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Integration of The Problem-Based Learning Model with A Deep Learning Approach to Improve Creative Thinking Ability of Eighth-Grade Students at SMP Negeri 8 Blitar

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ABSTRACT

This study focuses on analyzing the effectiveness of the Problem-Based Learning (PBL) model integrated with a deep learning approach in accelerating students' creative thinking ability in the Pancasila Education subject. Using a quantitative quasi-experimental design, the research, which ran for eight months from November 2025 to June 2026, involved a population of 254 eighth-grade students at SMPN 8 Blitar. Through the application of a cluster random sampling technique, 64 students were selected as the sample and distributed evenly into an experimental class that received deep-learning-based PBL treatment and a control class that was taught using the conventional method. Primary data were collected using a creative-thinking test instrument, which was subsequently analyzed through the Independent Samples t-Test and N-Gain calculation. The empirical findings confirmed a significant difference in achievement between the two groups (Sig. = 0.000 < 0.05), with the experimental group's mean posttest score of 88.00 significantly outperforming the control group, which only achieved 75.94. The experimental group also showed a high level of effectiveness, obtaining a mean N-Gain Score of 0.7527. The novelty of this research lies in the modification of the PBL syntax that synergizes the three pillars of deep learning—mindful, meaningful, and joyful learning—which provides practical implications for educators in transforming the classroom into a contextual learning environment. Based on these results, it is concluded that the implementation of a deep-learning-oriented PBL model is highly effective in boosting students' creative thinking skills.

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1. INTRODUCTION

Entering the 21st-century education era, instructional orientation has undergone a major transformation that demands a reconstruction of the learner's role from a passive

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recipient of information into an active subject who independently constructs their own knowledge. Axiologically and philosophically, modern learning patterns must be rooted in a *student-centered learning* methodology aligned with the values of progressivism and constructivism. This principle asserts that the essence of the educational process is to provide space for learners to hone their creativity, build collaboration, and explore their cognitive potential in discovering scientific concepts in depth (Umam & Jiddiyah, 2022). Instructional activities oriented toward student independence should ideally be designed to stimulate mental activity in order to trigger creative thinking skills (Fathurrahman & Puspita, 2025). Creative thinking ability itself is represented as the capacity for divergent thinking in generating a variety of applicable solutions and new ideas, which is an important competency for learners to break away from monotonous thinking patterns (Munandar, 2022).

From a regulatory standpoint, fostering this creativity requires learners to be accustomed to exploring ideas outside conventional frameworks, encouraged to offer alternative solutions when facing obstacles, and given space for objective evaluation. Therefore, creative thinking capacity must be trained consistently through solving contextual problems grounded in the reality surrounding students. However, empirical observations in the field reveal a real gap between this ideal condition and the actual reality of learning, as learners' creative thinking skills generally remain at an unsatisfactory level. At the macro level, this low innovation capacity is confirmed by the *Global Innovation Index*, which ranks Indonesia's innovation index 87th out of 132 countries (Priyambodo et al., 2021). Yet international competency standards, such as those formulated by the *National Science Teacher Association*, underline that creativity is a key pillar of 21st-century global competency that must be integrated into the education curriculum (Saidah, 2024).

Causally, this stagnation in student creativity is triggered by teachers' persistent tendency toward conventional models dominated by one-way lecturing methods. In addition, subject matter is often presented in a theoretical-textual manner without being linked to real problems in society, compounded by rigid assignment patterns that fail to spark students' creative reasoning. Such a conventional approach kills students' active engagement, dulls social sensitivity, and hinders independence in problem-solving (Suryani & Anwar, 2020; Naharia, 2024). This empirical gap was specifically identified through a preliminary study at SMP Negeri 8 Blitar in the Pancasila Education subject. Based on in-depth interviews with the subject teacher conducted between November and December 2025, it was revealed that although the school had targeted the implementation of the *Problem-Based Learning* (PBL) model with a *deep learning* approach, in practice most teachers still reverted to conventional patterns.

This problem is rooted in teachers' limited participation in regular professional training, which triggers biased interpretation of concepts when applied in the classroom. This misalignment is reinforced by observational findings showing that innovative lesson-module designs do not correspond to classroom reality, as teachers remain predominantly lecture-based, the material remains textual, and evaluation instruments only test low-level recall. As a result, when confronted with case-analysis questions, students' scores drop drastically, the classroom climate tends to be passive, and interaction is dominated by only a handful of students. Teachers appear not yet to have mastered the operational aspects of the *deep learning* approach, so learning outcomes only superficially touch the enjoyable dimension without succeeding in reaching the

essence of students' creative thinking. If this problem is left unaddressed, systemic negative impacts will emerge in the long term, in which students will struggle to master advanced competencies requiring complex analysis, their self-confidence will erode, and graduates will lose competitiveness in a global era that demands cognitive flexibility.

As a solution to this threat, a change in learning methodology is needed through the application of a deep learning approach. This approach is designed to transform knowledge retention to be more meaningful, contextual, and rational, while also strengthening creative thinking capacity and team collaboration (Amrullah et al., 2025; Nasrulloh, 2023). The characteristics of *deep learning* are highly urgent for meeting the demands of modern education, which requires analytical sharpness in various situations (Ardhana, 2025). To maximize these learning outcomes, this approach is highly effective when integrated with the *Problem-Based Learning* model (Taufiqurrahman & Junaidi, 2021). The PBL model itself shifts the teacher's role to that of a facilitator and centers activity on authentic problem-solving to build cognitive independence (Trianto, 2023). The integration of these two concepts gives rise to a flexible, interactive method that accommodates students' characteristics (Huwaidah et al., 2024). Through this synergy, learning is able to link new knowledge with students' existing cognitive structures, resulting in solid understanding while also triggering adaptive creative thinking skills (Miliniawati & Isnaeni, 2023; Ardhana, 2025).

In previous research, the theme of integrating PBL and deep learning has actually been partially examined by several researchers. Bariroh (2025) analyzed the effect of deep learning through PBL on the understanding of mathematical concepts, while Afdania (2025) and Wulandari (2025) compared the effectiveness of PBL, PjBL, and deep learning with a focus on the analytical ability of senior high school students. Meanwhile, Febrianto (2025) focused his study on the effect of deep learning on critical thinking based on local wisdom. Although these studies successfully demonstrated the significance of both models, a real gap in the literature (*gap analysis*) exists, as most prior research tested purely cognitive variables or critical thinking within the exact-sciences domain at the senior high school level. As far as the available literature shows, no empirical study has specifically examined the integration of deep-learning-based PBL to intervene in creative thinking skills within the social sciences and humanities domain, particularly the Pancasila Education subject at the junior high school level. This subject is often labeled as theoretical rote memorization, whereas the restructuring of the national curriculum demands that learners be able to provide creative solutions to national dynamics.

This scientific gap forms the basis of the novelty of this study, in which the research positions the integration of the PBL model and the deep learning approach as an instructional intervention strategy to spark the creativity of junior high school students in the Pancasila Education subject. Based on this reasoning, this study aims to analyze the effect of integrating the problem-based learning model with the deep learning approach on improving the creative thinking skills of eighth-grade students at SMP Negeri 8 Blitar. The urgency of this research is significant, both theoretically by providing a scientific contribution in the form of a new empirical reference regarding the reconstruction of modern instructional models in value-laden subjects and practically for educators seeking to broaden their pedagogical insight. Finally, for school management, this research is urgent as input, academic supervision evaluation material, and a strategic reference in

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formulating operational curriculum policy oriented toward improving the quality of meaningful learning.

2. METHODS

The population in this study comprised all eighth-grade students at SMP Negeri 8 Blitar in the 2025/2026 academic year, distributed across eight classes with a total of 254 students. Sampling was conducted using a purposive sampling technique, in which group selection was based on considerations of academic equivalence or homogeneity to preserve the experiment's internal validity. The main criteria used included equivalence of baseline ability, based on the mean score of the Pancasila Education analysis exam, and an equal number of students per class. Based on these criteria, class VIII D (32 students) was selected as the experimental group, which received the deep-learning-based PBL intervention, and class VIII E (32 students) was selected as the control group, which was taught using the conventional method. Both classes had an identical baseline mean score (M=77), thereby minimizing bias from confounding variables outside the treatment.

The research variables were divided into two parts: the independent variable (X), namely the innovative learning model operationalized through the implementation of PBL syntax integrated with deep learning principles, and the dependent variable (Y), namely creative thinking skills in the Pancasila Education subject, assessed based on Munandar's four dimensions: fluency, flexibility, originality, and elaboration. Based on this theoretical review, the null hypothesis (H_0) was formulated to state that there is no significant effect of the application of the innovative learning model (X) on learners' creative thinking skills (Y) in the Pancasila Education subject at SMP Negeri 8 Blitar. Conversely, the alternative hypothesis (H_a) states that there is a significant effect of the application of the innovative learning model (X) on learners' creative thinking skills (Y) at the research site.

To test this hypothesis, primary data were collected using a closed-ended Google Form-based questionnaire with a five-point Likert scale. Before being distributed to the main sample, the instrument was piloted (try-out) on 30 students outside the sample in class VIII C, which had homogeneous characteristics. Item validity was tested using the Pearson Product Moment Correlation formula to ensure the validity of each question item:

$$r_{xy} = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{[n\sum X^2 - (\sum X)^2]\,[n\sum Y^2 - (\sum Y)^2]}}$$

An item was declared valid if the calculated r value ($r_{calculated}$) > the table r value (r_{table}) at a 5% significance level with degrees of freedom df = 30 − 2 = 28, yielding a critical threshold of 0.361. Next, the internal reliability of the entire instrument was evaluated through the Cronbach's Alpha (α) coefficient test using the formula:

$$r_{11} = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum \sigma_b^2}{\sigma_t^2}\right)$$

The instrument was declared feasible and reliable if it met the feasibility threshold of $\alpha > 0.60$. Once all numerical data had been tabulated, data analysis was carried out with the help of SPSS 25.0 software through three interdependent stages. These stages

began with descriptive statistical analysis to describe the respondents' profile, followed by classical assumption tests comprising the Kolmogorov-Smirnov normality test, the linearity test, and the heteroscedasticity test using the Glejser test, to ensure that the estimation model met the Best Linear Unbiased Estimator (BLUE) criteria. As the core analysis to test the hypothesis partially, a simple linear regression analysis was used through the structural equation:

$$Y = a + bX + e$$

Verification of the significance of the effect was carried out through the t-test by comparing the calculated t value ($t_{calculated}$) against the table t value (t_{table}) at a significance level of $\alpha = 0.05$, where if the significance value $p < 0.05$, then H_0 is rejected and H_a is accepted. This series of analyses concluded with a test of the coefficient of determination (R^2) to determine the percentage contribution of the innovative learning model variable's variance to fluctuations in learners' creative thinking skills.

ChatGPT (OpenAI) and Gemini AI were used solely to assist in refining academic language and improving manuscript structure. These AI tools were not used for research design, data collection, data analysis, interpretation of results, or the formulation of scientific conclusions. All scientific content, research findings, and the final version of the manuscript were independently reviewed, verified, and approved by the authors, who bear full responsibility for the accuracy and integrity of the published work.

3. RESULTS AND DISCUSSION

3.1 Implementation of the PBL Learning Model with the Deep Learning Approach in Pancasila Education Learning

Observation data collected over three class meetings in the experimental class confirmed that all indicators of the learning scenario could be optimally implemented. This study's observation sheet contained 29 indicators measuring the planning, introduction, core activity, and closing phases, in which every indicator consistently received a "Yes" response at each meeting, so that the implementation percentage reached a perfect 100%. Based on the interpretation criteria that set the 81%–100% scale as the "very good" category, the implementation of the deep-learning-based PBL model in the Pancasila Education subject fell into the Very Good level. This implementation success was driven by the strong synergy between the PBL steps and the pillars of deep learning, in which the teacher applied the five stages according to Nurhadi et al. (2004) and Arends (2008), starting from orienting students to an authentic problem, organizing students, guiding investigation, developing and presenting artifacts, to evaluating the problem-solving process.

This very-good implementation was also driven by the internalization of the three pillars supporting deep learning: *mindful*, *meaningful*, and *joyful learning*. The mindful learning aspect manifested in students' full engagement, focus, and reflective attitude throughout the learning process, which was able to spark students' curiosity (Saputra et al., 2022). Meanwhile, the meaningful learning pillar was realized when the teacher connected digital literacy material on preserving national diversity with real issues in

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students' everyday lives, reinforcing David Ausubel's theory on the importance of linking new information to prior cognitive structures, in line with the view of Taufiqurrahman and Junaidi (2021). The classroom atmosphere was also colored by the joyful learning pillar, evidenced by the creation of an active, collaborative classroom climate free from psychological pressure, so that students felt comfortable and confident in expressing their creative ideas (Marzatifa et al., 2021). This success was supported by the repositioning of the teacher's role from a mere single source of information (*surface learning*) to a facilitator and mentor (Depdiknas, 2004; Amrullah, 2025), thereby, overall, successfully minimizing the weaknesses of the conventional method and successfully sparking students' creative thinking ability through the quantity of ideas (fluency) and flexibility of viewpoint (Sari, et al., 2026).

3.2 Creative Thinking Ability of Eighth-Grade Students in the Pancasila Education Subject

Based on the descriptive analysis of the dependent variable, there was a significant increase in students' creative-thinking scores between before (pretest) and after (posttest) treatment in both groups. In the control class, the pretest score of 52.06 (SD=6.937) rose to 75.94 at posttest (SD=6.900), an increase of 23.88 points. Meanwhile, in the experimental class implementing deep-learning-integrated PBL, the mean pretest score of 52.63 (SD=8.119) rose sharply to 88.00 at posttest (SD=7.501), an increase of 35.37 points. A direct comparison of the posttest data shows the experimental class outperforming the control class by 12.06 points, and since the two groups' baseline conditions were equivalent, this disparity in final outcomes is clear evidence of the impact of the classroom learning intervention. This finding confirms the view of Musyafak and Subhi (2023) that a deep learning ecosystem is highly effective in optimally boosting students' creative-thinking capacity.

Theoretically, the score increase in the experimental class occurred because the combination of PBL and deep learning was able to stimulate the four dimensions of creative thinking progressively through each academic stage. The first dimension, fluency, was triggered during the problem-orientation stage through the presentation of complex cases that drove students' cognitive processes to produce a range of alternative ideas (Munandar, 2019). Next, the second dimension, flexibility, flourished during group investigation, where students were trained to exchange ideas, expand their cognitive flexibility, and solve problems in various ways (Budiawati et al., 2023; Herdiawan et al., 2019; Rahayu et al., 2019). Meanwhile, the third indicator, originality, was facilitated during the presentation of the group's work, where students were given room to present their group's unique and fresh innovative solutions in front of the class (Palupi et al., 2019; Amrullah, 2025). Finally, the elaboration component developed through the meaningful and mindful learning pillars, which required students to connect Pancasila Education theory with empirical reality in order to compose comprehensive, detailed solutions (Saputra et al., 2022). This approach successfully transformed the classroom landscape from a shallow traditional method into a participatory, active agent (Agyeman, 2024).

3.3 The Effect of the PBL Learning Model with the Deep Learning Approach on Improving Students' Creative Thinking Ability

Next, in terms of statistical proof, the results of the Independent Samples t-Test analysis provided strong empirical confirmation of the effectiveness of the intervention

applied in this study. The significance value obtained (Sig. 2-tailed) was 0.000, which is far smaller than the determined critical threshold (0.000 < 0.05), so the statistical decision taken was to reject H_0 and accept H_a. This rejection of the null hypothesis clearly proves that there is a highly significant difference in creative-thinking capacity between the control class following conventional learning and the experimental class implementing PBL deep learning. The direction of this positive effect is shown by the calculated t value of −6.695 with a mean difference reaching 12.063, where the negative sign mathematically indicates that the experimental group's final performance far exceeded that of the control group.

This significance test was reinforced by comparing the absolute calculated t value against the table t value to ensure data accuracy. At degrees of freedom (df) = 62 and a significance level of $\alpha = 0.05$ for a two-tailed test, the table t value obtained was 1.999, so it is clear that the calculated t value is far above the table threshold (6.695 > 1.999). This empirical fact proves that the integration of the PBL model and the deep learning approach provides a significant accelerative impact in improving students' creative-thinking skills in the Pancasila Education subject. This quantitative finding is highly consistent with the theoretical foundation of Taufiqurrahman and Junaidi (2021) as well as Huwaidah et al. (2024), who state that the synergy of these two models can produce a learning atmosphere that is adaptive, interactive, and accommodating of students' cognitive potential. The results of this study also reinforce and extend the scope of empirical findings from several previous researchers, such as Armana, Lasmawan, and Sriartha (2020), who confirmed the importance of renewing innovative instructional models to improve student learning outcomes.

Although several prior studies similarly showed high significance, this study offers novelty as well as a far more substantive academic achievement. This is because the instructional process did not stop at the conventional PBL syntax stage but was reinforced through the deep learning approach. This intervention succeeded in completely overhauling Pancasila Education learning, which has long been criticized as tending toward shallow "surface learning" due to over-reliance on rote memorization of text or facts alone (Amrullah, 2025; Hadian et al., 2023; Triantoro et al.,2023). Through this reconstruction, learning activity shifted into a meaningful, reflective cognitive process oriented toward deep concept mastery through the implementation of its three main pillars: mindful learning, meaningful learning, and joyful learning.

Through the internalization of the mindful learning pillar, learners' attentional focus and active involvement in formulating problem solutions were fully accommodated without disruption. In this phase, students were guided to reflect on the nature and substance of what they were learning (Saputra et al., 2022), thereby stimulating the emergence of natural curiosity to produce problem-solving analyses rooted in their own empirical experience. On the other hand, the meaningful learning pillar, grounded in David Ausubel's theoretical foundation, asserts that cognitive meaningfulness is created when students are able to link new information into the structure of prior knowledge or experience they already possess. This integration of the PBL model within deep learning succeeded in grounding Pancasila Education issues in everyday reality, which in turn transformed the abstract concept of the state into something more concrete and relevant for students (Wibowo, 2020). To release these limitations on creativity, the joyful learning pillar was applied by building a conducive, relaxed, and supportive classroom atmosphere, so that students were no longer haunted by psychological anxiety when

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making mistakes (Diputera & Zulpan, 2024). This inclusive climate proved effective in reducing academic stress pressure while also increasing students' intrinsic motivation to boldly articulate fresh, innovative ideas (Marzatifa et al., 2021).

Empirical evidence regarding the superiority of this conceptual integration is further reinforced by the effectiveness analysis results through the N-Gain Score calculation. The control group, taught using the conventional method, only obtained a mean N-Gain score of 0.4908 (49.07%), placing that group in the "moderate" category with a "less effective" effectiveness level. In contrast, the experimental group successfully achieved a mean N-Gain score of 0.7527 (75.27%), which falls into the "high" category, meeting the "effective" criterion. Through the implementation of the deep-learning-oriented PBL model, students in the experimental class experienced an acceleration in creative-thinking ability of 35.37 points from their baseline condition. This massive growth in cognitive capacity in the experimental class can be validated and analyzed using three major umbrellas of modern learning theory.

First, Constructivism Theory underscores that knowledge cannot be passively transferred from educator to learner, but must instead be independently constructed by students through active interaction with objects and their learning environment. The process of investigating authentic problems within the PBL model provides students with the widest possible space to solidly construct their own conceptual understanding. Second, Vygotsky's Social Constructivism Theory explains that social interaction plays a central role in stimulating higher-order cognitive development. Collaborative activities, mutual argumentation, and idea negotiation in solving problems in the experimental class functioned as social scaffolding that sparked the emergence of new, original, and flexible thinking among students. Third, Discovery Learning Theory, developed by Bruner, demonstrates that understanding or solution formulas discovered independently by students through a process of inquiry are far more meaningful, have stronger memory retention, are more easily transferred to new situations, and have proven effective in boosting their creative-thinking flexibility.

The scientific findings of this study are reinforced by Ardhana's (2025) assertion that aligning deep learning principles within the structure of the PBL model greatly helps learners deeply connect new knowledge with past experience in order to produce solid conceptual understanding while also honing creative-thinking skills. When compared with the results of studies by UBM et al. (2025) and Febrianto and Nurharini (2025), which used similar approaches, this study at SMPN 8 Blitar recorded a far more substantive improvement trend. Thus, a conclusive common thread can be drawn: the intervention of the PBL learning model with the deep learning approach is not only empirically proven to have a significant effect, but also has a very high level of effectiveness in boosting students' creative-thinking ability in the Pancasila Education subject.

4. CONCLUSION

Based on the results of the data analysis and discussion, the conclusion of this study confirms that the implementation of the Problem Based Learning (PBL) model synergized with the deep learning approach has been proven to have a significant effect and a high level of effectiveness in escalating learners' creative-thinking capacity in the Pancasila Education subject at SMPN 8 Blitar. The success of this intervention is shown

by the dominance of the experimental group's posttest scores and N-Gain achievement, which successfully reached the high (effective) category, massively outperforming the control group taught via the conventional method, which remained stuck in the moderate (less effective) category. The synergy between the PBL syntax and the pillars of deep learning succeeded in stimulating all dimensions of students' creative thinking comprehensively and evenly, covering fluency, flexibility, originality, and elaboration.

Theoretically, the implications of these empirical findings further strengthen the legitimacy of constructivism theory and discovery learning, which state that students' creativity will never grow through superficial rote-memorization activities (surface learning). Instead, this competency will develop optimally when students are given room to independently construct their own knowledge by solving real problems in society. Practically, the results of this study offer an applicable guide for educators in transforming the classroom atmosphere into a learning environment that is meaningful, mindful, and joyful, in order to boost students' creative potential without the burden of exhausting cognitive pressure.

Referring to these conclusions and field findings, several strategic suggestions are proposed to Pancasila Education teachers to begin continuously integrating this innovative model into classroom instructional programs, with an emphasis on presenting stimuli in the form of authentic cases relevant to learners' life dynamics. In addition, school principals and institutional management are expected to provide concrete policy support, one of which is by facilitating and providing regular professional pedagogical training on deep learning to improve teachers' practical competence at school. Finally, future researchers are recommended to broaden the scope of testing this model's effectiveness to wider subject matter or different education levels, while also exploring its effect on other dependent variables such as critical-thinking skills or learning outcomes in the affective domain, in order to enrich the literature of modern educational research.

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