

Original Research Article

Teaching Science through Projects Based Learning

Nguyen Van Hung^{1*}

¹University of Education, Hà Nội, Vietnam

Article History

Received: 14.05.2024

Accepted: 26.06.2024

Published: 28.06.2024

Journal homepage:

<https://www.easpublisher.com>

Quick Response Code



Abstract: Currently, active teaching methods are a popular trend in education to help students develop their abilities and qualities. Project-based teaching has many advantages which are suitable for the characteristics of students in Vietnam. The article focuses on analyzing the characteristics and importance of project based teaching for primary school students, and proposes the process of teaching Science in elementary school through learning projects.

Keywords: Based learning, teaching, primary education.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

1. INTRODUCTION

The 2018 general education program aims to develop the qualities and capabilities of learners through educational content with basic, practical, and modern knowledge and skills; harmonizing moral, intellectual, physical, and aesthetic aspects; focusing on practice and applying the learned knowledge and skills to solve problems in learning and life through educational methods and organizational forms [1]. Project-based learning is a new, modern approach. If teachers can develop projects related to reality and activities aimed at promoting each student's initiative and potential, it will contribute to improving teaching and learning effectiveness. This article analyzes the perspectives, advantages, and characteristics of project-based learning, pointing out the appropriateness of this teaching method for elementary school students. From there, it proposes a process for teaching Science through learning projects, illustrating the steps of teaching with specific, visual examples.

2. RESEARCH RESULTS

2.1. Overview of Project-Based Learning

2.1.1. Perspectives on Project-Based Learning

A project is understood as a system that includes tasks with clearly defined objectives, resources, start and end times. In the field of education, a project is understood as a plan that includes specific objectives to be achieved within a certain timeframe.

Project-based learning is a complex teaching method where, under the guidance of a teacher, learners acquire knowledge and develop skills by solving a real-life task (project) that is closely related to the curriculum, combining theory with practice and creating specific products [3].

Agreeing on the complexity of the project-based learning method, author Dang Thi Minh Thu believes that in this method, learners must perform a complex task that combines theory and practice. This task is performed with a high degree of autonomy throughout the learning process [8].

Project-based learning is a form of teaching where students, under the guidance and assistance of teachers, independently solve a complex learning task that involves not only theoretical aspects but also practical ones, thereby creating practical products that can be presented and published [7].

Thus, project-based learning can be understood as a complex teaching method where, under the guidance of teachers, learners acquire knowledge and develop skills by solving a real-life task (project) that is closely related to the curriculum, combining theory with practice and creating specific products.

Project-based learning is a teaching method where students learn important skills by working on real projects. Students apply core academic skills and

creativity to solve authentic problems in real-life situations, using various tools.

Learning through projects becomes deeper and more meaningful when students engage in constructing their own knowledge. Students have the opportunity to choose a topic they are interested in within the required content framework and then take responsibility for planning their project.

2.1.2. Advantages of the Project-Based Learning Method

Developing self-study and autonomous learning abilities: For upper elementary students, logically and systematically designed project lessons help students explore and discover new knowledge in the Science subject. This is a crucial stage for fostering high-level self-study and problem-solving skills.

Developing communication and collaboration abilities: Solving complex projects requires students to interact with various educational forces for support when needed. Consultations from friends, teachers, and family are important bases for overcoming difficulties during their task execution.

Developing critical and creative thinking: Project learning activities are diverse, encouraging students to find new ways to solve problems, even independently of textbooks. Science topics are diverse, including human beings, animals, plants, substances, etc., creating favorable conditions to unleash students' imagination.

2.1.3. Characteristics of the Project-Based Learning Method

Project-based learning requires students to make efforts and persevere over a long period. Projects should emphasize helping develop abilities and foster qualities in learners. This is an active teaching method with several common characteristics, specifically:

- Lessons are constructed in an interdisciplinary manner: The lesson content relates to two or more subjects but needs to be processed in their interrelation, ensuring students can reasonably apply this comprehensive knowledge to solve learning and life situations. Teachers should select content knowledge within a scientific topic so that it is not duplicated but rather complements and illuminates each other, helping students thoroughly understand the issue.
- Enhancing experiential activities: The process of solving the project is the time when students control their learning process, proposing solutions, consulting friends, and teachers to choose the most optimal one. Therefore, projects need to be designed with multiple activities and forms.

- Projects must ensure practicality: Projects can serve as a bridge between theories and real-world experiences (Blumenfeld, 1991). Projects arise from real-life situations, ensuring they are manageable for learners. Students need to clearly understand the project's objectives if successfully implemented.
- Ensuring safety: Assigning projects to students must match their abilities, and the tools and materials provided must ensure absolute safety.
- High applicability of products: The final product of the project must be meaningful, serving learning or practical purposes, and, in ideal conditions, can be expanded to serve the community.
- Diverse and regular assessment forms: The expected outcomes must be clarified and continuously reviewed to verify the extent of understanding using various assessment methods. Teachers should provide opportunities for students to feedback, share information, or self-adjust throughout the project process using diverse assessment tools.

2.1.4. Appropriateness of Applying Project-Based Learning in Elementary Science Education

The Science curriculum is built on three main viewpoints: integrated teaching, thematic teaching, and active student participation [2]. This aligns perfectly with the characteristics of project-based learning. The content revolves around familiar, practical topics (humans and health, plants, substances, energy, fungi, bacteria, organisms, and the environment).

Applying project-based learning in the subject involves various teaching methods such as experiential learning, problem-solving, and practice [2].

Well-trained elementary teachers can handle multiple subjects in different fields. They are equipped with a solid foundation to teach science subjects well [6]. To implement project-based learning effectively, they need additional skills in designing interdisciplinary educational topics and focusing on controlling students' practical activities. The target learners are elementary students.

At this stage, their learning activities are always linked to visualization, curiosity, and eagerness to learn. These are favorable conditions for implementing project-based learning.

2.2. The Process of Project-Based Learning

When building a learning project, educators always place students at the center of activities. This helps develop related knowledge and skills through open-ended tasks, encouraging students to explore and realize the knowledge learned in practice and create their products. Project-based learning programs are built around important guiding questions, integrating content

standards and higher-order thinking within real-world contexts. Based on theoretical research and practical insights into project-based learning, especially in elementary Science, the author proposes a process for teaching Science through project-based learning, including specific steps:

Step 1: Identify and select the issue

The initial phase is crucial. Teachers need to thoroughly study the curriculum, identify issues related to the teaching content or real-life situations in schools, localities, etc. Use a system of questions to explore students' initial understanding of the issue to be resolved.

Step 2: Design the project

After identifying and selecting the issue, the teacher builds a detailed project. This process requires meticulousness, from designing activities to anticipating project results. Encourage the integration of content knowledge from multiple subjects to enhance student dynamism. Provide learning resources to ensure students have sufficient tools and means to carry out the project. Firmly equip learners with theories, helping them deeply understand the significance of the project if the desired results are achieved. Schedule, timeline, and specific products for each part of the project.

Step 3: Monitor and track progress

Teachers play a supportive role during the project's implementation, always guiding students toward activities to gain real-world experiences, which help learners gain valuable experiences and lessons. Encourage exploring ideas and finding solutions through collaboration.

Step 4: Assessment

At this step, the author recommends applying assessment in two aspects, specifically:

- Product assessment: Based on monitoring the process and the product obtained after the project ends, teachers provide comments and advice to help learners complete the product.

- Learning experience assessment: Learners give feedback on the advantages and difficulties encountered while implementing the project. Share wishes for future projects. At this step, teachers should use the Likert scale (5 levels) to assess learners' satisfaction, thereby having a plan to adjust their teaching strategy in the future.

Illustrative Example Project "Little Botanist" (Science 4)

Step 1: Identify and select the issue

The "Animals and Plants" chapter is a major content area in Science, providing students with knowledge and skills in plant care and animal husbandry. The "Little Botanist" project offers students new experiences, allowing them to care for plants and identify factors affecting plant growth and development.

Step 2: Design the project

Objectives:

- Identify factors affecting plant growth and development.
- Apply the knowledge learned to care for and protect plants.
- Implement plant protection in their living areas.
- Foster abilities: self-study and autonomy, communication and collaboration, scientific capabilities.
- Develop qualities: diligence, responsibility.

Preparation:

- Seeds (beans), small pots, soil
- Learning sheets
- Smartphones

Main Activities:

- Read materials, watch videos, research how to implement the project.
- Field survey:

Survey sheet on the environmental impact on plant size

Living Environment	Characteristics (size)		
	High	Medium	Low
On land			
Underwater			
Parasite			

- Explore factors affecting plant growth and development. Give specific examples.
- Sow seeds, monitor

Time	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5
Day 1					
Day 2					
...					



Change factors for each plant, observe changes in growth and development

Plant	Affecting Factors			
	Light	Water	Air	Minerals
Plant 1		X	X	X
Plant 2	X		X	
Plant 3	X	X		X
Plant 4	X	x	x	
Plant 5				

- Learn how to care for plants to achieve high effectiveness.

Step 3: Monitor and track progress

Group members carry out project tasks and plans under the teacher's supervision and support. Students investigate, monitor, and observe the living needs of plants in different habitats. Participate in influencing and caring for plants.

Step 4: Assessment

- Self-assessment by individuals
- Peer assessment among students
- Teacher

3. CONCLUSION

Project-based learning brings many positive aspects. Its advantages lie in focusing on student activities and opportunities to address interdisciplinary issues [4]. Students take on the role of researchers, utilizing various tools, technologies, and materials. They can work in groups or individually not only within the classroom but also school-wide. Students have the chance to present their work. In the context of significant educational transformation, teachers need the ability and readiness to prepare interdisciplinary and collaborative projects, even those addressing issues not found in traditional textbooks, such as modern scientific challenges. This approach aims to provide students with comprehensive development in terms of character and capabilities.

REFERENCES

1. Ministry of Education and Training. (2018). General Education Program - Comprehensive Program (Issued with Circular No. 32/2018/TT-BGDĐT dated December 26, 2018 by the Minister of Education and Training).
2. Ministry of Education and Training. (2018). General Education Program, Science subject.
3. Trinh Van Bieu., Phan Dong Chau Thuy., & Trinh Le Hong Phuong. (2011). Project-based learning - From theory to practice, *Journal of Science*, 28(3-4), Ho Chi Minh City University of Education.
4. Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26(3-4), 369-398.
5. Phan Thanh Ha. (2016). Project-based learning in grades 4-5 in elementary school. Doctoral dissertation in educational sciences, Institute of Educational Sciences.
6. Tran Vu Khanh. (2012). Teaching pedagogical skills in project-based learning for university students majoring in elementary education. Doctoral dissertation in Educational Sciences, Hanoi National University of Education.
7. Hoang Thu Phuong. (2018). Developing self-learning capabilities for students in teaching the basic principles of Marxism-Leninism. *Education Journal*, 421, p 50-53.
8. Dang Thi Minh Thu (2009). Developing active learning capabilities of students in chemistry teaching through project-based learning, Master's thesis, University of Education, Vietnam National University, Hanoi.

Cite This Article: Nguyen Van Hung (2024). Teaching Science through Projects Based Learning. *East African Scholars J Edu Humanit Lit*, 7(6), 208-211.