



The Impact of Project-Based Learning on Vocabulary Retention among Grade 5 Learners: A Study at Ngo Thoi Nhiem Primary School, Ho Chi Minh City

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Abstract

Project-Based Learning (PBL) is an approach for developing language proficiency for the 21st century. This research aimed to investigate the impact of PBL on enhancing vocabulary retention in an actual classroom context at a private primary school in Ho Chi Minh City. With the rising number of challenges between students and teachers, PBL can be a great step to address these issues. Despite the widespread recognition of PBL's theoretical potential and its development in education, a necessary journey remained between possibility and practical reality, especially within specific cultural and educational contexts. The findings from this research would have significant future directions for educators who seek strategies to support their academic success. In this regard, the report aims to analyse and synthesise Project-Based Learning approaches to design lesson plans and implement them in real-world classes. While previous studies strongly supported the value of Project-Based Learning, the majority of available studies focused on secondary or tertiary educational levels to bridge the gap between academic theory and real-world professional practice; this research was conducted to examine exactly how PBL influenced the long-term maintenance of learned vocabulary among young learners as well as determine the true value of the teaching approach. The Descriptive Quantitative Modified Quasi-Experimental Research Design was utilized not only to observe and compare learning outcomes numerically but also to describe the implementation process, classroom dynamics, and learner experiences. This study, therefore, embarked on the specific journey from moving beyond general assumptions to investigate, measure, and describe exactly what happened when PBL was applied to vocabulary instruction within the primary environment.

Keywords: *Project-Based Learning; vocabulary retention; young learners; EFL learners; primary school*

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1. Introduction

Vocabulary plays an essential role because it was characterized as an aspect that has not been adequately addressed in previous studies (Meara, 1980). Assessing vocabulary was not an academic requirement; it represented the key that unlocked their ability to communicate, understand, and participate in the global community (Cameron, 2001). Moreover, vocabulary knowledge is seen as a role like the best predictor of overall language competence to utilize grammatical structures or communicative strategies effectively. Conceptually, vocabulary retention referred to the ability of a learner to store, keep, and recall information or knowledge over a period (Aedo & Millafilo, 2022). Vocabulary retention is a central function to enhance learners' short-term or long-term memory, emphasizing the core of component of language learning. However, the path toward vocabulary mastery was a significant challenge in the educational context because of the distinction between learning words and retaining them.

In the textbook-based teaching method, vocabulary was taught in isolated or separated lists, and the educational environment fostered teacher-centred engagement. Furthermore, textbook-based teaching approaches frequently relied on rote memorisation, repetitive drills, and translation exercises, which succeeded only in creating short-term memory but often failed to establish the deep, long-lasting knowledge for actual usage (Schmitt, 2010). Taking PBL into study, international literature and educational studies by researchers documented that this approach fostered a high level of motivation, deeper cognitive processing, and greater social engagement, linked to better memory and vocabulary retention (Larson, 2000). Learners constructed meanings of the words through actions and interactions, so the words were not simply stored as isolated data but were integrated into deeper networks, fostering long-term retention (Dewey, 1959).

Within the challenges in modern educational approaches, PBL emerged as a promising pedagogical approach (Bell, 2010). PBL originated from the Constructivist Learning Theory of Piaget (1971) and Vygotsky (1978), shifting the focus from teacher-centered classroom to student-centered classroom. Each activity in PBL provides learners opportunities for future-oriented abilities on account of students' performance in the areas of academic achievements that break the language-related boundaries. With the aims of significant future directions for vocabulary retention, this research aims to analyze and synthesize PBL approaches to design lesson plans and implement them into real-world classes.

The related literature revealed significant gaps that justified the need for this specific investigation. First, previous studies supported the value of PBL or focused on secondary or tertiary levels (Helle et al., 2006; Larmer et al., 2015; Thomas, 2000); limited research dedicated to primary students, especially Grade 5, within the Vietnamese educational context. Consequently, findings from higher educational contexts could not be generalized or applied to primary school settings. Furthermore, the retention of vocabulary has been measured only limitedly. Therefore, this study examined exactly how PBL influenced the long-term maintenance of learned vocabulary among young learners as well as determined the true value of the teaching approach. Second, previous studies tended to adopt either quantitative designs (Amjad Joma et al., 2021; Kızıkan & Bektaş, 2017), or qualitative designs (LaPrad & Hyde, 2017) or mixed methods (Kurniadi & Cahyaningrum, 2023; Tran, 2024; Noble et al., 2020), which centred only on descriptions, interviews, and perceptions. There was a noticeable lack of

studies utilizing a Descriptive Quantitative Modified Quasi-Experimental Research Design, a framework that allowed researchers to observe and compare learning outcomes numerically, to describe the implementation process, classroom dynamics, and learner experiences. Third, the curriculum requirements, available resources, class sizes, and the unique teaching-learning culture present at schools in Ho Chi Minh City created a distinct setting to support improvement and informed instructional decision-making. Finally, there remained no sufficient empirical data describing the specific impact on vocabulary retention among Grade 5 learners at Ngo Thoi Nhiem Primary School. Therefore, this research embarked on the journey to move beyond general assumptions to describe exactly what happened when PBL was applied.

The research aimed to achieve the following:

- to measure and compare the performance between learners exposed to Project-Based Learning and those taught through communicative textbook instruction;
- to investigate learners' perceptions of Project-Based Learning in vocabulary learning;
- to describe the extent and level of implementation of Project-Based Learning regarding activities, participation, and instructional process.

To navigate the scope of this investigation and answer the general problem, the study addressed the following research questions:

What are the differences observed in the level of vocabulary retention among learners exposed to Project-Based Learning compared to those exposed to communicative textbook-based teaching methods?

What are the learners' perceptions regarding the use of Project-Based Learning for vocabulary learning?

To what extent is the Project-Based Learning implemented in vocabulary lessons in terms of activities, learners' participation, and instructional process?

This research was restricted entirely to vocabulary knowledge and did not extend to other language skills, nor did it cover advanced lexical items beyond the Grade 5 curriculum. The PBL seeks to improve vocabulary retention through integrating language skills and project-based activities. The results of this research are expected to contribute to both academic research and educational practice. Pedagogically, the results were beneficial to the following individuals and groups: Grade 5 students, English language teachers, school administrators and curriculum planners, parents and educational researchers. The gaps identified and the limitations encountered for new studies and continuous development of educational research.

2. Literature Review

2.1 Vocabulary Retention

Vocabulary retention refers to learners' ability to remember, and retrieve acquired lexical items over time, preventing them from being forgotten. Koval (2022) emphasized the effectiveness of moving information from short-term to long-term memory. In other words, vocabulary retention reflects learners' capacity to recall the meanings and uses of newly learned words after a certain period (Rindiani, 2018). According to Richards (2002), vocabulary retention defined as the ability to remember or recall information after a period, and it is considered a core component of language teaching. Bennet and Rebello (2012), who contended that the ability to keep information in long-term memory is known as retention of learned

information. It can be argued that retention is essential to learners while learning English, and it is a central function to enhance learners' short-term or long-term memory. These theories mention that vocabulary retention is the result of a learning or acquisition process.

2.2 Project-Based Learning

In the 1990s, Dewey developed about continuous education with perspective of "learning by doing" to emphasize the relationship between learning and experiencing real-life situations. Aligning with Dewey, another concept of PBL approach was defined by Kilpatrick (1918), he determined that Project-Based Learning approach genuinely fostered learners' problem-solving skills, motivation, and collaboration. Markham et al. (2003) defined that Project-Based Learning is a structured instructional approach that developed students' knowledge and skills through activities to produce specific outcomes. Beckett et al. (2018) structured PBL as an extended learning process that allows learners to develop linguistic knowledge, subject-based content, and relevant skills simultaneously. Krajcik and Blumenfeld (2005) reported that relied on constructivist principles, Project-Based Learning provided meaningful activities, which developed a deeper understanding when students got knowledge by exploring, applying, and working with ideas.

According to Thomas (2000), there are five crucial characteristics of each project involving centrality, driving questions, constructive investigation, learner autonomy and realism. In addition, project activities normally require learners to create a tangible product or artifact that demonstrates the outcomes if their learning (Helle et al., 2006); therefore, tend to participate in designing, researching, and presentation. Self-Regulated Language Learning (SRLL) provides a theoretical basis for understanding how learners manage their learning process through planning, monitoring, control and reflection (Pintrich, 2000). In the context of PBL, SRLL is highlighted to employ meaningful activities, which leads to progress in academic performance. T.Q. Tran et al. (2021), investigated Vietnamese EFL student's use of self-regulated language learning strategies. Their findings indicated that learners employed a range of strategies including planning, attention control, self-monitoring, and goal setting. These strategies support learners in arranging tasks, sustaining attention, and setting objectives to carry out in the classroom with Project-Based Learning approach.

2.3 Previous Studies

Several studies have reported that the impact of Project-Based Learning approach in the classroom setting. The focus of Dewey's concept (1938) is on the transition from a curriculum that children-centered to project-based, where students learn through experiences and interactions in specific context. In fact, working together on projects promoted social contact, which influences Vygotsky's (1978) social constructivism. Peer learning and peer scaffolding techniques assist learners in acquiring vocabulary efficiently, according to constructivist learning theory. In PBL contexts, the application of Zone of Proximal Development is reflected in the way teachers design project-based activities that challenge students beyond what they can complete independently. Lastly, by relating new language to prior knowledge and real-world situations, PBL aids students in developing retention. Bell (2010) characterised PBL as a learner-centred approach that develops important twenty-first-century competencies through inquiry, collaboration, communication, and problem-solving.

In addition, Holm (2011) examined evidence concerning the effectiveness of project-based instruction on students' academic outcomes and engagement. Aslan & Reigeluth (2014) conducted a study of PBL at Minnesota New Country School, where students were required to design and monitor their own projects step by step. The educators played a role as advisors, observing and guiding, and learners took formative and summative assessments of learning. The findings from research revealed a successful academic process with self-directed learning. De Vivo (2002) reviewed the research based on learners' outcomes when integrating Project-Based Learning into teaching and learning, especially using driving questions to enable students to "explore and address issues" outside of the classroom setting.

Not only in foreign countries but also in Vietnam, PBL has been integrated into educational institutions. PBL fostered self-regulation in language learning when the strategies were used genuinely. Kieu et al. (2024) stated that the development of teachers in PBL enhanced teaching practices innovatively and embarked on "student-centred learning environments". Tran and Tran (2021) investigated Vietnamese EFL high school students' use of self-regulated language learning strategies in PBL. These findings also revealed challenges as well as benefits when using PBL. This research demonstrated that educators engage in PBL to improve teaching quality, especially offering a long-term learning process for young learners that supported teachers' professional development promisingly.

2.4 Conceptual Framework

Figure 1 below revealed how PBL created meaningful, authentic, and student-centered learning conditions that could enhance young learners' vocabulary retention more effectively than traditional instructions. Project-Based Learning serves as the independent variable through authentic and real-world tasks, collaborative project works, learner-centered activities, and meaning-focus instructions. During twelve-week period, the experimental receives vocabulary instruction through PBL approach, whereas the control group is applied conventional textbook-based instruction. These pedagogical features are hypothesized to influence learners' vocabulary retention learning process through learning mechanisms. These instructional processes are expected to enhance and facilitate vocabulary retention, consistent with Levels of Processing framework (Craik & Lockhart, 1972), Cognitive load theory (Sweller, 1988), and constructivist learning theory (Vygotsky, 1978). The dependent variable – learners' vocabulary retention – is measured through pre-test, post-test and delayed post-test comparisons between an experimental group receiving PBL instruction and a control group which experienced textbook-based teaching methods. Vocabulary learning and retention are measured through three tests: a pre-test to establish learners' baseline vocabulary, a post-test to measure immediate outcomes, and a delayed post-test to examine the vocabulary retention. The framework integrates two complementary sources of evidence including classroom observation and questionnaire. The standardized classroom observation examines and tracked project activities, learner participation, classroom interaction and vocabulary integration. This observation provides the concrete evidence of the quality and extent of intervention delivered rather than measuring learning outcomes. The quantitative data from questionnaires further illuminate learners' perceptions and researcher's observation support the quantitative approach. The results explain how learners experienced the intervention and how PBL contributed to students' vocabulary learning.

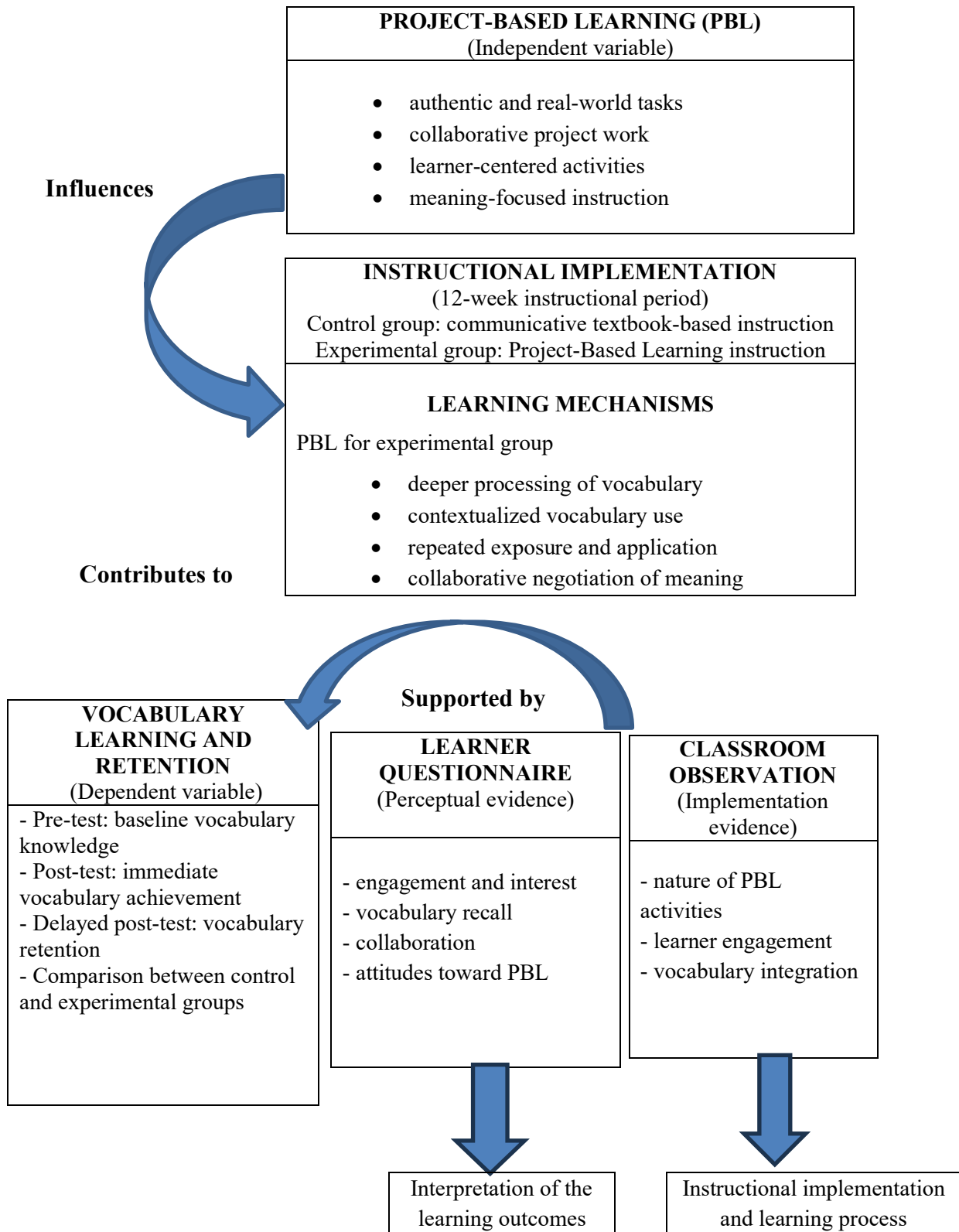


Figure 1. *Conceptual framework of the study*

3. Methodology

The heart of this research lies on the Descriptive Quantitative Modified Quasi-Experimental Research Design framework. This structure was selected intentionally in a natural setting to ensure the results are highly practical, providing the most appreciate lens through which to view the educational reality. The research demanded measurable evidence, numerical data, and statistical facts to describe what occurred in the treatment without open-ended interviews. Furthermore, the framework embarked a clear, accurate picture of the status of teaching practices, the extent if implementation, and the levels of knowledge retention observed in the field of Project-Based Learning. The research was seen as modified quasi-experimental because it utilized two intact classes (not randomly assigned) to compare an intervention group against a control group. Consequently, this design did not claim absolute cause-and-effect or declare this approach definitively superior to other teaching methods. Instead, its purpose was purely to observe, measure, and document the differences, changes, and trends between the groups and across time.

3.2. Participants

The research displayed as a comparison between two distinct classes: the quasi-experimental group (Class 5C2), which focused on applying Project-Based Learning approach and the quasi-controlled group (Class 5C1), followed the textbook-based teaching side of instruction and memorization. The stage of this exploration was set at Ngo Thoi Nhiem Primary School, An Lac Ward, Ho Chi Minh City, a private educational institution situated in a residential suburb of Ho Chi Minh City. This school operated fully within the national curriculum framework prescribed by the Ministry of Educational and Training (MOET) in Vietnam, where English was a core subject from Grade 1 through Grade 5, providing the necessary foundation for language learning. These young learners were chosen as the subjects of this research because they stood at the essential crossroads in their educational journey. The total sample comprised 70 learners, distributed equally across two distinct, unimpaired intact classes naturally formed as part of the school's organizational structure. These groups were kept whole and unaltered throughout the study, a non-probability technique selected to ensure the findings reflected authentic classroom dynamics rather than artificial laboratory conditions, and to ensure the findings from real-world environments. All participants had received the same exposure to language instruction, engaging in both the compulsory national English curriculum and the school's elective English enrichment courses prior to and during the study. One class was designated as the quasi-experimental group, focusing on the learning journey through Project-Based Learning, while the other served as the quasi-controlled group, continuing along the familiar path of conventional, teacher-centered instruction. Beyond the learners and the class teacher, the scope of respondents extended to include key stakeholders who provided essential data regarding the educational process. This group comprised school administrators, academic coordinators, and teaching assistants, all of whom volunteered their participation.

3.3. Instruments

These tools were specifically chosen to align with the Descriptive Quantitative Modified Quasi-Experimental Research Design, allowing the objective measurement of learning outcomes, the intervention implementation, and the quantification of participant experiences.

All the instruments were reviewed by a panel of experts and refined to suit the linguistic and cognitive level of Grade 5 learners. First, Standardized observation rubric for Project-Based Learning implementation includes specific performance indicators such as Nature of activities, Vocabulary integration, and Learner engagement. Each indicator included clear descriptive benchmarks rated on a 4-point scale: (1) Very Low Extent, (2) Low Extent, (3) High Extent, (4) Very High Extent. To ensure objectivity and reliability in scoring, two raters were involved: the researcher and a designated Teaching Assistant familiar with the PBL framework. Second, Questionnaires was designed to gather quantitative data regarding behaviors, habits, and subjective views, serving the distinct phases of study. The questionnaire consisted of nine five-point Likert-scale items adapted from Parasuraman et al. (1985). Items utilized a 5-point Likert Scale ranging from (1) Strongly Disagree/ Never to (5) Strongly Agree/ Always, allowing statistical analysis of trends. Final, vocabulary retention test served as the primary measuring tool of the entire investigation, specifically designed to assess the durability and stability of lexical knowledge over time, the core variable of the research. Unlike standard quizzes that simply check for correct answers, these tests were uniquely constructed to probe deep into what it meant to truly know and acquire a word. All three versions were strictly aligned with the Grade 5 English curriculum and the Cambridge Flyers preparation program. Each vocabulary assessment was standardized with a time limit of 20 minutes to ensure equal testing conditions for all participants.

3.4. Validity and reliability

Validity ensured that instruments measured the specific variables they intended to measure and the content was appropriate for the target population. The draft versions of the vocabulary retention test, questionnaires, and standardized observation rubric were subjected to critical review by three external experts, each selected specifically for their academic background, specialized knowledge, and extensive research experience relevant to this study. They evaluated the clarity of language, the suitability of content for Grade 5 learners, the ability of the tools to answer the specific research questions. The instruments received formal approval from this panel prior to further statistical testing.

While validity ensured accuracy, reliability ensured consistency and dependability of the measurements. This was established through internal consistency testing and inter-rater agreement: Internal Consistency (Cronbach's Alpha) to measure how closely related the set of items were as a group, Inter-Rater Reliability (For observation rubric) to establish through Inter-Rater Reliability between two independent raters, the researcher and teaching assistant; therefore, Cohen's Kappa Coefficient (Cohen, 1960) was obtained. Through this rigorous combination of expert validation, statistical verification, and stability testing, the instruments were proven to be scientifically sound, robust, and capable of producing high-quality data suitable for the comprehensive investigation of vocabulary retention and Project-Based Learning.

3.5. Data collection & analysis

3.5.1. Descriptive Statistical Analysis

This research was conducted with Quasi-Experimental Design, so the sample was divided into a Quasi-experimental group (n=35), receiving the modified intervention, and a Quasi-

control group ($n=35$), which was taught using textbook-based teaching methods. The descriptive demographic profiles of both groups verified baseline equivalence.

Table 3.1: *Distribution of instructional time per lesson by Group Condition*

Primary Teaching Practices	Control group ($n = 35$)		Experimental group ($n = 35$)	
	Time (minutes)	Percentage (%)	Time (minutes)	Percentage (%)
Project-Based learning	0	0%	50	71.4%
Direct instruction	20	28.6%	20	28.6%
Textbook-based teaching	50	71.4%	0	0%
Total lesson time	70	100%	70	100%

Table 3.2 demonstrates a clear distinction in instructional time allocation between the control and quasi-experimental groups. The control group primarily followed conventional teaching, with 70.4% (50 minutes) devoted to textbook-based activities and 28.6% (20 minutes) to direct instruction, while no Project-Based Learning was implemented. In contrast, the quasi-experimental group spent 71.4% (50 minutes) on collaborative, task-oriented PBL activities and 28.6% (20 minutes) on direct instruction. The textbook-based teaching was entirely omitted (0.0%, 0 minutes) during the lesson. The table also provided the evidence of treatment, ensuring that the time distribution offered two distinct methodological advantages for Quasi-experimental Design and firming that any differences in student outcomes cannot be attributed to a lack of baseline conceptual explanation.

3.5.2. Inferential Statistical Analysis

This phase tested the null hypotheses and determined whether the observed differences were real and significant, or merely due to chance. Given the use of intact classes and the focus on describing differences rather than proving absolute effectiveness, non-parametric tests were selected as the most appropriate tools, analyzed at a 0.05 level of significance:

Mann-Whitney U Test: The primary test used to compare the independent groups (experimental vs. control) at each testing stage. It determined if the differences observed in vocabulary retention were statistically significant ($p < 0.05$).

Wilcoxon Signed-Rank Test: Used to compare the performance of the same group across different time points (Pre vs. Post; Post vs. Delayed). It verified whether the changes within each group were meaningful and consistent ($p < 0.05$).

Friedman Test: Used specifically to analyze the results across vocabulary retention, determining if the teaching approach influenced equally, or if certain dimensions were retained significantly better than others ($p < .05$).

4. Results

The purpose of the findings presents the empirical findings and overview data analysis results, addressing the specific problem related to Project-Based Learning approach, highly achieve the objectives and draw the conclusion of the null hypotheses formulated for this study.

To answer the research question 1 related to vocabulary retention, the non-parametric tests involving Mann-Whitney U Test, Wilcoxon Signed-Rank Test, and Friedman Test were utilized to compare the vocabulary retention scores of the quasi-experimental group (n=35) and quasi-controlled group (n=35). The results were presented under descriptive and inferential statistics.

Table 4.1: *Descriptive Statistics for Vocabulary Scores by Groups and Testing Time*

Group	n	Pre-test		Post-test		Delayed Post-test	
Test		Mean	SD	Mean	SD	Mean	SD
Control	35	4.57	2.97	6.83	2.53	5.23	3.18
Experimental	35	5.60	2.56	8.40	1.55	7.63	1.92

Table 4.1 presents the descriptive statistics for vocabulary test scores across pre-test, post-test, and delayed post-test. At pre-test, the experimental group obtained a higher mean score ($M = 5.60$, $SD = 2.56$) than the control group ($M = 4.57$, $SD = 2.97$), indicating some initial difference in vocabulary performance between two distinct groups. After the intervention, both groups showed higher vocabulary scores. The control group's mean increased from 4.57 to 6.83, whereas the experimental group's mean went up from 5.60 to 8.40. The corresponding mean gains were 2.26 points for the control group and 2.80 points for the experimental group. As a result, the experimental group demonstrated a greater improvement in vocabulary performance from pretest to posttest. At the delayed post-test, scores decreased in both groups. The control group's mean decreased from 6.83 to 5.23, representing a reduction of 1.60 points, whereas the experimental group's mean declined from 8.40 to 7.63, nearly 0.77 points. Overall, the descriptive results suggest that the group experienced PBL achieving greater improvement and maintained vocabulary knowledge more effectively. Nevertheless, because the experimental group had a higher pretest mean, conclusions regarding the impact of PBL should be based on the corresponding inferential analyses rather than on descriptive statistic alone.

Table 4.2: *Inferential Statistics for Vocabulary Retention*

Comparison	Test	Statistic	<i>p</i>	Effect size
Control: pre-test vs. post-test	Wilcoxon	$Z = -4.232$	$< .001$	$r = 0.72$
Control: post-test vs. delayed post-test	Wilcoxon	$Z = -4.199$	$< .001$	$r = 0.71$
Experimental: pre-test vs. post-test	Wilcoxon	$Z = -5.188$	$< .001$	$r = 0.88$
Experimental: post-test vs. delayed post-test	Wilcoxon	$Z = -3.862$	$< .001$	$r = 0.65$
Control: pre-test, post-test, delayed post-test	Friedman	$\chi^2(2) = 27.43$	$< .001$	$W = 0.39$
Experimental: pre-test, post-test, delayed post-test	Friedman	$\chi^2(2) = 58.84$	$< .001$	$W = 0.84$

Table 4.2 shows the results of the Wilcoxon Signed-Rank Tests and Friedman Tests within both distinct groups. The Wilcoxon Signed-Rank Tests revealed significant changes in vocabulary scores. The control group showed an increase from pretest to posttest, $Z = -4.23$, p

< 0.001 , $r = 0.72$, followed by a decline from posttest to delayed posttest, $Z = 4.20$, $p < 0.001$, $r = 0.71$. Similarly, the experimental group improved significantly from pretest to posttest, $Z = -5.19$, $p < 0.001$, $r = 0.88$, and showed a decrease at the delayed posttest, $Z = -3.86$, $p < 0.001$, $r = 0.65$. The Friedman Tests further indicated changes across the three measurement points for both groups. The experimental group showed a stronger overall change ($\chi^2 (2) = 58.84$, $p < 0.001$, $W = 0.84$). To conclude, PBL contributed to both immediate vocabulary development and more sustained retention over time. These findings provide evidence that Project-Based Learning is an effective instructional approach for enhancing vocabulary and supporting longer-term vocabulary retention.

Table 4.3: *Group Comparisons of Vocabulary Scores*

Test time	Control Mean Rank	Experimental Mean Rank	<i>U</i>	<i>Z</i>	<i>p</i>
Pre-test	31.83	39.17	484.00	-1.52	0.128
Post-test	29.16	41.84	390.500	-2.648	0.008
Delayed post-test	28.00	43.00	350.000	-3.112	0.002

Table 4.3 indicates no significant difference between the control and experimental groups at pre-test, $U = 484.000$, $Z = -1.52$, $p = 0.128$. At post-test, the experimental group had a higher mean rank (41.84) than the control group (29.16), and the difference was significant, $U = 390.50$, $Z = -2.65$, $p = 0.008$. Similarly, at the delayed post-test, the experimental group obtained a higher mean rank (43.00) than the control group (28.00), $U = 350.00$, $Z = -3.11$, $p = 0.002$. Overall, the findings show that although the groups were comparable at baseline, the experimental group performed significantly better at both posttest and delayed posttest, suggesting stronger vocabulary retention following PBL instruction.

Table 4.4: *Reliability statistics of Questionnaire*

Measure	Value
Cronbach's α	0.821
Number of items	9

Table 4.4 shows the results of reliability in the questionnaire achieved a Cronbach's alpha coefficient of 0.821, indicating acceptable range for internal consistency. Because the alpha coefficient (0.821) exceeds the recommended threshold of .70, the questionnaire was considered reliable and appropriate for data collection in the study.

Table 4.5: *Item-total statistics*

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. Making posters in groups helps to learn new English words more easily.	.605	.792
2. Role-play activities help to understand how to use new vocabulary in real-life situations.	.444	.814

3. Writing stories in groups helps to use new words in creative ways.	.591	.794
4. Learning vocabulary through projects helps to stay more interested in English lessons.	.614	.791
5. Can remember English words better after making group posters.	.497	.806
6. Role-playing helps to recall new words when speaking English.	.389	.817
7. Writing short stories helps to remember the spelling and meaning of words for a long time.	.380	.818
8. Still remember vocabulary learned from PBL projects after class activities end.	.657	.787
9. Using new words in different PBL activities helps to keep memory longer.	.527	.803

Furthermore, table 4.5 indicates all 9 items in accordance with 9 questions in Questionnaire. The overall scale demonstrated good internal consistency reliability, $\alpha = .821$, which exceeds the accepted academic threshold of .70. In addition, the correct item-total correlations ranged from .380 (Item 7) to .657 (Item 8), all items exceeding the standard retention criterion of .30. Moreover, the evaluation of the alpha coefficient if an item were deleted that removing any single item would not improve the overall scale reliability (with simulated alpha values ranging between .787 and .818, all below the empirical score of .821). Consequently, all 9 items were retained in their original configuration for subsequent statistical analyses. This confirmation is determined that all the items within each scale were highly corrected and reliably.

Finally, the observation checklist result was a strong evident to answer the research question 3 about learner's participation through intervention. The observation data showed the contribution of discussions, ideas sharing, assigned task completion, and participation contributing the collaborative nature of activities.

Table 4.6: *Inter-rater reliability of observation scores by category*

Observation category	Cohen's kappa	Asymptotic SE	<i>z</i>	<i>p</i>	Interpretation
Activities	.417	0.128	3.168	.002	Moderate agreement
Interaction	.766	0.098	6.284	<.001	Substantial agreement
Engagement	.860	0.078	6.780	<.001	Almost perfect agreement

As shown in Table 4.6, the level of inter-rater agreement varied across three observation categories. Activities showed the significant moderate agreement with $\kappa = 0.417$, $SE = 0.128$, $p = 0.002$. Interaction demonstrated substantial agreement, $\kappa = 0.766$, $SE = 0.098$, $p < 0.001$. The highest level of agreement was found for learner engagement, which illustrated perfect

agreement between two raters ($\kappa = 0.860$, $SE = 0.78$, $p < 0.001$). Therefore, the results revealed that the raters evaluated interaction and learner engagement consistently.

5. Discussion

The research was beneficial to the individuals and groups as well as highlighted the essential role of the Project-Based Learning approach in enhancing vocabulary retention. The findings provided an essential point of reference for understanding the dynamics of vocabulary learning in elementary school. Regarding the three research questions, the findings discuss the differences observed in the level of vocabulary retention among learners exposed to Project-Based Learning; learners' perception regarding the use of PBL for vocabulary lessons in terms of activities, participation, and instructional process.

To answer research question 1, the non-parametric tests involving Mann-Whitney U Test, Wilcoxon Signed Rank Test, and Friedman Test were conducted to compare the vocabulary retention scores of the quasi-experimental group ($n = 35$) and the quasi-control group ($n = 35$). The Mann-Whitney U Test showed the difference between two distinct groups at the different time points. In the baseline, the control group has a Mean Rank of 31.83 and experimental group has 39.17 in Mean Rank, p -value is .128, which is greater than the standard 0.05 threshold. The gap is presented clearly in ranks, the control group's Mean Rank drops slightly to 29.16, while the experimental group's Mean Rank climbs to 41.84, p -value drops to .008. In fact, the experimental group retained the benefits of the intervention better than the control group obtained. Moreover, the Project-Based Learning encourages active participation through variety of activities during the lesson. Therefore, the Friedman Test demonstrated vocabulary was retained significantly with the highest Mean Rank in the post-test (2.76), followed by the delayed post-test (2.17), suggesting that students achieved vocabulary gains after the intervention and retained several weeks later. The bar chart under indicated that the results specifically from test instruments before and after intervention.

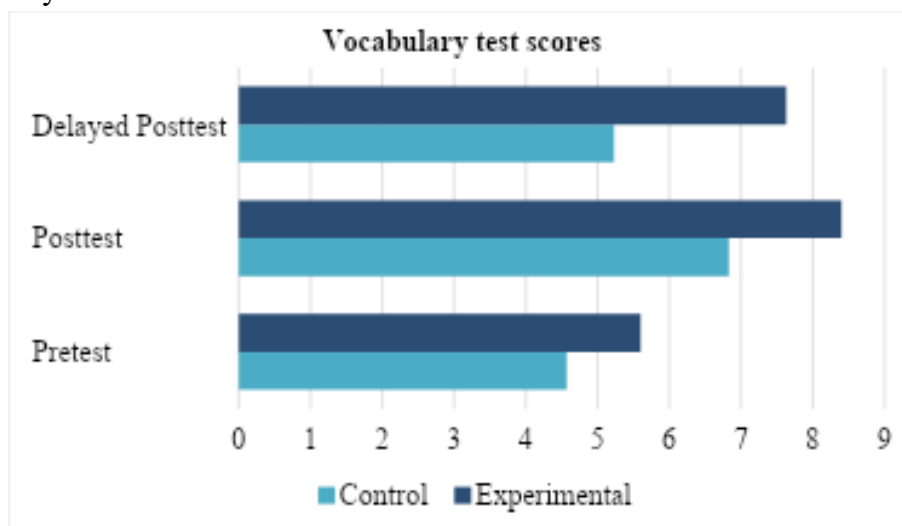


Figure 2. Comparison of vocabulary test scores

To answer the research question 2, the findings from the Questionnaire supported strongly. Most of Grade 5 learners held positive perceptions of learning vocabulary through Project-Based Learning. Most students agreed that project activities help them learn more interesting, enjoyable and easier to remember. One possible explanation for positive

perceptions is collaborative nature of Project-Based Learning. It can be explained that instead of studying isolated, the students received immediate support from their peers, which reduced anxiety and increased confidence, especially young learners. The findings also aligned with Constructivist Learning Theory (Piaget, 1971), which suggested active learning through meaningful contexts. The learners constructed their understanding by applying new words to complete project tasks rather than memorizing vocabulary. Finally, the results demonstrated that learners generally held positive perceptions of this instructional approach, which enhanced their motivation and confidence in learning English vocabulary. The mean score of the questionnaire yielded ranging from “Strongly Agree”, “Agree” and “Neutral”, indicating that participants held positive perceptions of PBL. The favorable ratings across questionnaire items suggested that learners perceived Project-Based Learning as an effective instructional strategy that bridging vocabulary acquisition and retained them beneficially.

To answer research question 3, the observation checklist was also evident in learners’ active participation through intervention and provided a roof. The observation checklist revealed the positive consistency across three rubric dimensions. The students received the high ratings in student engagement dimension; they participated actively and remained focused throughout the project activities. The students completed project tasks and produced work that demonstrated participation was rated high scores. Furthermore, the students showed good performance in vocabulary integration, successfully incorporating target vocabulary into oral presentations, group discussions and project products. Overall, the observation results supported that Project-Based Learning fostered an interactive and collaborative classroom environment in which students engaged and acquired vocabulary in authentic situations. The findings from observation reinforce the improvements demonstrated in vocabulary tests and provide the behavioral evidence that supported the test achievement. This strengthens that PBL influenced test scores and improvements.

6. Limitations

Although the findings served as essential reference point to understand the vocabulary learning in primary education, this study has several limitations. Firstly, the study was conducted with a small sample of Grade 5 students from one educational setting. Therefore, the scope was limited, and the findings may not be generalized to learners from different educational setting or age groups in Vietnam. Secondly, the duration of the intervention was limited (16 weeks). As a result, the study was only able to examine the short-term effects of PBL on vocabulary retention. The long-term impact of this approach remains the gaps. Additionally, this study adopted Quasi-Experimental Research Design, using intact classes rather than random classes. The pre-test was conducted to establish baseline equivalence, pre-existing differences among learners may have affected the outcomes to some extent. Thirdly, the study focused on primarily on vocabulary knowledge, did not extent to other language skills such as speaking, listening, reading, or writing, nor did not cover advanced lexical items beyond Grade 5. Finally, the data were collected through instruments such as tests, classroom observations, and questionnaires, students’ responses may have been influenced by personal perceptions and experiences, which could affect the accuracy of the results.

7. Conclusion

Project-Based Learning demonstrated the improvements in enhancing Grade 5 learners' vocabulary retention. The post-test and delayed post-test results indicated that students who learned through PBL achieved higher vocabulary retention than those who received traditional instruction. Furthermore, the conclusions were drawn strictly from the evidence fathered to vocabulary knowledge. The results from tests provided the ultimate data describing the difference between PBL and conventional methods. These findings are consistent with meaningful tasks and collaboration reported by Bell (2010) through Project-Based Learning. Similarly, students in this study demonstrated active engagement to apply target vocabulary in meaningful and real-world contexts. The instructional process was reflected intervention in both classroom observations and learners' perceptions, which was supported by Larmer et al. (2015). The improvement in vocabulary retention is consistent with the findings from Aslan et al. (2014), who reported that PBL improves academic achievement through learner autonomy and active participation. Furthermore, the findings in line with encouraging student-centered classroom in English language teaching within in Vietnamese educational context, which supported by Tran and Tran (2021) and Kieu et al. (2024). Looking back from theoretical framework, the findings in this study support Vygotsky's (1978) constructivist perspective. In fact, learners developed vocabulary when doing authentic project tasks. The results from test provided evidence that PBL could enhance vocabulary retention, which are consistent with Craik and Lockhart's (1972) Levels of Processing framework. Overall, in terms of the study's strengths, the findings indicated that Project-Based Learning enhanced learners' vocabulary and truly retained them. Moving on the concluding remarks, this study strongly contributes to the development of research on learner-centred approaches and provides evidence that Project-Based Learning is an effective strategy for enhancing vocabulary retention and promoting learning experiences among young learners.

8. Recommendations

Drawing in the study findings, the following recommendations are suggested. First, English language teachers should integrate PBL into vocabulary lessons, especially instructional techniques. Teachers should be encouraged to design authentic and meaningful projects, allowing students to use new vocabularies in the authentic contexts, and addressing challenges to optimize vocabulary instruction. Second, in terms of curriculum development, the education decision-makers should allocate sufficient instructional time and resources for project work, determining PBL approaches align with curriculum goals and learner needs. Schools should provide training programs, organize professional development on Project-Based Learning, and practical and beneficial for learners at Ngo Thoi Nhiem Primary School and similar educational setting. This study recommended as the contributor for changes in the context of Vietnam's educational context, specifically in Ho Chi Minh City. Lastly, future researchers are recommended to conduct similar studies with larger sample size and more diverse samples in different educational contexts. Further research could conduct longer interventions to examine sustained effects of Project-Based Learning on other language skills including speaking, reading, writing, and listening. Additionally, future studies are encouraged to employ mixed-methods or longitudinal research designs to gain the global understanding of

how Project-Based Learning impact on learners' academic achievement and learning experiences over time.

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Author Contributions

An, N.T.T: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft.

Anh, N.T.C: Validation, Review & Editing, Supervision., Supervision.

Conflicts of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be constructed as a potential conflict of interest.

Ethics Statement

Permission to conduct the study was obtained from the school administration. Participation was voluntary, and informed consent was obtained from the participants' parents or legal guardians. The participants' identities were kept confidential, and the data were used solely for research purposes. No personally identifiable information was reported in the study.

Informed Consent Statement

Permission to conduct the study was obtained from the school administration. The participating students and their parents or legal guardians were informed about the purpose and procedures of the study, and participation was voluntary.

Data Availability Statement

The raw data supporting the conclusions of this article will be made available by authors, without undue reservation.

Declaration of Generative AI and AI-Assisted Technologies

The author(s) declare that no Gen AI was used in the creation of this manuscript.

During the preparation of this manuscript, the authors used AI solely for language editing and proofreading. The authors take full responsibility for the content, accuracy, and integrity of the final manuscript.

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