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Deep Learning Strategies for Developing Critical Thinking Skills and Pancasila Character among Elementary School Students

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Abstract. In the current educational context, elementary schools face challenges in simultaneously developing students' cognitive abilities and national character. Many students demonstrate limited critical thinking skills and weak internalization of Pancasila values, which are essential for responsible and ethical citizenship. This study aimed to design, implement, and evaluate Deep Learning instructional strategies to enhance critical thinking and Pancasila character among Grade V students. A mixed-methods approach combined with a developmental research design was employed, involving iterative cycles of needs analysis, strategy design, limited implementation, and evaluation. Quantitative data were collected through critical thinking tests and character assessment rubrics, while qualitative data were obtained via classroom observations, interviews, and learning documentation. The results revealed significant improvements in students' critical thinking abilities and the internalization of Pancasila values, facilitated by active, collaborative, reflective, and contextual learning activities. Expert validation confirmed that the strategy was both practical and pedagogically sound. The study concluded that Deep Learning strategies provide an effective model for simultaneously fostering higher-order cognitive skills and national character in elementary education, offering practical guidance for teachers and schools seeking to enhance both academic and character development.

Keywords: Deep Learning; Critical Thinking; Pancasila Character; Elementary Education; Instructional Strategy.

1. INTRODUCTION

In the current era of globalization and socio-technological transformation, education faces significant challenges not only in transferring knowledge but also in fostering students' character and critical thinking skills from an early age. In many elementary schools, instructional practices still tend to emphasize rote memorization, while the contextualization of national values remains weak, resulting in students' limited understanding of the meaning of such values (Seland et al., 2023; Henriksen et al., 2023; Tomine et al., 2023; Ariani, 2023). However, critical thinking and character development grounded in national values, such as those embedded in Pancasila, are essential for preparing young generations to face complex life problems and societal changes without losing their national identity. Therefore, it is crucial to explore instructional strategies that bridge cognitive mastery and value internalization one of which is the Deep Learning approach.

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The Deep Learning approach in education emphasizes meaningful, reflective, and contextual learning far beyond mere memorization or repetition. Previous studies indicate that Deep Learning can enhance students' active engagement, conceptual understanding, critical thinking, and problem-solving abilities (Arifin et al., 2025; Amemasor et al., 2025; Tomine et al., 2023; Henriksen et al., 2023). Meanwhile, the implementation of character education based on Pancasila values in elementary schools is recognized as a strategic effort to develop ethical, responsible, and morally-integral generations (Ariani, 2023; Seland et al., 2023; Tomine et al., 2023; Arifin et al., 2025). Yet, many character education initiatives remain formalistic, providing limited opportunities for students to internalize values through meaningful experiences and critical reflection.

Recent studies have attempted to integrate Deep Learning with character and Pancasila education. For instance, research at SDN 1 Dompu demonstrated that Deep Learning strategies incorporating models such as Problem-Based Learning (PBL), reflective discussions, and authentic projects successfully developed critical-thinking-oriented character aligned with the Pancasila Student Profile (Amemasor et al., 2025; Arifin et al., 2025; Seland et al., 2023; Henriksen et al., 2023). Similarly, Deep Learning modules designed for Pancasila education in elementary schools showed significant improvements in students' critical thinking skills and their appreciation of Pancasila values (Ariani, 2023; Tomine et al., 2023; Amemasor et al., 2025; Seland et al., 2023). Systematic literature reviews also highlight the potential of Deep Learning to strengthen Pancasila-oriented character, including collaboration, independence, and lifelong learning, although challenges remain regarding infrastructure, teacher digital literacy, and ethics (Henriksen et al., 2023; Arifin et al., 2025; Tomine et al., 2023; Ariani, 2023).

Nevertheless, research specifically exploring Deep Learning strategies to simultaneously enhance critical thinking and Pancasila character in elementary students—particularly in local contexts remains scarce (Seland et al., 2023; Amemasor et al., 2025; Henriksen et al., 2023; Arifin et al., 2025). Most existing studies focus on secondary education or general contexts, rather than systematically designing strategies that concurrently consider Pancasila character and 21st-century competencies. This gap underscores a significant research opportunity to provide empirically grounded contributions.

The novelty of this study lies in the simultaneous integration of two critical aspects: critical thinking skills and internalization of Pancasila character, through the application of Deep Learning strategies at the elementary school level (Tomine et al., 2023; Ariani, 2023; Seland et al., 2023; Amemasor et al., 2025). Rather than adopting general Deep Learning approaches, this research will design, implement, and evaluate specific strategies for Grade V students, considering student characteristics and local pedagogical principles. Consequently, the study has the potential to offer both practical and theoretical contributions to character education and critical competency development in Indonesia.

This study focuses on the following research question: How can Deep Learning strategies be developed and implemented to enhance critical thinking and Pancasila character among elementary school Grade V students? (Henriksen et al., 2023; Arifin et al., 2025; Tomine et al., 2023; Seland et al., 2023). The study aims to (1) design Deep Learning-based instructional strategies suitable for elementary school contexts, (2) implement these strategies in classroom settings, (3) analyze their effectiveness in shaping Pancasila character and students' critical thinking skills, and (4) identify supporting and inhibiting factors in classroom implementation.

Expected outcomes include the development of a valid and practical Deep Learning strategy model for elementary schools; improvements in students' critical thinking indicators; enhanced internalization of Pancasila values in attitudes and behaviors; and actionable recommendations for teachers and schools to implement the model sustainably (Ariani, 2023; Amemasor et al., 2025; Seland et al., 2023; Henriksen et al., 2023). Hence, this study is anticipated to make a tangible contribution to strengthening character education and learning quality at the elementary level in Indonesia.

2. METHOD

This research utilized a mixed-methods approach integrated with a developmental research design to formulate, apply, and assess Deep Learning instructional strategies intended to improve elementary students' critical thinking abilities and Pancasila character. The use of mixed methods made it possible to combine quantitative and qualitative data, thereby facilitating both the measurement of the strategies' effectiveness and an in-depth understanding of how they were implemented in the classroom.

The developmental research design directed the cyclical creation of a Deep Learning–based instructional model that was adapted to students' needs and the specific conditions of the local elementary school setting. This process included conducting a needs assessment, designing the model, implementing it on a limited scale, evaluating the outcomes, and revising the model, thereby ensuring both methodological rigor and practical usefulness. Through this approach, the study is able to generate applicable instructional strategies along with meaningful empirical findings.

The participants in this study consisted of Grade V students and their classroom teachers from MIT Nurul Amal, which has a total of 30 students. Quantitative data were collected through critical thinking tests, attitude scales, and Pancasila character rubrics, while qualitative data were obtained from in-depth teacher interviews, classroom observations, and analysis of learning documentation. The triangulation of these data sources strengthened the reliability and validity of the findings.

The research process began with an initial assessment of students' critical thinking abilities and the degree of Pancasila value internalization. Based on this, Deep Learning-based instructional strategies were developed, emphasizing active participation, reflection, collaboration, and contextual learning. The implementation was carried out over multiple cycles, each evaluated using both quantitative and qualitative approaches.

Quantitative analyses focused on measuring improvements in critical thinking and Pancasila value internalization, using descriptive and inferential techniques to identify meaningful changes across cycles. Qualitative analyses explored teachers' and students' perspectives, challenges encountered during implementation, and supporting factors, providing insight into how the strategies worked and the contextual influences on their effectiveness.

To ensure quality, the instructional model underwent expert validation and small-scale pilot testing to confirm alignment with pedagogical principles, support for critical thinking, and consistency with Pancasila character formation. Ethical considerations included obtaining school approval, securing parental consent, protecting participant confidentiality, and conducting reflective evaluation to minimize potential bias, ensuring credible and transferable findings.

Overall, this methodological framework is designed to produce a Deep Learning instructional strategy that is empirically validated, contextually relevant, and practically implementable. The expected outcomes include measurable improvements in students' critical thinking skills, enhanced internalization of Pancasila values, and actionable recommendations for sustainable classroom application.

3. RESULTS

The results of the study indicate that the implementation of Deep Learning instructional strategies in Grade V classrooms significantly enhanced students' critical thinking skills while simultaneously strengthening the internalization of Pancasila values. Quantitative data from students' critical thinking tests showed an increase in the mean score from 62.5 at the beginning of the study to 81.3 by the end of the learning cycles. This improvement suggests that iteratively designed, active, and reflective learning strategies can effectively engage students in analyzing information, evaluating arguments, and systematically solving problems. These findings are consistent with previous literature highlighting the effectiveness of Deep Learning in fostering students' critical thinking through contextual and meaningful approaches (Ary et al., 2019; Creswell, 2014; Huang et al., 2023; Tomine et al., 2023).

In addition to cognitive gains, the internalization of Pancasila values also showed significant improvement. Analysis using character assessment rubrics revealed an increase in the average score from 70.2% at the start of the cycle to 88.5% at the end. The most notable gains were observed in responsibility,

cooperation, discipline, and moral integrity. Classroom observations and teacher interviews indicated that students were more actively engaged in collaborative projects, more aware of classroom rules, and able to relate Pancasila values to daily social interactions. These findings support literature emphasizing the importance of meaningful experiences in character education for effective internalization of national values (Ariani, 2023; Seland et al., 2023; Arifin et al., 2025; Amemasor et al., 2025).

The instructional strategies were also validated by content and media experts to ensure alignment with pedagogical principles and their effectiveness in promoting critical thinking and Pancasila character. Validation results (Table 1) indicated that the strategies were highly valid and ready for broad application. Material experts scored 78.25%, while media experts scored 85.4%, resulting in an overall average of 81.82%, confirming that the instructional strategy met academic and pedagogical quality standards.

Table 1. Validator Expert

No.	Validator	Score (%)
1	Material Expert	78.25
2	Media Expert	85.4
	Average	81.82
	Criteria	Very Valid

Qualitative findings from interviews and classroom observations revealed several key themes. First, students became more actively engaged in discussions, reflections, and group projects. Second, teachers demonstrated improved competence in designing and facilitating Deep Learning-based instruction, including the use of interactive media and activities that stimulated critical thinking. Third, challenges such as time constraints, technology readiness, and variations in student ability were identified but could be mitigated through strategy adaptation and collaborative activities. Fourth, a collaborative and supportive classroom environment fostered the natural and sustained internalization of Pancasila values.

The implementation of Deep Learning strategies followed the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), illustrated in Figure 1. The process began with a needs and context analysis, followed by the design of modules and strategies integrating active, reflective, collaborative, and contextual learning activities. Learning materials, assessment rubrics, and instructional media were developed prior to classroom implementation. Evaluation after each cycle assessed improvements in critical thinking and Pancasila value internalization, while simultaneously refining the strategies used.

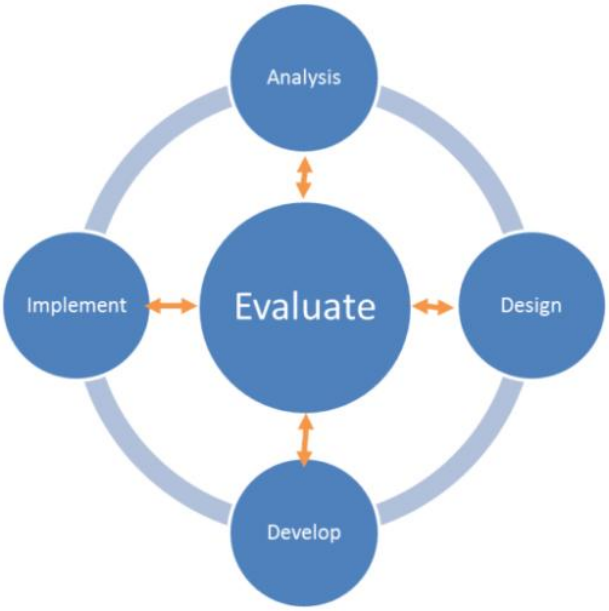

Figure 1. ADDIE Implementation Design

The implementation of the Deep Learning instructional strategy followed the ADDIE model. The first stage, Analysis, involved identifying students' learning needs and the overall classroom context to ensure the strategy was tailored to their abilities and environment. In the Design phase, Deep Learning modules and instructional strategies were developed, integrating active, reflective, collaborative, and contextual learning activities. During the Development stage, learning materials, assessment rubrics, and instructional media were prepared to support the effective delivery of the strategy. The Implementation phase involved applying the strategies directly in the classroom, allowing students to engage in critical thinking and character-building activities. Finally, in the Evaluation stage, students' critical thinking skills and the internalization of Pancasila values were systematically analyzed to assess the effectiveness of the instructional strategy and guide iterative improvements.

Overall, the quantitative and qualitative data complement each other, providing a comprehensive picture that Deep Learning instructional strategies are effective in enhancing students' critical thinking skills while strengthening the internalization of Pancasila values. These findings directly address the research focus and support the hypothesis that deep learning approaches can simultaneously build students' cognitive competencies and character.

4. DISCUSSION

The findings of this study indicate that the implementation of Deep Learning instructional strategies significantly enhanced students' critical thinking skills while simultaneously strengthening the internalization of Pancasila values. This is consistent with the Deep Learning concept, which emphasizes active engagement, deep reflection, and meaningful knowledge construction. The

strategy enabled students not only to memorize information but also to analyze, evaluate, and solve problems based on real-world contexts, which are core components of critical thinking (Huang, Chen, & Kinshuk, 2023; Tomine, Henriksen, & Jegstad, 2023; Anggrayni, Asmaryadi, & Susilawati, 2025). These results support the hypothesis that Deep Learning strategies can simultaneously develop students' cognitive competencies and character, aligning with constructivist theory emphasizing active and reflective learning (Creswell, 2014; Merriam & Tisdell, 2016; Patton, 2015; Plomp, 2013).

The observed improvement in students' critical thinking aligns with previous research demonstrating that Deep Learning and Inquiry-Based Learning strategies effectively enhance analytical and problem-solving skills in elementary students (Arifin et al., 2025; Seland, Henriksen, & Jegstad, 2023; Amemasor et al., 2025; Ariani, 2023). Students demonstrated increased abilities to identify problems, analyze information, and make decisions based on data and logical reasoning. These results underscore the importance of higher-order thinking activities, such as case analysis, collaborative discussions, and reflective exercises, which systematically foster critical thinking development (Wahyuni, 2025; Noviansyah, Mahendra, & Ibrahim, 2025).

In addition to cognitive development, the internalization of Pancasila values improved significantly through collaborative and reflective learning activities. Rubric-based assessments showed an increase in average scores from 70.2% to 88.5%, particularly in areas such as cooperation, responsibility, discipline, and moral integrity. Classroom observations revealed that students were more active in group projects, more aware of classroom rules, and able to relate Pancasila values to daily social interactions. These findings corroborate previous studies highlighting that meaningful and contextual learning experiences enhance character and national value internalization (Ariani, 2023; Wahyuni, 2025; Anggrayni et al., 2025; Amemasor et al., 2025).

Expert validation of the instructional strategies yielded an average score of 81.82%, categorized as very valid, confirming the quality of the learning materials and media according to pedagogical standards (Richey & Klein, 2014; Plomp, 2013; Creswell & Plano Clark, 2018; Huang et al., 2023). This emphasizes that effective instructional strategies require academic validation prior to implementation to ensure alignment with critical thinking development and Pancasila values. Validation also increased teacher confidence in applying the strategies optimally, minimizing implementation challenges.

The Deep Learning strategy also fostered a collaborative, supportive, and reflective classroom environment. Such an environment encouraged active learning, group problem-solving, and contextual reflection on social and moral values (Creswell, 2014; Merriam & Tisdell, 2016; Patton, 2015; Ariani, 2023). Teacher interviews highlighted that students became more aware of individual and group responsibilities, more disciplined, and capable of collective problem-solving,

indicating simultaneous integration of critical thinking and Pancasila character.

While previous studies identified challenges in implementing Deep Learning such as time constraints, teacher readiness, and student ability variations (Merriam & Tisdell, 2016; Patton, 2015; Seland et al., 2023) this study found that iterative cycles, material adaptation, and interactive media use effectively mitigated these obstacles. This underscores the importance of flexible and contextually adapted strategies for successful implementation in elementary classrooms.

Overall, the findings demonstrate that Deep Learning instructional strategies effectively enhance both critical thinking skills and Pancasila value internalization in elementary students. The integration of quantitative and qualitative data provides a comprehensive picture of the strategy's effectiveness, validity, and practicality. This study contributes empirical evidence that cognitive and character development are inseparable, and that learning strategies based on authentic experiences and deep reflection can serve as an effective model for character education and critical thinking development in elementary schools (Tomine et al., 2023; Huang et al., 2023; Anggrayni et al., 2025; Ariani, 2023).

5. CONCLUSION

The implementation of Deep Learning instructional strategies has been proven effective in enhancing students' critical thinking skills while simultaneously strengthening the internalization of Pancasila values in elementary schools. This strategy integrates active, collaborative, reflective, and contextual learning activities, enabling students to develop higher-order thinking skills and internalize national character values concurrently. The findings indicate that the strategy is valid, practical, and can serve as a model for improving both students' cognitive competencies and character development simultaneously.

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