

Applying Project-Based Learning To Promote High-School EFL Students' Critical Thinking Skills

Le Thi Thu Huong¹, Vu Thi Hue²

¹Thai Nguyen University of Education, Vietnam

²Vu Tien High school, Vietnam

Abstract: *The study explored an EFL teacher's application of project-based learning (PBL) in her English classrooms and its potential impacts on promoting high-school English as a foreign language (EFL) students' critical thinking skills. Eight-week action research was conducted with the participation of 90 students from two English classes at a local high school in the North of Vietnam. In the study, students were engaged in creating a group's tourism brochure. At different stages of PBL, the students were guided through a series of actions with the aim of promoting their critical thinking. Actions that the teacher applied range from getting students to evaluate the information they collected and its sources, making questions critically, making connections between their prior knowledge and the topic given, collecting, analyzing and evaluating information to solve their problems and make decisions, creating the final products and assessing the project using the rubrics provided by the teacher and completing the feedback form. Questionnaires and semi-structured interviews were relied on as the primary sources of information for the study. The outcomes of the study showed that the majority of students found the PBL application effective in promoting their critical thinking skills, and they mostly had positive attitudes towards learning following the PBL approach.*

Key Words: *Critical thinking, project-based learning, PBL to promote critical thinking, action research*

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I. Introduction

Framework for 21st Century Learning (Battelle for Kids, 2019) has defined critical thinking (CT) as essential to ensure 21st-century readiness for every student, contributing to students' success in the classroom, in the workplace, and as responsible citizens. CT development equips students with the necessary skills for decision-making in a rapidly changing world, discovering solutions to problems, and improving their skills to become lifelong learners (Ku, 2009; Renaud & Murray, 2008; Tsui, 2002).

The importance of CT in the educational system has also drawn much attention in Vietnam, which is evidently shown in the decision of the Vietnamese Ministry of Education and Training (MOET) to establish the development of comprehensive competencies including critical thinking ability as one of the primary objectives for general education. Driven by this, many classrooms have been encouraged to apply different methods to help improve students' critical thinking. However, the questions of what is critical thinking and how students can be trained to develop this ability remains unanswered, especially in my own teaching context.

From studying some studies in English language teaching (ELT), I found that project-based learning (PBL), a learner-centred approach, has the potential to transform students into critical thinkers. PBL provides an alternative approach to foster critical thinking development and promote students to become active participants in society (Dewey, 1991).

A number of studies have apparently shown that PBL instruction is beneficial in promoting students' critical thinking ability in the EFL context. However, these studies mostly focused on investigating tertiary students' CT. From my own study of the literature, I have not found a report about the potential impacts of PBL on high school EFL students' CT. Especially in Vietnam, research on the relationship between PBL approach and high school students' CT is still rare. Since there is a lack of research in this field in Vietnam with high school EFL students as participants, together with the fact that PBL is firmly proven advantageous for the development of CT; Therefore, in this study, I plan to implement PBL in my EFL classes and investigate its effects in promoting my students' critical thinking skills.

II. Literature Review

Definition of critical thinking

Different scholars have defined critical thinking in different way. According to Facione (1990), critical thinking is a cognitive process, a purposeful self-regulatory judgement with two components, which are cognitive skills including interpretation, analysis, inference, evaluation, explanation and self-regulation skills, and a motivational component which refers to the disposition toward critical thinking. Similarly, Beyer (1985) proposed that critical thinking is the ability to collect, evaluate and make effective and appropriate use of information. Critical thinking is also a crucial inquiry in which critical thinkers investigate problems, ask questions, pose new answers, and discover new knowledge.

More specifically, Glaser in Fisher (2001) suggested that the abilities underlying critical thinking are problem identification, solution recommendation, information gathering, unstated assumption recognition, comprehension and accurate, clear language use, precise interpretation of data, logical relationship recognition, ability to draw conclusion and generalization and render accurate judgment about specific things and qualities in everyday life.

From the educational approach, Bloom (1956) constructed a taxonomy for information-processing skills made out of six distinct levels of cognitive skills which form a hierarchy starting from remembering, to understanding, applying, synthesizing and evaluating. The three final levels in this hierarchy are widely recognized as high-order thinking or critical thinking. In the revised Bloom taxonomy (Anderson & Krathwohl, 2001), the names of the levels of thinking were slightly changed, with the three low levels including remembering, understanding, applying; and the high order thinking levels are analyzing, evaluating, and creating. Bloom's Taxonomy is a frequently used tool in setting goals and objectives, and developing activities for learners and assessment materials (Anderson & Krathwohl, 2001), and thus, can be based on in assessing learner achievement. In this study, the three final levels of cognitive thinking in the revised Bloom's Taxonomy were set as the primary goals, around which activities were designed to promote these levels of thinking.

Project-based learning

Grant (2011) defines PBL as a learner-centred instructional strategy based on a driving question or problem that requires learners to conduct inquiry and create artefacts that demonstrate their learning (Grant, 2011). Similarly, as defined on <https://www.pblworks.org/what-is-pbl>, PBL is a form of instruction in which students actively engage in real-world and personally relevant projects. In project completion, students learn information and skills by investigating and responding to an authentic, engaging, and complicated question, problem, or challenge over an extended period of time. Since in PBL, students are provided with multiple opportunities to solve real-world problems by designing their own inquiries, planning their learning, organizing their research, and implementing a multitude of learning strategies, they are naturally engaged in the critical thinking process, which is a key strategy for creating independent thinkers and learners.

In PBL, students are requested to go through several steps to complete their projects. Stoller (2019) suggested and elaborated on the five-step process for integrating project-based learning into language classrooms. According to the author, project-based learning is done through five stages, including (1) preparation cycle, (2) information gathering, (3) information processing, (4) information display, and (5) reflections cycle. The model provides language teachers with an easily adaptable guide in planning, implementing, and evaluating project-based learning. When conducting PBL in this study, the teacher followed Stoller's stages of implementation and designed activities which could promote critical thinking in each of the stages.

Previous studies regarding using PBL for critical thinking enhancement

A number of studies have been conducted to investigate the aspect of PBL which promotes critical thinking skills. Wang (2022) conducted a study in his online class for 16 weeks with the participation of 14 second-year university students in China in which PBL was applied. The participants worked in groups of four or five to complete a reading project. The outcomes of the study showed that the participants demonstrated higher levels of thinking in Bloom's Taxonomy. The participants shared that they were able to read and understand the texts, and use multiple resources of their own choice to facilitate their interpretation of the message communicated through the reading materials. Besides, they were able to make a link between what they read with what happened around them. The participants also engaged in evaluating the provided readings and were optimistic that they would be able to make better judgements in the future. This confirms that PBL can be effectively used to develop students' critical thinking skills together with other targeted skills in the study including reading, collaboration, and self-exploration.

Also in EFL setting, Sholikhah (2019) implemented PBL in her speaking class and explored her students' achievement in both English and critical thinking skills. Two cycles of classroom action research which involved 30 students were done. In this study, some set of projects regarding producing Vlog then uploading it in YouTube platform were given to students. Observation and consultation sheets, together with peer assessment, in-depth

interviews, and questionnaires were the main sources for data collection. By the end of the projects, findings of the study showed that PBL significantly elevates students' speaking skills as well as critical thinking skills.

Rochmahwati (2015) also relied on PBL to promote students' CT in his TEFL course. The instruments for data collection in his study were observation sheets and interviews. He stated the steps that he followed to make this work, which are: (1) Discussing the materials about English Language Teaching Method, (2) working with the group to construct scenario of teaching practice, (3) practicing the scenario, (4) recording the teaching practice into video, and (5) evaluating the video product. The findings showed that the implementation of PBL fostered his students' critical thinking and from the interviews, the students also showed that they had positive attitude toward the implementation of PBL approach. Thus, the author suggests English teachers to apply PBL in their EFL classes to help their students enhance their critical thinking.

From the review of the literature, it is apparent that PBL instruction is beneficial in promoting students' critical thinking ability in EFL context. Suggested activities that teachers can apply to promote their students' critical thinking when PBL approach is implemented in their classrooms are presented in the next part.

Activities teachers should apply in the process of PBL to promote students' critical thinking

As mentioned, students' CT could be improved once students have the opportunity to practice high-order thinking like critically asking questions, assessing the reliability of the information they read, making appropriate judgements to draw logical conclusions and making appropriate decisions, evaluating and creating something. Therefore, when giving projects, it is advisable that teachers provide students with opportunities to practice making judgments in multiple situations, such as in gathering and assembling information, in analyzing and synthesizing it, and in formulating and evaluating conclusions. Hughes, J. (2014) added that activities such as evaluating the reliability of sources of information; critical questioning, making connections between prior knowledge and topics; collecting, analyzing and evaluating information; creating the final products; assessing the project using rubrics and feedback form also play an essential role in developing students' critical thinking skills. In this study, the teacher engaged students in all these activities to promote their critical thinking in all stages of PBL.

III. Research method

Research questions

The study aims at investigating students' perceptions toward the application of PBL in their EFL classrooms for the purpose of developing their critical thinking skills. Therefore, the research question proposed was:

What are students' perceptions towards the impacts of the application of PBL in their EFL classrooms to develop critical thinking skills?

Research design and procedures

This study followed the action research design, in which the researcher was also the teacher of the class and the aim of the study was to apply the PBL approach to her teaching with a view to promoting her students' ability to think critically. Following the action research design, the teacher and researcher conducted an action research cycle following the four steps namely planning, acting, observing, and reflecting recommended by Kemmis and McTaggart (2000). Details about what the teacher did in each stage of the study are hereby presented.

Step 1: Plan

- ✓ The teacher studied a number of available theoretical and practical sources regarding CT, the PBL procedures, and how PBL can be used to promote CT in EFL context. From the knowledge accumulated, she designed a detailed tentative plan for the application of PBL in her classes to promote her students' CT.
- ✓ All the necessary materials were well prepared in advance, including the PBL lesson plan in which the teacher included all the necessary information for the implementation of PBL approach such as the name of the project, the driving question, the expected outcomes, the tentative products, the requirements for students, the activities to be disseminated in each stage of PBL, the materials to be used the feedback form and the rubrics for project work evaluation, the level of instructions and supports she was going to provide students to be able to facilitate students' CT, and all other related documents.
- ✓ Instruments to collect data for analysis and the time to distribute them were also prepared in advance.

Step 2: Act

- ✓ PBL was applied to the two classrooms that the teacher was in charge of teaching that semester.
- ✓ In the first week, the teacher communicated with the students about the projects, giving them all the necessary information and providing a clear explanation to make sure students all understand what they were expected to be doing in the following weeks in class and at home, what their roles would be and

where and when they could find the teacher for support. Students then formed groups, appointed a group leader and discussed their group plans and individual work which they should finish in the next week.

- ✓ In the following weeks, teachers continued acting as the facilitator, the guide for students and allowed students to make their own decisions regarding the group project. Also during this time, the teacher used her observation sheet to make notes about her students' participation in the activities for CT development she applied in PBL classrooms.
- ✓ In the final week, students were provided with the rubrics to practice evaluating their group and others' group project. Teachers explained the assessing criteria to make sure students understand in a similar way for a more accurate and fair evaluation.

Step 3: Observe

- ✓ To observe the classes, the teachers used a number of tools (observation, questionnaire, interview) to get information about the potential impacts of the PBL implementation on students' CT improvement. The observation was done by the teacher herself. She used it to briefly and conveniently note down information regarding students' level of participation in the activities for CT development she applied in PBL classrooms. The questionnaires and interviews were conducted during the final week of the PBL implementation to get information about students' perceptions regarding their improvement of CT and English skills and their attitudes towards the implementation of PBL approach in their EFL classrooms.

Step 4: Reflect

- ✓ The data collected were analyzed to look for the answer to the research questions. Based on the findings and discussion, implications on how EFL teachers can employ PBL in their classrooms to promote their students' CT were made.

Participants

90 EFL students in two different English classes at a high school in Vietnam were participants of this study. The classes were chosen simply because the researcher was also the teacher of the two classes. Consideration regarding their geographical and family background or level of English proficiency was not made because participants all came from the same high school and were in the same grade. Most importantly, the focus of the study was only put on what activities in PBL could teachers make use of to promote their students' thinking skills and how students perceive the PBL application in EFL context with the purpose of turning them into critical thinkers rather than analyzing the relationship among students' background and PBL and CT.

Data collection and analysis

As mentioned, the teachers used a number of tools including observation, questionnaire, and interview to get information about the potential impacts of the PBL implementation on students' CT improvement.

The questionnaires and interviews were the most important tools for collecting data. They were conducted during the final week of the PBL implementation to get information about students' perceptions regarding their improvement of CT and English skills and their attitudes towards the implementation of the PBL approach in their EFL classrooms.

The questionnaire had ten items, which are classified into three categories: (1) Students' interests in the project; (2) Students' beliefs of their changes in critical thinking ability after taking part in the PBL lessons; and (3) students' attitudes towards the development their English skills after the implementation. All the items were in the form of statements. Students were asked to show the extent to which they agreed or disagreed with those statements. Five-point Likert Scales were based to distinguish the level of agreement.

Semi-structured interviews with four students were conducted to have more insight into students' evaluation of the impacts of PBL instruction on promoting their CT, and their attitudes regarding the PBL application. Since the focus of the interview is information about students' perceptions, the interview questions are in Vietnamese to assure that students will not have any difficulties in understanding and expressing their ideas.

The interviews of the current study consist of five questions, done with a view to exploring the students' attitudes regarding the development of their critical thinking skills as well as their English skills under the impacts of PBL implementation. It also has an item to investigate students' difficulties during the intervention period and get to know their recommendations on how to carry out projects successfully so that the teacher can make some necessary changes for the next project-based lesson plan for her students' CT development.

The final tool for data collection was observation, done by the teacher herself. She used it to briefly and conveniently note down information regarding students' level of participation in the activities for CT development she applied in PBL classrooms.

IV. Findings and discussion

In the following part, the findings from the questionnaire, interviews and observation are presented and compared to look for the answer to the research question.

The most important finding from the questionnaire regarding students' perceptions of their own development of CT is illustrated in the following table. Since the number of positive responses which are *agree* and *totally agree* outweighed the neutral and negative answers (*neutral*, *disagree*, *totally disagree*), only figures regarding the positive feedback were summarized in Table 1.

Table 1: Students' perceptions of their own development of CT under the implementation of PBL

Statement	Number of positive responses	Percentage (%)
Through project-based learning, I have improved the ability to judge the value of new information or evidence presented to me.	72	80
Through project-based learning, I have improved the ability to make critical questions and actively engage in critical questioning.	65	72
Through project-based learning, I have improved the ability to make connections between prior knowledge and topics.	72	80
Through project-based learning, I have improved my ability to collect, analyze and judge the value of information.	65	72
Through project-based learning, I have improved the ability to create solutions or final products.	69	77
Through project-based learning, rubrics and assessment of projects have stretched my intellectual abilities.	70	78
I have learnt more about how to justify why certain procedures are undertaken in my projects.	66	74
I have developed a more focused and systematic way of thinking.	68	75

The figures in Table 1 showed that the majority of students participating in the PBL classrooms found that their CT was promoted to some extent. For all indicators of critical thinking skills, at least 72% and at most 80% of the participants recognized the changes in their ability to think critically. To be more specific, 80% of the students found that they could better judge the value of the new information and could make connections between their prior knowledge and the topics for discussion. Students' ability to relocate, and make judgement to validate the information, according to Brookhart (2010) has the potential to turn a student to become a critical thinker.

A little smaller percentage of students (77% and 78%, respectively) acknowledged that their ability to create solutions or final products was improved, and the rubrics and assessment of projects stretched their intellectual abilities. Though fewest students thought that the ability to make critical questions and actively engage in critical questioning, and the ability to collect, analyze and judge the value of information was changed, the percentage of 72% found the improvement regarding these two indicators of CT was still considered an impressive result. Elder and Paul (1998) strongly advocated that questions encourage thinking. Therefore, to promote students' critical thinking, teachers should provide opportunities for them to make questions critically.

From the interviews, students agreed that PBL was effective in promoting their CT. A student recognized that his ability to critically question was improved thanks to constant groupwork. "Since groupwork requires each to share one's own idea, making questions were important. From that, I was active in making questions and discussing with other group members to find the solutions." (Student B). Similarly, a student shared that regular critical question making helps "build critical thinking ability in my brain" (Student C).

Students also said that PBL helped them "become better at collecting and judging the value of new information" because they "have to choose the most valuable information which fits what the group are working on". (Student B). Thanks to this, students were able to "analyze (the situation) and find feasible solutions and explore the problems from multiple angles". (Student A).

Regarding the development of a more focused and systematic way of thinking, students revealed that his "ability to concentrate and think systematically is also greatly developed" because the PBL approach gave them the opportunity to "gradually formed logical thinking to solve the problem". (Student C) and also because they "need to complete the requirements of the group to make the content the most complete." (Student B).

With regard to students' attitudes towards the positive impacts of PBL on their English skills development, from the interviews, students agreed that PBL provided them with opportunities to learn and improve their weak skills and made students become "a better self" (Student D). The results of the questionnaire shown in the figure below summarize the massive of students' perceptions regarding this.

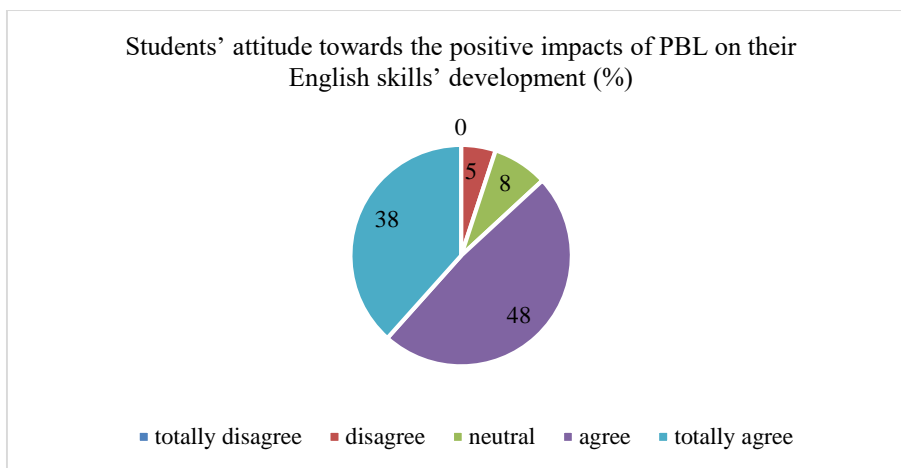


Figure 1: Students' attitude towards the positive impacts of PBL on their English skills' development

Figure 1 above presents information about students' attitudes toward the positive impacts of PBL on their English skills development. Similar to students' perceptions regarding the effects of PBL on their CT ability, a significant number of the students surveyed acknowledged that PBL implementation had a positive impact on their English skills. For more details, 48% of the students agreed that their English proficiency was improved to some extent, and 38% totally agreed on the positive effects of PBL on promoting their English. Only a small number of students (8%) were skeptical about the changes in their English proficiency, and 5% thought that they did not make any improvement. This confirms that the implementation of the PBL approach was not only beneficial for CT improvement but also good for enhancing students' English skills. In the interview, students explained that engaging in PBL helped "improve my vocabulary... and my reading and writing skills" (Students A and C). Students also share that their English skills were not so good before; however, "My English skills (listening, speaking, reading and writing) are improved because my friends and teacher help show me my mistakes and correct them" (Student D).

Findings from the observation sheet about students' level of participation in the activities for CT development the teacher applied in PBL classrooms are summarized and presented in the table below.

Table 2: Students' participation in the activities for CT development applied in the PBL classroom

Activity	Attentive participation
Evaluating the reliability of sources of information	Found in all groups
Questioning critically	Found in all groups
Collecting, analyzing and evaluating information	Found in all groups
Creating the final products	Found in all groups
Evaluating the project - using rubrics and feedback form	Found in all groups

As can be seen from the summary of the weekly observation sheets, for all activities that can facilitate critical thinking development conducted by the teacher, including evaluating the reliability of sources of information, questioning critically, collecting, analyzing and evaluating information, creating the final products, and evaluating the project - using rubrics and feedback form, evidence for students' attentive participation was found. This partly helps to confirm that the regular practice of CT during the completion of group projects had positive impacts on promoting students' critical thinking ability.

Besides, from the interviews, students shared that PBL was not only "good in promoting critical thinking ability but also fostering students' creativity" (Students A and B). PBL application in the EFL context also helped students become "more confident in sharing ideas and contributing to the lesson" (Student C). Besides, students acknowledged that "PBL was an interesting approach to learning". From the findings, it can be seen that students found their CT ability was promoted thanks to their CT practice through different steps of PBL and they had positive attitudes towards the implementation of PBL in their classrooms.

V. Conclusion

The results of the current study have confirmed that PBL application has the potential to promote students' critical thinking ability since it provides an array of opportunities for them to practice critical thinking skills. In PBL, students are the centre of the learning process. They acquire the knowledge and skills through a series of activities requiring critical thinking practice. In this study, students' CT has improved thanks to their

practice of evaluating the reliability of sources of information; critical questioning, making connections between prior knowledge and topics; collecting, analyzing and evaluating information; creating the final products; and evaluating the project using rubrics and feedback form. It can be concluded that PBL can entail CT development and, therefore, is worth applying in EFL settings in order to promote students' critical thinking ability. To be able to do this, it is advisable that teachers consider and make careful plans regarding the activities they conduct in their classrooms to maximize the opportunities for students to engage in critical thinking practice.

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