The Effect of Mind Mapping on EFL High School Students' Collocation Learning

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The aim of the study was to investigate the effectiveness of mind mapping on Ethiopian secondary school students' English collocation learning. The study specifically tried to check the effectiveness of mind mapping on adjective-preposition and verb-noun combination collocations. A sample of 110 grade 12 students who were learning in two sections at Majete General Secondary School, North Shoa Zone, Ethiopia, participated in the study. One of the two sections was randomly assigned to an experimental group, while the other one was labeled as a control group. A pre-test and two post-tests were used as data-gathering instruments. The data were analyzed by using mean scores, paired samples, and independent sample t-tests. The results revealed that although the two sections had no significant difference in their pre-test results, in the immediate and delayed post-tests, the score of adjective-preposition & verb-noun collocations of the experimental group students was significantly higher than the score of the control group students who learnt those collocations without mind map. Based on this, it could be concluded that using mind map was an effective strategy to improve EFL high-school students' collocations learning. Accordingly, it is recommended that EFL teachers and students should use mind-map during their collocations lessons.

Keywords: adjective-preposition collocations, collocations, mind map, verb-noun collocations, picturesque diagram

INTRODUCTION

Efforts have been made by linguists to define the word language, and their definitions extend from political to social and from educational to cultural views. Santana (2016) noted that even though linguists disagree upon the meanings of language, they are on the same page that it is one of the endowments that human beings have or the exchange and expressions of thoughts by single organizing words. Moreover, words can be organized in order to be formulaic expressions, and one of the kinds of formulaic expressions is collocations.

As Rao (2018) stated, collocations are one of the most important knowledges of language learning, and they are massively crucial for non-native English language learners for their fluency. Moreover, collocations have the relevance of avoiding the description of ideas and discussing issues in longer and wordier ways (Ghazali, 2006).

Contemporarily, applied linguists and researchers have always been trying to not only emphasize the importance of vocabulary, including collocation learning, but also propose better strategies for efficient learning of new vocabulary items. As stated in Pinkosky (2015) Cornell notes, active vocabulary skits, foldable pieces of paper vocabulary taboos, vocabulary cubes, paint chip vocabulary cards, word splash, concept building, and vocabulary notebooks are suggested as the techniques that can be employed while teaching students vocabularies. Furthermore, Gairns & Redman (1998) classified techniques of vocabulary presentations into three broad categories, which are visual, verbal,

and translation. Warre (2014) pinpointed the ways of delivering collocations for learners in the classroom as well. As he listed, collocation casino, online flashcards, collocation pictionary, collocation articulate, collocation charade, dictogloss, and videos are some of the ways to teach collocations in the classroom for the students.

On the contrary, according to Mengistie (2019, p.26), "vocabulary instructions in the textbook repeatedly present the traditional way of learning vocabulary like, definitions of words in matching form (linear listing)." However, as Buzan (2015) asserted, linear list of vocabularies with their meanings and examples written on the board is counterproductive and it doesn't help learners to develop their vocabulary enrichment because it lets only left hemisphere of their brain to be activated. Nevertheless, Buzan researched on the strategy which causes the utilization and activation of both left and right hemispheres of the brain. He found out that learning things through mind map can achieve it.

Mind maps are one of the learning techniques that helps learners explore concepts using visual partial relationships flowing from a central theme or image to outlying branches (Banten, 2016). Additionally, as Buzan (1986) claimed, MM accelerates vocabulary learning by relating and associating words with sounds, image and similarities. This technique dramatically plays a greater role in language learning and improves the learner's capacity to learn by simple ideas (Sujana, 2012). As Banten (2016) again indicated, mind map aids creativity, boosts recall of information, and efficiently multiplies one's knowledge capacity. Moreover, Kadagidze (2016) added that a mind map boosts confidence in learning, organizes ideas in a better way, and creates associations visually among semantics. The Mind mapping is significant for the increment of vocabulary knowledge as well (Fitriani, 2018).

Nevertheless, although Lucky (2012), Othman (2018), and Pua (anon) witnessed mind mapping as one of the most supportive vocabulary learning and teaching strategies teachers and students at Majete General Secondary School were not seen applying it during vocabulary teaching and learning. As the researchers acted as EFL teachers for the last eight years and observed classroom teachings, most collocation-associated lessons were presented through a linear list, in which teachers wrote and listed the words with their particles on the board with possible examples. This collocation delivery strategy hardly supports students to enhance their collocation capability, and it has nothing to expand their vocabularies for future use. As Buzan (2004) illustrated, teaching students with a linear listing strategy activates only the left hemisphere of their brain. Besides, Buzan & Buzan (1993) justified that activating and functioning only the left cortex of the brain doesn't make learners successful in academic fields and tends to make them forget what they learn within a short period of time. Therefore, the collocations they learned could diminish, and students would be hampered in real-life communication. Because of that, students faced the problem of expressing themselves and lost the freedom to describe their surroundings by organizing collocations.

Haregewoin (2003) stated that the English language proficiency of Ethiopian students is declining. The problem includes Majete General Secondary School's grade twelve students. They were reluctant to immerse themselves in these speaking situations. They prefer to refrain from productive skills. The major reason for the students to refrain from expressing themselves might be because of a lack of productive collocations. Kishen (2020), and Yumniamatillah (Anon) supported this idea as, although several factors affect speakers for their problems related to their speaking skill, one of the main factors is a lack of collocations, and this leads students not to express their ideas in sentences. When users do not have the knowledge of words, framing sentences can become a problem. In light of that, students need to be taught collocations through crucial strategies to remember them for different speaking contexts are vital.

Plenty of studies were done abroad on the effectiveness of the mind-mapping on different language skills & learning. However, the studies overlooked a positive effect that the mind map has on the enhancement of students' collocations. For instance, Lucky (2012), Othman (2018), and Pua (anon) studied individually the effect of mind mapping on vocabulary. As their findings show, mind mapping boosts students' vocabulary recall, ignites students' interest in their learning and avoids students' tiredness and boredom. Furthermore, Elkahlout (2013), Buran (2015), and Almubarak (2018) researched the mind map and its effect on grammar, language learning and causative verbs, respectively. As they found out, a mind map helps learners to improve their language-related classroom performances.

However, concerning this study, researchers in the field of ELT in Ethiopia have not paid enough attention to the field because of a lack of understanding or knowledge. Therefore, this quasi-experimental study was conducted to check how the mind-mapping was effective for the advancement of Majete General Secondary School's grade twelve students' adjective-preposition and verb-noun collocations.

METHOD

As long as the title of the study was illustrative, the design that was applied was a quasi-experimental research design. Besides, in terms of time, the study focused on 2022 Majete General Secondary School grade twelve students. The target population of the study was 238 grade 12 students who were attending their classes in five sections. Out of these, 110 (one hundred and ten) social science students, both of whom were taught by an English language teacher in two sections, had been randomly taken as samples of the study. From these two sections, a simple random sampling technique was used in order to decide which section was to be a control and experiment group. Consequently, students who were attending their classes in section D had been assigned as a control group, and students who were attending their classes in Section E had been labeled as an experimental group.

TREATMENT CONDITIONS

The English language teacher was given training on how to use mind maps to teach English collocations, focusing on adjective-preposition and verb-noun collocation types. He was oriented to teach collocations to the experimental group students by using a mind map. On the other hand, the same teacher was oriented to teach adjective-preposition and verb-noun collocations for the control group students by following the usual teaching method provided in the student's text book. The researcher, on the other hand, attended classes, gathering observation data while the teacher was teaching. The experimental treatment or intervention was conducted for a month.

Data Gathering Instruments

As indicated earlier, the main data for the study were gathered by using tests. Tests were one of the main instruments which the researchers used to gather data from the students respondents. The tests were consisted of twenty multiple choice questions solely about collocations. The collocations which were presented in all tests had been chosen thoroughly. Some were chosen from The BBI Combinatory Dictionary, some were from grade twelve English students' text book and the remaining collocations were taken from https://7esl.com/collocations.

Pre-Test

The first data gathering instrument which was used was pre-test. It was given for both experiment and control groups in order to identify whether there was significant difference between them or not. The questions were 20 multiple-choice questions which students chose only one possible answer from the given four alternatives. The main reason to prepare 20 questions was because of the number of

adjective-preposition and verb-noun collocations prepared by the researchers, and taught by the treatment teacher. The treatment was prepared with 7 adjective-preposition, and 3 verb-noun collocations 10 in accumulation. Two questions for each collocation were prepared. However, the questions that were included in pre-test hovered around the grammatical (verb-noun) and lexical (adjective-preposition) collocations.

Post-Tests

Two post-tests (an immediate post-test given a week after the beginning of the intervention and a delayed post-test administered at the end of the treatment process i.e., after 30 days) were given for both control and experiment groups. The purpose was to check whether the intervention had brought improvements in collocations abilities of the experimental group, and to see whether there was a difference in achievement between them. The results obtained from those tests were done via descriptive (mean) and inferential statistics (two-tailed significance difference) through SPSS. After that, their mean and significance difference had been compared one another so that their differences was figured out clearly.

Finally, the obtained data through tests were analysed through mean scores, paired samples t-tests and independent samples t-tests. To compute this, SPSS version 21 was employed.

Reliability and Validity of the Tests

Reliability and validity are the two most important and fundamental features in the evaluation of any measurement instrument or tool for a good research. Having known this, the researchers used samples who were almost on the same maturation level (all were grade 12 students) in order to avoid maturation related quality decreasing factor. The other one was testing. Relation to tests, the researchers used similar tests for both experimental and control groups which were designed by consulting other researcher's work. Furthermore, the researchers used similar data gathering instruments to increase instrumentations related quality. Additionally, simple random sampling technique was deployed to avoid biased selection of subjects, and finally, the researchers let the treatment to be given by other EFL teacher to eliminate experimental immorality.

FINDINGS AND DISCUSSION

In this section, the major findings of the study are presented, and discussions of the findings made. In doing so, first, the findings of the pre-test are dealt with, and then, the results obtained from the 2 post-tests are compared and contrasted.

Results of the Pre-Test

As indicated above, a pre-test was given for both experimental and control group students to have a base line data before the experiment was conducted. As we could see from the data in table 1 below, the calculated results of section D (mean=7.2449, std=2.63416) is a little lesser than the results of section E (mean=8.1837, std=2.83338). However, the mean difference of the two groups was not statistically significant at P=0.05 level. After having this base line result, the treatment process was commenced.

Table 1
Mean Scores of the two groups in the pre-Test

Sections	No	Mean	Std. Deviation	Sig. (2-tailed) (α)
D	49	7.2449	2.63416	.093
E	49	8.1837	2.83338	

Results Obtained From Post-Tests

As indicated above, 2 post-tests (one given after 7 days of the treatment and another delayed post-test administered after a month of the start of the experimental intervention) were utilized to gather the necessary data for the study. The results obtained from these tests are presented and discussed in the sections below.

Results Obtained from the Two Groups in Post-test 1 (the Immediate Post-test)

As the data in the following table shows, during the immediate post-test, the mean score of the control group students was 8.6923. On the other hand, the mean score of the experimental group students who learned adjective-preposition and verb-noun combination collocations through mind map was 10.8750. As can be observed from the table, the mean score difference between the 2 groups was found significant at P=0.005 level of significance. This finding suggests that teaching English collocations by using mind map is more effective than using other strategies of teaching collocation.

Table 2

Mean scores of the control and experimental groups during Post-Test 1

Groups	No	Mean	Std. Deviation	Sig. (2-tailed) (α)
Control	52	8.6923	2.71913	.001
Experimental	40	10.8750	3.25960	

In addition, to further check whether the differences in the means of the collocation gains of the 2 groups during the immediate post-test (post-test 1) was significant; an independent samples t-test was run. The independent t-test statistics produced the following output.

Table 3

Independent samples T-Test of Post-Test 1 of control and experiment groups

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval	
		F	Sig.	t	df	Sig. (2-tailed)	Mean D/ce	Std. Error D/ce	Lower	Upper
Score	Equal variances assumed	.534	.467	-3.500	90	.001	-2.183	.624	-3.422	-.944
	Equal variances not assumed			-3.418	75.4	.001	-2.183	.639	-3.455	-.911

As the information in table 3 depicts, the independent t-test result revealed a significant difference between the test scores of the experimental and control group students during the immediate post-test. In other words, the experimental group students who were taught English collocations by using mind map outperformed the students in the control group who learnt those collocations by using the usual teaching approaches given in the text book.

Results Obtained from Post-test 2 (the Delayed Post-test)

As indicated earlier, at the end of the experimental treatment, the students in the two groups were provided a test to check the effects of the treatment on a long-run. The results of the test are provided in the following table.

Table 4
Mean scores of Post-Test 2 of the students in the 2 groups

Groups	No	Mean	Std. Deviation	Sig. (2-tailed) (α)
Control	47	8.7021	3.40661	.000
Experimental	51	11.4314	4.00127	

As the data in table 4 show, the control group students (N=47) scored a grand mean of about 8.7021 during the post-test 2 collocation test. On the other hand, the experimental group students who learnt collocations with the incorporation of mind map scored a mean of about 11.4314. The mean difference between the two groups was about 2.7293 which was significant at P=0.05 alpha level. From this result, it can be concluded that the strategy (mind map) which was used to teach those collocations for the experimental group students was more beneficial than the strategy used to teach the control group students.

Moreover, to further check the differences in the collocations achievement of the two groups during the delayed post-test, an independent t-test was computed. The results of the t-test are presented in the figure below.

Table 5
Independent t-test results of the control and experiment group during Post-test 2

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence	
		F	Sig.	t	df	Sig. (2-tailed)	Mean D/ce	Std. Error D/ce	Lower	Upper
Score	Equal variances assumed	2.010	.159	-3.620	96	.000	-2.729	.754	-4.226	-1.233
	Equal variances not assumed			-3.644	95.421	.000	-2.729	.749	-4.216	-1.243

As the information in the above figure shows, the experimental group students who were taught collocations by using mind map significantly outperformed the students in the control group who were taught those collocations by using the customary teaching techniques.

Differences in Collocation Scores of the Two Groups in Each Collocation Type

In the following sub-sections, an attempt was made to examine the effects of the two collocation teaching strategies on each collocation scores of the students in the two groups. In doing so, first, the differences in adjective-preposition collocation scores were tested followed by verb-noun collocations.

Differences in Adjective-Preposition Collocations Gains between the Control and Experimental Group Students during the Immediate Post-test

During the immediate post-test, both groups were provided with 14 adjective-preposition collocation questions. As it is illustrated n the table below, the results of experimental group (mean=6.9500, std=2.28653) were found to be better than the results of control group (mean=5.9615, std=2.28346). The mean score of the experimental group was higher by .9885 than the mean of the control group.

Table 6
Mean scores and p-value of adjective-preposition collocations in Post-Test One

Groups	No	Mean	Std. Deviation	Sig. (2-tailed) (α)
Control	52	5.9615	2.28346	.043
Experimental	40	6.9500	2.28653	

Besides, as the t-test unveiled in the above table, the two-tailed significant difference indicated that there was a significance difference between the groups since they have a .043 p-value which is smaller than .05. Therefore, it can be concluded that according to the means of the 2 groups, experiment group outscored control group and those means brought significant difference in t-test. And that could be because of the effect which mind map brought on experimental group made a difference.

Differences in Adjective-Preposition Collocations Gains between the Control and Experimental Group Students during the Delayed Post-test

Mean computation had not been stalled in post-test one of the groups. It was also done for score of delayed or post-test two of adjective-preposition collocations. In the table below, 47 students took post-test two from control group and got 6.3404 mean. On the contrary, the mean of 51 students who attended their adjective-preposition collocations lessons in experiment group with mind map got 7.5294 mean.

Table 7
Mean scores and p-value of adjective-preposition collocations in Post-Test Two

Groups	No	Mean	Std. Deviation	Sig. (2-tailed) (α)
Control	47	6.3404	2.46079	.024
Experimental	51	7.5294	2.65596	

Between the two groups, 1.189 mean variation was registered. Control group who learnt without mind map had the mean which was less by 1.189 from experiment group who learnt those contents with the help of mind map.

Additionally, in order to verify their significant difference from the above mean, t-test was conducted. As it is signified in the table, the two groups had .024 t-test p-value which is interpreted as there is significant difference between the groups because the p-value is less than .05.

Comparison of Verb-noun Collocation Results of the 2 Groups during the Immediate Post-test

It is fact that the sum of all questions in pre-test, post-test one and post-test was twenty. Nonetheless, since the coverage of contents varied, the number of questions for contents varied as well. Beware of that, out of twenty questions under each test, there have been fourteen adjective-preposition collocations questions and six verb-noun collocations questions. In light of that, as it is showed below in the table fifty-two students who were the members of control group had 2.8077 verb-noun collocations mean.

Table 8
 Mean scores and p-value of verb-noun collocations in Post-Test One

Groups	No	Mean	Std. Deviation	Sig. (2-tailed) (α)
Control	52	2.8077	1.08535	.000
Experimental	40	3.8750	1.34331	

Notwithstanding, 40 who learnt in experimental group with the help of mind map got 3.8750 verb-noun collocations mean which is greater than the mean of control group who they learn verb-noun collocations without the support of mind map.

Moreover, the t-test of verb-noun collocations questions of post-test one had been done either to support the null hypothesis of to reject it. As it is showed above, the two-tailed significant difference of the groups is .000 which .05 is greater than it. This p-value of the groups declared that there is significant difference between the two groups.

Comparison of Verb-noun Collocation Results of the 2 Groups during the Delayed Post-test

Lastly, the verb-noun mean scores of the 2 groups during the delayed post-test were compared to see if there were any significance differences. The result is presented in table 9 below.

Table 9

Mean scores and p-value of verb-noun collocations in Post-Test Two

Groups	No	Mean	Std. Deviation	Sig. (2-tailed)
Control	47	2.3617	1.32576	.000
Experimental	51	3.9020	1.62794	

As it is understood from the table above, the mean of the control group students for their verb-noun collocations during the delayed post-test was 2.3617. On the other hand, the mean of experimental group for their verb-noun collocations score was 3.9020. Between the two groups, it was understood to have a 1.5403 mean difference. In other words, the mean which experimental group got was greater by 1.5403 after they learnt those collocations through mind map for a month. On the contrary, the control group who learnt verb-noun collocations without mind map was lesser by 1.5403.

Moreover, a t-test was done as well for the purpose of identifying to what extent mind map has helped experimental group students to increase their verb-noun collocations. Beware of that, as it is shown in the table, the significance difference which was obtained from the two groups is .000. The p-value which is seen in the overhead table shows that there was significant difference between the students who learnt verb-noun collocations with and without mind map. Therefore, for the occurrence of the diagram can be taken as the reason. Therefore, it can be concluded that mind map also increases students' stock of verb-noun collocations.

DISCUSSION

So far, despite Majete General Secondary School's grade twelve social science students learning adjective-preposition and verb-noun collocations without the help of a mind map, they were incapable of using the words for actual written and oral communications by retrieving the from their memory. They were having trouble expressing themselves in different speaking situations. Beware of that, this study came up with the purpose of testing how effective the mind map was in enhancing Majete General Secondary School grade twelve students' stock of adjective-preposition and verb-noun collocations.

Students were classified into two control and experimental groups after they took the pre-test. According to the result that was obtained from the pre-test, although there has been a fraction of a difference in their mean between the two sections, their p-value has been greater than .05, and suggests that there has not been any significant difference between the two groups.

However, after teaching collocations with and without mind maps, experimental group students who learned adjective-preposition and verb-noun collocations with mind map outscored control group students who learnt collocations without mind map in both immediate and delayed post-tests. The students who learnt through the picturesque diagram brought huge difference in their post-test result because of the implementation of it. Nonetheless, the result of students who learnt collocations without mind map through usual way was not as equal as the students who were talked about before. Therefore, the findings of this study showed experimental group got significant difference in their adjective-preposition and verb-noun score in comparison with control group in their both post-tests. The major cause which created result variation and difference between those two groups was because the lessons were mind map-aided.

Similar results have been obtained by other studies which were conducted abroad. For instance, Prabha (2020) who conducted study on the effect of mind map for the development of third-year students' vocabulary found out that students got significance difference after they were taught through mind map. Moreover, Almubarak (2018) got that the result which mind mapping technique has significant influence towards experiment group student's ability in using causative verbs. This result also was found identical with the results which were obtained from this study. Similarly, Abdulaziz , and Yamat (2016) conducted quasi-experimental research by administering pre and post tests for both control and experimental groups. And the study unveiled that mind mapping technique helped learners to improve their vocabulary. In addition, Aswadi (2013) in his research got that the result of students who didn't get excellent score in their pre-test got excellent in their post-test score after using mind map during their vocabulary learning. Therefore, since both adjective-preposition and verb-noun collocations are advanced vocabularies, the results obtained from studies which emphasize on vocabularies and mind map can be profoundly related with the results attained in this study.

In addition, it was fortunate for them to be delivered collocations mind-map aided. This opportunity paved the way for them to use it in the future various language classes including when they learn adjective-preposition and verb-noun collocations.

Furthermore, as they promised in delayed questionnaire, they found it helpful and they will use it when they learn adjective-preposition and verb-noun collocations. Therefore, it can be concluded that the study created another opportunity for students by introducing this new and unusual strategy to learn collocations and other language contents.

To sum up, this study proved the theory of Jean Piaget cognitive theory and aligns with connectionism theory which is advocated by Rumelhart and McClelland.

CONCLUSION

The main aim of the study was to find out the effect of mind map on Majete EFL high school students' collocation learning. After the treatment, the following findings were obtained. Such as:

✓ Although the mean of experimental group (mean=8.18) is slightly higher than the mean of control group (mean=7.24), there is no statistically significant difference (α=0.93) between the two groups.
✓ In immediate post-test, experimental group who learnt both adjective-preposition and verb-noun collocations higher mean (mean=10.87) than the mean of control group (mean=8.69) who learnt

the so called collocations without mind map, and there is statistically significant difference (α=0.01) between the two groups.

✓ In delayed post-test, experimental group who learnt the collocations through mind map got higher mean (mean=11.43) than control group who learnt the collocations without mind map (mean=8.70), and there is statistically significant difference (0.000) between the two groups.

Therefore, the immediate and delayed post-tests revealed that mind map brought relevance and noticed result change on experimental group students who learnt adjective-preposition and verb-noun collocations with the incorporation of the picturesque strategy. This claim was supported by the mean and p-value computed on SPSS and compared with the students who learnt the so called collocations without the help of mind map. Results of both experimental and control groups were calculated for the purpose of reaching on decision how much the two groups were different.

Based on the results, it is suggested that English language teachers should consider using mind map as a strategy when they are teaching collocations. Text book writers and curriculum designers are also recommended to consider mind map as an alternative strategy to be included in the textbooks and curricula.

IMPLICATIONS

The study will play greater role for the improvement of EFL students' collocation knowledge. Even though there are different strategies to present collocations for their students, the study suggests EFL teachers to use mind-mapping technique to deliver collocations. There are different justifications to recommend it. One of the reasons is it activates both hemispheres of brain. When teachers use mind-mapping during collocation delivery, they are making their students use both hemispheres of brain which will lead them to use their ultimate capacity in their learning. This tends to help them be successful in learning. The second reason is because of its colourfulness. Mind-mapping requires resources, such as crayons, papers and images etc., and this ignites students' interest of learning language contents interestingly.

Moreover, the study will pave the avenue for other researchers to conduct other studies on the area. So far, although plenty of studies have been conducted on the advantages of mind-mapping for language teaching and learning, EFL teachers and students are not seen using it in their language teaching and learning. Therefore, the more studies are conducted on the area, the more recognition it gets, and the more it will be used by EFL teachers and EFL students during their language teaching and learning.

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