

## **EXPLORING PROJECT-BASED LEARNING IN ENHANCING CRITICAL THINKING SKILLS OF PUPILS**

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**ABSTRACT**

The findings revealed that teachers predominantly adopt highly interactive, student-centered PBL activities to foster critical thinking. Among the strategies used, educational Games and Role-Playing ranked highest (50% usage rate), followed by Differentiated Tasks, Visual Aids, and ICT-Based Activities (25% each), while Hands-on Tasks were the least used (12.5%). Despite the positive cognitive growth observed in pupils, teachers faced notable implementation barriers. Student Readiness and Group Dynamics emerged as the most significant challenge (62.5%), closely followed by Time Management Constraints (50%), Classroom Management (25%), and Resource Limitations (12.5%). To optimize PBL execution, respondents strongly recommended strategic Resource Allocation (62.5%) and increased Administrative Support and Flexible Curriculum Design (50%). Overall, the study concludes that while PBL is a powerful driver for developing analytical and problem-solving skills in young learners, its success relies heavily on institutional support, adequate material resources, and targeted teacher training.

**Keywords:** Alaminos City, Project-Based Learning, Critical Thinking, Pupils, Elementary Education

## **INTRODUCTION**

Critical thinking skills have become a cornerstone of 21st-century education. Traditional, teacher-centered instructional methods focusing on rote memorization and passive knowledge intake are no longer sufficient to prepare students for modern challenges (Almazroa & Alotaibi, 2023). Modern learners must be equipped with the capacity to assess, analyze, and apply information to solve complex, real-world problems. Despite this, passive learning remains prevalent in many elementary classrooms, indicating a clear need for student-centered instructional models.

Project-Based Learning (PBL) offers a dynamic alternative. Founded on constructivist principles, PBL engages learners in sustained, inquiry-based exploration centered on complex, authentic questions (Buck Institute for Education, 2021). Through hands-on activities, collaboration, and structured self-reflection, pupils move beyond traditional textbook learning to construct functional knowledge. While the theoretical benefits of PBL are well-documented, its practical execution in public elementary schools often encounters local friction, such as strict scheduling, variable student readiness, and limited classroom materials.

This study investigated the role of PBL in developing the critical thinking skills of pupils at Longos Elementary School in Alaminos City, Pangasinan. By exploring the specific activities utilized by teachers, analyzing the logistical and behavioral challenges they encounter, and synthesizing their practical recommendations, this research aims to build an actionable path for effective PBL integration in elementary education.

## **METHODS**

This study utilized a mixed-method research design, combining qualitative depth with quantitative descriptive statistics to examine the implementation of PBL. The primary participants were eight (8) purposively selected elementary school teachers from Longos Elementary School, Alaminos City, Pangasinan, who voluntarily participated in the study.

Quantitative data were gathered using structured questionnaire profiles to compile demographic data (sex, subjects taught, and years in service) and to calculate the frequency and percentage distribution of PBL activities, challenges, and recommendations. Qualitative data were collected via semi-structured, in-depth interviews administered through digital platforms (Google Forms and Google Classroom).

The qualitative datasets underwent thematic analysis to categorize open-ended responses into core conceptual themes based on constructivist and experiential learning frameworks. To ensure the reliability and validity of the research instruments, the questionnaires and interview guides were validated by a panel of educational experts and school administrators.

## RESULTS

### Demographic Profile of the Respondents

The demographic characteristics of the eight (8) teacher-participants are structured in Table 1.

**Table 1. Demographic Profile of the Respondents**

**n = 8**

| Profile Variable | Category           | Frequency | Percentage (%) |
|------------------|--------------------|-----------|----------------|
| Sex              | Female             | 8         | 100.0%         |
|                  | Male               | 0         | 0.0%           |
| Subject Taught   | 3 to 4 Subjects    | 2         | 25.0%          |
|                  | 5 to 6 Subjects    | 5         | 62.5%          |
|                  | 7 to 8 Subjects    | 1         | 12.5%          |
| Years in Service | 0 to 5 Years       | 5         | 62.5%          |
|                  | 6 to 10 Years      | 1         | 12.5%          |
|                  | 11 Years and above | 2         | 25.0%          |

The demographic profile shows that the respondents are entirely female (100.0%). The majority (62.5%) manage a moderate teaching workload of 5 to 6 subjects and are in the early stages of their professional careers with 0 to 5 years in service. This high percentage of newer teachers suggests an open, receptive environment for adopting innovative, active-learning methodologies like PBL.

### Project-Based Learning Activities Used to Enhance Critical Thinking

Teachers employ a variety of active-learning strategies to operationalize PBL principles. The frequency of use and corresponding rankings of these activities are detailed in Table 2.

The empirical data highlight a strong preference for highly social and interactive strategies. Games and Role-Playing shared the top rank (50% usage). Educators noted that these methods successfully capture students' motivation, ignite interest, and simulate real-world situations.

For instance, Teacher 4 highlighted that games encourage cooperative problem-solving, stating:

*"They will work together and brainstorm experiences based on the ideas and knowledge they acquire to solve and finish tasks like budgeting, specifically in marketing as a game."*

Similarly, Role-Playing allows students to explore multiple viewpoints, fostering social empathy and high-level reasoning. Teacher 5 shared:

"Students can share their ideas and knowledge and apply their personal experiences by showing and adapting stories and scenarios on a specific topic."

**Table 2. Project-Based Learning Activities Utilized in Classrooms**

**n = 8**

| <b>Project-Based Activities</b> | <b>Frequency</b> | <b>Percentage (%)</b> | <b>Rank</b> |
|---------------------------------|------------------|-----------------------|-------------|
| Games (Game-Based Learning)     | 4                | 50.0%                 | 1           |
| Role playing                    | 4                | 50.0%                 | 1           |
| Differentiated Tasks            | 2                | 25.0%                 | 3           |
| Visual Aids                     | 2                | 25.0%                 | 3           |
| ICT - Based Activities          | 2                | 25.0%                 | 3           |
| Hands-on Taks                   | 1                | 12.5%                 | 6           |

\*(Multiple responses allowed)

ICT-Based Activities and Differentiated Tasks (25.0% each) provide tailored cognitive paths. As noted by Teacher 2, integrating digital tools shifts students "from passive consumers of information into active, engaged learners who use technology to research, collaborate, and develop solutions to real-world problems."

Remarkably, physical Hands-on Tasks ranked lowest (12.5%), indicating that logistics, material preparation, and classroom constraints make raw experiential learning harder to implement in this public school setting.

### **Challenges Encountered by Teachers in Implementing PBL**

Despite the clear benefits of PBL, teachers reported structural and behavioral barriers during classroom integration. These challenges are summarized in Table 3.

Student Readiness and Group Dynamics emerged as the primary challenge (62.5%). Teachers observed that pupils display uneven levels of self-direction, motivation, and cooperative skills when placed in open-ended group settings. This uneven contribution can lead to group friction. Teacher 2 explained:

*"Students come with different motivation levels, collaboration skills, and prior knowledge... some might struggle with self-direction, group dynamics, or the open-ended nature of projects."*

**Table 3. Challenges Encountered by Teachers in Implementing PBL**

**n = 8**

| <b>Challenges</b>                    | <b>Frequency</b> | <b>Percentage (%)</b> | <b>Rank</b> |
|--------------------------------------|------------------|-----------------------|-------------|
| Student Readiness and Group Dynamics | 5                | 62.5%                 | 1           |
| Time Management Constraints          | 4                | 50.0%                 | 2           |

|                      |   |       |   |
|----------------------|---|-------|---|
| Classroom Management | 2 | 25.0% | 3 |
| Resource Limitations | 1 | 12.5% | 4 |

- (Multiple responses allowed)

**Time management constraints** emerged as the second most significant challenge, affecting 50.0% of participants. Given that Problem-Based Learning (PBL) demands comprehensive planning, in-depth research, and collaborative effort, it frequently clashes with the rigid structure of fixed class schedules. As Teacher 1 remarked:

*"The biggest challenge I encountered during the implementation of project-based learning was managing time effectively to ensure all students stayed on track while completing meaningful, in-depth projects."*

**Resource limitations** (12.5%), though ranked as the lowest barrier, continue to pose significant challenges. The scarcity of physical materials, technology, and classroom support hampers the effective implementation of active projects.

#### ***Teachers' Recommendations for Enhancing PBL Implementation:***

To overcome these obstacles, educators have suggested systemic strategies aimed at fostering the sustainable integration of Project-Based Learning (PBL). These recommendations, detailed in Table 4, focus on improving resource availability, infrastructure, and support mechanisms to ensure more effective and consistent PBL practices.

The most frequent recommendation is Resource Allocation (62.5%), with teachers emphasizing the need for accessible classroom materials, stable ICT tools, and learning supplies.

The second most prominent recommendation is Administrative Support and Flexible Curriculum Design (50.0%). Teachers expressed that flexible scheduling, reduced pressure from standardized testing, and structured planning time are essential for deep learning. Teacher 6 observed:

*"School leaders and policymakers can support teachers by giving them enough time for planning, providing training on PBL strategies, and ensuring access to resources... When teachers feel supported, they are more confident."*

**Table 4. Recommended Interventions for Improving PBL Implementation**

n = 8

| Recommendations                                       | Frequency | Percentage (%) | Rank |
|-------------------------------------------------------|-----------|----------------|------|
| Resource Allocation                                   | 5         | 62.5%          | 1    |
| Administrative Support and Flexible Curriculum Design | 4         | 50.0%          | 2    |
| Enhancing Parental And Community Involvement          | 1         | 12.5%          | 4    |
| Provision of Training and Professional Development    | 1         | 12.5%          | 4    |

- (Multiple responses allowed)

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Conclusions**

Based on the empirical findings, this study draws the following conclusions:

1. The typical teacher-respondent is female, manages a mid-range workload of 5 to 6 subjects, and is in the first five years of her professional career.
2. Project-Based Learning successfully improves elementary pupils' critical thinking and analytical capabilities. Teachers rely heavily on interactive, high-interest methods—specifically educational games and role-playing—to connect learning with real-world scenarios.
3. The successful execution of PBL is limited by students' readiness for self-directed teamwork, collaborative group dynamics, and strict daily schedules.
4. Securing administrative support, allowing curriculum flexibility, allocating material and technological resources, and providing targeted professional development are essential steps for the long-term success of PBL in elementary classrooms.

### **Recommendations**

Grounded in these conclusions, the following strategic recommendations are proposed:

1. For School Administrators and Policy Makers: Institutionalize administrative frameworks that provide curriculum flexibility. This includes designing adaptable schedules, allocating dedicated planning blocks for teachers, and reducing the pressure of rigid standardized pacing to give pupils time for deeper inquiry.
2. For the Department of Education and LGU Stakeholders (Resource Allocation): Prioritize budget lines for classroom materials, reliable internet connectivity, educational software, and modern ICT devices to support active learning.
3. For School Leaders and Coordinators (Professional Development): Design and implement continuous, hands-on professional development plans, such as the proposed Action Plan, to train educators on effective PBL design, group facilitation, and rubric-based assessment.
4. For Classroom Teachers: Build student readiness for collaborative work by providing explicit instruction in teamwork, communication, and conflict resolution before launching complex group projects.
5. For Parents and Community Members: Actively participate in school showcase events, local project initiatives, and volunteer opportunities to provide pupils with real-world feedback and support.

### **ACTION PLAN: PROFESSIONAL DEVELOPMENT SEMINARS AND TRAINING**

To ensure the practical application of this study's findings, the following action plan is proposed for Longos Elementary School:

| <b>Phase/ Objective</b>                                                                                                 | <b>Activity</b>                                                                                                                                               | <b>Duration</b>     | <b>Facilitator</b>                                    | <b>Expected Output</b>                                                                    | <b>Budget</b> |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------|
| <b>Phase 1:</b><br><br>Orientation & Awareness<br>Objective: Introduce the philosophy, components, and benefits of PBL. | Seminar: "What is PBL?" (Philosophy & key components)<br><br>Workshop: "Why PBL Works" (Case studies & best practices)                                        | Month 1-2 (2 Days)  | Educational Consultant /Experienced Practitioner      | Training manuals<br><br>Participant reflection logs<br><br>Pre/post-surveys               | P13,000       |
| <b>Phase 2:</b><br><br>Assessment & Evaluation<br>Objective: Train teachers on designing rubric-based assessments.      | Workshop:<br><br>"Assessing PBL Effectively" (Rubrics & self-assessment tools)<br><br>Collaborative<br><br>Session: Peer Review of PBL Units                  | Month 4-5 (2 Days)  | Assessment Expert / Teaching Peers                    | Customized rubrics<br><br>Peer-reviewed unit lesson plans                                 | P13,500       |
| <b>Phase 3:</b><br><br>Implementation Support<br><br>Objective: Provide hands-on classroom coaching and reflection.     | Mentorship: Peer coaching during active projects<br><br>Observations: Bi-weekly classroom check-ins<br><br>Reflection:<br><br>Monthly teacher sharing circles | Month 6-8 (Ongoing) | PBL Coaches /Instructional Coach/Internal Facilitator | Mentor logbook<br><br>Observation feedback reports<br><br>Compiled strategy journals<br>↓ | P27,000       |

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#### **DECLARATION ON THE USE OF AI TOOLS**

Grammarly was used solely to improve grammar, spelling, punctuation, sentence structure, clarity, and readability. AI was not involved in data collection, analysis, interpretation, conclusions, or decision-making. All research activities were conducted independently by the researchers through their knowledge, critical thinking, and collaboration. Any AI-assisted outputs were reviewed, revised, and verified to ensure accuracy, originality, and adherence to academic integrity and ethical standards. The researchers are fully responsible for the content and validity of this study.

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