



THE IMPLEMENTING PROBLEM-BASED LEARNING IN LITERACY-ORIENTED CLASSROOMS TO ENHANCE STUDENTS' CRITICAL READING AND WRITING ENGAGEMENT

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Abstract

Literacy-oriented classrooms require instructional practices that enable students to read critically, interpret information, negotiate meaning, construct arguments, and communicate ideas through written and oral responses. However, many literacy lessons remain teacher-centered and text-reproduction oriented, limiting students' opportunities to question, investigate, collaborate, and solve authentic literacy problems. This study examined the implementation of Problem-Based Learning in literacy-oriented classrooms and investigated its effect on students' critical reading and writing engagement. A mixed-method quasi-experimental embedded design was employed involving 96 senior high school students divided into an experimental group and a control group. The experimental group received literacy instruction through Problem-Based Learning, while the control group received conventional text-based instruction. Data were collected through literacy performance tests, classroom observation, student reflective journals, interviews, and learning artifacts. Quantitative data were analyzed using descriptive statistics, paired-sample t-tests, independent-sample t-tests, normalized gain, and effect size. Qualitative data were analyzed thematically. The findings showed that students in the Problem-Based Learning classroom achieved significantly higher literacy performance than those in the conventional classroom. The strongest improvements occurred in problem identification, evidence-based reading, argument construction, and collaborative discussion. The study concludes that Problem-Based Learning can strengthen literacy-oriented classrooms when authentic problems, rich texts, inquiry scaffolds,

collaborative tasks, and reflective writing are systematically integrated.

Keywords: *problem-based learning; literacy classroom; critical reading; writing engagement; inquiry*

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A. Introduction

Literacy-oriented classrooms are designed to help students read critically, evaluate information, construct meaning, and communicate ideas through speaking and writing. In contemporary education, literacy is not limited to decoding texts or answering comprehension questions; it is a complex social and cognitive practice that enables learners to participate in academic, civic, and digital life. Students need to interpret multiple texts, question claims, compare perspectives, and use evidence to support their responses (Luke, 2012; McKeown, Beck, & Blake, 2009).

Hmelo-Silver (2004) explains that PBL supports flexible knowledge, problem-solving skills, self-directed learning, collaboration, and intrinsic motivation. In literacy-oriented classrooms, PBL is relevant because literacy itself involves problem-solving with texts. Students read, discuss, and write to investigate problems and formulate evidence-based responses.

Previous research suggests that PBL can support deeper learning and skill development. Strobel and Van Barneveld (2009) reported that PBL is more effective than conventional instruction for long-term retention, skill development, and learner satisfaction. Walker and Leary (2009) showed that the effect of PBL varies across problem types, disciplines, implementation forms, and assessment levels. These findings indicate that PBL is promising but must be implemented through carefully designed problems, facilitation, collaboration, and assessment alignment (Dolmans, De Grave, Wolfhagen, & Van der Vleuten, 2005; Hung, 2011).

Reading comprehension research also emphasizes the importance of strategic and meaningful text engagement. Reading involves word knowledge, background knowledge, inference, text structure, and knowledge integration (Kendeou, McMaster, & Christ, 2016; Kintsch, 1988; Perfetti & Stafura, 2014). Writing about texts can also improve comprehension because students

must select evidence, organize ideas, and express interpretations (Graham & Hebert, 2011). Therefore, a PBL literacy classroom can integrate critical reading and writing engagement in one connected instructional cycle.

This study examines the implementation of PBL in literacy-oriented classrooms. It investigates whether PBL improves students' critical reading and writing engagement compared with conventional literacy instruction and explores students' experiences during implementation. The research questions are: (1) How is PBL implemented in literacy-oriented classrooms? (2) Does PBL significantly improve students' literacy performance? (3) Which components of literacy performance improve after implementation? (4) How do students experience PBL? and (5) What challenges emerge during implementation?

B. Method

This study employed a mixed-method quasi-experimental embedded design. The quantitative component examined the effect of PBL on students' literacy performance, while the qualitative component explored classroom implementation, students' learning experiences, and implementation challenges. This design was selected because the study aimed to measure learning outcomes and explain how the instructional process contributed to those outcomes.

The participants were 96 eleventh-grade students from a senior high school. Two intact classes with comparable previous English and literacy achievement were selected. One class was assigned as the experimental group, consisting of 48 students, while the other class was assigned as the control group, also consisting of 48 students. The same teacher taught both classes to maintain instructional consistency. Interview participants were selected from high, moderate, and low achievement categories.

The experimental group received literacy instruction through PBL for eight meetings. The PBL cycle consisted of six stages: problem orientation, problem analysis, inquiry planning, text-based investigation, solution construction, and reflection. Problems were related to online misinformation, environmental campaigns, school reading habits, youth health issues, and cultural identity in digital media. The control group received conventional literacy instruction through teacher explanation, text reading, vocabulary discussion, comprehension questions, and individual summaries.

The main quantitative instrument was a literacy performance test consisting of reading and writing tasks. The reading component measured literal comprehension, inference, evidence identification, perspective comparison, and critical evaluation. The writing component measured claim clarity, evidence use, coherence, argument development, and reflection. The instrument was validated by two English language education experts and one assessment expert. The reliability coefficient was 0.87, and inter-rater reliability for writing responses was 0.84.

Qualitative data were collected through classroom observations, student reflective journals, semi-structured interviews, group artifacts, and teacher field notes. Quantitative data were analyzed using descriptive statistics, paired-sample t-tests, independent-sample t-tests, normalized gain, and Cohen's d. Qualitative data were analyzed thematically through familiarization, coding, theme construction, and verification. Ethical procedures included school permission, informed consent, anonymization, and assurance that participation did not affect students' grades.

C. Finding and Discussion

1. Finding

The findings are presented in five parts: implementation of PBL stages, students' literacy performance, improvement across literacy components, students' learning experiences, and implementation challenges.

Table 1. PBL Stages in Literacy-Oriented Classrooms

PBL Stage	Classroom Activity	Literacy Function
Problem orientation	Students examined contextual problems through texts, pictures, and guiding questions	Activating background knowledge
Problem analysis	Students identified known information, unknown information, and inquiry needs	Developing questioning skills
Inquiry planning	Students selected sources, assigned roles, and planned investigation steps	Organizing literacy inquiry
Text-based investigation	Students read multiple texts and identified claims, evidence, and perspectives	Strengthening critical reading
Solution construction	Students produced written arguments, recommendations, and presentations	Developing writing engagement
Reflection	Students wrote journals and evaluated group learning	Building metacognitive literacy

Source: Classroom observations and teacher field notes.

Observation data showed that PBL was implemented through six connected stages. Each stage had a literacy function that supported reading, writing, speaking, and collaborative inquiry. During problem orientation, students became more active when the problem was connected to real situations. For example, one lesson began with the question, "How can students respond to misleading information about healthy lifestyles on social media?" Students then read a short article, an infographic, and several social-media style statements.

Table 2. Literacy Performance Scores of Experimental and Control Groups

Group	Test	N	Mean	SD	Interpretation
Experimental	Pretest	48	61.48	7.24	Moderate
Experimental	Posttest	48	82.36	6.18	High
Control	Pretest	48	61.02	7.31	Moderate
Control	Posttest	48	70.41	7.02	Moderate to high

Source: Literacy performance test data.

Table 3. Gain Scores and Statistical Comparison

Indicator	Experimental Group	Control Group	Statistical Result
Mean gain	20.88	9.39	Experimental group higher
Normalized gain	0.54	0.24	Moderate vs. low-to-moderate
Posttest comparison	82.36	70.41	$t(94) = 8.72$; $p < .001$
Effect size	-	-	Cohen's $d = 1.78$; large effect

Source: Pretest and posttest data analysis.

The pretest results showed that the experimental and control groups had comparable initial literacy performance. The independent-sample t-test showed no significant difference before the intervention, $t(94) = 0.31$, $p = .757$. After eight meetings, the experimental group achieved a higher posttest mean score than the control group. The posttest difference was significant, $t(94) = 8.72$, $p < .001$, with a large effect size.

The paired-sample t-test showed that the experimental group improved significantly from pretest to posttest, $t(47) = 20.14$, $p < .001$. The control group also improved, $t(47) = 8.63$, $p < .001$, but the gain was smaller. These findings indicate that PBL had a stronger effect on literacy performance than conventional instruction.

Table 4. Literacy Component Scores in the Experimental Group

Literacy	Maximum	Pretest	Posttest	Gain	Interpretation
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Component	Score	Mean	Mean		
Problem identification	20	12.18	17.01	4.83	Strong improvement
Critical reading	20	12.41	16.86	4.45	Strong improvement
Evidence use	20	11.96	16.77	4.81	Strong improvement
Argument construction	20	12.23	16.52	4.29	Strong improvement
Writing coherence	20	12.61	15.81	3.20	Moderate improvement
Reflective thinking	20	12.09	16.04	3.95	Strong improvement

Source: Literacy performance rubric.

The strongest improvement occurred in problem identification and evidence use. Students became better at identifying the issue, formulating inquiry questions, and selecting relevant information from texts. Before the intervention, many students wrote general responses without textual evidence. After PBL implementation, students were more likely to cite information from texts, compare sources, and justify conclusions.

Table 5. Qualitative Themes on Students' PBL Literacy Experiences

Theme	Evidence from Learning Practice	Pedagogical Meaning
Authentic literacy purpose	Students read texts to solve contextual problems	Reading became meaningful
Collaborative meaning-making	Students discussed claims, vocabulary, and evidence in groups	Literacy became social practice
Evidence-based reasoning	Students supported answers with textual information	Critical reading improved
Reflective engagement	Students wrote journals about strategies and challenges	Metacognitive awareness developed

Source: Observations, journals, interviews, and learning artifacts.

Student interviews indicated that PBL made reading more purposeful. Students stated that they read texts because they needed information to solve a problem, not only because the

teacher asked them to answer questions. Observation data also showed that group discussion helped students understand texts. Students asked peers about unfamiliar words, debated which evidence was relevant, and negotiated how to present conclusions. Reflective journals showed that students became more aware of their reading and writing strategies.

Table 6. Implementation Challenges and Teacher Responses

Challenge	Classroom Evidence	Teacher Response
Time management	Problem analysis and inquiry took longer than planned	Teacher used time checkpoints
Uneven participation	Some students dominated discussion	Teacher assigned group roles
Evidence selection difficulty	Students selected irrelevant or weak evidence	Teacher provided evidence tables
Limited vocabulary	Students struggled with unfamiliar words in texts	Teacher used vocabulary scaffolds
Scaffolding demands	Students needed guidance during inquiry	Teacher used guiding questions

Source: Classroom observations and teacher notes.

Time management was the most visible challenge because students needed to analyze problems, read multiple texts, discuss evidence, and construct responses. Uneven group participation also occurred, particularly when active students dominated discussion. The teacher addressed these challenges by assigning roles such as discussion leader, evidence finder, vocabulary helper, writer, and presenter. Evidence tables and guiding questions helped students connect claims, textual support, and conclusions.

2. Discussion

The findings indicate that PBL can improve literacy-oriented classroom practice by transforming reading and writing from routine tasks into inquiry-based activities. In the experimental classroom, students read to understand problems, evaluate information, construct arguments, and communicate solutions.

This supports the view that PBL develops flexible knowledge, problem-solving, self-directed learning, collaboration, and motivation (Barrows, 1986; Hmelo-Silver, 2004; Savery, 2006).

The significant difference between the experimental and control groups shows that PBL had a stronger effect on literacy performance than conventional instruction. This finding is consistent with meta-analytic evidence that PBL supports skill development and deeper learning when implemented appropriately (Dochy, Segers, Van den Bossche, & Gijbels, 2003; Gijbels, Dochy, Van den Bossche, & Segers, 2005; Strobel & Van Barneveld, 2009; Walker & Leary, 2009). The result also confirms that PBL is more productive when assessment emphasizes reasoning, evidence use, and application rather than factual recall.

Improvement in problem identification suggests that PBL helped students frame literacy tasks as inquiry processes. Students learned to identify issues, formulate questions, and determine what information was needed. This is important because literacy-oriented classrooms should prepare students to approach texts critically. Reading becomes more meaningful when students understand why they need information and how they will use it.

Critical reading improved because students engaged with multiple texts and evaluated different sources. This supports comprehension theories that emphasize inference, knowledge integration, and strategic processing (Afflerbach, Pearson, & Paris, 2008; Kendeou et al., 2016; Kintsch, 1988; Perfetti & Stafura, 2014). In PBL, students must connect information across texts, evaluate claims, and synthesize evidence. Such activities require deeper comprehension than literal question-answer tasks.

Evidence use showed strong improvement. Before the intervention, students often expressed opinions without textual support. After PBL implementation, they became more aware that claims require evidence. This finding is important because evidence-based reasoning is a core feature of academic literacy and critical literacy. Critical literacy requires students to question

texts, evaluate perspectives, and justify interpretations (Belland, Glazewski, & Richardson, 2008; Coiro, 2011; Luke, 2012).

Argument construction improved because PBL required students to move from reading to writing. Students used texts as sources for written responses, recommendations, and group products. This confirms the value of connecting reading and writing in literacy instruction. Graham and Hebert (2011) argue that writing about texts can strengthen reading comprehension. In this study, students' written arguments improved because they had already discussed problems and evidence before writing.

Collaboration was another key mechanism. Students negotiated meaning, clarified vocabulary, debated evidence, and constructed group responses. This supports sociocultural views that literacy is a social practice. However, collaboration required structured roles and teacher monitoring. Without scaffolding, some students dominated while others became passive. This condition reinforces the facilitator role emphasized in PBL literature (Dolmans et al., 2005; Hmelo-Silver & Barrows, 2006; Schmidt, Rotgans, & Yew, 2011).

The challenges found in this study confirm that PBL is demanding. Time management, uneven participation, evidence selection, vocabulary limitations, and scaffolding needs are common barriers. Hung (2011) emphasizes that PBL implementation often fails when problem design is not aligned with learning outcomes. Therefore, teachers need training in designing literacy problems that are authentic, text-rich, cognitively challenging, and aligned with reading and writing objectives.

The study also suggests that teacher questioning is central to PBL literacy facilitation. Students benefited when the teacher asked probing questions such as: What is the real problem? Which part of the text supports your claim? Is the source reliable? What evidence contradicts your conclusion? These questions helped students move from opinion-based responses to evidence-based reasoning. Thus, teacher scaffolding should focus on prompting

students to explain, justify, compare, and revise rather than simply giving correct answers.

From an assessment perspective, literacy-oriented PBL should use both individual and group evidence. Group products show collaborative problem solving, but individual journals reveal personal comprehension, reflection, and writing development. If only group performance is assessed, passive students may receive inflated scores. If only individual tests are assessed, the collaborative inquiry process may be ignored. A balanced assessment system should therefore include performance tests, group artifacts, individual reflection, peer evaluation, and teacher observation notes.

Overall, this study demonstrates that PBL can strengthen literacy-oriented classrooms when implemented systematically. It improves literacy performance not because students are merely placed in groups, but because they engage with authentic problems, read multiple texts, discuss evidence, construct written responses, and reflect on their learning. PBL therefore provides a viable framework for integrating critical reading, writing engagement, collaboration, and problem solving in literacy instruction.

D. Conclusion

This study demonstrates that Problem-Based Learning can effectively improve students' critical reading and writing engagement in literacy-oriented classrooms. Students who participated in PBL achieved higher literacy performance than those who received conventional instruction, particularly in problem identification, critical reading, evidence use, argument construction, and reflective thinking. The findings also show that authentic problems, multiple texts, collaborative inquiry, and reflective activities made literacy learning more meaningful and encouraged students to support their ideas with relevant evidence. However, successful implementation requires careful time

management, structured group roles, appropriate text selection, vocabulary support, and continuous teacher scaffolding. Therefore, PBL should be implemented as a systematic literacy framework rather than merely as group-based learning. Future research may examine its long-term effects across different literacy genres, school levels, and digital learning environments.

Declaration of AI-Assisted Technologies

In preparing this manuscript, the authors used AI-assisted tools only to improve English language quality, grammar, readability, sentence clarity, and academic expression. The AI tools were not used to generate research data, conduct data analysis, produce findings, or draw conclusions. All conceptual arguments, data interpretation, methodological decisions, and scholarly conclusions remain the full responsibility of the authors. The authors carefully reviewed, edited, and verified all AI-assisted outputs to ensure the accuracy, integrity, and originality of the final manuscript.

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