

LANGUAGES

The Impacts of Problem-Based Learning on Grammar Knowledge of Grade 11 Students at a High School in Vietnam

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Abstract

Although grammar is an important part of English learning in Vietnamese upper-secondary schools, grammar instruction is still largely teacher-centered and exam-oriented. This paper reports on the impacts of using Problem-Based Learning (PBL) to teach grammar to Grade 11 students, as well as their perceptions of learning grammar through PBL. A quasi-experimental pre-test–post-test design was used with two intact Grade 11 classes ($N = 90$) at Nguyen Thuong Hien High School in Ho Chi Minh City. The intervention lasted eight weeks. Quantitative data were collected through 25-item grammar tests administered before and after the intervention and a 12-item perception questionnaire administered to the experimental group. Qualitative data were obtained from semi-structured interviews with eight experimental-group students. The results showed that both groups improved, but the experimental group demonstrated substantially greater gains. Its post-test mean was 8.705 compared with 7.674 for the control group, and the difference in gain scores was statistically significant, $t(88) = -6.169$, $p < 0.001$, with a large effect size (Cohen's $d = 1.30$). Questionnaire responses were generally positive, with all 12 items receiving high mean ratings (3.75–4.11). The interview results further showed perceived benefits in grammar understanding, application, retention, confidence, motivation, and collaboration. However, students also reported problems related to task difficulty, time management, unequal participation, and the need for teacher explanation and practice. The findings suggest that PBL can support grammar learning in a Vietnamese English as a Foreign Language (EFL) context when combined with appropriate teacher support and practice.

Keywords: problem-based learning; grammar achievement; grammar instruction; Grade 11 students; Vietnamese EFL; student perceptions.

Introduction

English proficiency is becoming increasingly important in Vietnam for education, employment, and global communication. In this context, grammatical knowledge remains an important part of language competence because learners need to understand how grammatical forms express meaning and use them accurately and appropriately [1, 2]. Nevertheless, English grammar teaching in Vietnamese high schools has traditionally been shaped by teacher-centered and exam-oriented practices. Rule explanations, textbook examples, drilling exercises, and practice tests can help learners develop declarative knowledge, but they may offer fewer opportunities for language investigation, peer interaction, and the application of grammar in meaningful contexts [3, 4].

A shift towards learner-centered teaching is also in line with the current direction of educational reform in Vietnam. The national English curriculum highlights communicative competence, learner involvement, and

the development of broader competencies rather than the rote learning of language forms [5]. At the Grade 11 level, this creates a need to balance the consolidation of grammatical knowledge with the development of broader language competencies. However, grammar still plays an important role in high-stakes assessment, which may reinforce a focus on discrete-point knowledge and controlled practice. Previous Vietnamese research has also identified continuing tensions between examination-driven teaching and more communicative and meaningful approaches to English learning [3, 4].

One potential response to this issue is Problem-Based Learning (PBL). PBL is a learner-centered approach in which students are introduced to a meaningful problem, determine what they already know and what they still need to learn, explore possible solutions, work with other learners, apply newly gained knowledge, and reflect on the outcome [6, 7]. Authentic problems, self-directed learning, cooperation, and teacher support are key features of PBL and distinguish it from more traditional forms of

instruction in which grammatical rules are presented before students practice them [6, 7]. These features may give learners opportunities to notice grammatical forms, negotiate meaning, explain their reasoning, and use grammar for meaningful communication. Through meaningful problem-solving tasks, PBL may also help learners connect grammatical knowledge with broader communicative goals.

Research on PBL in EFL education has generally reported favorable effects on language learning. Studies focusing specifically on grammar have reported improvements in grammatical competence, including studies of relative clauses, passive voice, and broader grammar outcomes [8–10]. A recent systematic review likewise suggests that PBL can benefit academic achievement and motivation in EFL contexts [11]. Vietnamese studies have also highlighted the potential of PBL to promote higher-order thinking, communication, and active participation [12–14]. However, much of this work has been conducted in university or specialized English-learning contexts rather than upper-secondary schools. Evidence concerning grammar achievement among Vietnamese Grade 11 students therefore remains limited.

Another underexplored issue concerns students' perceptions of PBL-based grammar learning. Previous studies have reported generally favorable learner responses, particularly in relation to motivation, engagement, and the learning experience [9, 11, 14]. However, students' perceptions of the effectiveness and suitability of PBL for grammar learning have received less attention in Vietnamese upper-secondary contexts. Such perceptions are important because PBL changes familiar teacher–student roles and requires learners to assume greater responsibility for problem solving and collaboration. Positive perceptions may encourage engagement and participation, while difficult tasks, insufficient guidance, or problems in group work may reduce the quality of students' learning experiences [11, 13, 14].

In this study, grammar achievement is measured through students' performance on pre- and post-tests covering the grammar content taught during the intervention. The test scores are treated as an observable indicator of changes in the aspects of grammar knowledge assessed by the tests. The study therefore seeks to answer the following research questions:

- 1) To what extent does PBL enhance Grade 11 students' grammar achievement compared with traditional instruction?
- 2) What are Grade 11 students' perceptions of using PBL for grammar learning?

By considering both changes in grammar achievement and learners' perceptions, the study provides context-specific evidence on the use of PBL in a Vietnamese upper-secondary EFL setting. It also considers

the practical conditions that should be taken into account when PBL is used in grammar teaching.

Literature Review

Grammar Knowledge and Grammar Achievement

Grammar has been viewed both as a system of rules and as a resource for expressing meaning in context [1, 2]. In this study, grammar knowledge refers to what learners know about grammatical forms and their relationships with meaning and use, while grammar achievement refers to their observable performance on grammar assessment tasks. Such performance provides evidence of the aspects of grammar knowledge measured by the tests.

Modern grammar teaching emphasizes the relationship between form, meaning, and use, suggesting that grammatical forms should be connected to communicative purposes rather than learned as isolated forms [2, 15]. From a second language acquisition perspective, grammar development can be supported by noticing relevant grammatical forms in the input [16] and by opportunities to practice grammar in meaningful contexts, interact with others, produce language, and receive feedback [17–19]. These principles provide a theoretical basis for examining whether PBL can support grammar knowledge, as reflected in students' gains in grammar achievement.

Problem-Based Learning in EFL Grammar Instruction

PBL is particularly compatible with these principles because the learning process begins with a problem that creates a communicative or cognitive need [6, 7]. Students may need to identify an appropriate tense, clause structure, or grammatical pattern in order to complete a task. The problem can therefore make grammar functionally relevant. Collaborative discussion provides additional opportunities for students to articulate hypotheses, compare alternatives, negotiate meaning, and receive peer or teacher feedback. Repeated application across problem-solving activities may further strengthen the connection between grammatical knowledge and language use [17–19].

The PBL model used in the present study was adapted from the learning cycle described by Hmelo-Silver [6]. In grammar instruction, the cycle can be operationalized through problem presentation, identification of relevant facts, hypothesis generation, identification of knowledge gaps, self-directed learning, application of new knowledge, abstraction/generalization, and evaluation/reflection. The teacher remains important as a facilitator who clarifies goals, monitors group work, provides prompts, and gives corrective feedback when needed. Thus, PBL does not necessarily eliminate explicit grammar explanation; rather, it changes when and why explanation is provided.

Students' Perceptions of PBL-Based Grammar Learning

Students' perceptions are also important when evaluating PBL because the approach requires greater learner participation, collaboration, and responsibility than conventional teacher-led instruction [6, 7]. In the present study, perceptions are considered in terms of students' perceived effectiveness of PBL for grammar learning and their attitudes toward learning grammar through this approach. Meaningful problem solving, interaction with peers, and active participation may contribute to positive perceptions, while difficult tasks, insufficient teacher guidance, or problems in group work may reduce engagement [11, 13, 14]. Examining students' perceptions also complements the achievement results by showing how students experience PBL-based grammar learning.

Previous Empirical Evidence and Research Gap

Previous studies on PBL in language learning have generally reported positive results. For example, Zuhriyah [8] found that PBL could help improve grammar competence, while Chiou [9] reported positive effects for low-achieving learners studying relative clauses and motivation. Pohan [10] also found positive effects of PBL on passive voice learning. Other studies have shown that PBL can support writing, reading, communication, and broader language learning [11]. These findings suggest that meaningful problem solving can create favorable conditions for language learning. However, previous studies differ in their participants, educational levels, grammar targets, and outcome measures.

In Vietnam, PBL has received increasing attention as part of learner-centered and competency-based education. Studies have shown that it can promote higher-order thinking, communication, and active participation [12–14]. However, direct evidence on PBL-based grammar instruction at the upper-secondary level remains limited. Grade 11 students learn English within a curriculum influenced by national assessment requirements and may be accustomed to teacher-led grammar lessons. Therefore, it is important to examine whether PBL improves students' grammar achievement in this context and how students perceive the approach in terms of its usefulness and manageability.

The present study addresses this gap by combining a quasi-experimental comparison of grammar achievement with a questionnaire and interviews examining students' perceptions. The integrated framework assumes that PBL may support grammar achievement through meaningful contexts, noticing, collaborative interaction, and repeated application, while the same learning conditions may shape students' perceived effectiveness and attitudes toward grammar learning.

The research gap is therefore both contextual and methodological. First, relatively few studies have examined PBL-based grammar teaching among Vietnamese upper-secondary learners. Second, previous

studies have often focused on a particular grammatical structure, a specific language skill, or tertiary-level learners. The present study broadens this focus by examining grammar achievement across the content taught during the intervention together with students' perceptions. Questionnaire and interview data are also used to provide a fuller view of how effective the approach is and how students experience PBL-based grammar learning.

The role of scaffolding is also important. Although PBL is learner-centered, the teacher still acts as a facilitator and provides support when learners encounter difficulties [6, 7]. In grammar classrooms, such support may include prompts, explanations, corrective feedback, and brief periods of explicit explanation [17, 19]. Therefore, in this study, PBL is viewed as learner-centered but teacher-supported instruction.

Theoretical Framework

The theoretical framework combines complementary perspectives on PBL and second language acquisition. Hmelo-Silver's learning cycle [6] and Savery's learner-centered view of PBL [7] explain how an authentic problem can structure inquiry, collaboration, self-directed learning, application, and reflection. For grammar learning, the form-meaning-use perspective of Larsen-Freeman and Celce-Murcia [2], Schmidt's theory of noticing [16], Ellis's distinction between analyzed knowledge and contextualized use [17], Swain's Output Hypothesis [18], and Nassaji and Fotos's emphasis on interaction and feedback [19] help explain how learners may turn knowledge of grammar rules into more usable grammatical knowledge. Based on these perspectives, PBL may support grammar achievement through meaningful contexts, noticing and reflection, interaction, language production, feedback, and repeated application. These same learning conditions may also influence how students perceive the PBL learning experience.

Methodology

Research Design

A classroom-based quasi-experimental design was used, with pre-test and post-test comparisons together with questionnaire and interview data. Two intact Grade 11 classes were used as the experimental and control groups. Individual students could not be randomly assigned because the existing class organization at the school was maintained. Both groups completed a pre-test and a post-test to assess changes in students' grammar knowledge. After the intervention, students in the experimental group (EG) completed a perception questionnaire, and eight of them participated in semi-structured interviews to explore their perceptions of learning grammar through PBL.

Participants

The participants were 90 Grade 11 students from two intact classes at Nguyen Thuong Hien High School in Ho Chi Minh City during the 2024–2025 academic year. The two classes were selected mainly because their timetables were suitable for the study. Class 11A10, consisting of 46 students, served as the control group (CG), whereas Class 11A1, with 44 students, formed the EG. To maintain similar instructional conditions, both groups followed the same Grade 11 curriculum, used *Friends Global 11* as the main textbook, had the same number of English periods each week, covered the same grammar content, and were taught by the same English teacher.

Ethical Considerations

Permission to conduct the study was obtained from Nguyen Thuong Hien High School before data collection. Students' identities and responses were kept confidential, and the data collected were used only for research purposes. Participation in the semi-structured interviews was voluntary, and the interview participants agreed to have their interviews audio-recorded and transcribed. No identifying information was included when reporting the findings.

Research Instruments

Three main instruments were used. First, both groups completed a pre-test and a post-test. Each test consisted of 25 questions, and students had 35 minutes to complete it. The tests included eight multiple-choice questions assessing grammar use, two sentence-ordering tasks, five gapped cloze items, five guided cloze items, and five reading-comprehension questions requiring students to apply grammar in context. Raw scores were converted to a 10-point scale. The tests were aligned with the Grade 11 curriculum and the grammar content taught during the intervention. Two experienced English teachers reviewed the test items, and a pilot test was conducted with 10 students from another class before the main study to examine item clarity, difficulty, and test administration. All scored items were marked using a predetermined answer key, minimizing subjective scoring judgments.

Second, the Students' Perceptions of Problem-Based Learning in English Grammar Instruction questionnaire was administered to the EG after the intervention. It consisted of 12 items on a five-point Likert scale grouped into two dimensions: Perceived Effectiveness of PBL in Enhancing Grammar Knowledge (six items) and Students' Attitudes toward Learning Grammar through PBL (six items). The instrument was reviewed by two experienced teachers and piloted with five Grade 11 students not involved in the study. Internal consistency was measured using Cronbach's alpha.

Third, individual semi-structured interviews were conducted with eight students from the EG. The students were selected to represent high, medium, and

relatively low/neutral questionnaire responses. The interview protocol contained ten questions: five yes/no questions with follow-up prompts and five open-ended questions. Interviews explored understanding, retention, confidence, collaboration, motivation, real-life problem solving, difficulties, and preferences for continued PBL use. The questions were reviewed by two experienced English teachers for clarity and relevance. The interview data were used to complement and triangulate the questionnaire findings.

Intervention Procedure

Following the pre-test in Week 1, the instructional intervention was conducted over eight weeks, from Weeks 2 to 9. Both groups studied the grammar content in Units 5 to 8 of *Friends Global 11* and received one 45-minute grammar lesson per week.

The EG lessons followed an eight-stage PBL procedure adapted from Hmelo-Silver [6]. Students first encountered a meaningful problem scenario and selected a topic. They then identified relevant facts and prior knowledge, generated possible explanations, identified grammar-related knowledge gaps, consulted resources and peers, applied newly acquired knowledge to the original problem, generalized grammatical principles, and reflected on the outcome.

During the classroom activities, students worked in small groups, discussed problem scenarios, explored relevant grammatical structures, and created posters using Canva before presenting their work to the class. The teacher served as a facilitator by guiding the discussion, explaining the task, and giving assistance when needed. However, the CG only received the conventional form of instruction that was centered on explanation, example, controlled practice, worksheet, and presentation.

In Week 10, both groups took the post-test. The EG then completed the perception questionnaire. Eight selected students in the EG subsequently participated in semi-structured interviews. Figure 1 presents the study timeline and the instructional conditions for each group.

Data Analysis

Quantitative data were analyzed using SPSS. Means and standard deviations were calculated for the pre-test, post-test, and gain scores of the control and experimental groups. The Shapiro-Wilk test was conducted to examine the normality of the data. The control-group pre-test scores ($W = 0.931$, $p = 0.010$) and post-test scores ($W = 0.881$, $p < 0.001$) deviated significantly from normality. In contrast, the experimental-group pre-test scores ($W = 0.970$, $p = 0.304$) and post-test scores ($W = 0.967$, $p = 0.235$) did not deviate significantly from normality. Based on these results, Mann-Whitney U tests were used to compare the two groups at pre-test and post-test, while Wilcoxon signed-rank tests were used to compare pre-test and post-test scores within each group.

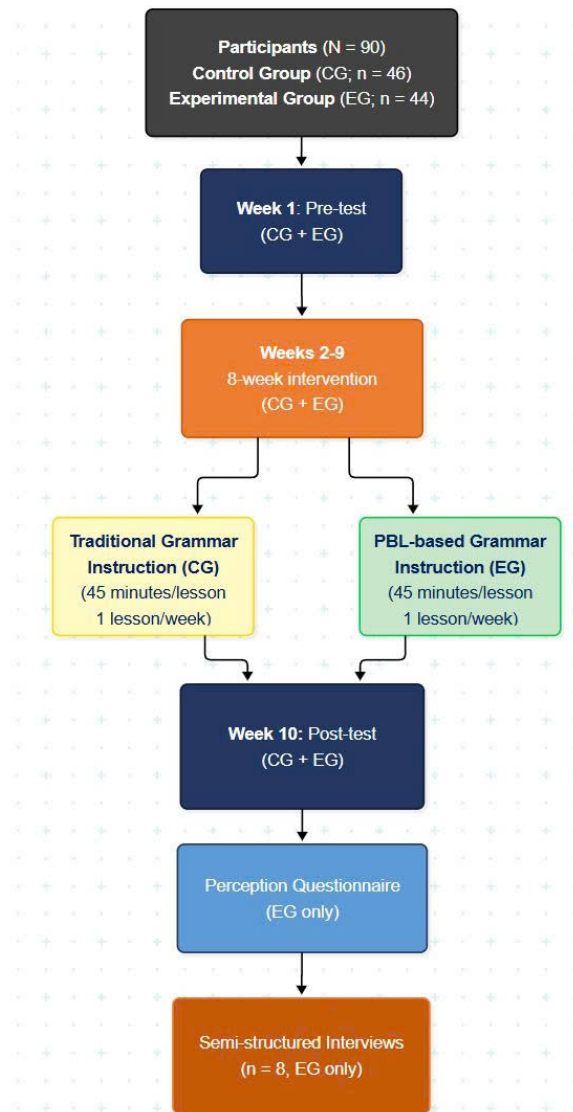


Figure 1: Overview of the research design and intervention timeline.

Gain scores were computed by subtracting each participant's pre-test score from their post-test score. The distribution of the gain scores in the combined sample ($N = 90$) was not significantly different from normality ($W = 0.984$, $p = 0.331$). An independent-samples t -test was used to compare the mean gain scores of the two groups. Cohen's d was calculated as the effect size for the gain-score comparison, while r was used to estimate the effect sizes for the non-parametric comparisons.

Since the questionnaire on students' perceptions was administered only to the EG after the intervention, the questionnaire results were analyzed descriptively rather than compared before and after the intervention. Cronbach's alpha was computed to measure the internal consistency of the two questionnaire dimensions. Students' responses to the statements were summarized using item means, standard deviations, frequencies, and percentages.

Interview responses were analyzed using descriptive summary and thematic analysis. Responses to the

yes/no questions were summarized using frequencies, while students' follow-up explanations and responses to the open-ended questions were read several times, coded, and grouped into broader themes. Frequencies and percentages were calculated to show how many interview participants mentioned each theme. The interview themes were then compared with the questionnaire findings to identify areas where the two sources were consistent and to provide further explanation of students' perceptions of learning grammar through PBL.

Results and Discussion

Grammar Achievement

The two groups were similar before the intervention. As shown in Table 1, the CG had a pre-test mean of 7.348 ($SD = 0.687$), while the EG had a mean of 7.482 ($SD = 0.614$). The Mann-Whitney U test showed that this difference was not statistically significant, $U = 894.00$, $Z = -0.966$, $p = 0.334$. Thus, there was no evidence of a significant pre-intervention difference in grammar knowledge between the two groups. Table 2 shows the inferential comparisons conducted within and between the two groups.

Both groups improved after eight weeks of instruction; however, the EG showed greater improvement. The mean score of the CG increased from 7.348 to 7.674, a gain of 0.326 points. The Wilcoxon signed-rank test indicated that this improvement was statistically significant ($Z = -2.626$, $p = 0.009$), with a medium effect size ($r = 0.39$). The mean score of the EG increased from 7.482 to 8.705, a gain of 1.223 points, and the Wilcoxon test confirmed a statistically significant improvement ($Z = -5.708$, $p < 0.001$), with a large effect size ($r = 0.86$). In addition, 42 of the 44 EG students improved, compared with 28 of the 46 CG students.

The post-test comparison also showed an advantage for the PBL group. The EG had a mean score of 8.705 ($SD = 0.553$), while the CG had a mean score of 7.674 ($SD = 0.463$). The Mann-Whitney U test found a statistically significant difference between the groups ($U = 151.50$, $Z = -7.053$, $p < 0.001$), with a large effect size ($r = 0.74$).

The gain-score analysis also compared the amount of improvement. The EG had a mean gain of 1.223 ($SD = 0.622$), while the CG had a mean gain of 0.326 ($SD = 0.748$). An independent-samples t -test revealed a statistically significant difference between the mean gain scores, $t(88) = -6.169$, $p < 0.001$. Cohen's d was 1.30, indicating a large effect.

These results clearly answer Research Question 1: PBL improved Grade 11 students' grammar knowledge to a greater extent than conventional instruction within the context of this study. This finding is consistent with previous research showing that PBL can support grammatical knowledge when target forms are included in meaningful problem-solving tasks [8–10].

Table 1: Grammar achievement before and after the intervention.

Group	<i>n</i>	Pre-test <i>M</i> (<i>SD</i>)	Post-test <i>M</i> (<i>SD</i>)	Mean gain
Control	46	7.348 (0.687)	7.674 (0.463)	0.326
Experimental	44	7.482 (0.614)	8.705 (0.553)	1.223

Table 2: Inferential comparisons of grammar achievement.

Comparison	Statistical test and statistic	<i>p</i>	Effect size
CG: Pre-test vs. post-test	Wilcoxon signed-rank: $Z = -2.626$	0.009	$r = 0.39$ (medium)
EG: Pre-test vs. post-test	Wilcoxon signed-rank: $Z = -5.708$	< 0.001	$r = 0.86$ (large)
Pre-test: EG vs. CG	Mann-Whitney $U = 894.00$; $Z = -0.966$	0.334	$r = 0.10$ (small)
Post-test: EG vs. CG	Mann-Whitney $U = 151.50$; $Z = -7.053$	< 0.001	$r = 0.74$ (large)
Gain scores: EG vs. CG	Independent t -test: $t(88) = -6.169$	< 0.001	$d = 1.30$ (large)

It is also consistent with broader evidence that PBL can have positive effects on academic outcomes in EFL settings [11].

Students' Perceptions of PBL

The internal consistency of the questionnaire dimensions was evaluated before interpreting students' perceptions. Both dimensions demonstrated satisfactory internal consistency, with Cronbach's alpha coefficients of 0.850 for perceived effectiveness and 0.805 for attitudes toward PBL. These results supported the use of both scales in the subsequent descriptive analysis.

The questionnaire results showed generally favorable perceptions among the 44 experimental-group respondents. As shown in Table 3, all 12 items fell within the high range of the five-point Likert scale, with mean scores ranging from 3.75 to 4.11. Within the perceived-effectiveness dimension, the highest-rated item concerned students' ability to apply grammar knowledge more effectively after learning through PBL ($M = 4.05$, $SD = 0.746$). Within the attitudes-toward-PBL dimension, the highest-rated item concerned students' desire for their teacher to continue using PBL in grammar lessons ($M = 4.11$, $SD = 0.841$).

The response distributions further indicated generally favorable perceptions. None of the 44 respondents selected Strongly Disagree or Disagree for any of the 12 items. For the perceived-effectiveness dimension, the combined Agree and Strongly Agree responses ranged from 61.4% to 75.0%. PE6 received the highest proportion of positive responses (75.0%), followed by PE2 (72.7%) and PE5 (70.5%). PE3 and PE4 received the lowest combined positive responses (61.4% each), although positive responses still represented a majority for both items. Neutral responses ranged from 25.0% to 38.6%, with the highest proportions recorded for PE3 and PE4 (38.6% each) (Figure 2).

For the attitudes-toward-PBL dimension, the combined Agree and Strongly Agree responses ranged from 63.6% to 70.4%. AT2, AT4, and AT6 each received 70.4% positive responses, whereas AT1 had the lowest proportion at 63.6%. Particularly noteworthy was AT6, for which 40.9% of respondents selected Strongly Agree, the highest proportion of strong agreement

among the six attitudes items. Neutral responses ranged from 29.6% to 36.4%, with AT1 recording the highest proportion of neutral responses (Figure 3).

Semi-Structured Interview Findings

The interview findings complemented the questionnaire results and provided additional qualitative insight into students' experiences of learning grammar through PBL. In the yes/no section of the interviews, all eight participants reported that PBL helped them understand grammar more clearly, remember grammatical structures more easily, become more confident in using grammar, and benefit from collaboration with classmates. All eight participants also supported the continued use of PBL in grammar lessons, although five of the eight participants indicated that it should be combined with teacher explanation, review, and controlled practice.

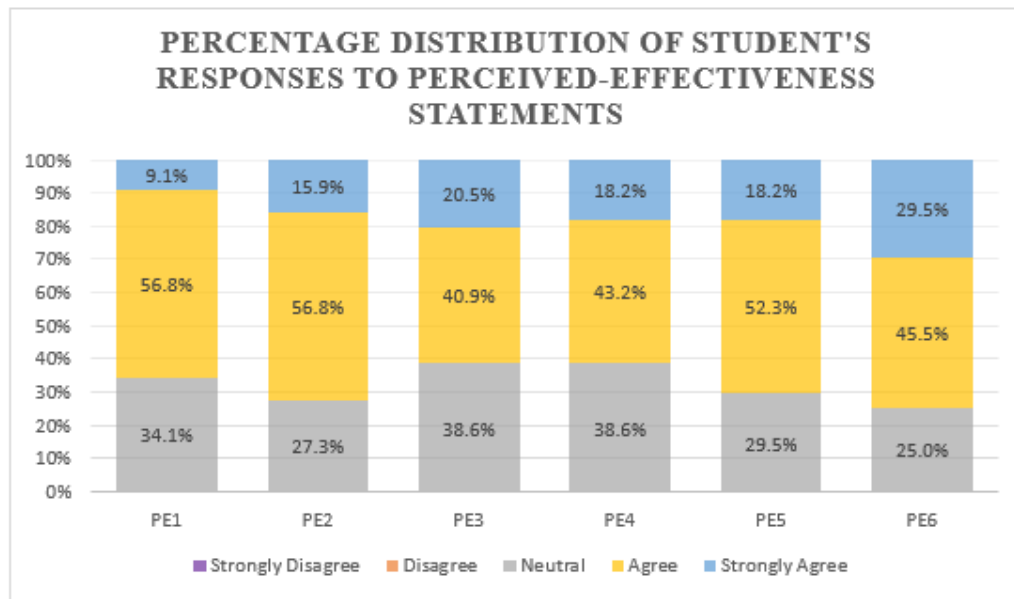
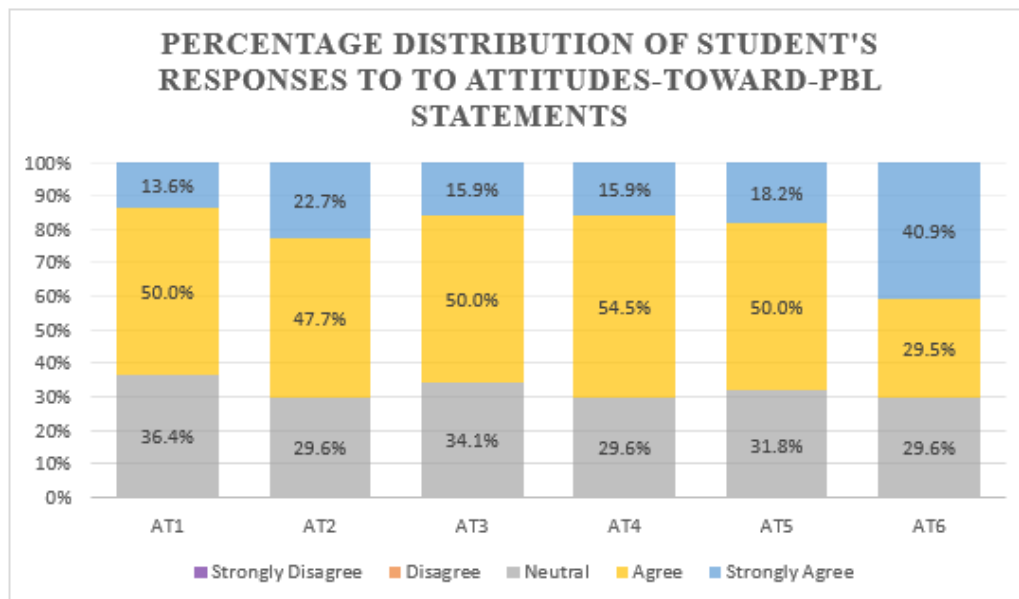
The analysis of the open-ended responses identified six major themes. As shown in Table 4, enhanced grammar understanding and increased motivation or interest were the most frequently reported benefits, each mentioned by seven participants (87.5%). These were followed by improved grammar application and benefits of collaboration, each reported by six participants (75.0%), and better grammar retention, reported by five participants (62.5%). Four participants (50.0%) also identified challenges associated with the implementation of PBL.

Students noted that talking about grammar with peers made it easier to understand complex rules, while applying grammatical structures to practical or contextualized tasks helped them see how grammar could be used beyond individual exercises. Several students also mentioned increased interest and motivation during PBL activities. On the other hand, students' perceptions were not entirely positive. Four participants reported problems with time management, task difficulty, or unequal participation in group work, and stronger students sometimes dominated group discussions. These responses show that students generally valued PBL but also recognized practical difficulties in its classroom implementation.

The questionnaire and interview findings answer Research Question 2 by showing that Grade 11

Table 3: Descriptive statistics for individual perception questionnaire items.

Item	M	SD	Interpretation
Perceived effectiveness (PE)			
PE1 – Grammar-rule clarity	3.75	0.615	High
PE2 – Correct grammar use in real-life problems	3.89	0.655	High
PE3 – Grammar retention	3.82	0.756	High
PE4 – Sentence-construction skills	3.80	0.734	High
PE5 – Critical thinking about grammar use	3.89	0.689	High
PE6 – Grammar application	4.05	0.746	High
Attitudes toward PBL (AT)			
AT1 – Enjoyment of PBL grammar learning	3.77	0.677	High
AT2 – Interest in grammar lessons	3.93	0.728	High
AT3 – Motivation to learn grammar	3.82	0.691	High
AT4 – Enjoyment of group learning	3.86	0.668	High
AT5 – Confidence in grammar learning	3.86	0.702	High
AT6 – Continued use of PBL	4.11	0.841	High

**Figure 2:** Percentage distribution of students' responses to perceived-effectiveness statements.**Figure 3:** Percentage distribution of students' responses to attitudes-toward-PBL statements.

students viewed PBL as a helpful, interesting, and supportive approach to grammar learning. They as-

Table 4: Main themes from semi-structured interviews.

Interview theme	Participants (<i>n</i> = 8)	Percentage
Enhanced grammar understanding	7	87.5%
Increased motivation/interest	7	87.5%
Improved grammar application	6	75.0%
Benefits of collaboration	6	75.0%
Better grammar retention	5	62.5%
Implementation challenges	4	50.0%

sociated PBL with better understanding, application, retention, confidence, motivation, and collaboration. However, the interview findings also showed that these positive perceptions were accompanied by implementation challenges and a continuing preference among some students for teacher explanation, review, and structured grammar practice.

Integrated Discussion of the Findings

The grammar achievement findings directly address Research Question 1. While both groups improved, the EG showed much greater progress, although the two groups had comparable pre-test performance. These findings suggest that PBL added value to the existing instructional process rather than simply reflecting an initial advantage or replacing explicit grammar instruction. This result is consistent with previous research on PBL and grammar learning [8–10] as well as broader evidence of positive PBL outcomes in EFL settings [11]. It is also consistent with the theoretical framework, in which meaningful contexts, noticing and reflection, collaborative interaction, and repeated application of grammatical structures may support grammar learning [6, 7, 16–19]. These mechanisms may help explain the greater improvement in the EG, although they were not measured directly in this study.

The perception findings also provide an answer to Research Question 2. Questionnaire and interview data showed generally positive perceptions of PBL, with students associating it with better understanding, application, retention, confidence, motivation, and collaboration. These findings are consistent with learner-centered and interaction-based perspectives on PBL and grammar learning [6, 7, 17, 19]. However, neutral responses in the questionnaire and problems with time management, task complexity, and unequal participation show that students' perceptions were not always positive. Five of the eight interviewees also preferred PBL to be combined with teacher explanation, review, and controlled practice. The findings suggest that PBL is better used as a complementary, teacher-supported approach rather than as a complete replacement for structured grammar instruction.

Conclusion

The present study examined the impacts of Problem-Based Learning on Grade 11 students' grammar

knowledge and their perceptions of PBL-based grammar learning in a Vietnamese high school. Both experimental and control groups showed progress during the eight weeks of instruction; however, the EG showed greater improvement than the CG. The EG gained 1.223 points, while the CG gained 0.326 points, and the difference in gains was statistically significant, $t(88) = -6.169$, $p < 0.001$, with a large effect size (Cohen's $d = 1.30$). These findings indicate that, in the present context, PBL was associated with greater improvement in grammar achievement than conventional instruction.

Students generally viewed PBL positively. All 12 questionnaire items received high ratings, with mean scores ranging from 3.75 to 4.11. The interview findings showed that students associated PBL with improved grammar understanding, application, retention, confidence, motivation, and collaboration. At the same time, they reported problems related to task difficulty, time management, unequal participation in group work, and the need for teacher explanation, review, and structured practice. Collectively, the findings suggest that PBL should be viewed as a complementary, teacher-supported approach rather than as a replacement for explicit grammar instruction, providing learners with additional opportunities to analyze, discuss, apply, and reflect on grammatical knowledge in meaningful contexts.

Pedagogical Implications

The results suggest that PBL can be integrated into grammar teaching for Grade 11 EFL learners when grammatical structures are included in meaningful problems and collaborative tasks. A combination of approaches may be especially appropriate: students first engage with a problem, identify their linguistic needs, discuss possible solutions, and apply target structures, while the teacher provides focused explanation, scaffolding, corrective feedback, and consolidation when needed. Clear group roles, manageable task demands, appropriate time allocation, and opportunities for individual practice may help address the difficulties in PBL implementation reported by students. Thus, PBL can complement rather than replace traditional grammar teaching by connecting rule knowledge with contextualized language use.

Limitations and Future Research

Several limitations should be noted. First, the present study used two intact classes rather than individually

randomized participants, and therefore full equivalence between the two groups cannot be assumed beyond their measured pre-test performance. Second, the study was limited to one Vietnamese high school with a relatively small sample and an eight-week intervention, which limits the generalizability of the findings. Third, students' perceptions were partly based on self-report data, while the qualitative data came from interviews with only eight students. Finally, the study did not include a delayed post-test and therefore cannot determine whether the observed grammar gains were maintained over time.

Future research should examine PBL across larger and more diverse samples, multiple educational settings, and longer intervention periods. Where feasible, stronger experimental designs and delayed post-tests could provide more robust evidence regarding the durability of learning effects. Further studies could also investigate how different levels of teacher scaffolding influence PBL outcomes and examine more specific dimensions of grammar development, including grammatical accuracy, long-term retention, and communicative production.

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Competing Interests

The authors declare that there are no competing interests.

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