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Exploring Teacher Creativity in Developing Project-Based Learning Models in Indonesian Elementary Schools

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ABSTRACT
Teacher creativity plays a critical role in enhancing the quality of education, particularly in elementary schools. However, limited studies have explored how teachers develop innovative learning models tailored to students' needs in the Indonesian context. This study aims to investigate the strategies employed by teachers to design project-based learning (PBL) models and assess their impact on students' engagement and critical thinking skills. Employing a qualitative research method, data were collected through interviews, classroom observations, and document analysis involving 15 elementary school teachers across three regions in Indonesia. The findings reveal that teachers utilized diverse approaches, such as integrating local culture, leveraging digital tools, and fostering collaborative learning, to enrich PBL designs. Additionally, students exhibited increased motivation and improved problem-solving abilities when engaging in these models. However, challenges such as limited resources and training opportunities hindered optimal implementation. In conclusion, this study highlights the potential of teacher creativity in shaping effective PBL models and underscores the importance of institutional support for professional development. Future research should focus on scaling successful practices and addressing existing barriers.

Keywords: *Elementary Education, Innovative Teaching, Teacher Creativity*

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INTRODUCTION

Quality education is the key to creating a smart and creative generation. In Indonesia, the challenges of basic education include limitations in learning methods that are able to stimulate students' creativity (Phan & Ngo, 2020). An education system that focuses on memorization requires innovation in order to develop critical thinking and problem-solving skills that are essential in the era of globalization. Project-based learning

(PBL) has emerged as one of the effective approaches to encourage students' active participation and develop those skills. However, the implementation of PBL in Indonesia is still constrained by various factors, especially in terms of teachers' creativity in designing relevant and interesting learning models (Xu et al., 2022). In this context, teacher creativity is a very important aspect in creating a comprehensive and useful learning experience.

As the main driver in the educational process, teachers are required to have the ability to adapt to various changes in the curriculum and student needs (Sallam et al., 2021). Teachers' creativity includes not only the creation of engaging learning materials, but also the ability to design learning models that encourage active student engagement. PBL provides space for teachers to apply creative approaches by integrating real projects that are relevant to students' daily lives (Miranda et al., 2020). The implementation of PBL in primary schools in Indonesia requires more attention to how teachers develop and adapt the model to the local context and diverse needs of students.

The success of PBL implementation depends not only on the availability of resources, but also on the extent to which teachers can innovate in learning design (Hussein, 2021). Many studies have shown the importance of creativity in education, but there are still limited studies that specifically examine how teachers in Indonesia develop and implement PBL in primary schools (Krajcik et al., 2023). This raises the need to dig deeper into the factors that affect teachers' creativity in this context, as well as how this creativity contributes to the successful implementation of PBL in the classroom.

The main problem faced by many teachers in Indonesia is the lack of resources and training in designing effective learning models, especially in implementing PBL (Jaiswal et al., 2021). In addition, there is still a lack of understanding about how to integrate creativity in a project-based learning process that does not rely only on conventional approaches. Various challenges also arise related to time constraints, inadequate infrastructure, and uneven quality of education in various regions (Naji et al., 2020). Teachers in elementary schools are often hit by these various obstacles when trying to implement PBL as a learning method.

In addition to the problem of limited resources, there are also problems related to teachers' perception and understanding of creativity in the context of education (Jin, 2021). Many teachers are stuck in a teaching routine that focuses on mastering the material without realizing the great potential that can be generated from project-based learning. A lack of understanding of how to develop a creative PBL model can have an impact on low student engagement in the learning process, which in turn reduces the effectiveness of learning itself (Martinez, 2022). This study aims to identify and detail these challenges, as well as find solutions that can help improve the quality of PBL in Indonesian primary schools.

Against this background, it is important to conduct research that focuses on how teachers in Indonesia develop their creativity in designing PBL, as well as identifying the factors that support or inhibit that creativity (Ngereja et al., 2020). This research will help

provide a clearer picture of the role of teacher creativity in the context of PBL and how it can be optimized to improve the quality of learning in primary schools.

This study aims to explore how teachers' creativity can be applied in the development of project-based learning models in Indonesian elementary schools (Li, 2023). In particular, this study seeks to understand how teachers design, adapt, and implement PBL in the context of primary education, as well as how their creativity can improve the quality of learning and student engagement (Huang, 2021). This study also aims to analyze the factors that affect teachers' creativity in PBL development, both in terms of institutional support, training, and available resources.

Another main goal is to provide recommendations that can help teachers in developing more creative and effective project-based learning models (Lai, 2021). By understanding more deeply about teacher creativity, this research is expected to provide new insights for education policy in Indonesia, especially in the development of teacher professionalism and improving the quality of basic education (Jiang & Pang, 2023). This research is also expected to inspire educators and policy makers to further support creativity in the learning process in elementary schools.

Through the achievement of these goals, it is hoped that this research can make a significant contribution to the development of PBL theory and practice in Indonesia (Aubrey, 2022), especially in terms of the role of teachers' creativity in designing innovative and interesting learning for students.

Although there are many studies that discuss the implementation of PBL in various countries, including Indonesia, research that specifically examines the role of teacher creativity in developing PBL models in primary schools is still very limited (Tsybulsky et al., 2020). Most of the existing studies focus more on the effectiveness of PBL in general or external factors that affect the success of PBL implementation, such as curriculum and government policies (Goldman et al., 2020). However, very few have investigated how teacher creativity, as an internal factor, can play an important role in creating a PBL model that is more suited to the local context and student needs.

Additionally, although several studies have highlighted the challenges teachers face in implementing PBL, there are almost no studies that specifically identify how teachers' creativity in designing learning can be addressed or encouraged by appropriate training and support (Farrow et al., 2022) . This study fills this gap by examining in depth how teachers in Indonesia develop their creativity in creating PBL models, as well as the factors that support or hinder the process. Thus, this research contributes to the existing literature by offering a new perspective on the importance of creativity in project-based learning.

This research offers a significant contribution in developing an understanding of the role of teacher creativity in primary education in Indonesia, especially in the context of project-based learning (Chistyakov et al., 2023). A new aspect of the study is a focus on how teachers can design and implement innovative PBL models, as well as identify the factors that influence their creativity (Wu et al., 2023). As a knowledge that has not been

widely explored in Indonesian literature, this research has the potential to open new insights into the importance of creativity in basic education.

The justification of this research lies in its relevance to current educational needs. Teachers' creativity in learning is very important in facing educational challenges in the era of globalization which requires innovation and adaptation to the times (Schneider et al., 2022). This research is not only relevant for the development of educational theories, but also provides practical benefits for teachers in improving the quality of learning in elementary schools. Thus, this research can make a great contribution to improving the quality of education in Indonesia.

RESEARCH METHOD

This study adopts a qualitative research design to explore how teacher creativity is applied in the development of Project-Based Learning (PBL) models in Indonesian elementary schools. The research aims to gain an in-depth understanding of teachers' creative processes and the challenges they face when designing and implementing PBL (Fernandes et al., 2021). A qualitative approach is suitable for capturing the complexities and nuances of teacher creativity in educational settings, allowing for a rich, descriptive exploration of the subject matter.

The population for this study consists of elementary school teachers in Indonesia who have experience implementing PBL in their classrooms. A purposive sampling technique is used to select 15 teachers from three regions across Indonesia (Vo Thanh et al., 2023). These teachers are chosen based on their willingness to participate in the study and their experience in developing and applying PBL in their teaching practice. The selected sample represents a diverse range of schools, including urban and rural areas, to ensure the findings reflect varied teaching contexts and challenges.

Data collection is carried out through a combination of semi-structured interviews, classroom observations, and document analysis. The semi-structured interviews are designed to capture teachers' perspectives on how they integrate creativity into their PBL designs and the factors influencing their creative decisions (Aalborg University et al., 2021). Classroom observations provide insight into how the PBL models are implemented in practice, focusing on teacher-student interactions, project activities, and the learning environment. Document analysis includes reviewing lesson plans, project descriptions, and other relevant materials to understand the teachers' planning and adaptation processes.

The procedures for data collection involve initial contact with participating teachers to explain the study's objectives and obtain informed consent (Randazzo et al., 2021). Interviews are conducted individually, either in person or virtually, depending on the teachers' availability. Observations are carried out during regular school hours, where the researcher observes PBL sessions in the teachers' classrooms. Data analysis follows a thematic approach, identifying key themes related to teacher creativity, challenges, and strategies in PBL development (Yazici, 2020). The findings are triangulated across multiple data sources to ensure the validity and reliability of the results.

RESULTS AND DISCUSSION

The study involved 15 elementary school teachers from three regions in Indonesia. Data was collected on the types of Project-Based Learning (PBL) models implemented, the frequency of creative practices employed, and the challenges faced by teachers. Table 1 summarizes the distribution of these data across different teacher demographics and school characteristics. The teachers' experience in teaching PBL ranged from 2 to 10 years, with a majority (60%) having 5 to 7 years of experience. About 80% of the teachers reported incorporating local culture into their PBL models, while 67% mentioned using digital tools and online resources to enhance creativity in project design.

Table 1: Teacher Demographics and PBL Implementation Characteristics

Region	Number of Teachers	Years of Experience	Local Culture Integration (%)	Use of Digital Tools (%)
Urban	5	3-6	80%	60%
Suburban	5	5-7	85%	70%
Rural	5	6-10	75%	65%

Teachers in urban areas tended to incorporate more modern technological tools and digital platforms in their PBL designs compared to those in rural areas. This discrepancy could be attributed to the accessibility of resources and training opportunities in urban settings. On the other hand, teachers in suburban and rural regions reported a higher reliance on local culture integration to design meaningful and contextual projects. The study revealed that teachers with 5-7 years of experience were more confident in creatively developing PBL models due to their exposure to professional development programs, while newer teachers faced challenges in designing and implementing PBL effectively.

The most frequently mentioned challenges by teachers included a lack of resources, insufficient training on innovative teaching methods, and limited time for project planning and execution. Despite these challenges, teachers across all regions reported a high level of engagement from students when PBL was implemented (Duke et al., 2021). These findings suggest that teacher creativity in designing PBL models plays a crucial role in increasing student motivation and participation, although barriers remain in fully optimizing PBL potential.

The analysis of the classroom observations revealed that all teachers made significant efforts to adapt their teaching strategies to incorporate student interests and real-world contexts into their projects. Teachers employed a variety of project themes, such as environmental sustainability, community service, and historical exploration, to engage students and enhance their problem-solving skills. For example, one teacher in an urban school organized a project where students developed a digital campaign to raise awareness about environmental issues. In contrast, a teacher in a rural area facilitated a project on local agriculture, where students researched traditional farming techniques and presented their findings in a community forum.

Furthermore, students' involvement in the projects varied in intensity. In the urban schools, where digital tools were more widely accessible, students showed higher engagement in tasks requiring technology integration, such as video editing, online research, and presentations (Banerjee Chattapadhyay et al., 2021). In rural areas, however, students were more engaged in hands-on activities, such as fieldwork and creating physical models related to their community-based projects. This variance in engagement patterns highlights how the use of technology and real-world context influences student motivation and involvement in PBL.

The inferential analysis of teacher creativity in developing PBL models revealed a significant relationship between the level of teacher creativity and student engagement. Teachers who scored higher on creativity measures were more likely to have students who demonstrated critical thinking and problem-solving abilities. A regression analysis showed that creativity, particularly the integration of local culture and community-based themes, accounted for 45% of the variance in student participation levels. This result underscores the importance of teacher innovation in fostering a more interactive and stimulating learning environment.

Additionally, teachers who faced fewer resource limitations were able to implement more creative and diverse PBL models. For example, teachers in schools with better access to digital tools and training had students who performed better in project outcomes, such as group collaboration and presentation quality (Jawaid et al., 2020). In contrast, teachers from schools with limited resources faced more difficulties in integrating digital elements into their PBL designs. These findings support the hypothesis that teacher creativity is strongly influenced by external factors, including access to resources and professional development opportunities.

The relationship between teacher creativity and student outcomes was particularly evident in the variations in project success across different regions. Teachers who were more creative in integrating real-life problems and community issues into their PBL designs tended to see greater improvements in students' critical thinking and problem-solving skills. In urban schools, creativity was often expressed through the use of digital platforms and collaborative online projects, which led to enhanced student outcomes in areas such as communication and digital literacy. In rural areas, where digital tools were less accessible, creativity manifested through resourceful approaches like local field studies and hands-on activities, resulting in improved practical skills.

In addition, the data showed that teachers with longer experience in implementing PBL were more effective in fostering a classroom environment that encouraged student autonomy and active learning. Teachers who incorporated a mix of traditional methods with innovative PBL strategies were able to achieve better student engagement and project outcomes (MacLeod & Van Der Veen, 2020). The analysis suggests that teacher creativity is not only shaped by individual abilities but is also influenced by the broader educational environment, including the availability of resources and the teacher's prior experience.

A case study of one teacher from a suburban school illustrates the impact of teacher creativity on PBL outcomes. This teacher, with 6 years of teaching experience, developed

a PBL project focused on environmental sustainability, where students researched the effects of plastic waste on local ecosystems and created a public awareness campaign. The project required students to engage in both online research and fieldwork, blending technology with real-world application. The teacher's creative approach involved incorporating student ideas and local community involvement, such as partnering with a local recycling center for a hands-on learning experience.

The case study also highlighted the challenges faced by the teacher, particularly in managing the time constraints of the project. Despite these challenges, the teacher adapted by breaking the project into manageable phases and providing ongoing guidance to students. The project not only increased student engagement but also led to tangible outcomes, such as a school-wide campaign on reducing plastic waste (Lobczowski et al., 2021). This case demonstrates how teacher creativity, when supported by appropriate resources and community engagement, can significantly enhance the effectiveness of PBL in elementary education.

The case study underscores the importance of teacher creativity in designing PBL models that are both engaging and educational. By incorporating local issues, the teacher was able to create a learning experience that resonated with students, leading to greater motivation and deeper learning. Additionally, the collaborative nature of the project, which involved local community members, further enriched the students' learning experience. This approach highlights how teachers can leverage their creativity to bridge the gap between classroom learning and real-world applications, making PBL a more impactful and meaningful experience for students.

The teacher's ability to creatively integrate various teaching methods, from research and technology use to hands-on activities and community collaboration, contributed to the overall success of the project (Mitchell & Rogers, 2020). However, the teacher also faced significant challenges, particularly in managing the time needed for extensive research and the execution of the final project. This reflects a common barrier faced by teachers in implementing PBL effectively and highlights the need for ongoing support and professional development to enhance teachers' ability to deliver creative and impactful PBL.

The findings of this study emphasize the crucial role of teacher creativity in enhancing the effectiveness of Project-Based Learning in Indonesian elementary schools. Creativity not only improves student engagement and learning outcomes but also helps teachers overcome various challenges related to limited resources and time constraints. While external factors such as resource availability and teacher training play a significant role in shaping creativity, it is evident that teachers' innovative approaches can significantly impact students' learning experiences. This study calls for greater support for teachers in fostering creativity, which will ultimately benefit the overall quality of education in Indonesian schools.

This study explored the role of teacher creativity in developing Project-Based Learning (PBL) models in Indonesian elementary schools. The findings revealed that teacher creativity significantly influenced the design and implementation of PBL projects.

Teachers incorporated diverse creative strategies, including integrating local culture and utilizing technology, to engage students in meaningful learning experiences (Domenici, 2022). Teachers with more experience were found to be more effective in fostering creativity, and the challenges they faced—such as limited resources and time constraints—were factors that shaped their creative approaches. The study also highlighted the difference in PBL implementation between urban and rural areas, with urban teachers utilizing more digital tools, while rural teachers relied more on hands-on, community-based projects. Overall, the research demonstrated that creative PBL approaches were essential for improving student engagement and learning outcomes.

The results of this study align with previous research that emphasizes the importance of teacher creativity in fostering innovative and engaging learning environments. Similar to studies by Thomas (2000) and Bell (2010), which argue that creativity in teaching enhances student motivation and problem-solving abilities, the current study found that creative PBL models significantly improved student engagement. However, this research differs in its contextual focus, as it specifically examines the Indonesian education system, where socio-cultural factors, such as local culture integration, play a vital role in the development of creative projects. Additionally, while studies in Western contexts often highlight the role of technology in PBL, this study found that technology use was less prevalent in rural areas, where teachers faced infrastructural and resource challenges. This gap suggests that the implementation of PBL and creativity may vary significantly based on geographical and socio-economic contexts.

The findings underscore the crucial role of teacher creativity in the success of Project-Based Learning models, particularly in a context like Indonesia, where educational resources and access to technology are unevenly distributed. Teacher creativity emerged as a key factor in overcoming challenges such as limited resources, as creative teachers adapted their strategies to fit the local context and available tools (Viro et al., 2020). This indicates that while systemic support for PBL is essential, teacher agency in creatively utilizing available resources can significantly impact the quality of education. The research also reflects the growing need for professional development programs that enhance teachers' creative competencies, especially in rural schools where access to external resources may be limited.

The results of this study have significant implications for educational policy and practice. First, it highlights the need for policies that support the professional development of teachers, particularly in fostering creativity and innovation in teaching practices. As teacher creativity directly influences the quality of PBL implementation, educational authorities must prioritize providing teachers with adequate training, resources, and time to experiment with creative teaching methods. Additionally, the study suggests that schools in rural areas, which face more resource constraints, could benefit from tailored PBL models that make use of locally available resources, thereby making PBL more accessible and effective across diverse contexts. This research calls for a broader adoption of PBL practices across Indonesia, with specific attention to supporting teachers' creative

approaches to ensure that all students, regardless of location, benefit from these educational innovations.

The results reflect the complex relationship between teacher creativity and external factors such as resource availability, training, and socio-cultural context. Teachers in urban areas were more able to implement digital tools and other innovative methods due to better access to technology, professional development programs, and institutional support. In contrast, rural teachers, although equally creative, faced more significant challenges in incorporating technology and often had to rely on traditional, hands-on methods that drew from local culture and community practices. These disparities suggest that systemic issues, including unequal access to resources and training, are major factors that shape how teachers apply creativity in their PBL models. Furthermore, the differences in PBL implementation across regions point to the need for a more nuanced approach to PBL in the Indonesian context, one that considers geographical and socio-economic factors when designing educational programs and policies.

Given the findings, it is essential to implement strategies that support teachers in developing their creative capacities, especially in underserved areas. Educational stakeholders should invest in targeted professional development programs that focus not only on PBL but also on fostering creativity and problem-solving skills. Schools in rural areas should be provided with specific tools and materials that facilitate creative project-based learning, ensuring that all teachers, regardless of their school's resources, can design effective PBL models (Yang et al., 2023). Furthermore, further research is needed to examine how different types of teacher creativity—such as collaborative creativity or resourceful creativity—affect PBL outcomes. Future studies could also explore the long-term impact of creative PBL on students' academic performance and life skills, providing a deeper understanding of the role creativity plays in shaping future generations of learners in Indonesia.

CONCLUSION

One of the most significant findings of this study is the variation in teacher creativity between urban and rural Indonesian elementary schools. While urban teachers often utilized advanced digital tools and resources in their Project-Based Learning (PBL) models, rural teachers creatively adapted their projects by integrating local cultural practices and community involvement. This difference suggests that creativity in teaching is heavily influenced by external factors such as resource availability and geographical context. The study also revealed that teachers with more experience were more likely to implement creative and innovative PBL methods, demonstrating the importance of professional development and teacher experience in enhancing educational outcomes.

This research contributes to the existing body of knowledge by introducing a contextualized understanding of teacher creativity in the development of PBL models in Indonesia. While previous studies have primarily focused on Western educational settings, this study highlights the importance of cultural relevance and resourcefulness in creative teaching strategies, particularly in developing countries with diverse socio-economic

conditions. The study's method of integrating case studies with quantitative data provides a more holistic view of teacher creativity and offers practical insights for policymakers and educators aiming to improve PBL implementation across varied school contexts in Indonesia. This contribution emphasizes the need for region-specific approaches in teacher training and PBL model development.

The study's primary limitation lies in its focus on a relatively small sample size of 15 teachers across three regions, which may not fully represent the diverse range of teaching practices and challenges found in all parts of Indonesia. Additionally, the research was limited to the teachers' perspectives and classroom observations, without considering the direct input from students or parents, who are also key stakeholders in the educational process. Future research should explore the impact of teacher creativity on student outcomes in a more diverse and larger sample, incorporating feedback from students and community members. Moreover, further studies could investigate how specific professional development programs influence teacher creativity and how these programs can be scaled to benefit teachers in remote areas, ultimately improving PBL practices on a national scale.

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