Using a Brain Based Learning Program for Improving Preparatory Stage EFL Students' Vocabulary Retention

By

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Abstract

The study attempted to investigate the effect of using a brain based learning program for improving preparatory stage EFL students' vocabulary retention. Sixty students from El-Shaheed Ahmad Ibrahiem preparatory school, Minia Educational Directorate, Minia governorate were randomly selected. The study adopted the quasi experimental research design as sixty participants were divided into two groups. The treatment group (n= 30) was taught by using the brain based learning program (BBLP), while the non-treatment group (n=30) was using the regular way of instruction. A vocabulary retention test was developed by the researcher and used in the study. Analysis of the collected data indicated that the participants of the treatment group significantly outperformed the non-treatment one in the post-performance of the vocabulary retention. It was concluded that the brain based learning program helped first year preparatory school EFL students to improve their vocabulary retention.

Key words: brain based learning program- vocabulary retention.

استخــدام التـعـلـم المسـتنـد إلي الـدماغ لتحسـين الاحتفـاظ بالمفـردات اللـغوية لـدي طـلاب المـرحلة الإعـدادية

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ملخص الدراسة

هدفت الدراسة الحالية الي التحقق من مدي تأثير التعلم المستند إلي الدماغ في تحسين المفردات اللغوية لدي طلاب المرحلة الإعدادية. وتكونت العينة من ستين طالباً من مدرسة الشهيد أحمد إبراهيم الإعدادية – التابعة لإدارة المنيا التعليمية – محافظة المنيا ، وتم اختيار عينة الدراسة بشكل عشوائي ، وقسمت العينة الي مجموعتين (تجريبية وعددها 30 طالباً واخري ضابطة وعددها 30 طالباً ايضاً). واتبعت الدراسة المنهج شبه التجريبي (القبلي – البعدي) ، وقد تم تدريس المجموعة التجريبية باستخدام برنامج التعلم المستند إلي الدماغ، بينما تم التدريس لطلاب المجموعة الضابطة بالطريقة المعتادة. وقد أعد الباحث اختبار للاحتفاظ بالمفردات اللغوية، وقد تم تطبيق هذه الدراسة خلال الفصل الدراسي الأول من العام الدراسي 2018/2019 وأظهر تحليل البيانات باستخدام (اختبار ت) انه يوجد فرق ذو دلالة احصائية بين المجموعة التجريبية والمجموعة الضابطة في الاختبار البعدي للاحتفاظ بالمفردات اللغوية لصالح المجموعة التجريبية. وأظهرت نتائج الدراسة التأثير الإيجابي لاستخدام التعلم المستند إلي الدماغ في تحسين المفردات اللغوية لدي طلاب المرحلة الإعدادية.

الكلمات المفتاحية: التعلم المستند إلي الدماغ – الاحتفاظ بالمفردات اللغوية.

Introduction

At birth, children are immersed in oral language through which they interact with the world. Throughout a child's development and academic years, child has to acquire words to mentally process information and effectively communicate meaning through oral and written expressions. Therefore, vocabulary learning is considered as the first step towards learning English as a foreign language (EFL). Nation (2001) asserts that knowing a word involves getting to know its form (spoken, written, and parts of speech), meaning (concept, referents, and association), and use (grammatical function, collocation, and constraints on use).

Hulstijn (2013, p. 2) states that in foreign language lexical teaching and learning, there are two types of vocabulary learning: incidental learning and intentional learning. Incidental vocabulary learning refers to the acquisition of a word when there is no conscious intention whereas the intentional vocabulary learning refers to a deliberate attempt to commit factual information to memory.

The brain is the major controller of the body, similar to a computer's CPU (Central Processing Unit). It is the information processor of the human body. Jensen (2000) writes that the brain is capable of multitasking. "It assembles pattern, composes meaning, and

sorts daily life experiences from extraordinary number of clues". In addition, the brain contains hundreds of billions of neurons and interneuron that produce the great number of neural nets, or groups of neurons working together. From which, our daily experience is created (Lackney, 2004).

Memory, either short-term or long-term, is essentially about the brain. The students' ability to store information and recall it later can certainly affect their performance in learning. Memory is not a unitary concept and the different areas of the brain join in the encoding and retrieving tasks. The essence of teaching using BBL is that it implies understanding how the brain works best to increase learning to the highest degree (Moghadam & Araghi, 2013). Therefore, teaching English language through BBL does not focus on enhancing academic achievement for short time, but it enhances the possibilities of keeping information and knowledge learned for a long time.

Researches on the brain, has identified the following 12 basic principles as the essential structure stones of Brain-Based Learning (Caine and Caine, 2002; Aziz-ur Rehman, 2011).

1. The brain is a parallel processor.

2. Learning engages the entire physiology.

3. The search for meaning is innate.

4. The search for meaning occurs through patterning.

5. Emotions are critical to patterning.

6. The brain processes parts and wholes simultaneously.

7. Learning involves both focused attention and peripheral perception.

8. Learning always involves conscious and subconscious processes.

9. We have at least two different types of memory: A spatial memory system and a set of systems for rote learning.

10. We understand and remember best when facts and skills are embedded in natural, spatial memory.

11. Learning is enhanced by challenge and inhibited by threat.

12. Each brain is unique.

Literature Review and Related Studies

Several studies have been carried out on the use of brain based learning in EFL classrooms and most of these studies proved that incorporating some aspects of brain based learning into classrooms is very useful for students' success and learning process. Salem (2017) in his study "Engaging ESP Students with Brain-Based Learning for Improved Listening Skills, Vocabulary Retention and Motivation"

stated that Brain Based Learning is effective for developing listening skills consolidate vocabulary recalling and retention.

Salama (2015) aimed at investigating the impact of Brain-Compatible teaching strategies (BCTSs) on enhancing vocabulary learning, the participants of the study consisted of 61 male students randomly selected from third year of Belqas Preparatory school for boys, in Dakahlia Governorate. Results of the study showed that BCTSs had a positive effect on the pupils' vocabulary learning.

Haghighi (2013) stated in the study "The effect of brain- based learning on Iranian EFL Learners achievement and retention", that brain based learning theory focuses on using research about how the brain works. The study lasted 16 weeks for a total of 63 class hours. Analysis of post-test achievement and retention tests revealed a significant difference between the groups favoring brain-based learning.

Nafa (2013) in his study "A Brain Based Approach for Teaching English Language Vocabulary to ESL Learners", this study implemented the brain based approaches and strategies in order to enrich English vocabulary teaching and learning processes. Findings and empirical studies of this study showed that the brain based learning

is proved to be effective in treating the problem of English vocabulary low attainment.

Lago & Seepho (2012) in their study "Brain Compatible Activities for EFL Vocabulary Learning and Retention" indicated that Brain Compatible Activities provided the better atmosphere among the students which led to gaining vocabulary knowledge and retention. Moreover, the vocabulary they learned was retained at least 6 weeks after the instruction.

Van Roekel (2002) in his study " Brain-based Learning: Implications for the Elementary Classroom" discovered new methods of teaching have been devised using the term, brain-based strategies or brain-based learning. This thesis paid particular attention to the enriched environment, the effect of emotion on learning, and the concept of sensitive or critical periods.

Context of the Problem

Many EFL learners usually do not have the opportunity to use English outside classrooms; students tend to remember the words that they use very often, eventually forget those words that are used infrequently. The researcher applied a vocabulary test for first year preparatory school students to deeply investigate the problem in a more

specific way. The scores of most students on the vocabulary test confirmed that they have problems regarding their vocabulary retention.

Objective

The current study attempted to identify the effect of using brain based learning program for improving vocabulary retention of first year EFL preparatory school students.

Hypothesis

Based on both context of the problem and the previous reviewing of literature, the current study tried to verify the following hypothesis:
- There is a statistically significant difference between mean scores obtained by the treatment group and the non-treatment one favoring the treatment group on the vocabulary retention post-test.

Research Design

To achieve the aim of the present study, the researcher adopted the quasi experimental research design (a pre-post control group design). The treatment group and a non-treatment one were exposed to pre-posttests in vocabulary retention in English as a foreign language. The treatment group was instructed and trained in a program of brain

based learning, while the non-treatment one was using the regular way of instruction. The researcher taught both groups to ensure better implementation of the study.

Participants of the Study

The students chosen for the present study were sixty students enrolled in the first year from Al-shaheed Ahmad Ibrahiem preparatory school – Minia Governorate. They were randomly selected as the participants of the study during the first semester of the academic year 2018 - 2019. They were divided intact into two groups. The two groups were assigned to a treatment group, which consisted of thirty (30) students, and a non- treatment group, which consisted of thirty (30) ones.

Material: The Brain Based Learning (BBL) Program

The BBL program consisted of four parts, content analysis, framework, teacher's guide, and students' activity book. It includes four units, each unit includes three lessons. Each unit began with general objectives and each lesson includes its behavioral objectives. It also includes a model of strategies which the students use. Each lesson has activities, each activity related to vocabulary retention skills. Each

lesson ends with an evaluation of the different questions to assess the students' progress.

Procedures

Step one: (Warm-up)

The instructor prepared the learners through setting a positive emotional climate. The participants asked and answered questions related to lesson title through a predicting activity.

Step two: (presentation)

The participants read the text, underlined unfamiliar words and tried to guess their meaning. The instructor presented a mind map for new vocabulary items.

Step three: (Brain Break)

The instructor asked the participants to sit down comfortably and take a deep breath, after that he asked them to solve the puzzle of this lesson in three minutes to activate their mind.

Step four: (Practice).

Participants applied some tasks in forms of activities such as: after reading card game, brain teaser activity, Truth or Lie, and vocabulary use activity.

Step five: (Observing the participants' progress).

The instructor recorded and observed the participants' progress in group and encouraged the shy and poor ones to participate.

Step six: (Brain Break).

The instructor asked the participants to make their bodies relaxed and close their eyes for two minutes, after that the participants read the funny comic of the lesson before they continued the lesson.

Step seven: (Closure).

The instructor asked the participants to provide him feedback through filling the exit ticket, in which they wrote what they learned and any lingering questions related to the topic of lesson.

Step eight: (Evaluation)

The instructor focused on creating positive interaction environment through involving tasks for evaluation that depended on brain such as role-playing, crossword puzzles and word correction.

The Vocabulary Retention Test

The test of vocabulary retention was prepared by the researcher according to the sub-skills of vocabulary retention and the content areas that were covered in the program. It included thirty items representing the most important and emphasized objectives of the program. The test included 30 items, 15 multiple-choice items, 3 correction items, 5

choice & completion items, and 7 completion items and lasted for 45 minutes and the total score of the test was 30 marks. The jury members confirmed the suitability and applicability of the test after making the suggested modifications.

After administering the pilot study, the data collected used to calculate the statistical validity of the test, the internal consistency (item – total statistics) was calculated as shown in the following table:

Table (2): The internal Consistency between each item and the total vocabulary retention test (N = 30).

Item	Corrected item-total correlation	Item	Corrected item-total correlation
1	0.716	16	0.180
2	0.343	17	0.403
3	0.468	18	0.180
4	0.425	19	0.493
5	0.428	20	0.326
6	0.386	21	0.475
7	0.440	22	0.532
8	0.172	23	0.323

9	0.769	24	0.067
10	0.165	25	0.268
11	0.520	26	0.379
12	0.576	27	0.373
13	0.421	28	0.115
14	0.322	29	0.523
15	0.348	30	0.158

The reliability coefficient of the test score was determined by the Alpha Cronbach method. The data obtained was calculated and the reliability coefficient was found (0.816), which is considered acceptable. Aron (2006) stated that the test should have a reliability coefficient ranging from (0.70) and preferably closer to (0.90) to be considered useful.

Duration of the Experiment

The experiment was carried out during the first term of the school year 2018-2019. It lasted for 11 weeks, two hours a week, for a total of 23 hours, including testing time.

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Results

The study hypothesis predicted that there was a statistically significant difference between the mean scores obtained by participants of the treatment and non-treatment groups on the post testing of vocabulary retention test (favoring the treatment group). Analyzing of the collected data using t-test showed that the treatment group achieved a higher degree of improvement than the non-treatment one on the vocabulary retention test as t-value (13.248) is significant at the (0.01) level. Thus the hypothesis was accepted.

Table (1) below presents a summary for the analysis of data obtained in the post test for both groups (the treatment group & non-treatment group) in the vocabulary retention test.

Table (1) mean scores and t-test value of the post administration of the vocabulary retention test for both groups.

Group	M.	S.D.	t. value	Df	Sig.	Eff. Size
Treat.	21.90	3.98	**13.248	58	0.000	0.75
Non-treat.	7.80	4.25				

**Significant at (0.01) level.*

It is clear from the table above that the calculated t-value (13.248) is significant at the (0.01) level. P-value was (0.000) and this is less than the (0.01) level of the significance. This indicates that there is a statistically significant difference (favoring the treatment group, higher mean) between mean scores obtained by the treatment group non-treatment group on the post testing of vocabulary retention test.

As a complementary procedure to ensure the effect of BBL based program on first year preparatory school students' vocabulary retention, the effect size of the program was tested using the Eta Square formula (η^2). As shown in table above, the (η^2) value was (0.75), which is considered highly effective. Cohen (1988) asserted that when Eta-squared value is less than (0.1) the effect size is considered weak, when it is more than (0.1) and less than (0.6) the effect size considered medium, and when it is more than (0.6) the effect size is high. So, the effect size showed that the program was really effective and improved students' vocabulary retention.

Finally, There was a statistically significant difference between participants of the treatment group and those of the non-treatment group on the post testing of vocabulary retention (favoring the treatment group) as shown in the above table through the calculated the total mean

that is (21.90**) for the treatment group and (7.80**) for the non-treatment group. This indicates improving of the participants' vocabulary retention of the treatment group as a result of receiving the brain based learning program. Therefore, it could be conducted that the BBL based program affected the students' vocabulary retention positively.

Discussion

Results gained confirmed the study hypothesis. Participants of the treatment group (who were instructed by the using of BBL program) surpassed their counterparts of the non-treatment one (who were instructed by using the regular way of instruction) in their post administration of (vocabulary retention test). The implementation of the BBL program had obviously influenced the students' vocabulary retention.

According to these results, the hypothesis of the study was accepted. In addition, t-test results of the treatment group's vocabulary retention showed how far the program improved the treatment group's vocabulary retention. This confirmed the effect of using BBL based program of the study. It showed that the BBL program improved the treatment group participants' vocabulary retention. Such results

coincided with the findings of Salem (2017), Salama (2015), Haghighi (2013), Nafa (2013), Lago & Seepho (2012), and Van Roekel (2002) which concluded that the use of BBL improves students' learning in general and students' vocabulary learning in particular. On the other hand, the study of Hutchins (2009) did not agree with these results. It showed that brain based learning is still a questionable practice and further empirical research is warranted to be used in the educational process.

Using strategies like mind mapping KWL chart helped participants to connect prior knowledge of vocabulary items with new ones and organize vocabulary items and then memorize them easily. Some brain-compatible activities such as after reading card game, brain power word, brain teaser, and crossword puzzles encouraged participants to engage and retain new words better than those who learnt the same vocabulary items using conventional activities. Brains break also had an effective role in vocabulary retention, whereas the researcher used it twice in each lesson to make participants' bodies relaxed and help their brains to deal with vocabulary items and information they have learned.

Furthermore, the higher retention rate of word spoken and written form, as well its meaning found here, emphasizes once more the importance of combining explicit learning with some sort of incidental focus. Subsequently, the findings of this study revealed that incidental and intentional vocabulary learning by using various brain based learning strategies can indeed occur and that brain based learning might be an effective tool to support vocabulary retention.

Pedagogical Implications

The program used in this study suggested significant implications for social change particularly when one considers the goals of the BBL. The recurring focus of this study was to decide if a program that used some brain based learning strategies would provide the skill necessary for a social change in the field of vocabulary retention. This study also hopes to add knowledge needed to promote social change by increasing vocabulary because the healthy teaching environment should provide physical, emotional, and social aspects that enunciate interesting and motivating learning experience.

In light of the current study findings, the following pedagogical implications can be listed.

1. Brain based learning (BBL) program has to be a conspicuous part of the EFL reading and writing courses presented at different learning stages.

2. Implementation of Brain based learning helps learners with active brains to achieve meaningful learning through memory work that relate new objects to the ones already exists in the cognitive structure (Duman, 2006).

3. The holistic nature of brain based learning helps memory to work better in exploring and understanding the content provided instead of mere memorizing mere words segregated from its context.

4. Teacher should not allow random social groupings for more than 10-20% of the school day. Use targeted, planned, diverse social groupings with mentoring, teams and buddy systems.

5. All educators should know the brain can change every day. In fact every student's brain is changing as they attend school. So, they should teach attention skills, memory skills and processing skills.

6. The brain based learning confirmed the value of teaching content in even smaller chunk sizes. Teachers should teach in small chunks, process the learning, and then rest the brain by giving students breaks during session.

Recommendations

Based on the findings and discussion of the present study, the following recommendations were offered:

1. Attention should be directed to the use of vocabulary strategies.

2. The first year preparatory schools should receive more semantic and directed training in vocabulary learning.

3. The EFL learners should be given real opportunities for developing their vocabulary.

4. Teaching vocabulary should be emphasized in EFL syllabus for preparatory schools students.

5. Teachers' role should be changed from being the main source of information to becoming a facilitator, monitor, and consultant.

6. The EFL teachers should review the vocabulary they teach through a brain-compatible game or activity and encourage their students to do the same at home.

7. It is a good idea for EFL teachers to teach/learn words with associated meaning together through brain-based learning strategies.

8. The EFL teachers should their students the grammatical names for the parts of speech and the phonemic script.

9. The EFL teachers should use brain based learning activities to reinforce retaining information and especially vocabulary.

Suggestions for Further Research

In the light of the results of the present study, the following topics are suggested areas that need further investigation:

1. The present study can be replicated with a large sample of 1st year preparatory schools.

2. Direction of the future research may revolve around the e-brain based language learning due to the technological advancements happened these days.

3. A study to investigate the effect of using BBL on teaching other English language skills such as creative writing and critical reading.

4. A study to investigate the effect of using BBL on developing students' motivation and self-esteem can be conducted.

5. A study to investigate the effect of using BBL on students with special needs is needed.

6. Different areas of research can be focused on, like English for specific purposes, or retaining information in long-term storage.

References

Aron, A, Aron, E. & Coups, J. (2006). Statistics for Psychology upper Saddle River, N.J. Pearson Prentice Hall.

Aziz-Ur-Rahman, & Bookhari, M. (2011). Effectiveness of brain-based learning theory at secondary level. *International Journal of Academic Research*, 3(4), 354-359.

Caine, N., & Caine, G. (2002). *Beyin temelli ögrenme* [Brain based learning]. (Interpreter Edt.: Gulten Ulgen). Ankara: Nobel Publications.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Duman, B. (2006). The Effect of Brain-Based Instruction to Improve on Students' Academic Achievement in Social Studies Instruction. Retrieved from fie.engrng.pitt.edu/icee2006/papers/3380.pdf

Haghighi, M. (2013). The Effect of Brain- Based Learning on Iranian EFL Learners' Achievement and Retention. *Procedia - Social and Behavioral Sciences, 70*, 508-516. https://doi.org/10.1016/j.sbspro.2013.01.088.

Hulstijn, J. H. (2013). Incidental learning in second language acquisition. *The Encyclopedia of Applied Linguistics,* 1-5.

Hutchins, J. (2009). Perceptions of Brain Based Instructional strategies: A multiple-site case study. *DAI/A* .70-71. DA 3385383.

Jensen, E. (2000). *Brain-based learning*. San Diego, CA: The Brain Store.

Lackney, J. A. (n.d.). 2004. *Twelve design principles based on brain-based learning research.* Retrieved January 13, from http://www.designshare.com/Research/BrainBasedLearn98.htm

Lago, L. & Seepho, S. (2012). Brain-Compatible Activities for EFL Vocabulary Learning and Retention. *International Journal of Scientific and Research Publications. Volume 2, Issue 1, ISSN 2250-3153*

Moghaddam, A. N., & Araghi, S. M. (2013). Brain-Based aspects of cognitive learning approach in second language learning. *English Language Teaching, 6(*5), 55-61.

Nafa, M. (2013). A Brain Based Approach for Teaching English Language Vocabulary to ESL Learners: An Investigation Based on Arabic-speaking Learners. Dubai: Faculty of Education. The British University in Dubai.

Nation, P. (2001). *Learning vocabulary in another language.*

Salama, H. (2015). The Impact of Brain-Compatible Teaching Strategies on Enhancing Vocabulary Learning. Master Thesis, Mansoura University, Faculty of Education.

Salem, A. (2017). *Engaging ESP Students with Brain-Based Learning for Improved Listening Skills, Vocabulary Retention and Motivation*, Sadat Academy for Management Sciences, College of Business Administration, Egypt

Van Roekel, B. (2002). Brain-based Learning: Implications for the Elementary Classroom. *Master of Education Program Theses.* Paper 72.