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APPLYING PROJECT-BASED LEARNING TO EDUCATE PRIMARY SCHOOL STUDENTS ON ENVIRONMENTAL PROTECTION

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Abstract. Environmental protection has become a global concern, making environmental protection education vital at the primary school level. This education aims to comprehensively develop students' competencies and qualities as outlined in the 2018 General Education Curriculum. Project-based learning is a teaching method where students engage in complex tasks that seamlessly integrate theory and practice. Through high self-reliance, students autonomously complete tasks, acquiring essential knowledge and skills by solving problems linked to real-life contexts. Upon completing projects, students produce outcomes that align with learning objectives or propose practical solutions to real-world issues. This study employs document-based research methods closely linked to practical teaching. The paper proposes a process for applying project-based learning to environmental protection education for primary school students, based on relevant content, to meet the requirements of the 2018 General Education Curriculum. This approach is designed to help students complete tasks systematically and logically.

Keywords: environmental protection education, primary school students, project-based learning process.

1. Introduction

Maria Montessori once shared a meaningful insight about the environment: a child who deeply loves their surroundings and all living creatures, and who finds joy and enthusiasm in their work, gives us hope for a new direction in humanity's development. This quote highlights the significant impact the environment has on children, especially primary school students. Among modern teaching trends, project-based learning (PBL) stands out as an advanced method that places learners at the center, promoting active and self-directed learning. This approach was pioneered by American educator and philosopher John Dewey (1859-1952), who championed the idea of teaching through specific projects and practical problem-solving (Dewey, 1897). The method was first implemented by Barrow, an American neurologist and professor at McMaster University in Canada, in 1969. PBL is a student-centered teaching model that encourages students to explore, apply the knowledge they have gained, and create their products through open-ended assignments. Unlike traditional teaching models, PBL involves a complex pedagogy where students acquire knowledge and develop skills by solving real-world problems, all under the guidance of a teacher. This approach integrates closely with the curriculum, combining theory and practice, and culminates in the creation of specific products (MOET, 2018; Dinh et al., 2019). The core of project-based learning is that students gain essential knowledge and skills through situational tasks that relate to real-world practice (the project assignment). Upon completing the

project, students must produce a product that aligns with the learning objectives and has practical applications. This approach not only deepens their understanding but also ensures that their knowledge is practically applied.

PBL is an instructional model that organizes learning around projects. In PBL handbooks for teachers, projects are defined as complex tasks centered on challenging questions or problems, involving students in design, problem-solving, decision-making, or investigative activities. These projects allow students to work relatively independently over extended periods and result in realistic products or presentations (Jones et al., 1997; Thomas et al., 1999). Key characteristics highlighted in the literature include authentic content and assessment, teacher facilitation rather than direct instruction, clear educational goals (Moursund, 1999), cooperative learning, reflection, and the integration of real-world skills (Diel et al., 1999). Smith (2018) characterized PBL as an educational approach where students cultivate and apply skills by engaging in a long-term project focused on deeply exploring a particular topic or question. This method introduces students to new skills and allows them to refine those they have already started to learn. According to research by Akseka and Haataien (2019), PBL effectively involves a wide range of participants, including both teachers and students. PBL offers significant benefits by developing essential skills such as teamwork, problem-solving, and innovation, while also broadening students' knowledge. Moreover, PBL is seen as an effective instructional strategy for preparing students for higher education, professional growth, and future challenges (Larmer et al., 2015). In the 2018 General Education Curriculum, environmental protection education for primary school students is delivered through various subjects and activities, including Moral education, Experiential activities, Science (Grade 4), and History and Geography (Grades 4 and 5), etc. With a strong foundation, students can engage in meaningful actions to protect the environment. Implementing PBL, especially in environmental education, will help primary school students develop autonomy, self-directed learning, communication and collaboration skills, as well as problem-solving and creativity. Additionally, it will foster five key qualities: patriotism, compassion, honesty, responsibility, and diligence.

The primary challenge of implementing PBL lies in designing practical and feasible activities that yield successful outcomes. Environmental protection education is a vital component of the school curriculum, aimed at developing specific competencies in primary school students while promoting their overall personal growth, in accordance with the objectives of the 2018 General Education Curriculum. This approach positions primary school students at the center of the learning process, encouraging them to adopt positive, proactive, and creative attitudes. It is especially relevant for environmental protection education, as students can easily observe and identify environmental issues in their daily lives such as climate change, water quality, air quality, and the presence of waste or greenery in their classrooms. Through project assessments, teachers can effectively gauge students' engagement levels, their ability to apply knowledge to real-world situations, and their problem-solving skills regarding environmental challenges. This paper proposes a method for implementing PBL in environmental protection education for primary school students. It is grounded in a study of relevant content and outlines a clear instructional process that aligns with the requirements of the 2018 General Education Curriculum.

2. Content

2.1. Project-based learning in primary schools

2.1.1. Definition

PBL is a student-centered instructional approach based on three constructivist principles: learning is context-specific, learners are actively engaged in the learning process, and they achieve their goals through social interactions and sharing knowledge and understanding (Cocco, 2006).

As a distinct form of inquiry-based learning, PBL uses authentic questions and real-world problems to provide a context for learning, leading to meaningful educational experiences (Wurdinger et al., 2007; Al-Balushi & Al-Aamri, 2014). In this educational strategy, students gain knowledge and skills by delving into and tackling a complex question, problem, or challenge over an extended period. This approach enables students to actively engage with the material and develop essential skills, including critical thinking, problem-solving, and teamwork (Hoang & To, 2019).

In this research, PBL is recognized as an important and effective teaching method, well-suited for the current education system oriented towards developing competencies. It applies to various types of lessons and learning activities, particularly experiential activities in the 2018 General Education Curriculum (MOET, 2018). For primary school students, PBL is characterized by the following features: (1) student-centered approach: students are at the center of project-based teaching; (2) practical activities; (3) diverse learning activities; (4) combination of group and individual work and (5) focus on outcomes: attention is paid to the project's outcomes. PBL in primary schools integrates various teaching methods during the implementation process, such as group discussions, presentations, observations, and problem-solving. To successfully implement PBL, primary school teachers and students must have a solid understanding of active teaching methods, their advantages, and limitations, to apply them flexibly throughout the process. By leveraging these characteristics, PBL can effectively engage primary school students, fostering their competencies and enhancing their learning experiences through practical, hands-on projects.

2.1.2. Advantages and Limitations of Project-based learning in primary schools

Advantages:

- Learning occurs naturally, making the content more meaningful.
- Learning is driven by the need to solve practical problems, which stimulates active and engaged learning, creating a favorable environment for students to practice and develop their skills.
- PBL develops students' soft skills such as teamwork, time management, and critical thinking.
- The curriculum is flexible, allowing for adaptation to different learning needs and contexts.

Limitations:

- PBL requires significant time, technical resources, and financial investments.
- Teachers find it challenging to plan and manage student learning due to the lack of textbooks or structured lesson plans.
- The uneven knowledge base of students makes it difficult to assess individual progress accurately.
- Some students may not yet be ready for this new learning approach, especially those who are accustomed to traditional methods (Dinh et al., 2019)

According to Kilpatrick (1918), a significant challenge teachers face is sustaining students' interest in projects over an extended period while ensuring that the work remains purposeful. For primary school students, PBL presents particular difficulties, especially for those in the early grades, due to their developing cognitive abilities and limited soft skills and practical experience. In contrast, students in the later grades of primary school can better leverage the strengths of PBL, as they have matured cognitively and developed essential skills such as teamwork, which enhances their capacity for exploration and discovery. Research and practical experiences in organizing PBL linked to environmental protection education for primary school students reveal several advantages and challenges. One of the main advantages of PBL is that it enables students

to take ownership of their learning. They engage in practical activities and observe real-life situations, moving beyond reliance on textbooks and illustrations. Through projects focused on environmental education, students develop crucial skills such as communication, teamwork, critical thinking, and problem-solving in real-world contexts. This hands-on approach not only enhances their motivation to learn but also fosters their ability to explore and create, particularly in transforming knowledge into action. However, implementing PBL in primary education also involves challenges. These include effectively managing time during project organization, potential time losses, and the preparation of physical resources and environments. Additionally, it is essential to ensure that the specific objectives of the curriculum are met throughout the various stages of the project.

2.2. Environmental protection education through Project-based learning for primary school students

The environment is understood as the collection of surrounding factors or external conditions that interact directly or indirectly and influence the development and existence of living organisms. According to Article 3 of the 2005 Law on Environmental Protection, "The environment includes natural and artificial material factors surrounding humans, which impact human life, production, existence, and development, as well as nature" (National Assembly, 2005).

Environmental protection education aims to help individuals and communities develop a deep and sensitive understanding of the environment and its existing problems. This involves mastering basic environmental concepts, being aware of the responsibility to protect the environment, forming a sense of love for nature, and establishing relationships to improve and protect the environment. It also includes developing negotiation and problem-solving skills, mobilizing community participation in environmental protection, fostering a self-reliant spirit, and taking appropriate action to address environmental issues.

Environmental protection education aims to comprehensively develop students' knowledge, skills, life values, and environmental awareness. This process is crucial for helping students recognize the importance of environmental protection from a young age, especially at the primary school level, and it contributes to the sustainable development of ecosystems. In primary schools, environmental protection education is integrated into various subjects through multiple methods, including full, partial, and content-related integration. However, this integration often faces several challenges. A survey conducted in several primary schools in Can Tho City has identified these issues and proposed solutions to enhance students' awareness of environmental protection (Trinh & Lu, 2022). PBL serves as an effective approach for teaching environmental education to primary school students. It allows them to actively implement their personal or group ideas, ensuring that the various steps in the project are seamlessly interconnected. In this context, primary school teachers act as guides, facilitators, and supporters, assisting students from brainstorming ideas to completing the final product. They also organize peer evaluations and help students reflect on their experiences and lessons learned from practical work. Additionally, subject teachers, such as those in Fine Arts, Music, and Physical Education, can collaborate with homeroom teachers to integrate environmental protection education into diverse learning projects. This collaboration provides students with enriching experiential learning opportunities, further enhancing their understanding and commitment to environmental stewardship.

Based on the psychological and cognitive characteristics of primary school students, environmental protection education can be effectively integrated into PBL in ways that align with their developmental traits. For students in grades 1, 2, and 3, environmental protection projects create opportunities for collaboration, idea sharing, and discussions about solutions to environmental issues. These projects help young learners understand the impact of the environment on their community and encourage them to engage in activities aimed at improving

it. At this age, students can distinguish between positive and negative behaviors and recognize what actions are necessary to protect the environment. However, their shorter attention spans may pose challenges for implementing large or long-term projects. In contrast, students in grades 4 and 5 exhibit more developed cognitive abilities and a heightened desire to explore the world around them, making PBL particularly suitable for this age group. Environmental protection projects at this level are practical and socially relevant, stimulating curiosity and creativity through hands-on activities and experiences. These older students can maintain higher levels of concentration, discipline, and time management skills compared to their younger peers, allowing them to coordinate effectively with one another to solve assigned problems. At the conclusion of a project, students in grades 4 and 5 can self-evaluate their own work, assess their group's efforts, and provide constructive feedback to improve the overall project. This reflective approach not only deepens their understanding of environmental issues but also fosters critical skills essential for their future education and personal development.

2.3. Integrating environmental protection education across subjects in the 2018 General Education Curriculum

In the 2018 General Education Curriculum, environmental protection education projects for primary school students are understood as the integration of environmental protection education content across various subjects. The level of integration of environmental protection content in PBL depends on the compatibility between the objectives and content of environmental protection education with the objectives and content of the lesson or chapter. This integration can be classified into the following levels:

- Comprehensive level: The objectives and content of the lesson, part of a lesson, chapters of a subject, and the content of different subjects align well with the objectives and content of environmental protection education.

- Partial level: Part of the lesson or subject has objectives and content that are suitable for environmental protection education.

- Associative level: There are logical connections between knowledge, environmental issues, and environmental protection education through different subjects.

To achieve the educational goals set forth in the 2018 General Education Curriculum, especially concerning environmental protection education, teachers must have a thorough understanding of the overall curriculum and the specific subjects at the primary school level that incorporate environmental education content. This knowledge enables them to create a comprehensive plan that outlines the timeline, duration, and personnel required for organizing PBL for primary school students in a clear and detailed manner.

PBL can be integrated into several subjects that contain environmental protection education content for primary school students in the 2018 General Education Curriculum, as outlined in the following Table 1 (MOET, 2018):

Table 1. Environmental protection education content integrated into primary school subjects

Subject	Objectives	Environmental protection education
Natural and Social Sciences (Grades 1, 2, 3)	It is a compulsory subject in grades 1, 2, and 3, built on a foundation of basic scientific knowledge about nature and society. This subject is highly practical, as it organizes real-life experiences for students, helping them develop a love for their homeland, a diligent character, an awareness of self-protection and family, and a sense	The content of environmental protection education is expressed through the required competencies of investigating the natural and social environment around them and developing reading skills to: explain at a simple level some objects, phenomena, and relationships in nature and society.

	of responsibility towards their living environment.	
Science (Grades 4 and 5)	Science is a compulsory subject for students in grades 4 and 5 at the primary school level. It builds on the learning themes introduced in the Natural and Social Sciences subject in grades 1, 2, and 3.	The topic "Environment and Natural Resources" helps students understand that nature, humans, and society form a unified whole with reciprocal relationships. Humans, through their activities, serve as the bridge between nature and society, significantly impacting both. Teachers need to provide clear guidance on how to convey the information and organize activities appropriate for this age group. The goal is not only to help students acquire knowledge but also to apply it in their practical lives. This approach ensures that students recognize the importance of environmental protection and the impact of human activities on natural resources and society.
History and Geography (Grades 4 and 5)	History and Geography is a subject that imparts basic knowledge closely connected to the natural and social environments surrounding the students. Therefore, it provides a favorable context for educating students about the environment, developing skills to interact with it, and fostering responsible attitudes towards environmental stewardship.	-Educating students about the beauty of nature and the importance of protecting natural resources in Vietnam. -Encouraging students to respect mineral resources and use them responsibly. -Helping students understand that human production activities directly impact the environment, thereby illustrating the influence of human activities on the natural environment.
Moral education (Grades 1,2,3,4,5)	This subject helps students develop an initial understanding of ethical and legal behavioral standards appropriate for their age group in their relationships with themselves, others, the community, the country, humanity, and the natural environment.	- Educating students to understand and implement the maintenance of public works that are directly related to the environment and quality of life. - Helping students recognize the importance of natural resources for human life. - Instilling a sense of responsibility in students for participating in the preservation and protection of natural resources, in ways that are appropriate to their abilities.
Experiential Activities (Grades 1,2,3,4,5)	Experiential activities are a compulsory component of the educational curriculum at the primary school level. Environmental protection education can be integrated into these activities through various formats such as flag ceremonies, thematic education, classroom activities, and clubs.	By organizing experiential activities focused on environmental protection, students will (1) Develop an understanding of their living environment and the importance of maintaining it; (2 Learn to appreciate and love nature; (3) Increase their awareness of the need to protect and preserve nature and the living environment; and (4) Understand the importance of sustainable and safe living practices.

The above summary outlines the integration of environmental protection education into the subjects of the 2018 General Education Curriculum at the primary school level (MOET, 2018). From the environmental protection knowledge acquired through these subjects, students will be able to practice and reinforce their learning through experiential activities. Applying PBL will

enable students to optimally apply this knowledge in practical settings. Within the scope of this article, the authors propose a process for developing PBL to actively engage primary school students in environmental protection education.

2.4. Process for applying Project-based learning to educate environmental protection for primary school students

In this paper, the authors explore the application of the 5-step PBL process proposed by Krajcik and Blumenfeld (2006) for social science subjects, specifically adapted to the theme of environmental protection education. This approach is well-suited for primary school students, enabling them to complete tasks systematically and logically.

PBL is a comprehensive approach to creating effective learning environments, consisting of five fundamental stages, as illustrated in Figure 1:

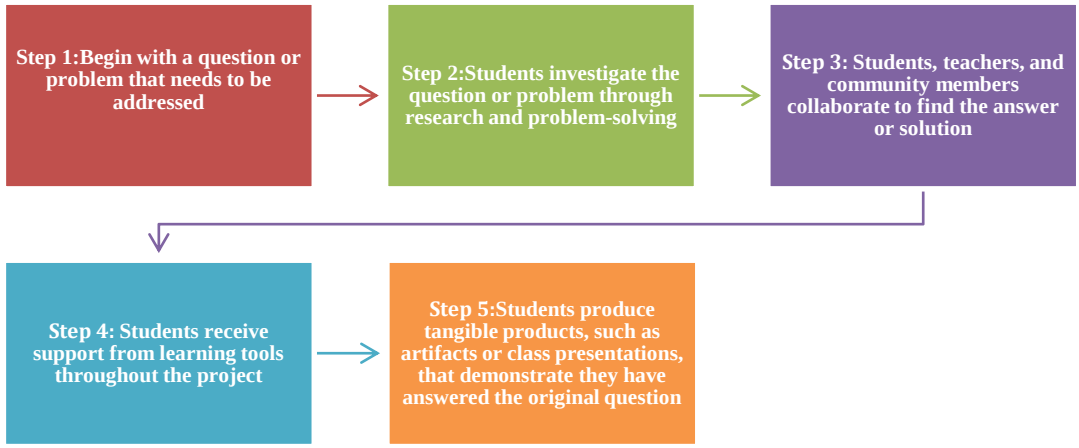

Figure 1. Krajcik & Blumenfeld (2006), Project-based learning

Drawing on the process researched by Krajcik & Blumenfeld (2006), and taking into account the psychological and physiological characteristics of primary school students in Vietnam, the authors have developed a five-step project-based teaching process for environmental protection education:

Table 2. Project-based Teaching process for environmental Protection Education

Step	Objectives	Procedures
Step 1: Identify the Theme, Topic, and Divide into project groups	Propose the names of the projects. Guide students on how to formulate guiding questions related to the topic. Identify the project objectives, including general competencies, specific competencies, and qualities.	*Activity 1: Divide into groups* Divide the class into smaller groups. Assign tasks to each group. Create a list of the groups (group names and members). *Activity 2: Record student feedback* Use the 5W1H technique to gather student input.
Step 2: Develop the project plan	Guide students with oriented questions related to the topic. Identify the tasks and activities required for the project. Develop the overall project plan.	*Activity 1: Establish consensus on project group names and activity plans* Groups discuss and briefly present their implementation plans for the project using a mind map. *Activity 2: Establish evaluation criteria*

		The teacher and students discuss and agree on criteria to evaluate the project, including the evaluation of group activities, project content, and project products.
Step 3: Implement the project plan	Understand the knowledge used in the project implementation process. Apply practical life knowledge to the project. Work according to the established project plan and activities.	*Activity 1: Report on project implementation progress* Discuss and exchange ideas with group members. Students present the discussion results. Each group reports on their project implementation progress, sharing difficulties and challenges with the teacher to solve problems and receive feedback and suggestions for better results. *Activity 2: Guide students to prepare the product report* The teacher guides and edits to help students prepare the complete group product, presentation slides, etc.
Step 4: Present the project products	Present the knowledge and products developed in the project. Identify the knowledge applied in practice. Understand the products of the group and other groups. Provide comments, evaluations, and scores for the projects of other groups based on the agreed evaluation criteria.	The groups take turns presenting and discussing their project products. Students report on their group's products from the ideation stage to completion, the significance of the products, etc.
Step 5: Evaluate the project	Enable students to self-evaluate and evaluate other groups' products. Allow the teacher to provide comments, summaries, and direction for future activities	*Activity 1: Group and individual self-evaluation* Group representatives share lessons learned through the project, including difficulties encountered during collaboration and their resolutions. Students share their feelings about participating in the project and draw lessons from the implementation process. *Activity 2: Summarize* The teacher concludes whether the issues have been resolved and identifies any necessary adjustments. Evaluate the quality of the products. The teacher provides rewards and encouragement to the students.

2.5. Example

I. Project Title: "**Today's Environment - Tomorrow's World**"

This project, "Today's Environment - Tomorrow's World," is designed for students in grades 4 and 5, drawing on the principles of PBL and the environmental education content integrated across various subjects. The project will be conducted over two class periods: one for in-class guidance and the other for students to actively engage in the project and prepare their reports.

Teaching Methods

The teaching approach will utilize PBL in conjunction with other methods, including group discussions, problem identification and resolution, and presentations…

Teaching Aids and Learning Materials

Textbooks: Science (grades 4 and 5), Experiential Learning, and Moral Education.

Materials: A0 papers, colored paints, magnets, colored markers, etc.

Technology: Computers, projectors, and illustrative images.

II. Project Objectives

After participating in the project, students will be able to:

Identify some of the causes and harmful effects of environmental pollution.

Recognize and differentiate between a clean environment and a polluted environment.

Carry out some actions to protect the environment.

Investigate the level of environmental pollution in their local area through research methods, statistics, and interviews.

Propose measures to protect the environment, such as recycling and creating awareness-raising artwork.

Develop general competencies: problem-solving and creativity, communication and collaboration, autonomy and self-learning.

Foster personal qualities: responsibility, diligence, and compassion.

III. Project Description

School: .....

Grades: 4 - 5

Number of Students: .....

Number of Classes: .....

Objectives	**Procedures**
Step 1: Identify the topic and subject matter Objective: Recognize and differentiate the signs of a clean environment and a polluted environment. Method: Observation and question-and-answer	-The teacher shows students two videos: one depicting clean water sources, fresh air, etc., and another showing polluted water sources, indiscriminate dumping of waste, factory emissions, etc. -The teacher asks the following questions: What was the content of the two videos you just watched? What kind of environment do you want to live in? Why? What role does the environment play in human life? What do we need to do to have a clean environment? -Students discuss these questions and propose solutions. -The teacher summarizes the discussion and suggests possible sub-topics for student projects, such as: Creating environmental protection awareness posters Displaying recycled products Initiating a project to say no to plastic waste Creating a short play on environmental protection Preparing presentations -The teacher and students agree on the final topic
Step 2: Develop a plan Objective:	-The teacher divides the class into four groups, each consisting of 8-10 students, depending on class size. -Each group discusses and develops ideas for sub-topics related to the project.

<table>
<tr>
<td>Propose sub-topics for the project “Today's Environment - Tomorrow's World”
Develop a detailed plan of action for each sub-topic
Method:
Discussion, question-and-answer, and problem-solving</td>
<td>-The teacher summarizes the ideas from all groups and, along with the students, proposes issues to investigate.
-Students select sub-topics and form groups to carry out the project tasks. They can name their group's project based on the sub-topic content.
-Examples:
Group 1: Draw paintings on the theme of environmental protection.
Group 2: Investigate the current state of the environment where they live.
Group 3: Recycle materials into decorative items.
Group 4: Present some measures to protect the environment using PowerPoint.
-Students in each group discuss and determine the objectives of their sub-topics.
-The teacher, together with the students, develops a detailed plan by suggesting questions for students to answer: Who? What? Where? How? When? These questions should be appropriate for the research subject of each sub-topic.
-Develop a plan for practical activities, assigning specific tasks, resources, locations, and expected products.
-The group leader holds meetings to discuss the division of tasks among group members.
-Groups share and discuss their plans to ensure feasibility, relevance, and the achievement of objectives.</td>
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<tr>
<td>Step 3: Implement the plan
Objective:
Implement the objectives of the sub-projects.
Investigate and synthesize the causes of environmental issues.
Propose solutions to contribute to environmental protection.
Method:
Investigation, survey, and observation.</td>
<td>-Groups and individuals carry out tasks according to their plans, conducting actual investigations and researching documents.
-Students record and save the information they obtain.
-The teacher distributes survey forms to the students.
-Provides suggestions on how to collect and record information.
-Example: Group 2: Investigate the current state of the environment where you live. The teacher guides students to investigate the soil environment, identifying causes and proposing protection methods.
SURVEY FORM FOR ASSESSING THE CURRENT STATE OF THE NATURAL LANDSCAPE
Group Name: .....
Landscape Name: .....
Address: .....
Time of Survey: .....
Members Participating in the Survey: .....
Current State:
<table>
<tr><th>No</th><th>Survey Content</th><th>Quantity</th><th>Comments on Current State</th><th>Notes</th></tr>
<tr><td>1</td><td>Waste</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>Wastewater</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>Greenery</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>Signage</td><td></td><td></td><td></td></tr>
</table>
(For Group 2 and Group 3, the teacher contacts parents, seeking their support and assistance during the investigation process (filming, taking photos) to ensure student safety).</td>
</tr>
<tr>
<td>Step 4: Presenting the project products
Objective:</td>
<td>-The groups summarize the information and create initial reports from the collected data.
-Share the report ideas with the teacher for feedback.</td>
</tr>
</table>

Provide comments and draw overall conclusions from the actual research. Propose appropriate environmental protection measures for the age group. Method: Group discussion	-Share and discuss within the group the appropriate way to present the report. -Students can discuss with the teacher and request support from their families and subject teachers on the presentation method. -Each group presents their findings and proposed measures for environmental protection. -Engage in a discussion with peers and teachers to refine their conclusions and proposals.
Step 5: Evaluating the project Objective: Groups present their projects and display the products. The teacher and groups provide comments and evaluations based on agreed criteria. Project products are displayed on the school's bulletin board. Method: Presentation and evaluation.	Group Presentation and Display: -Each group presents their project and displays their products. -The teacher and peers provide comments and evaluations. Group Self-evaluation: -Group representatives share with the class what they have learned from the project, the competencies they have developed, their satisfaction with the results, and the difficulties they faced and how they solved them. -Members discuss their feelings during the project implementation and their perceptions after completing the project. -The teacher may invite the Principal and the Head of the Youth Union to participate as guests and evaluate the students' project results. Peer evaluation: -Each group prints a report for other groups to read, comment on, and evaluate. -Groups use the agreed criteria to review and evaluate the projects of other groups. Teacher's evaluation: -Evaluate the quality of the products and the group's self-assessment results. -Assess the group's working methods and the work attitudes of the members. -Discuss lessons learned and provide constructive feedback.

3. Conclusion

The study demonstrates that applying PBL in environmental protection education for primary school students significantly enhances their competencies and qualities as outlined in the 2018 General Education Curriculum. PBL effectively combines theoretical knowledge with practical experiences, increasing students' interest in learning. By focusing on environmental protection, PBL encourages students to work like researchers, using practical tools and developing collaboration and creativity. However, PBL has both advantages and disadvantages. This study highlights its benefits, such as increased student engagement and the opportunity to integrate knowledge from various subjects while solving real-world problems. To mitigate drawbacks like the significant time required and the challenge of assessing individual contributions, teachers should follow a structured five-step process and select projects suitable for primary school students and relevant to real-life contexts. In conclusion, this study provides valuable insights into the process, organization, and application of PBL for environmental protection education. By leveraging the strengths of PBL, educators can foster a deeper understanding of environmental issues and develop students' critical thinking, problem-solving, and collaborative skills, preparing them to become responsible citizens contributing to environmental protection.

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