Conditional Sentence Comprehension in High School Students: A Project-Based Learning Approach with Pedagogical Reference

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Abstract

This research addresses the challenge of comprehending conditional sentences among EFL high school students in English courses. The study aimed to 1) improve the comprehension of conditional sentences, 2) study the developmental scores (Gain Scores) of high school students after applying Project-Based Learning (PBL) with a pedagogical reference, and 3) examine student satisfaction with PBL coupled with a pedagogical reference. A quantitative pre-experimental design was used, involving 29 purposively selected high school students. Statistical analysis included Standard Deviation (S.D.), Mean ($\overline{X}$), and paired-sample T-test. The results demonstrated a statistically significant increase in post-test mean scores compared to pre-test scores. The average post-test score was 8.17, compared to the pre-test score of 4.07. The gain scores showed substantial progress in English proficiency, with 48.28% of students making notable advancements. Student satisfaction with the pedagogical reference was notably high, with a mean of 3.85, indicating a "very satisfied" level. Most students (82.76%) expressed high satisfaction, while 17.24% reported a neutral level of satisfaction. The outcomes of this study contribute crucial insights into the practical application of Project-Based Learning, complemented by a pedagogical reference, to enhance the comprehension of conditional sentences in Thai high school students.

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การจัดการเรียนรู้โดยใช้โครงงานเป็นฐานร่วมกับคู่มือการเรียนรู้ เพื่อเสริมสร้างความเข้าใจ เรื่อง ประโยคเงื่อนไข ของนักเรียนชั้นมัธยมศึกษาตอนปลาย

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บทคัดย่อ

วิจัยครั้งนี้มีวัตถุประสงค์เพื่อ 1) เสริมสร้างความเข้าใจ เรื่อง ประโยคเงื่อนไข โดยใช้กระบวนการจัดการเรียนรู้โดยใช้โครงงานเป็นฐานร่วมกับคู่มือการเรียนรู้ของนักเรียนมัธยมศึกษาตอนปลาย 2) ศึกษาคะแนนพัฒนาการสัมพัทธ์ของแบบทดสอบก่อนและหลังเรียน 3) ประเมินความพึงพอใจต่อกระบวนการจัดการเรียนรู้โดยใช้โครงงานเป็นฐานร่วมกับคู่มือการเรียนรู้ของมัธยมศึกษาตอนปลาย วิจัยครั้งนี้ดำเนินการทดลองแบบกลุ่มทดลองหนึ่งกลุ่มวัดผลก่อน และหลังการทดลอง ต่อกลุ่มตัวอย่าง 1 กลุ่ม ที่เลือกแบบเจาะจง คือ นักเรียนชั้นมัธยมศึกษาศึกษาปีที่ 5 จำนวน 29 คน วิเคราะห์ข้อมูลโดยการหาค่าเฉลี่ย ค่าเบี่ยงเบนมาตรฐาน ทดสอบสมมุติฐานด้วย paired-sample T-test ผลการวิจัยพบว่า คะแนนเฉลี่ยหลังเรียนเพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติ เมื่อเทียบกับคะแนนก่อนการเรียน ด้วยคะแนนเฉลี่ยหลังเรียน 8.17 เปรียบเทียบกับคะแนนก่อนเรียน 4.07 การศึกษาคะแนนพัฒนาการสัมพัทธ์ระหว่างแบบทดสอบก่อนเรียนและหลังเรียนพบว่า นักเรียนร้อยละ 48.28% มีคะแนนพัฒนาการสัมพัทธ์ในระดับสูงมาก ความพึงพอใจของนักเรียนต่อคู่มือการเรียนรู้พบว่า อยู่ในระดับพึงพอใจมาก โดยมีค่าเฉลี่ยที่ 3.85 นักเรียนร้อยละ 82.76% มีความพึงพอใจในระดับมาก ขณะที่นักเรียนร้อยละ 17.24% มีความพึงพอใจในระดับปานกลาง ผลจากการศึกษาครั้งนี้แสดงถึงความสำคัญต่อการประยุกต์ใช้การจัดการเรียนรู้โดยใช้โครงงานเป็นฐานร่วมกับคู่มือการเรียนรู้ ซึ่งสามารถส่งเสริมความเข้าใจ เรื่อง ประโยคเงื่อนไข ของนักเรียนชั้นมัธยมศึกษาตอนปลายได้

คำสำคัญ: การเรียนรู้โดยใช้โครงงานเป็นฐาน, ประโยคเงื่อนไข, คู่มือการเรียนรู้

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Introduction

In contemporary society and the rapidly changing world, English is an international language. Apart from Chinese and Spanish, a large number of people from different countries use English as a tool to communicate, exchange information and understand each other. In many Asian countries, including Thailand, the majority of children learn English as a second or foreign language after becoming proficient in their national language (Khamkhien, 2011). According to Fadhilawati (2019), studying English grammar is crucial for foreign language learners as it enables them to communicate in English accurately. In order to adequately prepare their students, each teacher needs to have a well-prepared lesson plan, appropriate learning activities and learning materials, and an effective teaching technique or style.

Conversely, teaching English language forms has been a controversial difficulty for EFL students for decades. Sattayatham and Honsa (2007) reported that Thai EFL learners from four medical schools at Mahidol University encountered the greatest difficulty in generating the correct verb forms of if-conditionals in their written English. Conditional sentences are also deemed to be one of the biggest challenges for Thai high school students who have registered in English subjects. In this study, conditional sentences are identified in the course syllabus, which students must face in the L2 teaching and learning process. Conditional sentences are generally classified into four types: zero conditional, first conditional, second conditional and third conditional. The majority of Grade 11 students tend to confuse the forms of the sentence, most notably in the second conditional and the third conditional.

Celce-Murcia and Larsen-Freeman (1999) and Kang, (2007) noted that conditional sentences are often perceived as one of the most challenging aspects for students learning English. In the context of this study, it was observed that students encountered difficulties when using modal verbs and the past perfect tense while constructing conditional sentences - especially second conditional and third conditional. Additionally, they expressed feelings of boredom, likely due to a lack of foundational knowledge in English. Additionally, the results of the pre-test conducted throughout the academic year 2022 indicated that the student's performance on the conditional sentences test was not up to the level expected. Due to these negativities of studying conditional sentences, the researcher decided to seek a way to improve the teaching method and increase the understanding of conditional sentences in English classes.

Project-based learning (PBL) is one of the most appropriate teaching strategies for solving the mentioned struggles of high school students. PBL also promotes a sense of being child-centred by employing collaborative activities in which the learners have plenty of opportunities to integrate with L2 exposure within a group discussion. In addition, in an era of significant technological advancements, educators face challenges in keeping students actively engaged in their academic pursuits. PBL has emerged as a recommended instructional approach that promotes high levels of student engagement and academic achievement (Barell, 2006; Bender, 2012). Advocates of PBL argue that this instructional approach is particularly effective for fostering the development of the 4 Cs - 21st-century skills: communication, collaboration, creativity, and critical thinking (Krauss & Boss, 2013). They propose that PBL provides students with opportunities to actively engage in real-world problem-solving, promoting the acquisition and mastery of these essential skills. Srikrai (2008) highlighted that the project participants develop the ability to collaborate effectively with their peers. Therefore, employing PBL in high school could cultivate the understanding of studying conditional sentences as well as encourage individual students to familiarize themselves with L2 within a group of students.

The significance of this study lies in its exploration of the application of PBL in the instruction of specific grammatical structures, namely the second and third conditional sentences. By integrating PBL with a carefully designed pedagogical reference, the research aims to contribute valuable insights into the field of language education. Here are some key points highlighting the study's significance: shaping the comprehension of the second and third conditional sentences, contributing to the discourse on innovative pedagogies by exploring the effectiveness of PBL in a language learning context, and understanding how PBL, when combined with a targeted pedagogical reference, impacts student comprehension and offers insights into tailoring teaching approaches for specific language structures. This adaptability is particularly relevant in diverse learning environments.

Literature review

The mode of project-based learning prioritizes long-term, interdisciplinary, and student-centred learning activities, proving particularly effective in nurturing 21st-century skills and professional competencies (Guthrie, 2010; Chen et al., 2022). The PBL, as its title implies, typically denotes an educational method that structures learning tasks based on projects.

Certainly, learning within a PBL environment underscores the importance of genuine learner-centred tasks aimed at achieving long-term objectives. PBL engages students in a more profound level of learning compared to conventional learning methods such as lectures and improves a sense of being a good communicator within a group of students.

Numerous scholarly sources affirm the advantages of PBL. PBL provides students with the flexibility to learn at individualized levels, utilizing resources that align with their reading proficiency and personal interests. This approach encourages students to explore more challenging materials as they pursue specific information. Furthermore, the learning process becomes highly meaningful for students as they actively apply their abilities in project planning, management, and execution, drawing on their content knowledge and language skills (Kloppenborg & Baucus, 2004). The results from Simpson's study, which delved into the potential enhancement of students' English language skills through PBL, reveal that students experienced notable advancements in their listening and speaking abilities when engaged in the PBL approach. Additionally, the impact of collaborative learning significantly influenced the development of the reading and writing skills of the students (Simpson, 2011). This approach encourages learners to gather and evaluate information, engage in discussions, and collaborate with their peers while working on a project (Solomon, 2003).

Project work introduces students to authentic communicative situations involving real-life tasks such as analysis, decision-making, editing, rejection, organization, and delegation. Furthermore, it frequently incorporates multidisciplinary skills that can be drawn from other subjects. In essence, project work fosters a higher level of cognitive engagement, moving beyond mere vocabulary and structural learning, as emphasized by Bilsborough (2013). Moreover, PBL is effective in improving academic performance in diverse subjects such as science, mathematics, and language arts (Bender, 2012 & Srikrai, 2008). Bilsborough (2013) found that PBL activities heightened students' motivation, engagement, and participation in grammar learning, resulting in a deeper understanding of grammatical concepts. Fadhilawati (2019) observed that PBL projects enhanced student communication skills, emphasizing their adept use of grammar in diverse contexts.

In the language teaching context of Thailand, numerous studies explored the effectiveness of PBL in the language classroom. Somjai and Soontornwipast (2020) discovered that integrating PBL with multimedia and experiential learning significantly enhanced students'

vocabulary proficiency and their perceptions of the instruction. Similarly, Chiou (2019) reported that PBL increased students' engagement and improved their grammar competence. Soparat et. al (2014) and Coffin (2013) both underscored the cultivation of essential competencies and the positive impact on students' learning experiences with the use of PBL in language education. These studies collectively indicate that PBL can serve as an effective approach for enhancing English language learning among Thai high school students. Therefore, the engaging and contextualized nature of PBL projects, combined with collaborative opportunities and feedback, can promote enhancement in grammar accuracy, fluency, and communication skills.

Utilizing Project-Based Learning (PBL) in teaching L2 Context

Of utmost importance, as highlighted by Stoller (2012), is that projects should be customized to align with the needs and interests of the students. Research on PBL has revealed that students who participated in PBL acquired a higher level of factual knowledge in comparison to students who engaged in more traditional learning (Barron & Hammond, 2008). There are many notable reasons why PBL is appropriately employed in teaching settings.

1. Motivating inquiries to enhance learning

Krajcik and Mamlok-Naaman (2006) defined a driving question as a thoughtfully crafted query that serves as a focal point for both students and teachers during a project, prompting them to delve into, investigate, and ultimately address its various aspects throughout the project's duration. PBL conclusively could expose a sense of curiosity during group work and brainstorming sessions.

2. Leveraging projects to enhance Learning

Engaging in a project encourages self-directed learning, allowing students to acquire the second language (L2) organically and without undue pressure. Parker et. al (2013) emphasized that projects should be considered the core of the course and regarded as the primary focus, rather than an additional component (p. 1432).

3. Facilitate cooperative learning

The nature of Project-Based Learning in a project is an integral part of the learning and teaching process. In order to complete the assigned project, the students would be

required to socialize and discuss within the group. Therefore, they would develop productive skills through the employment of the project. Krajcik and Shin (2014) clarified that the collaborative exercises of their project-based science approach "[mirror] the complex social circumstance of master issue solving" (p. 276)

4. Promotes speaking skills by presenting the product

PBL encourages the speaking skills of students by employing presentations. This benefits the students directly by familiarizing them with L2. Darling-Hammond (2008) stated that PBL contained the significance of students showcasing their work to broader audiences.

There are few empirical studies of PBL on conditional sentences. However, the mentioned advantages above have pointed out that employing PBL as a teaching approach would alleviate the high school students' boredom and promote collaborative skills including L2 fluency. According to the study by Nurcahyoko (2014), PBL can effectively enhance the grammatical accuracy of students, regardless of their motivation levels, whether high or low. Hence, ensuring accurate grammar is a crucial aspect of language learning. Accuracy pertains to the proper grammatical form that language learners utilize.

In this study context, to improve the understanding of conditional sentences as well as encourage collaborative skills, the researcher employed PBL under the principle of Grant (2002) as shown in Table 1 below.

Table 1

Project-Based Learning under the principle of Grant (2002)

Seven Project-Based Learning elements introduced by Grant (2002)	
1. Introduction	The process and inquiry encompass the essential stages needed to accomplish the task or to respond to the guiding or driving.
2. Tasks	The learners require assistance, support, and scaffolding. These may encompass interactions between students and teachers, practice materials, peer guidance etc.

Seven Project-Based Learning elements introduced by Grant (2002)	
3. Resources	Resources offer information or data for utilization and may encompass hypertext links, guideline references etc.
4. Process	The process should encompass activities demanding advanced-level and critical thinking skills, such as analysing, synthesizing, and evaluating information.
5. Guideline and Scaffolding	Since learners often need assistance, guidance and support, various strategies can be employed. These can be the interaction between students and teachers, practice worksheets, peer counselling etc.
6. Collaborative learning	Peer review and brainstorming sessions.
7. Reflection	PBL provides an avenue for presenting the activities through closure, debriefing and reflection.

What is the pedagogical reference?

Dirven (1990) defines pedagogical grammar as a broad term encompassing learner- or teacher-centred explanations or presentations of foreign language rule systems, aimed at facilitating and directing the learning process (p. 1). To ensure active participation in the project and to enhance the participants' understanding of conditional sentences, the researcher furnished the participants with pedagogical references related to conditional sentences throughout the project's progression. In this study, the provided pedagogical reference, serving as an extensive handout, centred on grammatical components, including past simple tense, past perfect tense, infinitive verbs, and modal verbs (incorporating 'would', 'would have', and past participles). It serves as a complementary handout for students during teaching, learning, and collaborative activities.

In conclusion, considering the advantages associated with the utilization of Project-Based Learning and the presence of pedagogical references within the educational framework, these factors can significantly contribute to enhancing the understanding of high school students when it comes to studying conditional sentences. Moreover, this approach can potentially enhance the teaching methodology's overall appeal.

The objectives of the research

1. To compare the learning achievement toward pre-test and post-test of Grade 11 students after experiencing PBL integrated with a pedagogical reference.
2. To study the developmental score (Gain score) of high school students after employing PBL in conjunction with the pedagogical reference.
3. To examine high school students' satisfaction with PBL in conjunction with the pedagogical reference.

Hypotheses of the research

1. High school students, who engage in PBL with the integration of pedagogical references, are expected to achieve higher post-test scores as compared to their pre-test scores.
2. The students' satisfaction with PBL in conjunction with the pedagogical reference for conditional sentence reference is at a satisfactory level.

Scope and limitations of the study

The study suggests that incorporating Project-Based Learning (PBL) in the teaching of second and third-conditional sentences is likely to yield positive results. The combination of PBL and pedagogical references is expected to improve comprehension skills among Thai high school students. The research aims to contribute insights to discussions on innovative language pedagogies and their impact on understanding and applying conditional sentences. It is crucial to note that the study is conducted in a public Thai high school in Pathum Thani province, where English is learned as a foreign language. Consequently, the findings may not be universally generalizable to other educational contexts or all Thai students nationwide. Interpretation and application of the outcomes of the study should consider the unique characteristics of each school and its language-learning environment.

Research Methodology

Research design

This study employed quantitative research using the pre-experimental research through the lens of a one-group pre-test and post-test design as it attempted to enhance the

understanding of conditional sentences utilizing PBL integrated with a pedagogical reference of high school students as shown in Table 2 below (Knapp, 2016):

Table 2

Pre-experimental (One group pre-test and post-test design)

Pre-test	Treatment	Post-test
O_1	X_1	O_2
Where	O_1 = Pre-test	
	O_2 = Post-test	
	X_1 = Project-based learning in conjunction with pedagogical Reference	

Population and sample

This research was conducted at a public high school in Thailand, focusing on a study population comprising 117 Thai high school students in grade 11 who were non-native speakers of English, all of whom were mandated to study English. Employing purposive sampling methods, the sample was specifically drawn from the Grade 11 English language class. This grade level was chosen strategically to align with the curriculum's emphasis on intricate grammatical structures, notably including conditional sentences. The study, encompassing 29 high school students from a single class section, acknowledged the diverse English language proficiency levels exhibited by participants, as evidenced by their English subject grades after the 2022 academic year. This deliberate sample selection aimed to capture a nuanced representation of students' abilities and experiences within the targeted curriculum.

The scope of the content

This study employed the pedagogical reference coupled with PBL. The particular reference contained conditional sentence content and assignments. The topics in the pedagogical reference came from the feedback of their previous English teachers. The analysis highlighted the specific learning areas where students faced challenges in comprehensive
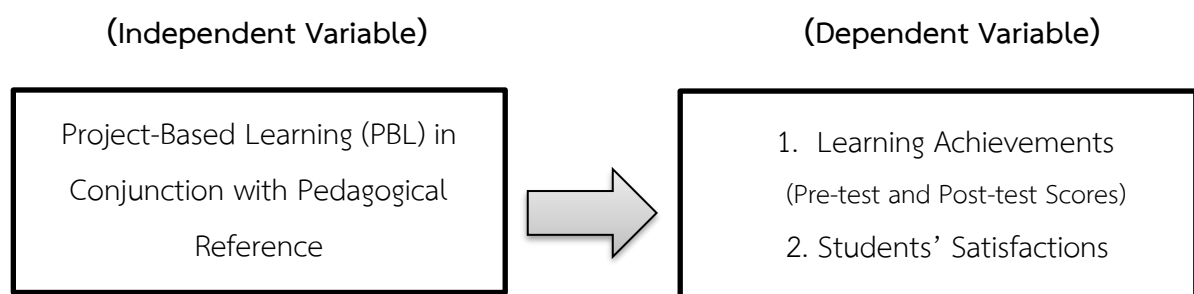
understanding. Additionally, the identified learning topics represent crucial grammar concepts that form the foundational knowledge required for constructing various types of conditional sentences. The accompanying pedagogical reference, functioning as a comprehensive handout, focuses on grammatical elements such as past simple tense, past perfect tense, infinitive verbs, and modal verbs (including 'would', 'would have', and past participles).

Conceptual framework

This research employed PBL in conjunction with a pedagogical reference for conditional sentence lessons to improve the comprehension of high school students. Additionally, it aimed to assess student satisfaction with the combination of PBL and the pedagogical reference during the learning and teaching process. The conceptual framework of this study is illustrated in Figure 1 below.

Figure 1

Conceptual framework of PBL alongside the pedagogical reference

(Independent Variable)   **(Dependent Variable)**

| Project-Based Learning (PBL) in Conjunction with Pedagogical Reference | ⟹ | 1. Learning Achievements (Pre-test and Post-test Scores)
 2. Students' Satisfactions |

Methods

Research instruments

A pre-test and post-test were constructed and revised by two native speakers; the tests covered all types of conditional sentences comprising second conditional and third conditional. In validating the tests, the pre-test and post-test were statistically analyzed by discrimination power indices range ($\overline{X}$), level of difficulty (P), and reliability range (KR-20). The findings from the study suggest that the items in both the pre-test and post-test had varying levels of difficulty, with scores ranging from 0.30 to 0.80. Additionally, the discrimination power

indices of the items were observed to be 0.20 and above, indicating that these items effectively differentiated between the participants' performance levels. The calculated reliability of the test using the KR-20 coefficient was 0.61, suggesting a moderate level of internal consistency in the test items.

Questionnaires were constructed based on the interviews of the participants on previous learning experiences of conditional sentence lessons and revised by the two experts in relevant fields. The questionnaires were also pilot-tested on 20 high school students in different sections. The two questionnaires were analyzed by using Cronbach's alpha coefficient, a measure of internal consistency, which was calculated and yielded a value of 0.75, indicating an acceptable level of reliability for the research tool. To enhance the tool's reliability, certain items with unclear meanings were revised, and items that duplicated content were eliminated.

Data collection procedures

This study extended over a single learning semester, specifically during the initial semester of the academic year 2023, encompassing 10 weeks totalling 30 hours. Initially, a permission letter was sent to the school, and consent forms were provided to all the participants. Subsequently, the participants were briefed on the research objectives and the meticulous data collection process. It is important to note that all statistical and personal data of the participants is to be kept confidential, and no participant names or other identifying information will be shared or published without their express written consent.

The following are the steps taken to implement PBL in a high school English class, specifically focusing on conditional sentences: second conditional and third conditional as Table 3 below:

Table 3

PBL teaching process within the framework Grant (2002)

Week	Learning steps	Project implementations
-		Pre-test
1	1. Introduction	- Introduce the learning topics: conditional sentences - second conditional and third conditional.

Week	Learning steps	Project implementations
2	2. Tasks	- Highlight the learning goals for the project: activities focusing on second and third conditional sentences. - Divide the students into two major groups for both types of conditional sentences. - Outline the project tasks and deliverables, including research, story development, creative production, and presentation.
3	3. Resources	- The pedagogical reference is provided for all students as the learning hangout. - Encourage students to conduct their own research and explore additional resources.
4-5	4. Process	- Guide students through the project process step-by-step, providing clear instructions and support. - Offer opportunities for peer feedback and collaboration throughout the process.
6	5. Guideline and Scaffolding	- The students study all the provided learning topics for mastering the two types of conditional sentences in the the pedagogical reference. - Offer guidance on storytelling techniques, creative expression, and presentation skills.
7-8	6. Collaborative learning	- Work collaboratively throughout the project. - Present the projects and implement the activities
9-10	7. Reflection	- Consider their strengths, challenges, and areas for improvement.
Post-test and Questionnaire Administration		

Data analysis

For data analysis, the statistical data obtained from the pre-test and post-test were subjected to analysis using the paired-sample T-test, mean, and standard deviation through the use of IBM SPSS software. Moreover, the pre-test and post-test scores of the high school students were computed using relative gain scores to clarify their developmental levels comprising: Very high development, High development, Moderate development, Moderately

severe development and No development (Kanjanawasee, 2014). The questionnaires were also analyzed using mean and standard deviation.

Results

1. Pre-test and post-test

The pre-test and post-test results were analyzed by pair-sample T. test and the mean score. The findings are revealed in Table 4 below.

Table 4

One-group statistical test of the pre-test and post-test scores

Tests	N	mean	S.D.	t-test	p-value
Pre-test	29	4.07	1.66	8.213	.000
Post-test	29	8.17	1.73		

**p<.01

The findings of Table 4 reveal that the learning achievement average score tested by the pretest was 4.07, and the standard deviation score was 1.66. The result of the post-test mean score was 8.17, and the standard deviation score was 1.73. Therefore, the difference between the pre-test and post-test in employing the pedagogical reference under the use PBL teaching approach indicated that the post-test was higher than the pre-test mean score at the .01 statistically significant level.

2. Relative gain score

The pre-test and post-test scores as the learning achievement were compared to find the developmental gain scores of each student. The results are shown in Table 5 below.

Table 5

Developmental score criteria

Gain score	Level of development	Participants	Percentage
76-100	Very high development	14	48.28
51-75	High development	4	13.79

Gain score	Level of development	Participants	Percentage
26-50	Moderate development	6	20.69
0-25	Moderately severe development	3	10.35
Below 0	No development	2	6.89

The table above reveals the learning achievement of the students in conditional sentence lessons. It was found that the number of very high development gain score was 14 students, representing 48.28 percent. There were 4 students in the level of high development, representing 13.79 percent. There were 6 students in the level of moderate development, representing 20.69 percent. There were 3 in the level of moderately severe development, representing 10.35 percent, and 2 students in the level of no development, representing 6.89.

3. The student's satisfaction

The questionnaire aimed to examine the level of satisfaction of high school students toward the application of PBL alongside the pedagogical reference. The 29 participants were required to complete the questionnaire at the end of the study phase. The overall results are illustrated in Table 6.

Table 6

The level of student satisfaction with PBL integrated with the pedagogical reference

The Level of satisfaction	Number (people)	Percentage
Very satisfied	24	82.76
Neutral	5	17.24
Total	**29**	**100.00**

The results, as presented in Table 6 above, unveil a substantial level of contentment among the students regarding the Project-Based Learning approach coupled with pedagogical guidance in the context of the teaching and learning processes. Specifically, a very satisfied level was 82.76 percent of grade 11 students expressed a high degree of satisfaction. Meanwhile, 17.24 percent of the students exhibited a moderate level of satisfaction.

Table 7

The questionnaire examining levels of satisfaction of the high school students

Question	Average	S.D.	Level of satisfaction
1. Clarity and effectiveness of the pedagogical reference	3.89	0.30	Very satisfied
2. Coherence of the pedagogical reference	3.86	0.44	Very satisfied
3. Accuracy of the pedagogical reference	3.79	0.41	Very satisfied
4. Content is clear and can be comprehended	3.79	0.55	Very satisfied
5. Integration of technology into teaching process	3.86	0.51	Very satisfied
6 Encourage students to engage in critical thinking	3.82	0.53	Very satisfied
7. The teacher consistently incorporates engaging activities into the learning process	3.96	0.62	Very satisfied
8. The teacher functions as a facilitator	3.82	0.53	Very satisfied
9. The learning activities align with stated learning objectives	3.86	0.51	Very satisfied
10. The project-based learning engages students in collaborative teamwork	3.89	0.40	Very satisfied
11. The project-based learning, supported by the pedagogical, becomes an engaging and captivating approach	3.86	0.44	Very satisfied
12. Timeframe and context in project engagement	3.82	0.46	Very satisfied
Total	**3.85**	**0.47**	Very satisfied

As shown in Table 7, the questionnaire on the satisfaction level of students with the learning and teaching process found that, according to Question 7, the majority of the students were most satisfied with the teacher consistently incorporating engaging activity into the learning process (mean=3.96, S.D. =0.62). This was closely followed by the results from Question 1, which showed the students' high satisfaction level with the clarity and effectiveness of the pedagogical reference, (mean=3.89, S. D=0.30). On the other hand, the lowest levels of satisfaction were shown by Question 3 - accuracy of the pedagogical reference (mean=3.79, S.D=0.41), and Question 4 - content is clear and can be comprehended (mean=3.79, S.D 0.55). However, both scores remained in the "very satisfied" range.

Discussion

This study centred on the implementation of Project-Based Learning (PBL) in conjunction with pedagogical references for teaching conditional sentence lessons to grade 11 students. The primary objective was to improve the comprehension of conditional sentences among grade 11 students in Thai high schools. The study also aimed to assess the developmental score (gain score) achieved by grade 11 students through the application of the pedagogical reference. Furthermore, the study sought to examine the level of satisfaction among grade 11 students regarding the learning and teaching process facilitated by the combination of PBL and pedagogical references. The outcomes of this investigation are explained below.

1. The instructional process employed within the framework of PBL, in conjunction with the integration of pedagogical references, was deliberately tailored to enhance comprehension of conditional sentences in Thai in the high school context. The utilization of PBL alongside pedagogical references served multiple purposes: fostering collaborative tasks and teamwork dynamics, promoting proficiency in technology literacy, cultivating a positive learning atmosphere and motivational drive, and nurturing the capacity for effective brainstorming within the context of conditional sentence lessons. Given the inherent challenges associated with grasping grammar concepts, particularly for Thai students, the adoption of the PBL approach emerged as fitting and aligned with their specific educational needs and aptitude levels. PBL demonstrated its efficacy as a strategic framework that nurtures a spectrum of skills through tasks that hold inherent meaning. Interestingly, the pedagogical reference or the handout could fulfil the comprehension of conditional sentences during project implementation. Therefore, this approach contributed to a heightened understanding of conditional sentence lessons among high school students. The findings of this study are also consistent with a multitude of previous studies. Harada et al. (2008) discovered that PBL resulted in notable enhancements in the mastery of English grammar when compared to traditional instructional methods. PBL has been shown to enhance academic performance across various subjects, including science, mathematics, and language arts (Bender, 2012 & Srikrai, 2008). In addition, PBL enables students to achieve success by completing projects, thereby nurturing self-efficacy and fostering confidence in their abilities, as noted in the study by Parker et al. (2013). Moreover, it establishes a bridge between the application of English within the controlled environment of the classroom and its utilization in authentic real-world scenarios (Fried-Booth, 2002).

2. The PBL is one of the most effective ways of teaching grammar and it serves as a productive and positive experience for high school students. The PBL creates engagement and collaboration with even more opportunities for practising the target language. In effect, it constructs a positive learning atmosphere where the students enthusiastically and actively exercise the target language and particularly conditional sentences. According to Supadol et. al (2014), PBL was observed to heighten students' involvement and enthusiasm, leading to enhanced proficiency in grammar. This study's findings also reveal that most students experience advancements in their comprehension of conditional sentences, indicating a positive learning trajectory facilitated by the combination of PBL and pedagogical references. This implies not only a significant improvement in conditional sentence comprehension but also a positive learning experience among high school students. These results are consistent with the findings of many scholars. Bilsborough (2013) reported that PBL activities increased students' motivation and engagement in grammar learning, leading to improved participation and a deeper understanding of grammatical concepts. Another study found that PBL increases self-esteem in students, attributing it to successful academic experiences and a sense of ownership over learning (Cruickshank et al., 1999). In addition, PBL fosters diverse and authentic learning experiences, catering to various learning styles and interests, which contributes to a positive learning environment (Murray et al., 2004).

Thus, integrating PBL and pedagogical references proves effective in addressing the inherent challenges of grammar acquisition for Thai students by promoting collaborative learning and a motivational learning environment. These results align with prior research demonstrating the benefits of PBL in various subjects, including improved academic performance, self-efficacy, and application of learned concepts in real-world scenarios. This study could offer the essence of PBL alongside the pedagogical reference in conditional sentences as the pedagogical implication in an English class, particularly in English as a Foreign Language (EFL) settings such as Thailand, where chances to utilize English are restricted.

Recommendations

1. Recommendations for English language teaching

1.1 The first observation of the researcher was that most of the students were timid when it came to speaking English, and the majority were afraid of expressing opinions in brainstorming sessions and during collaborative working. To resolve this difficulty, the teacher

should come up with activities that can help make students feel relaxed and be able to speak out more readily.

1.2 During presentation sessions, some groups could not apply proper presentation procedures and English phrases in the presentation. To alleviate such problems, the teacher should introduce the steps and phrases used in English presentations and encourage the students to practice presentation skills before they present the project work.

2. Recommendations for Future Studies

- To effectively demonstrate the effect of PBL alongside the pedagogical reference in teaching, the next study should involve enrolling two distinct groups of participants in the study, enabling a comparative analysis of the outcomes between these two groups.

Conclusion

While it may seem challenging to encourage students to master conditional sentence lessons, incorporating PBL alongside a pedagogical reference is poised to immerse students in authentic literacy activities, fostering meaningful engagement with the complexities of conditional sentences. The pedagogical reference fosters the learning content more directly and specifically which could enhance the understanding of participants. This instructional approach not only facilitates the enhancement of students' comprehension of conditional sentence structures, aligning with the goals of the study, but it also contributes to the refinement of their overall literacy skills within the context of language instruction. Through the iterative implementation of PBL and the pedagogical reference, students will actively participate in the learning and teaching process of the language classroom.

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