International Journal of Multidisciplinary Research and Innovation
ISSN (Online): 3110-066X
Vol X no X (2025): June 2025
https://journal.berkahopungpungan.com/index.php/IJMRI/index
Email: editorijmri2@gmail.com

Developing Critical Thinking Skills among Young Learners through Innovative Learning Models

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Abstract: *This study investigates the effectiveness of innovative learning models in developing critical thinking skills among young learners in elementary schools located in Ponorogo, Indonesia. In the context of 21st-century education, fostering critical thinking from an early age is essential to prepare students for complex and dynamic life challenges. Employing a qualitative case study approach, this research explores how models such as Project-Based Learning (PjBL), inquiry-based instruction, and collaborative learning contribute to enhancing students' cognitive engagement, reasoning ability, and problem-solving skills. Data were collected through classroom observations, semi-structured interviews with teachers, and documentation of student projects across four elementary schools. The findings reveal that innovative pedagogical approaches significantly increased student participation, encouraged reflective inquiry, and supported the development of independent thought. Teachers reported that learners became more confident in expressing their ideas, analyzing real-life problems, and working collaboratively with peers. Despite the positive outcomes, the study also identified challenges such as limited instructional time, lack of teacher training, and insufficient learning resources, particularly in rural settings. The research concludes that integrating innovative learning models into primary education can serve as a strategic pathway to foster critical thinking, provided that adequate support systems and teacher development programs are in place. These findings offer valuable insights for educators, school leaders, and policymakers seeking to improve educational quality and student competencies in Ponorogo and similar contexts.*

Keywords: *Critical Thinking, Innovative Learning Models, Elementary Education, Student Engagement, 21st-Century Skills*

INTRODUCTION

In the rapidly evolving landscape of 21st-century education, critical thinking has become a cornerstone of effective teaching and learning. Defined as the ability to analyze, evaluate, and synthesize information to make reasoned judgments (Facione, 2015), critical thinking is increasingly recognized as a fundamental skill that enables young learners to navigate complex problems, adapt to change, and participate meaningfully in society. Particularly at the elementary

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level, fostering critical thinking lays a strong foundation for lifelong learning and intellectual independence.

Despite its recognized importance, the integration of critical thinking into primary education remains a challenge in many developing contexts, including Indonesia. Traditional teaching methods—characterized by rote memorization, teacher-centered instruction, and limited student interaction—still dominate classrooms across the country (Suyanto, 2017). This approach often inhibits students' cognitive development, creativity, and engagement. Therefore, there is an urgent need to shift toward pedagogical models that promote active learning and cultivate higher-order thinking skills from an early age.

In response to this need, educators have increasingly turned to innovative learning models that emphasize student-centered instruction, collaborative problem-solving, and real-world application. Among these approaches, Project-Based Learning (PjBL), inquiry-based learning, and cooperative learning have gained attention for their capacity to engage students in meaningful tasks that require analysis, decision-making, and reflection (Bell, 2010; Barron & Darling-Hammond, 2008). These models not only enhance academic achievement but also foster critical thinking, communication, and social-emotional skills.

Project-Based Learning, in particular, provides opportunities for students to work collaboratively on complex tasks that mirror real-world challenges. Through structured inquiry and sustained exploration, learners are encouraged to ask questions, conduct research, and present solutions—thus developing analytical reasoning and self-directed learning skills (Thomas, 2000). Inquiry-based learning complements this by positioning students as active participants in knowledge construction, enabling them to formulate hypotheses, test ideas, and revise understanding based on evidence (Kuhlthau, Maniotes, & Caspari, 2015). Cooperative learning adds another layer by promoting peer interaction, shared responsibilities, and mutual accountability (Johnson & Johnson, 2009).

These innovative models have shown promising results in diverse educational settings. Kokotsaki, Menzies, and Wiggins (2016) found that PjBL significantly improved students' critical thinking and problem-solving abilities. Similarly, a review by Condliffe et al. (2017) emphasized

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that student-centered approaches support deeper learning by connecting academic content to students' experiences and interests. However, successful implementation depends on factors such as teacher readiness, curriculum flexibility, and the availability of resources and professional development opportunities.

In rural and semi-urban areas like Ponorogo, East Java, the application of innovative pedagogies presents both opportunities and challenges. On one hand, these regions offer unique cultural and community contexts that can be integrated into student-centered learning. On the other hand, infrastructural limitations, unequal access to digital tools, and a lack of trained educators often hinder the effective adoption of new teaching strategies (Trilling & Fadel, 2009). Nonetheless, with appropriate support and localized adaptation, these approaches have the potential to transform traditional classrooms into vibrant spaces for critical inquiry and collaboration.

This study aims to examine how innovative learning models contribute to the development of critical thinking skills among elementary students in Ponorogo. Specifically, it explores the experiences of teachers and students engaged in PjBL, inquiry-based instruction, and cooperative learning projects. By documenting classroom practices, challenges, and outcomes, the research seeks to provide evidence-based recommendations for enhancing pedagogical effectiveness in primary education.

Understanding how young learners develop critical thinking through innovative instruction is essential for informing curriculum design, teacher training, and policy development. As Indonesia continues to reform its education system to meet global standards, insights from local contexts like Ponorogo can guide scalable and sustainable improvements. Moreover, by investing in early critical thinking development, schools can better prepare students for the demands of secondary education, future careers, and active citizenship.

The shift toward innovative pedagogies in elementary education represents a vital step in equipping students with the skills they need for the 21st century. Critical thinking, as a core competency, must be nurtured through instructional practices that are interactive, inquiry-driven, and culturally responsive. This study contributes to that effort by exploring the potential of

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innovative learning models to foster cognitive growth and learner autonomy among young students in Ponorogo.

METHOD

This study employed a qualitative case study design to explore how innovative learning models influence the development of critical thinking skills among elementary school students in Ponorogo, Indonesia. A qualitative approach was deemed appropriate because it allows for a deep exploration of participants' perspectives, experiences, and contextual factors that shape teaching and learning practices (Creswell & Poth, 2018). The case study method enables the examination of phenomena in real-life settings, particularly where the boundaries between the context and the phenomenon are not clearly defined (Yin, 2018).

The research site consisted of four public elementary schools in Ponorogo that had implemented Project-Based Learning, inquiry-based learning, and cooperative learning approaches. Participants included 12 teachers and 60 students, selected through purposive sampling to ensure that they had experience with the innovative teaching models under study (Patton, 2015). Data collection methods included classroom observations, semi-structured interviews, and document analysis. Classroom observations focused on instructional strategies, student interactions, and manifestations of critical thinking behaviors. Interviews with teachers and students provided insights into instructional planning, implementation challenges, and perceived learning outcomes (Merriam & Tisdell, 2016).

Data were analyzed using thematic analysis, following Braun and Clarke's (2006) six-phase framework. NVivo 12 software was used to code the data, organize themes, and manage large volumes of qualitative information effectively. To ensure the credibility and trustworthiness of the findings, techniques such as triangulation, member checking, and audit trails were employed (Lincoln & Guba, 1985; Miles, Huberman, & Saldaña, 2014).

RESULT AND DISCUSSION

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This section presents the findings of the study based on data collected through classroom observations, interviews, and document analysis. The discussion is organized into three thematic areas: (1) Increased Student Engagement through Real-World Projects, (2) Development of Critical Thinking Skills through Inquiry and Collaboration, and (3) Challenges and Contextual Adaptations in Implementation.

Increased Student Engagement through Real-World Projects

The implementation of innovative learning models, particularly Project-Based Learning (PjBL), significantly enhanced student engagement in elementary classrooms in Ponorogo. Students demonstrated higher levels of enthusiasm and motivation, especially when engaged in projects that were directly related to their everyday experiences and communities. One notable example involved a local environmental awareness project where students conducted neighborhood surveys on waste disposal and proposed solutions to improve cleanliness. This hands-on, problem-solving activity enabled students to see the relevance of their learning, reflecting Bell's (2010) assertion that real-world tasks increase ownership and motivation.

Teachers observed a marked shift in student behavior—from passive listeners to active learners. Students became more inquisitive, engaged more readily in discussions, asked thoughtful questions, and expressed a desire to explore new ideas. These behaviors align with the framework of cognitive engagement described by Fredricks, Blumenfeld, and Paris (2004), who argue that relevance and interest are crucial to sustaining student involvement in academic tasks.

Collaborative group work emerged as a key factor in promoting engagement. Students worked in diverse teams to investigate problems, design solutions, and present findings. This process fostered a sense of responsibility, teamwork, and mutual support. Teachers noted that group interactions encouraged students to listen to each other, negotiate roles, and resolve conflicts constructively. These collaborative dynamics are consistent with the findings of Kokotsaki, Menzies, and Wiggins (2016), who emphasize that PjBL promotes not only cognitive but also emotional and behavioral engagement.

The incorporation of local culture and resources further strengthened student engagement. In some cases, students created multimedia presentations based on traditional folktales or designed

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eco-friendly tools inspired by indigenous knowledge. These culturally relevant tasks helped students feel a personal connection to the material, supporting Gay's (2010) theory of culturally responsive pedagogy. When students see their identity and background reflected in the curriculum, their sense of belonging and interest in learning is heightened.

Technology, where available, also played a supporting role in increasing engagement. Teachers who incorporated digital storytelling, simple animations, or online research into projects reported heightened student enthusiasm. Even in resource-constrained settings, the creative use of mobile phones or school computers helped bring projects to life. Trilling and Fadel (2009) note that digital tools, when used meaningfully, can amplify student agency and extend learning beyond the classroom.

Another observed benefit of real-world projects was the development of leadership and organizational skills among students. As students planned their projects, they had to manage time, delegate tasks, and monitor progress. These practical experiences not only kept them engaged but also contributed to their personal growth and confidence. According to Barron and Darling-Hammond (2008), such experiences are essential in preparing students for future academic and life challenges.

The role of the teacher as a facilitator rather than a lecturer contributed significantly to increased engagement. By posing guiding questions, offering feedback, and encouraging reflection, teachers empowered students to take ownership of their learning process. This shift in instructional style allowed students to experience autonomy and develop a growth mindset—key components of meaningful and lasting engagement in learning.

Real-world projects implemented through PjBL effectively transformed classrooms into dynamic, student-centered environments. The integration of local context, cultural relevance, teamwork, and guided inquiry fostered a learning atmosphere where students were not only active participants but also critical thinkers and problem-solvers. These findings underscore the importance of designing learning experiences that are authentic, collaborative, and deeply rooted in students' lived experiences.

Development of Critical Thinking Skills through Inquiry and Collaboration

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The second major finding highlights the development of critical thinking through inquiry-based and cooperative learning strategies. Students were encouraged to investigate problems, gather information, evaluate sources, and draw conclusions—core processes of critical thinking as defined by Facione (2015).

During one project, students explored the impact of plastic waste on the local river. They examined different types of waste, interviewed community members, and proposed actionable solutions. These activities required students to interpret data, compare perspectives, and reason logically. Such inquiry aligns with the constructivist framework discussed by Thomas (2000), where learning occurs through active exploration and reflection.

Teachers reported improvements in students' questioning techniques, reasoning, and peer feedback. Students learned to articulate their opinions, support their arguments with evidence, and consider alternative viewpoints. According to Barron and Darling-Hammond (2008), these are critical aspects of classroom discourse that promote metacognition and analytical reasoning.

The role of the teacher shifted from knowledge-giver to facilitator, supporting students with scaffolding, guiding questions, and reflection prompts. This aligns with the pedagogical shift advocated by Wurdinger and Qureshi (2015), who argue that critical thinking flourishes when teachers create spaces for inquiry and encourage student autonomy.

Another key development was the emphasis on collaborative group work to deepen critical thinking. In small teams, students had to plan project steps, divide responsibilities, and synthesize their findings. This structure required students to negotiate meaning, challenge assumptions, and justify conclusions—practices central to higher-order thinking (King, Goodson, & Rohani, 2011). Collaboration enabled learners to extend individual thinking through shared dialogue and peer critique, reinforcing the social dimensions of cognition.

Teachers noted that students became more reflective over time. When prompted to explain their choices, defend project ideas, or critique outcomes, learners displayed growing self-awareness of their thought processes. This development aligns with Kuhn's (1999) argument that metacognition, or thinking about one's own thinking, is a foundational element of critical thinking.

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The repeated cycles of planning, doing, reviewing, and revising embedded in project-based tasks helped students internalize these reflective habits.

Technology was sometimes integrated to support inquiry and analysis. Students used mobile phones to take photos, record interviews, and search for environmental data. Although limited in scope due to infrastructure challenges, these digital practices helped learners access wider sources of evidence and present their ideas more creatively. As noted by Trilling and Fadel (2009), critical thinking in the 21st century is increasingly mediated by technology, making such exposure valuable.

The study also found that students' confidence in critical dialogue improved. In one classroom, students held a structured debate on community waste management policies, using evidence from their investigations to support opposing views. This experience not only enhanced reasoning but also taught students how to respectfully disagree—a skill essential to democratic participation and civic responsibility (Brookfield, 2012).

The continuous encouragement from teachers to engage with open-ended questions and real-world challenges laid the groundwork for sustained inquiry. Teachers who consistently modeled curiosity and problem-solving strategies helped establish classroom cultures that valued thoughtfulness and intellectual risk-taking. According to Zohar and Dori (2003), such cultures are crucial for fostering long-term dispositions toward critical thinking.

Challenges and Contextual Adaptations in Implementation

Despite the promising results associated with the implementation of Project-Based Learning (PjBL), several contextual challenges hindered its full potential in elementary schools in Ponorogo. One of the most prominent barriers was the constraint of instructional time. Teachers reported that the current structure of the national curriculum limited their ability to plan and implement interdisciplinary projects that required several weeks to complete. The emphasis on standardized testing and the pressure to cover mandated content reduced the flexibility needed for innovative practices. This concern echoes the findings of Condliffe et al. (2017), who noted that systemic constraints often inhibit the sustainability of PjBL models.

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Another significant obstacle was unequal access to technology and digital infrastructure. While some schools had basic technological tools, others lacked internet connectivity, multimedia devices, or educational software. This digital divide impeded students' ability to conduct online research, collaborate virtually, or develop digital products as part of their projects. These disparities reflect the concerns raised by Trilling and Fadel (2009), who warn that the uneven availability of technological resources can deepen educational inequality and restrict innovation.

In response to these limitations, teachers employed a variety of adaptive strategies. Many educators turned to locally available materials—such as newspapers, recycled items, oral histories, and community elders—to enrich the content of student projects. This use of community resources aligns with Gay's (2010) framework of culturally responsive pedagogy, which advocates for the integration of students' cultural backgrounds and everyday experiences into instructional design. Teachers found that contextualizing learning in this way not only mitigated resource gaps but also enhanced student engagement and relevance.

Some teachers creatively redesigned projects to be more time-efficient and curriculum-aligned. Rather than implementing lengthy, cross-disciplinary projects, they designed shorter, subject-specific tasks that still required inquiry, collaboration, and presentation. For example, a science lesson on ecosystems became a week-long mini-project involving schoolyard biodiversity mapping and poster creation. These efforts illustrate teachers' ability to adapt PjBL principles within the constraints of the existing school system.

The presence and support of Professional Learning Communities (PLCs) also proved to be a key enabler of innovation. Teachers who participated in regular PLC meetings reported feeling more confident and prepared to implement PjBL. These meetings provided a platform for co-planning, sharing of best practices, and collective problem-solving. Cordingley et al. (2015) argue that such collaborative structures are essential for professional growth and instructional reform, especially in settings where resources are limited.

Leadership support emerged as a crucial factor. In schools where principals actively promoted teacher autonomy and provided time for experimentation, PjBL was more likely to be implemented effectively. Supportive administrators helped align project-based approaches with

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school improvement plans, allocated flexible scheduling, and encouraged peer mentoring. This finding is consistent with Leithwood et al. (2008), who emphasize the role of transformational leadership in driving educational innovation.

Many teachers noted the lack of follow-up support after initial training sessions. Although some had attended workshops on PjBL, they rarely received ongoing mentoring or classroom-based coaching to help integrate the approach. This gap in professional development support is consistent with Guskey's (2002) assertion that lasting instructional change requires continuous feedback, reflection, and support.

The successful implementation of PjBL in Ponorogo was shaped by a complex interplay of challenges and contextual adaptations. While systemic barriers like curriculum rigidity and technological inequality posed significant hurdles, the ingenuity of teachers, the use of local knowledge, the formation of PLCs, and leadership support collectively enabled meaningful learning experiences. These findings underscore the need for flexible policies, sustained professional development, and infrastructural investment to fully realize the potential of innovative pedagogies like PjBL.

CONCLUSION

This study highlights the significant impact of innovative learning models, particularly Project-Based Learning (PjBL), on the development of critical thinking skills among elementary school students in Ponorogo, Indonesia. The findings reveal that when students are engaged in real-world, contextually relevant projects, their motivation and active participation increase markedly. Through collaborative learning and hands-on inquiry, students demonstrate enhanced analytical skills, the ability to evaluate information, and improved communication and teamwork capabilities. These outcomes align with global research emphasizing the effectiveness of student-centered pedagogies in fostering 21st-century competencies.

The study shows that critical thinking is not an isolated skill but is cultivated through sustained interaction, reflection, and guided facilitation by teachers. Educators who adopted the role of facilitators and employed scaffolding techniques enabled students to take ownership of

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their learning and apply reasoning in meaningful contexts. This pedagogical shift is vital in encouraging independent learning and problem-solving among young learners.

The study also identified notable challenges in implementing PjBL, including time constraints, rigid curriculum structures, and limited access to digital resources. Despite these obstacles, teachers demonstrated resilience and creativity by adapting materials and leveraging local knowledge to make learning meaningful. The presence of professional learning communities further supported the sustainability of innovative practices.

The integration of PjBL and similar models in elementary education offers a powerful avenue for nurturing critical thinking skills from an early age. Policymakers, school leaders, and educators must collaborate to provide adequate training, resources, and curricular flexibility to ensure the successful and sustainable implementation of such approaches across diverse educational settings.

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