-	12	8	-	-
4.	Semantics/marked	expertise	-	-	-	-	12	8	-	-	-	-	-	-	-	-
		Structure	-	-	-	-	-	-	-	-	-	-	11	9	14	6
		Formula	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Credit	-	-	-	-	-	-	-	-	-	-	13	7	15	5
		Commission	11	9	-	-	-	-	-	-	-	-	12	8	16	4
		Resource	15	5	-	-	16	4	-	-	-	-	13	7	-	-
		Survey	12	8	-	-	12	8	-	-	-	-	-	-	13	7
		tradition	-	-	12	8	-	-	-	-	-	-	12	8	14	6
	Semantics/ unmarked	Consume	-	-	-	-	-	-	12	8	-	-	-	-	-	-
		Legislate	-	-	12	8	-	-	11	9	-	-	-	-	-	-
		Compute	17	3	16	4	-	-	18	2	-	-	-	-	-	-
		Area	-	-	-	-	16	4	-	-	-	-	-	-	-	-
		Method	-	-	-	-	-	-	16	4	-	-	-	-	-	-
		Specify	-	-	-	-	-	-	13	7	-	-	17	3	16	4
		Select	-	-	14	6	-	-	-	-	-	-	-	-	13	7

Appendix 13

FACULTY ETHICS POLICY

Guidelines for Ethics in Educational Research

Basic Principles

Three *basic ethical principles* underlie the Faculty of Education Guidelines for Ethics in Educational Research:

- **respect for persons**, that is, that persons should be treated as autonomous individuals, and that persons with diminished autonomy are entitled to protection;
- **beneficence**, that is, that there is an over-riding obligation to maximize possible benefits and minimize possible harms. Harm, in this context, includes psychological or emotional distress, discomfort and economic or social disadvantages. Researchers exercise beneficence in assessing the risks of harm and potential benefits to participants, in being sensitive to the rights and interests of people involved in their research, and in reflecting on the social and cultural implications of their work; and
- **justice**, that is, that the question of who ought to receive the benefits of research and bear its burdens should be explicitly addressed.

These principles apply to all forms of educational research, including research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behaviour.

Considerations in Data Collection

Researchers should take special care to avoid research activity in which the information collected is recorded in such a manner that:

- participants can be identified, directly or through identifiers linked to the subjects;
- any disclosure of the participants' responses outside the research could reasonably place the participants at risk of professional liability or be damaging to the participants' financial standing, employability or reputation; and
- the research deals with sensitive aspects of the participants' own behaviour, such as sexual preference, illegal conduct, use of alcohol, drug use, or includes information about health status.

Educational researchers should:

- ensure confidentiality;
- not use data of a confidential nature for their own personal advantage or that of a third party;
- obtain the free and informed consent of human subjects.

Informed Consent

The principle of obtaining informed consent from the participants in research is considered to be one of the most important ethical issues in research involving human participants. In almost all cases participants should be provided with a written summary of the research procedure, its benefits, harms and risks, and that they be able to retain this information. What is provided to potential participants should be brief and clearly written, and written from their point of view. When consent is obtained from research participants, it should be voluntary, competent; informed; and understood.

The decision of a person to consent to participating in a research project should always be based upon their knowledge of the research proposal and the requirements for their participation (as participants) in the project. Aspects of informed consent are:

- consent to participate in the research is given freely and without coercion;
- subjects have the capacity to understand the research project;
- the information sheets given to research subjects are understandable and have taken consideration of the anticipated level of competence of potential research subjects;
- inclusion of a clear explanation of the likely risks to the research subject arising from participation in the research project;
- the information sheet includes a clear explanation of the likely benefits of the research project itself;
- proper communication by the investigator of the risks and benefits of the research project to potential subjects;
- Confirmation that the consent of the research subject is not influenced by financial inducement, improper pressure or any form of misrepresentation and that the research subject is competent to consent. It is the responsibility of the researcher to place the issue of payment within the context of the particular research project and determine as best she or he can at what point the incentive becomes an inducement that puts undue pressure on participants to take part;
- assurance that a research subject may withdraw at any time from the research without loss of benefit or penalty; and
- the need to exercise special care in cases where the subjects are unable to consent for themselves (for example, in the case of intellectually impaired students).

Responsibilities to Participants

Research involving treatment and control groups should be evaluated in terms of the benefit of the research and the individuals' overriding right to know and to have access to the best educational practice available in all circumstances. The methods should not result in harm to the participant. In assessing covert or deceptive research, the following two guidelines should be observed:

- participants should not be subject to any procedure which is reasonably likely to cause physical harm, psychological harm (which is distinguished from temporary embarrassment, mild alarm, etc), or enduring educational disadvantage ;

- participants should be fully informed at the conclusion of the study as to its nature and the disposition of results;
- the full benefits of the intervention should be made available to all participants as part of the outcome of the comparison of programs.

Ethics Form

To be completed by the student and submitted to the Ethics Research Committee

NAME OF RESEARCHER: Mahmoud Sultan Nafa

CONTACT TELEPHONE NUMBER: 00971505786555

EMAIL ADDRESS: 110114@student.buid.ac.ae

DATE: 28th January 2013

PROJECT TITLE: A Brain Based Approach for Teaching the Vocabulary of English Language to ESL Learners : An Investigation Based on Arab-speaking Learners

BRIEF OUTLINE OF PROJECT (100-250 words; this may be attached separately. You may prefer to use the abstract from the original bid):

Vocabulary is the core of Language teaching and learning because it is the expressive tool that conveys all types of messages. Nobody can send or understand a message without vocabulary; however, a message can be conveyed and understood without having a correct structural layout. Additionally, the lack of vocabulary can cripple the progress and the development of all human activities as it limits the comprehension of any human activity. Consequently, the issue of teaching L2 vocabulary has received a great deal of attention and a diversity of different views of processing vocabulary has been discussed at different stages. Some of the discussions focus on the classifications of vocabulary that is what kind of vocabulary to teach and which approach to use for introducing vocabulary.

The main focus of this dissertation is to improve the lexical competence of grade 12 students, art section, at Al- Maarif Secondary School. The analysis or the ordinary diagnostic tests carried at the beginning of the scholastic year shows a clear weakness in students' lexical items which requires an immediate remedial plan. Those students study English language for six hours a week and the other subjects are taught in Arabic language; therefore there is no other exposure to English other than the daily 55 minutes English language class. This dissertation focuses on enriching students' lexical capacities by teaching them the academic word lists (see appendix 2) which are selected by the Ministry of Education in the UAE for preparing developing students' abilities in learning English as a second language and for passing the Cepa exam "Common Education Proficiency Assessment". In addition, this dissertation will highlight three pivotal

research questions for solving the problem of vocabulary low achievement at Al- Maarif Secondary School.

MAIN ETHICAL CONSIDERATION(S) OF THE PROJECT (e.g. working with vulnerable adults; children with disabilities; photographs of participants; material that could give offence etc):

This research is carried out with adult learners of grade12; therefore many considerations

should be considered when dealing with them. For example, confidentiality is a main factor as

learners are very sensitive to displaying the results because they consider results a genuine part

of their self esteem. In addition, the research should respect their opinions and suggestions for

building on them.

DURATION OF PROPOSED PROJECT (please provide dates as month/year):

28th January –   by 15th April 2013

DATE YOU WISH TO START DATA COLLECTION:

28th January 2013

Please provide details on the following aspects of the research:

1. What are your intended methods of recruitment, data collection and analysis?

Please outline (100-250 words) the methods of data collection with each group of research

participants.

This dissertation will adopt many methods and tools for collecting data and analyzing them. First,

of all, it will administer a diagnostic test for both the controlled and the experimental groups to

evaluate the subjects' lexical competence for building up a constructive strategy for improving

their levels. The results of the diagnostic test will be analyzed and assessed in order to be used

as the base for pinpointing the learners' points of strengths and weaknesses relying on

markedness criteria. After that 60 words of the first, the second and the third lists of the

academic will be given to the learners as bases for learning new lexical items.

2. How will you make sure that all participants understand the process in which they are to be engaged and that they provide their voluntary and informed consent? If the study involves working with children or other vulnerable groups, how have you considered their rights and protection?

I will explain to the learners the whole process stating that they will be tested generally to assess their lexical competence and they will be divided into two groups to study some words. The results will be analyzed to show the improvement of teaching and learning L2 vocabulary and will be confidential as they will be used only for the research purposes. With regard to children, parents should have a comprehensive idea about the purposes and the methodologies used to carry out this dissertation. I have only volunteers as I am not entitled to force anyone to participate in carrying out this research.

3. How will you make sure that participants clearly understand their right to withdraw from the study?

I will tell them openly that they have the free well to withdraw from the study at any time or stage. In addition, I will undertake in writing that participants have the full right to withdraw from the study without any notice or bearing any responsibility what so ever.

4. Please describe how you will ensure the confidentiality and anonymity of participants. Where this is not guaranteed, please justify your approach.

I will collect out the information alone and I will keep them in a safe place because confidentiality is the core of any research. In addition, I will encourage all the participants to participate effectively in this study by giving them intrinsic motivation as their lexical competence will be highly improved assuring them that their speaking, reading and writing will be improved as well.

5. Describe any possible detrimental effects of the study and your strategies for dealing with them.

Some participants may be afraid of being targeted in this study because they may be embarrassed due to the possibility of getting low marks on the pre and post tests. This issue should be treated carefully by assuring the participants that grades and analyses will be confidential and used only for the research purposes. Another problem may arise that the participant teacher who will teach the controlled group may feel threatened. In this case, he will be also assured that the teaching methodologies will be used only for the research purposes.

6. How will you ensure the safe and appropriate storage and handling of data?

The data will be stored in a safe place by using electronic devices equipped with passwords. For example, I can store the whole data on a hard disk and use a password for not allowing any

unauthorized people to disclose the stored data. In addition I will keep all the documents in a safe drawer for being sure that no one can get access to them. Moreover, I will discuss the information with targeted person individually and without being in touch with any other person.

6. If during the course of the research you are made aware of harmful or illegal behaviour, how do you intend to handle disclosure or nondisclosure of such information (you may wish to refer to the BERA Revised Ethical Guidelines for Educational Research, 2004; paragraphs 27 & 28, p.8 for more information about this issue)?

It depends on the kind of information, but I have to respond to the situation. I will talk to the subjects pointing to them that there is something illegal that should be redressed as I cannot proceed with illegal findings. If they do not respond positively, I will react according to the seriousness of the illegality. If it is dangerous I will certainly inform my dissertation supervisor to consider how to react.

7. If the research design demands some degree of subterfuge or undisclosed research activity, how have you justified this?

I will act according to the requirements of the research; however, I will consider the participants' points of view and confidentiality rights. I will disclose as much information as necessary and I will not mention the names, the nationalities or even the ages of the participants.

8. How do you intend to disseminate your research findings to participants?

I will rephrase the research findings in an academic language and thank the participants for their great and sincere efforts focusing on the importance of their efforts for the success of this dissertation. After that I will use the proper ways of disseminating this research such as conferences, publications, internet and other means after consulting the supervisor.

Declaration by the researcher

I have read the University's Code of Conduct for Research and the information contained herein is, to the best of my knowledge and belief, accurate.

I am satisfied that I have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my obligations as researcher and the rights of subjects. I am satisfied that members of staff (including myself) working on the project have the

appropriate qualifications, experience and facilities to conduct the research set out in the attached document and that I, as researcher take full responsibility for the ethical conduct of the research

in accordance with the Faculty of Education Ethical Guidelines, and any other condition laid down by the BUiD Ethics Committee.

Print name: Mahmoud Sultan Nafa

Signature:

Date: 28. January 2013

Declaration by the Chair of the School of Education Ethics Committee (only to be completed if making a formal submission for approval)

The Committee confirms that this project fits within the University's Code of Conduct for Research and I approve the proposal on behalf of BUiD's Ethics Committee.

Print name:

(Chair of the Ethics Committee)

Signature:

Date: