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Evaluate the Impact of Project-Based Learning Strategy on Vocabulary Acquisition: An Experimental Study among Palestinian Students in Gaza

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Abstract

This study aimed to evaluate the impact of the project-based learning strategy on developing third graders' vocabulary achievement level in the subject of English. The research questions were addressed using the experimental approach. The researchers purposively sampled 76 third graders from AlZaitun Co-ed Elementary C School in Gaza and randomly sampled two classes of third graders. Participants were divided into two equivalent groups, each consisting of 38 students. The Project–based learning strategy was used in teaching the experimental group, whereas the traditional method was used for the control group. The study tool consisted of a pre-post achievement test. Data were analyzed using the Statistical Package for Social Sciences. Independent samples t-test and effect size were used in the analysis. Results revealed higher mean scores in vocabulary for the experimental group in the post-application test. The researchers attributed these findings to the project–based learning strategy and recommended its use in teaching English to develop vocabulary.

Keywords: Project-based learning, Palestinian students, vocabulary.

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Introduction

Learning the English language has become an important need nowadays as it is one of the most essential and dominant languages around the world. In addition, English is the everyday language of many aspects of life such as business, science, economics, technology and education. During the last few decades there has been an increasing need to use English language for the expression of knowledge within specific professional fields (Ardeo, 2003).

Cameron (2001) points out that there are some differences between teaching a foreign language to children and teaching it to adults. Children are often more enthusiastic and lively, but lose interest more quickly and are less able to keep themselves motivated on a task they find difficult. Children struggle to use language as accurately and fluently as older learners, and they tend to speak with a more native-like accent. In addition, they also have difficulty paying attention for more than 10-20 minutes, after which they become bored and tired. Given these characteristics, the relevance of active learning becomes apparent.

In the case of learning English as a second or a foreign language, vocabulary acquisition and learning are considered a fundamental demand. It would be impossible to learn English language without vocabulary. Accordingly, to learn English successfully and to use it effectively in the four basic skills, reading, writing, listening, and speaking, a learner must pay more attention to vocabulary. Wilkins (1972) assures that Without grammar very little can be conveyed, without vocabulary nothing can be conveyed.

Vocabulary encourages students to make use of language learning opportunities around them such as listening to the radio, listening to native speakers, using the language in different contexts, reading and watching television. In the past, vocabulary learning and teaching were often given little priority. It was often to look after itself and received only incidental attention in many textbooks and language programs. Thus, although the course curriculum was often quite specific about aspects of teaching such as grammar, reading, or speaking, little specification was given to the role of vocabulary. (Richards & Renandya, 2002)

Many strategies have been used to facilitate the process of learning and teaching English language in general and vocabulary in particular. In order to overcome all the challenges that face the educational process concerning English as a second language, the teacher should implement appropriate teaching methods that encourage students to employ the studied language.

Project-based learning (PBL) is one of the promising new learning strategies that respond to children's needs for active learning. Hallermann, et al. (2011) define project-based learning as a systematic teaching method that engages students in learning important knowledge and 21st century skills through an extended, student-influenced inquiry process structured around complex, authentic questions and carefully designed products and learning tasks. Project-based learning offers a wide range of benefits to both students and teachers. A growing body of academic research supports the use of project-based learning in school to motivate students, cut absenteeism, boost cooperative learning skills, and improve academic performance (George Lucas Educational Foundation, 2001).

Many studies around the world have investigated the effectiveness of project-based learning, both for the study of English and for other types of learning. These studies support the effectiveness of this strategy on school success and the development of various life skills. For example, Bagheri, et al. (2013) have reported the benefits of project-based learning on students' self-directed learning skills,

whereas Baş (2011) and others have reported the benefits of of project-based learning on students' academic achievement and attitudes towards English.

The current study aims to assess the effects of project-based learning strategy on vocabulary achievement in English as a foreign language among third grade students in UNRWA primary schools in Gaza. The Research Questions are: (1) Are there statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of students' vocabulary acquisition in the post application of the vocabulary test between the experimental group and control one?; (2) Are there statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of students' vocabulary acquisition in the experimental group between the pre and post application of the vocabulary test?.; (3) Are there statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of students' vocabulary acquisition between male and female students in the experimental group?

Method

Research Design

The study employed an experimental approach that required two groups of students: an experimental group and a control group. The project-based learning strategy was applied for teaching vocabulary to the experimental group, whereas the traditional method was used with the control group. The experiment lasted for six weeks. Both groups were taught by the researcher.

Participants

The population of the study consisted of all third graders at UNRWA schools in Gaza enrolled in the first semester of the school year. The sample of the study consisted of (76) students distributed into two groups: the experimental group consisting of (38) students and the control group consisting of (38) students also. The sample of the study was purposively chosen from Al Zaitun Elem Co-ed "C" School in the east of Gaza, where one of the researchers works as an English teacher. The sample was randomly chosen from the third grade classes. Table (2.1) shows the distribution of the sample.

Table 2.1. *Sample Distribution*

Group	Experimental	Control	Total
Number of students	38	38	76

Study Instrumentation and Procedures

Vocabulary Achievement Test

The achievement test was prepared by the researchers to measure the subjects' vocabulary achievement. It was used as a pretest applied before the experiment and as a posttest applied after the experiment. The test aimed at measuring the impact of Project-Based Learning Strategy on 3rd graders' English vocabulary. It was built according to the criteria of test specifications. It was used as a pretest to prove that both groups were similar in terms of vocabulary achievement and as a posttest to identify the differences in the achievement of both groups.

Table of Specifications

The test specifications, outlined in Table (2.2) below were designed according to the general objectives of the content, the content analysis and the percentage weight of each skill and the objectives of the test. The third grade syllabus consists of nine units each consisting of six periods. The test items for each skill accorded with the general objectives of the skill and its nature. The test consisted of (28) varied items as presented in Table (2.2) below. These skills were equally represented in the test specification and therefore their items in the test.

Table 2.2. *Table of Specifications*

Skills	No. of items	Marks	%
Word recognition	4	4	14.2%
Word and picture association	4	4	14.2%
Missing letter completion	5	5	17.8%
Missing word completion	4	4	14.2%
Writing the word correctly	5	5	17.8
Word classification	6	6	21.4%
Total	28	28	100%

Pilot Study

The test was first applied on a random sample of forty students from Al Zaitun Elem Co-ed "C" School in the east of Gaza. The results were recorded and statistically analyzed to assess the test validity and reliability. The items of the test were modified in light of the statistical results .The researchers used the following equation to calculate the test time.

$$\text{Test Time} = \frac{\text{The time needed for the } 1^{st} \text{ student} + \text{The time needed for the last student}}{2}$$

$$= 35 + 55 \div 2 = 45 \text{ Minutes}$$

After applying the equation on the pilot study results, the researcher found that the time needed for the test to be applied was 45 minutes.

Internal Coherence

Al Agha (1996) writes that the internal coherence indicates the correlation of the score of each item with the total score of the test. It also indicates the correlation of the average of each domain with the total average. The internal coherence was calculated by using Pearson Formula, whose results are outlined in Table 2.3 below

Table 2.3. *Correlation Coefficient of the Achievement Test Items*

Domains	Items	Pearson correlation	Domains	Items	Pearson correlation
Word recognition	1	0.805**	Missing word completion	14	0.662**
	2	0.708**		15	0.725**
	3	0.685**		16	0.757**

Word and picture association	4	0.794**	Writing the word correctly	17	0.755**
	5	0.783**		18	0.771**
	6	0.776**		19	0.631**
	7	0.745**		20	0.485**
	8	0.674**		21	0.514**
Missing letter completion	9	0.675**		22	0.625**
	10	0.608**	Word classification	23	0.373*
	11	0.804**		24	0.631**
	12	0.724**		25	0.455**
	13	0.552**		26	0.573**
				27	0.539**
				28	0.380*

r table value at df 38 and sig. level 0.05 = 0.304
r table value at df 38 and sig. level 0.01)= 0.393

As seen in Table 2.3 the coefficient correlation of each item score with the total score of the achievement test was significant at levels (0.01) and (0.05). Accordingly, it can be concluded that the test was highly consistent and valid as a tool for the study.

As seen in table 2.4 the coefficient correlation of each skill with the total degree of the achievement test was significant at level (0.01). Accordingly, it can be concluded that the test is highly consistent and valid as a tool for the study.

Table 2.4. *Correlation Coefficient of Each Skill within the Total Degree of the Test*

Skills	Pearson correlation	Sig. level
Word recognition	0.698	sig. at 0.01
Word and picture association	0.668	sig. at 0.01
Missing letter completion	0.852	sig. at 0.01
Missing word completion	0.729	sig. at 0.01
Writing the word correctly	0.840	sig. at 0.01
Word classification	0.739	sig. at 0.01

r table value at df 38 and sig. level 0.05 = 0.304
r table value at df 38 and sig. level 0.01 = 0.393

Test Reliability

The test is considered reliable if it gives the same results when reapplied in the same conditions (Al-Agha, 1996, p.120). The reliability of the test was measured with the Kud-Richardson (K-R21) and the spilt- half techniques.

Split Half Technique

The reliability of the test was measured by calculating the correlation between the even and odd items of the test. The results of this correlation are outlined in Table 2.5 below.

Table 2.5. *Reliability Coefficient by Spilt –Half Technique*

Skills	Total	Correlation Coefficient	Reliability
Word recognition	4	0.577	0.732
Word and picture association	4	0.586	0.739
Missing letter completion	*5	0.735	0.753
Missing word completion	4	0.547	0.707
Writing the word correctly	*5	0.546	0.596
Word classification	6	0.914	0.955
Total	28	0.765	0.867

As clearly shown in Table 2.5, the spilt-half coefficient was (0.867), which indicates that the achievement test was reliable to be applied in the study.

Kud-Richardson (K-21) Technique.K-R21 test depends on calculating the percentages of correct answers to the test items and also on the variance of every item. Table 2.6 describes (K-R21) for the test domains.

Table 2.6. *(K_R21) Coefficients for the Test*

Skills	Total	(K_R21) coefficient
Word recognition	4	0.735
Word and picture association	4	0.732
Missing letter completion	5	0.731
Missing word completion	4	0.700
Writing the word correctly	5	0.572
Word classification	6	0.652
Total	28	0.889

According to Table 2.6, the test proved to be reliable. Richardson (K-R21) coefficient is (0.889).

Difficulty Coefficient

The difficulty coefficient is calculated by dividing the number of students who get a wrong answer by the total number of the students taking the test. The equation is as follows:

$$\text{Difficulty Coefficient} = \frac{\text{No. of wrong answer}}{\text{The total no. students}}$$

Table 2.7 shows the difficulty coefficient for each item of the test:

Table 2.7. *Difficulty Coefficient for Each Items of the Test*

No.	Difficulty coefficient	No.	Difficulty coefficient
1	0.64	15	0.45
2	0.45	16	0.50
3	0.64	17	0.64
4	0.68	18	0.55
5	0.45	19	0.27
6	0.64	20	0.32
7	0.59	21	0.36
8	0.59	22	0.27
9	0.64	23	0.50
10	0.59	24	0.68
11	0.59	25	0.68
12	0.55	26	0.50
13	0.68	27	0.64
14	0.64	28	0.77
Total difficulty coefficient		0.55	

Table 2.7 shows that the difficulty coefficient wobbled between (0.27 – 0.77) with a total average (0.55), meaning that each item was acceptable or in the normal limit of difficulty according to the viewpoint of assessment and evaluation specialists.

Discrimination Coefficient

Discrimination coefficient refers to the test ability to differentiate between the high achievers and the low achievers.

$$\textbf{Discrimination Coefficient} = \frac{\text{No. of high achievers with correct answers}}{\text{No. of high achievers}} - \frac{\text{No. of low achievers with correct answers}}{\text{No. of low achievers}}$$

Table 2.8 shows the discrimination coefficient for each item of the test:

Table 2.8. *Discrimination coefficient for Each test item*

No.	Discrimination coefficient	No.	Discrimination coefficient
1	0.73	15	0.55
2	0.55	16	0.45
3	0.55	17	0.73
4	0.64	18	0.73
5	0.55	19	0.36
6	0.55	20	0.27
7	0.64	21	0.73

8	0.45	22	0.36
9	0.73	23	0.64
10	0.45	24	0.45
11	0.64	25	0.45
12	0.73	26	0.64
13	0.64	27	0.36
14	0.73	28	0.45
Total discrimination coefficient			0.56

Table 2.8 shows that the discrimination coefficient wobbled between (0.27 – 0.73) with a total average (0.56), which means each item was acceptable or in the normal limit of discrimination according to the viewpoint of assessment and evaluation specialists.

Controlling the Variables

To assure the accuracy of the results and avoid any marginal interference, the researcher tried to control some variables before the study.

English and General achievement variable:

T-test was used to measure the statistical differences between the groups due to their English and general achievement. The subjects' results in the second term test of the school year (2015) were recorded and analyzed as shown in Table 2.9 below.

Table 2.9. *T-test results of Controlling English Achievement Variable*

Domain	Group	N	Mean	Std. Deviation	t	Sig. value	sig. level
English achievement	experimental	38	19.868	10.429	0.160	0.874	not sig.
	control	38	20.237	9.685			

Table 2.9 shows that there were no statistical differences at $\alpha \leq 0.05$ between the experimental and the control subjects due to the English achievement variable.

Previous Learning Variable

To make sure that the sample subjects were equivalent in their previous English language achievement, the researcher applied the pre-achievement test. The results of the subjects were recorded and statistically analyzed using T-test. The results of this analysis are outlined in Table 2.10 below.

Table 2.10. *T-test Results of Controlling Previous Learning in English Variable*

Domain	Group	N	Mean	Std. deviation	*t*	Sig. value	sig. level
Word recognition	experimental	38	2.368	1.364	0.161	0.872	not sig.
	control	38	2.421	1.482			
Word and picture association	experimental	38	1.289	1.250	1.051	0.297	not sig.
	control	38	1.605	1.366			
Missing letter	experimental	38	1.658	1.419	0.285	0.776	not sig.

completion	control	38	1.737	0.950			
Missing word completion	experimental	38	1.026	0.822	1.141	0.258	not sig.
	control	38	1.289	1.160			
Writing the word correctly	experimental	38	0.289	0.611	1.197	0.235	not sig.
	control	38	0.474	0.725			
Words classification	experimental	38	3.658	1.697	0.965	0.337	not sig.
	control	38	4.000	1.375			
Total degree	experimental	38	10.289	4.538	1.211	0.230	not sig.
	control	38	11.526	4.367			

Table 2.10 shows the mean and the standard deviation of each group in English previous learning. The analysis of the results indicated that there were no statistically significant differences between the experimental and the control groups at ($\alpha \leq 0.05$).

Controlling for Gender

To control for the gender of students in the experimental group, the researchers used the independent sample t-test Results, the results of which are outlined in Table 2.11 below.

Table 2.11. *Results of the Independent Samples t-Test- Differences Between Male and Female in the Experimental Group*

Test	Gender	N	Mean	Std. deviation	t	Sig. value	sig. level
Word recognition	Male	16	2.313	1.493	0.213	0.833	not sig.
	Female	22	2.409	1.297			
Word and picture association	Male	16	1.313	1.352	0.096	0.924	not sig.
	Female	22	1.273	1.202			
Missing letter completion	Male	16	1.625	1.408	0.120	0.905	not sig.
	Female	22	1.682	1.460			
Missing word completion	Male	16	1.063	0.854	0.229	0.821	not sig.
	Female	22	1.000	0.816			
Writing the word correctly	Male	16	0.313	0.704	0.196	0.846	not sig.
	Female	22	0.273	0.550			
Words classification	Male	16	3.125	1.668	1.692	0.099	not sig.
	Female	22	4.045	1.647			
Vocabulary skills	Male	16	9.750	4.796	0.620	0.539	not sig.
	Female	22	10.682	4.412			

t table value at d f 36 and sig. level 0.05 = 2.02
t table value at d f 36 and sig. level 0.01 = 2.70

Analysis of the results indicated that there were no statistically significant differences between the male and the female students of the experimental group at ≤ 0.05.

Statistical Analysis

The researchers used a number of statistical tools that were consistent with the nature of the study. Data were collected and computed using the Statistical Package for Social Sciences. The Spearman correlation was used to determine the internal consistency validity of the test items and the evaluation criteria of the test. Split-half technique and Kud-Richardson (K-R21) used to test the reliability of the test Also, to control the interferential variables and to measure the statistical differences in means between the two groups with respect to the study variables, the researchers used independent samples t. test. To measure the effect size level, it was by using t.value, Eta square, and Cohen's d: to check the effect size effect of the differences which the independent variable, the intervention, had on the dependent variable of the experimental group.

Findings

The purpose of the current study was to examine the impact of the project-based learning strategy on third graders' English vocabulary. This section reexamines the research questions and hypotheses in light of results after analysis using the Statistical Package for Social Sciences. In her attempt to analyze the data, the researchers employed different statistical formulae such as frequencies, means, standard deviations and t-test. Furthermore, the researchers used effect size through $(\eta)^2$ and d value to measure the extent to which the independent variable, project–based learning strategy, had an effect on the dependent variable, the experimental group's vocabulary achievement level in English.

Answers to Research Questions

The first question is stated as follows: "Are there statistically significant differences ($\alpha \leq 0.05$) in the mean scores of students' vocabulary achievement in the posttest between the experimental group and control group?"To answer this question, the researchers tested the null hypothesis that "There are no statistically significant differences at ($\alpha \leq 0.05$) in the mean scores of students' achievement in vocabulary in the post test between the experimental group and control group. To examine this hypothesis, means and standard deviations of both groups' results on the post-test were computed. An independent sample t-test was used to assess the differences. Table (3.1) outlines the results.

Table 3.1. *Results of the Independent Samples t.Test - Differences Between the Experimental and the Control Group in the Vocabulary Posttest*

Domain	Group	N	Mean	Std. deviation	t	Sig. value	sig. level
Word recognition	experimental	38	3.658	0.534	3.816	0.000	sig. at 0.01
	Control	38	2.737	1.389			
Word and picture association	experimental	38	3.500	1.033	4.705	0.000	sig. at 0.01
	Control	38	2.079	1.549			
Missing letter completion	experimental	38	4.474	1.033	6.157	0.000	sig. at 0.01
	Control	38	2.553	1.622			
Missing word completion	experimental	38	3.579	0.858	4.213	0.000	sig. at 0.01
	Control	38	2.368	1.550			
Writing the	experimental	38	3.474	1.390	6.152	0.000	sig. at

word correctly	Control	38	1.395	1.552			0.01
Words classification	experimental	38	5.289	1.206	4.138	0.000	sig. at 0.01
	Control	38	3.526	2.334			
Vocabulary skills	experimental	38	23.974	3.132	7.723	0.000	sig. at 0.01
	Control	38	14.658	6.743			

t table value at d f 74 and sig. level 0.05= 2.00
t table value at d f 74 and sig. level 0.01= 2.66

As shown in table 3.1, the T. calculated value for t (7.723) exceeds the corresponding value in the t. table (2.00) , meaning that there are significant differences at (α≤ 0.05) in the total mean score of the post-test between the experimental and control group in favor of the experimental one. The mean of the post-test in the experimental group reached (23.974), whereas the mean of the control group was (14.658). This result indicates that using the project-based learning strategy was more effective than the traditional method in developing students' vocabulary. As a result, the null hypothesis is rejected in this study.

The size effect of the project-based learning strategy on the experimental group in the posttest was measured and the results are presented in table 3.2. The researchers used Eta square $\eta^2 = \frac{t^2}{t^2 + df}$ "η²"by using the following equation (Afana, 2000, p.42):

Also the researcher calculated "d" value by using the following equation:

$$d = \sqrt{\frac{2t}{df}}$$

Table 3.2. *The Level of Effect Size (η2) and (d)*

Test	Effect size		
	Small	Medium	Large
η^2	0.01	0.6	0.14
D	0.2	0.5	0.8

Table 3.3. *Values of "t", eta square "η² ", and " d " for the Total Degree of the test*

Skill	T value	η ²	d	Effect size
Word recognition	3.816	0.164	0.887	Large
Word and picture association	4.705	0.230	1.094	Large
Missing letter completion	6.157	0.339	1.432	Large
Missing word completion	4.213	0.193	0.979	Large
Writing the word correctly	6.152	0.338	1.430	Large
Words classification	4.138	0.188	0.962	Large
Vocabulary skills	7.723	0.446	1.796	Large

The values of η 2 and d are shown in Table (3.3) highlighting the large effect size of the use of project-based learning strategy in the total level of vocabulary skills.

The second question was formulated as follows: Are there statistically significant differences at (α≤0.05) in the mean scores of students' vocabulary achievement in the experimental group between the pre- and posttest? To answer this question the researcher tested the null hypothesis that there are no statistically significant differences at (α≤0.05) in the mean scores of students' vocabulary achievement in the experimental group between the pre and the posttest. To examine this hypothesis, the mean scores of the experimental group results of the pre- and post-tests were computed. A paired samples t-test was used to analyze the data. The results are outlined in Table (4.4),was used to analyze the data statistically.

Table 3.4. *Results of the Paired-Samples t- Test Differences Between the Pre- and the Post-Test of the Experimental Group*

Skill	Group	N	Mean	Std. deviation	t	Sig. value	Sig. level
Word recognition	Pre test	38	2.3684	1.364	5.481	0.000	sig. at 0.01
	Post test	38	3.6579	0.534			
Word and picture assocition	Pre test	38	1.2895	1.250	9.249	0.000	sig. at 0.01
	Post test	38	3.5000	1.033			
Mising letter completion	Pre test	38	1.6579	1.419	11.680	0.000	sig. at 0.01
	Post test	38	4.4737	1.033			
Mising word completion	Pre test	38	1.0263	0.822	15.652	0.000	sig. at 0.01
	Post test	38	3.5789	0.858			
Writing the word correctly	Pre test	38	.2895	0.611	14.510	0.000	sig. at 0.01
	Post test	38	3.4737	1.390			
Words classification	Pre test	38	3.6579	1.697	4.736	0.000	sig. at 0.01
	Post test	38	5.2895	1.206			
vocabulary skills	Pre test	38	10.2895	4.538	19.041	0.000	sig. at 0.01
	Post test	38	23.9737	3.132			

t table value at d f 37 and sig. level 0.05= 2.02

t table value at d f 37 and sig. level 0.01= 2.70

As shown in Table 3.4, the calculated value for t (19.041) exceeds the corresponding value in the t table (2.02), meaning that there are statistically significant differences at (α ≤ 0.05) between the mean scores of the pre-test and post-test in vocabulary skills for the experimental group in favor of the post-test. This shows that using the project-based learning strategy improve vocabulary learning among students. As a result, the null hypothesis is rejected.

To measure the effect size of the project-based learning strategy on the experimental group in the vocabulary posttest, the researchers tested for effect size as shown in Table 3.5.

Table 3.5. *Values of t, eta square η^2, and d for the Total Degree*

Skills	*t*	η^2	*d*	Effect size
Word recognition	5.481	0.448	1.802	Large
Word and picture associtions	9.249	0.698	3.041	Large
Mising letter completion	11.680	0.787	3.840	Large
Mising word completion	15.652	0.869	5.146	Large
Writing the word correctly	14.510	0.851	4.771	Large
Words classification	4.736	0.377	1.557	Large
Vocabulary Skills	19.041	0.907	6.261	Large

Values for η^2 and d values shown in Table 3.5 indicate the large effect size of the use of project-based learning strategy on the total degree of vocabulary skills.

The third question is the following: Are there statistically significant differences at (α≤0.05) in the mean scores of students' vocabulary learning between the males and females in the experimental group? To answer this question, the researchers tested the hypothesis that there are no statistically significant differences at (α≤0.05) in the mean scores of students' vocabulary learning between the males and females in the experimental group. To examine this hypothesis, the means and standard deviation of both the male and female students' scores on the post-test were calculated. An independent samples t-Test was used to test for significant differences. Table 3.6 describes the results.

Table 3.6. Results of the Independent Samples t-Test- Differences Between Male and Female Students in the Experimental Group

Test	Gender	N	Mean	Std. deviation	*t*	Sig. value	sig. level
Word recognition	Male	16	3.563	0.629	0.938	0.355	not sig.
	Female	22	3.727	0.456			
Word and picture association	Male	16	3.625	0.885	0.631	0.532	not sig.
	Female	22	3.409	1.141			
Missing letter completion	Male	16	4.563	0.964	0.447	0.657	not sig.
	Female	22	4.409	1.098			
Missing word completion	Male	16	3.625	0.806	0.279	0.782	not sig.
	Female	22	3.545	0.912			
Writing the word correctly	Male	16	3.750	1.390	1.046	0.302	not sig.
	Female	22	3.273	1.386			
Words classification	Male	16	5.375	1.204	0.368	0.715	not sig.
	Female	22	5.227	1.232			
Vocabulary skills	Male	16	24.500	3.120	0.881	0.384	not sig.
	Female	22	23.591	3.157			

t table value at df 36 and sig. level 0.05 = 2.02

t table value at df 36 and sig. level 0.01 = 2.70

As shown in Table 3.6, the calculated value for t (0.881) is lower than the corresponding value in the table (2.02), meaning that there are no statistically significant differences at (α≤ 0.05) in the mean scores among students' vocabulary learning in the experimental group in the post test due to gender.

Discussion

This section discusses the results of the study. It summarizes the conclusions that are to be drawn from the study results. It also contains suggestions and recommendations for further study and other recommendations for course designers, English teachers, supervisors, students and educators. These recommendations could ultimately improve the teaching of English language in general and vocabulary in particular.

Study Findings

Based on the results of this study, the following findings were observed that; first, there were statistically significant differences at (α≤ 0.01) in the total mean score of students' vocabulary achievement in the post-test between the experimental and control group in favor of the experimental group. Second, there were statistically significant differences at (α ≤ 0.05) between the mean scores of students' vocabulary achievement in the experimental group's pre-test and post-test for the in favor of the post-test. Third, there were no statistically significant differences at (α≤ 0.01) in the mean scores of students' vocabulary achievement among the experimental group in the post test due to gender.

The overall results of the study showed that the experimental group which was taught by using the project-based learning strategy, performed better than the control group which was taught using traditional methods.

Discussion of Findings

The current study aimed at investigating the effectiveness of using project–based learning in developing third graders' vocabulary achievement. To achieve this objective, the researchers adopted the experimental approach where the results of an experimental group were compared with those of a control group.

The experiment was designed to determine if third graders' vocabulary achievement would be increased by the application of a project-based learning strategy. After six weeks of experimentation all students in the experimental group showed clear improvements in their vocabulary acquisition after the implementation of the project-based learning strategy; as shown on the posttest.

These findings of the present study agree with many previous studies' results that proved the effective role and impact of the project-based learning strategy on learning English in general and vocabulary in particular. These are the studies of Al-Jamal (2014), Nassir (2014), GökhanBaş (2011), Fragoulis (2009), Foss et al. (2006), Shafaei et al.(2007) and Nurnia's (n.d.).

Discussion of the first and second hypotheses findings

Because of the close relationship between the first and second hypotheses the researcher is going to interpret their findings together. The results showed that there were statistically significant differences at (α ≤ 0.05) between the mean scores of students' vocabulary achievement in the pre-test and post-test of the experimental group in favor of the post-test. And it also showed that there were statistically significant differences at (α ≤ 0.01) in the total mean score of students' vocabulary achievement in the post-test between the experimental and control

group in favor of the experimental group. In addition, the researcher found that the effect size was large in the total scores of the post test. This effectiveness of the project–based learning strategy and its large effect size could be attributed to many different factors: (1) The experimental group students implemented three projects about three different topics from the third grade curriculum which were:" jobs, food, and animals". There were many new vocabulary items to identify, memorize and even use in context. Teaching students by using project-based learning strategy helped them to be familiar with these vocabulary items as part of their life because they had to use them in all the steps and the stages of the project either inside or outside the classroom. (2) The variety of activities, tasks and missions that were expected to be done and achieved by the students themselves during the implementation of the projects completely depended on using this vocabulary. These activities were used as formative and summative evaluation. For example, they were expected to associate words with related pictures in many different techniques according to the nature of the project. (3) The variety of techniques and teaching aids used by the teacher such as brainstorming, questions derivation, discussion and presentation helped to improve the students' thinking skills in addition to their use of language during participation in all these techniques. And even if they did not know the exact words that they should use, they tried to express themselves and they were encouraged to ask whatever questions they wanted. (4) Using project-based learning strategy created an enjoyable, motivating and interactive atmosphere in the classroom which increased the student's enthusiasm and motivation. In other words, it made it fun to learn English and especially to learn vocabulary. Moreover, the students looked at this strategy as an attractive, exciting and new way in contrast with the traditional boring one. (5) Working in groups and in pairs helped students to discuss and share their ideas and information with each other, which consequently helped the low achievers to get the idea and to have the opportunity to use the new words comfortably with their colleges. (6) Implementing the projects required students to use pictures, posters and real objects that are obviously beneficial in learning vocabulary, especially for the young learners. (7) The duration of the experiment was suitable enough for the students to be familiar with the steps and stages of the projects in addition to the repetition of the vocabulary in each task they were supposed to do.(8) Homework activities related to the project were clearly effective, which helped students to transfer their classroom knowledge to their real life and to get more support from their families in addition to involving them in these activities. This could give them the opportunity to use the language and especially the target words in other situations outside the class, which effectively helped the vocabulary to stick in their minds.(9) The procedures of project-based learning strategy were very clear for the students. They were familiar with their roles and they moved from an activity to another smoothly with the help of the teacher. The teacher role was also definite as she was a facilitator and counselor rather than a dominator.(10) The teacher encouraged students to search for certain topics; so they did not get the information easily. They made effort getting the information and this helped them to better memorize the used words.

Accordingly, the researchers noticed this clear positive impact of using this strategy on developing the student's vocabulary in the final stages of the experiment application in which the students appeared to be active learners and they had a good chance to be so close to the teacher who gave each one of them time, help and special care. These results agreed with those of Al-Jamal (2014), Nassir (2014), GökhanBaş,s (2011), Fragoulis (2009), Foss, et al. (2006), Shafaei et al.(2007) and Nurnia's (n.d.),which revealed the effectiveness of project-based learning strategy on achievement.

Discussion of the third hypothesis findings

The findings of the third hypotheses showed that there were no statistically significant differences at ($\alpha \leq 0.01$) in the mean scores of students' vocabulary achievement among the experimental group in the posttest due to gender. This result could be attributed to many different factors: (1) Both boys and girls inside the experimental group received the same knowledge via the same strategy and also by the same teacher.(2) The activities were distributed among all students equally and every student had to play a role to achieve the project goals. The teacher herself did not differentiate between male and female while distributing the activities. In addition, the groups were mixed consisting of both male and female students.(3) All students were the same age and had the same characteristics, needs and abilities that depend on movement, games, pictures, real objects, repetition and motivation. They all received the same treatment.

Limitation of the Study

This study presents some limitations which may offer more opportunities for future studies in educational field. The study focused on third grade students at UNRWA schools; and it was limited to elementary schools in eastern Gaza; it was applied on three units of "the English for Palestine book". Additionally, the methods of the study are exponential approach.

Conclusions

Based on the findings, the researchers conclude that students were clearly more engaged in learning with the PBL strategy than the traditional way as the PBL strategy was more interesting and held their attention longer. The PBL strategy increased students' motivation, involvement and interaction in the classroom. Researchers also conclude that the PBL strategy increased the diversity of lessons which reduced the students' boredom of seeing the same things over and over again. Finally, the PBL strategy was suitable for all types of students, such as visual, auditory and tactile learners due to the variety of activities that the students had to carry out themselves.

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