

A character education model based on deep learning in the teaching of Pancasila

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Abstract

This study developed and tested a Deep Learning-Based Character-Strengthening Education Model for Pancasila Education at the junior high school level in Bandar Lampung City, Indonesia. Using a mixed-methods design integrated with Research and Development (R&D), the study proceeded through six stages, from preliminary participatory observation and prototype development to expert and teacher validation, quasi-experimental testing, multilevel statistical analysis, and final model refinement. Participants comprised teachers and students from junior high schools across Bandar Lampung City, selected through random sampling. The results showed that understanding of Pancasila concepts increased by 25% in the experimental group, compared with 10% in the control group, with character-strengthening indicators – tolerance, integrity, responsibility and cooperation – also registering significantly greater gains ($p < 0.05$). Teacher implementation quality, school environmental support and student engagement emerged as key mediators of the model's effectiveness. The findings indicate that embedding mindful, meaningful and joyful learning principles within Pancasila Education strengthens both conceptual understanding and student character more effectively than conventional, teacher-centred approaches. The model offers a practical, empirically validated framework for character-based citizenship education in Indonesian schools and contributes to broader debates on deep-learning pedagogies in civic and moral education.

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Introduction

Cheating remains a relevant issue across various aspects of life, including educational and social contexts. In reality, individuals are often confronted with situations that provide opportunities to act dishonestly in order to gain personal benefits. As stated by Miller (2025), most individuals tend to engage in dishonest behaviour when such actions offer advantages, particularly when they perceive that the behaviour can be carried out without detection.



However, at the same time, individuals are aware that cheating is morally wrong. Romero (2025) argues that relatively weak character traits do not always serve as a consistent foundation for decision-making, making individuals more susceptible to changes in attitudes and behaviours when faced with different situations. In this context, situational factors such as environmental pressure and social conditions often exert a stronger influence than an individual's internalised moral values. Consequently, decisions made do not fully reflect stable moral principles but are instead shaped by prevailing circumstances. This condition indicates a discrepancy between moral understanding and actual behaviour in everyday life, ultimately highlighting the importance of strengthening character, particularly in terms of honesty. Therefore, character strengthening and character education are highly necessary, with early character development serving as a crucial foundation (Zeng et al., 2026). Environmental factors play a significant role in shaping individual characteristics. The social, economic, and cultural environments in which a person develops influence their ways of thinking, behaving, and acting in daily life. Thus, character formation is not solely determined by internal factors but is also strongly influenced by external conditions surrounding the individual (Casali et al., 2024).

Character education requires a holistic approach through the integration of curricular and extracurricular activities. This effort serves as a key strategy in realising the Pancasila Student Profile, which reflects values such as religiosity, independence, and critical thinking skills among students (Sarifah et al., 2025). Character strengths represent an essential aspect in psychological studies, focusing on the positive potentials and best qualities possessed by individuals. Over time, this concept has evolved beyond being merely a personality attribute, becoming a factor that significantly contributes to an individual's quality of life. Character strengths have been shown to significantly enhance well-being and reduce various negative psychological conditions (Feraco & Casali, 2025). This indicates that individuals who are able to recognise, develop, and apply their character strengths in daily life tend to experience higher levels of life satisfaction, more stable positive emotions, and better capabilities in coping with stress and life challenges. Furthermore, character strengths are closely associated with the prevention of various psychological disorders, such as stress, anxiety, and depression. By optimising their positive potentials, individuals can build stronger psychological resilience. Therefore, the development of character strengths is not only relevant in the context of personal development but also represents a strategic approach in psychological interventions. This perspective further emphasises that focusing on human strengths can be a key factor in creating a more balanced, healthy, and meaningful life.

In an education system that aims to develop humans who are not only intellectually intelligent, but also intelligent as human beings who have high morality and integrity, character education is a fundamental aspect (Gunawan, 2022). Character education is not merely a complementary component of education, but rather serves as a fundamental foundation that underpins all processes and learning activities within the school environment (Dabdoub et al., 2024). Character education is an essential component of the core objectives of national education (Brooks & Lamb, 2026). It is conceptualised as a systematic process of instilling values in students, including awareness, comprehension, concern, and a strong commitment to practicing these values. Strengthening character education serves as a strategic instrument that must be integrated into instructional materials in order to shape students' identities as ethical, independent, and respectful individuals in social interactions. Education functions not only as a means of knowledge transmission but also as a primary pillar in fostering civility and moral responsibility (Prayitno et al., 2022). Furthermore, character education may be understood as an intentional effort to develop positive personal attributes grounded in universal human moral values (Oldham & McLoughlin, 2025a). In Indonesia, character education has a close relationship with the values of Pancasila as the basis of the state and the guideline for the life of the nation and the state (Silitonga et al., 2025). This research is based on the character education theory of Lickona (1991), which emphasises the integration of moral knowledge,

moral feelings, and moral actions, as well as Pancasila as a holistic state philosophy (Pulhehe & Robandi, 2024). The deep learning framework from Fullan et al. (2018) is the basis, where deep learning is considered as a transformation process that combines cognitive, emotional, and social to form character, in line with the concept of *active citizenship* in Indonesia's multicultural society (Banks, 2008).

Emerging practices now show that conventional *teacher-centred* approaches fail to build student engagement due to the lack of integration between theory and real practice, so that Pancasila values remain abstract and not internalised. This practice is often trapped in verbalism, where students simply memorise precepts without contextual understanding, resulting in low knowledge transfer to daily life (Hafni et al., 2025). In addition, this approach is prone to political bias and less adaptive to the digital age, where students are more exposed to foreign values through social media without the critical tools of formal education (Hastangka & Ediyono, 2023). Overall, this practice is not only ineffective but also counterproductive, as it weakens the foundation of the national character that should be strengthened. Therefore, the development of a media-based learning model in Civic Education not only aims to enrich students' knowledge but also plays an important role in shaping their character (Soeupudin et al., 2025; Suhaida et al., 2025).

The growing urgency of character education has become evident amid the decline in moral values and integrity among Indonesia's younger generation in responding to global challenges (Chowkase, 2023). In this context, Pancasila-based character education can be positioned as a fundamental framework for strengthening character development. Schools can optimise character education by integrating it into subjects such as Civic Education (PPKn) and using approaches that incorporate personal reflection, engagement in authentic case studies, and direct community interaction. Such methods enable students not only to understand the concept of tolerance theoretically but also to apply it in practice and draw inspiration from community role models (Sarkadi et al., 2022). Empirical data from the UNICEF (2025) report shows that Indonesian adolescents face serious mental health challenges, with suicide being one of the top five causes of death in the 10-19 age group, while depression reaches a prevalence of 61% among 15-24-year-olds, with 2% of them having considered suicide in the past month. In addition, national surveys such as the *National Adolescent Mental Health Survey* (Center for Reproductive Health, University of Queensland, & Johns Hopkins Bloomberg School of Public Health, 2022) reveal that one in three adolescents (approximately 15.5 million people) experience mental health problems, including internet addiction (49.4%), suicidal thoughts (46%), and cyberbullying (16.9%). The 2022 PISA results from the OECD (2023) also reflect the low civic competence and critical thinking of Indonesian students, with only 31% of students achieving a basic level in creative thinking (compared to the OECD average of 78%), as well as average scores in mathematics of 366, reading 359, and similar sciences—all below the OECD average. This phenomenon is exacerbated by the influence of globalisation, social media, and technology, which leads to an increase in cases of violence, *cyberbullying*, drug abuse, and a lack of respect for parents and teachers, as revealed in Muttaqin et al.'s (2023) study on moral and ethical crises in Indonesia. Without immediate intervention through effective character education, future generations are at risk of losing their national identity, so Pancasila education becomes a priority to prevent social disintegration and support sustainable development.

The lack of space to understand and apply Pancasila values in daily life for students is the impact of educational institutions that still tend to be theoretical in learning Pancasila. Theoretical and textbook-based explanations that focus on memorisation materials cause competence in learning Pancasila and Citizenship not to be achieved optimally. Bahri et al. (2025) and Janah et al. (2024) show that many students feel bored and bored due to the repetition of Pancasila theory from school to lectures. Conventional learning methods that are still dominant, with a focus on one-way material delivery, do not provide opportunities for students to think critically, reflect, and internalise the values taught. Tiastra (2022) explained

that the conventional learning model is teacher-centred, where teachers emphasise the delivery of material rather than active student interaction. This traditional approach is often ineffective and monotonous, as teachers tend to rely solely on printed textbooks without providing opportunities for students to think critically or express their opinions (Amin, 2022). Character education also frequently exhibits weaknesses in its assessment aspects, which reduces its overall effectiveness (Oldham & McLoughlin, 2025b). Consequently, students face difficulties in connecting Pancasila concepts with real-life social contexts, resulting in suboptimal learning outcomes in character development. The integration of character education into the learning process plays a significant role in shaping students' personalities holistically. Through an integrated learning approach, students not only acquire cognitive knowledge but also internalise essential moral values required for social life. These values include tolerance toward differences, empathy for others, and responsibility in acting both within the school environment and in society. Furthermore, the strengthening of character education fosters the development of discipline, honesty, and collaborative skills, which serve as essential competencies for life within society and the nation (Winarni et al., 2021).

Pawelski (2026) argues that moral development occurs not only progressively but also through deep and meaningful experiential processes. The integration of local wisdom values into character education constitutes a fundamental approach to establishing a solid foundation of children's identity, while fostering a relevant learning ecosystem in which students are guided to appreciate cultural heritage and cultivate respect and cooperation as key dispositions for addressing future challenges (Sakti et al., 2024). By embedding fundamental values into everyday practices within both school and home environments, children are encouraged to develop moral reasoning that underpins their ethical conduct in social interactions. The effectiveness of such character education is highly contingent upon the alignment between the moral messages delivered by educators and the behavioural realities observed by children within their surrounding environment (Birhan et al., 2021). A more in-depth and meaningful learning approach is needed to address these problems, which not only focus on the cognitive component but also integrate emotional and psychomotor aspects. Deep *Learning* offers a promising strategy, focusing on creating a *mindful, meaningful, and joyful* learning environment (Fullan et al., 2018). This approach emphasises holistic growth in intellectual, ethical, aesthetic, and kinesthetic aspects, which encourages deep understanding and active participation (Fauziah et al., 2025), resulting in more holistic learning and successful character enhancement. This strategy encourages deep understanding as well as active participation of students in the learning process, allowing students to fully understand information through meaningful experiences, focused attention, and enjoyable learning activities. This technique seeks to increase students' capacity in connecting new knowledge with past knowledge and using it in various circumstances (Polman et al., 2021). By integrating the principles of *Meaningful Learning* (connecting new knowledge with real experiences and contexts), *Mindful Learning* (increasing cognitive flexibility and full engagement), and *Joyful Learning* (fostering intrinsic motivation through happiness), deep learning can facilitate a more comprehensive and transformative educational experience (Elisa et al., 2025; Liao et al., 2018). *Meaningful Learning* is the process by which students connect new material with past knowledge, resulting in relevant and contextual interactions (Polman et al., 2021). *Mindful Learning* focuses on the learning process to improve students' cognitive flexibility and engagement (Geng et al., 2011). Meanwhile, *Joyful Learning* emphasises the value of a learning environment that prioritizes happiness and intrinsic motivation, which has been shown to significantly improve learning outcomes (Bhakti et al., 2019; Dudley, 2025).

Although there is a lot of research on Pancasila character education, there is a significant gap in the integration of deep learning approaches. Previous studies, such as Han (2024) and Janah et al. (2024), have focused on critiquing conventional methods, but have less explored holistic alternative models. Empirical research on the application of deep learning in the context of Pancasila is still limited, with only about 20% of studies from 2020-2025

incorporating mindful, meaningful, and joyful elements (Rohmah et al., 2026). Another gap is the lack of ongoing evaluation of the long-term impact on student character. Deep learning is a solution because of its ability to overcome the limitations of conventional methods through a holistic approach that increases student *engagement* by up to 30% (Fullan et al., 2018). Research by Rohmah et al. (2026) shows that *deep learning* is effective in building character in elementary schools, with increased understanding of Pancasila values through real-based projects, in line with the Independent Curriculum, which emphasises project-based learning for character transformation.

The objectives of this research are: (1) developing a deep learning-based character education model for Pancasila learning; (2) testing the effectiveness of the model in improving the understanding, internalisation, and application of Pancasila values; (3) providing practical recommendations for educators and policymakers for implementation in Indonesian schools. This research contributes to developing an integrative framework between deep learning and Pancasila, enriching character education theory in the Indonesian context (Pulhehe & Robandi, 2024). Practically, this research provides an implementation model that schools can adopt to improve the quality of learning, reduce student boredom, and support the development of the 2045 golden generation through strong character. This research is also expected to support the development of innovative learning models in character education in Indonesia. Based on the previous background explanation, the author identifies the importance of providing and developing an appropriate educational model for Pancasila learning with the research title "A Character Education Model Based on Deep Learning in the Teaching of Pancasila".

Method

This study used a mixed-methods approach that combines quantitative and qualitative research (Sugiyono, 2011). In the data collection stage, the study used quantitative methods, with the population of all Junior High Schools (SMP) in Bandar Lampung City. In this study, there are six phases.

Phase I: Data collection

The first phase involves collecting initial data related to the implementation of Pancasila Education learning in junior high schools throughout Bandar Lampung City. This process is conducted using a participatory observation method, where the researcher directly observes learning activities in the classroom. The purpose of this stage is to obtain an in-depth understanding of the current learning practices, teaching strategies, and challenges faced by teachers and students in the implementation of Pancasila Education.

Phase II: Preparation of development patterns (prototype)

The second phase focuses on the development of a prototype for Pancasila Education learning. In this stage, the researcher designs a development pattern by integrating various existing learning strategies, theoretical foundations, and findings from the initial data collection. The goal is to create a systematic and comprehensive guideline that can support the implementation of Pancasila Education learning in schools.

Phase III: Validation of development patterns (prototype)

In this phase, the prototype undergoes a validation process to ensure its relevance, feasibility, and practicality. Validation is carried out by collecting feedback and suggestions from Pancasila Education experts, teachers, and relevant stakeholders. The validation process is conducted both on a limited scale and a broader scale, allowing the researcher to refine and improve the prototype before it is tested in the field.

Phase IV: Experiment

The fourth phase involves conducting an experimental study to test the implementation of the developed prototype in real learning situations. A quasi-experimental method is used to

evaluate the effectiveness of the Pancasila Education learning model based on the prototype that has been designed. This stage allows the researcher to compare learning outcomes and observe the impact of the developed model on students.

Phase V: Analysis of the effectiveness of development patterns (prototype) based on experimental results

At this stage, an effectiveness analysis of the prototype is conducted using both descriptive analysis and multilevel statistical analysis. Descriptive analysis is used to evaluate how well the prototype supports the learning process, encourages reflection, assists in decision-making, and provides practical recommendations for teaching. Meanwhile, multilevel statistical analysis is employed to measure the overall effectiveness and impact of the development pattern on the learning outcomes.

Phase VI: Preparation of the final development pattern (prototype)

The final phase involves preparing the final version of the development pattern prototype. In this stage, the prototype is revised and refined based on the results obtained from the validation and experimental phases. The revisions are carried out comprehensively to ensure that the final prototype is valid, effective, and ready for implementation in Pancasila Education learning.

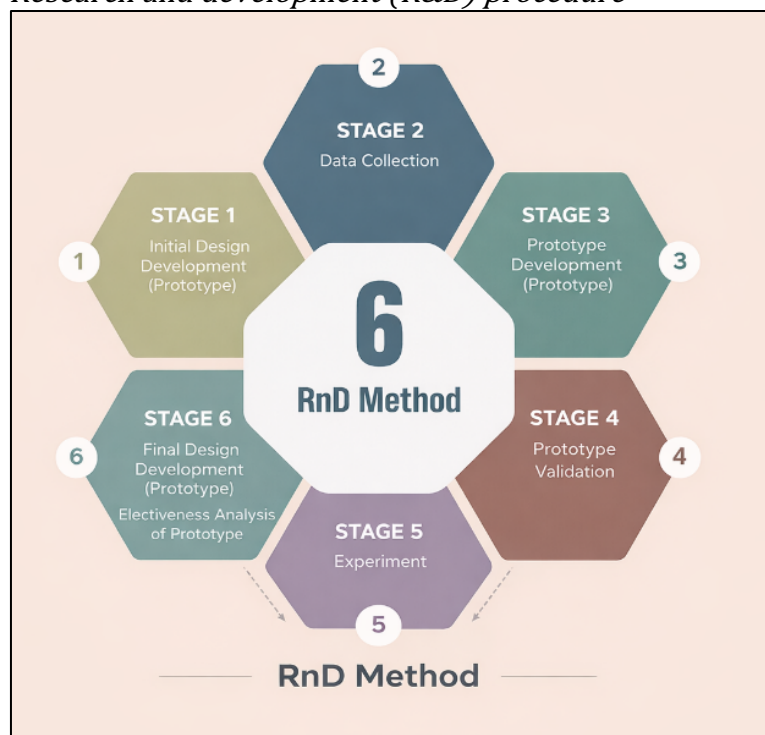
Results and Discussion

This study uses *the Research and Development (R&D) method with a mixed-method research* approach that combines quantitative and qualitative data to obtain comprehensive and valid results. The research subjects included teachers and students of Pancasila Education in junior high schools throughout Bandar Lampung City, with *random sampling* techniques to ensure data representativeness.

The final result of the research is in the form of a prototype of the Pancasila learning model that integrates deep learning strategies, namely meaningful *learning*, mindful *learning*, and joyful *learning*. This model is designed to encourage students to actively think critically, reflectively, and internalise Pancasila values in daily attitudes and behaviours.

Figure 1.

Research and development (R&D) procedure



Source: Research Data, 2026.

Phase I: Data collection

The first stage of this study focuses on collecting initial data to obtain a comprehensive understanding of the real conditions of learning Pancasila Education at the Bandar Lampung City Junior High School level. This research was conducted in five junior high schools in Bandar Lampung City and involved 40 respondents: 10 teachers and 30 students. Data collection was conducted through participatory observation, in-depth interviews, and quantitative questionnaires designed to measure perceptions, understanding, and needs related to learning Pancasila Education based on deep learning. The results of observations show that the learning methods applied are still very varied.

Around 20% of teachers consistently use discussion and reflection methods that encourage active student involvement, while the majority of teachers, 50%, still rely on lecture methods combined with questions and answers. The rest, around 30%, tend to use lectures predominantly without providing meaningful interaction space for students. In terms of material, 60% of teachers try to relate Pancasila values to actual social issues, providing relevant context for students, but the other 40% still convey material theoretically without connecting it to students' daily lives. The interaction between teachers and students also showed an uneven pattern; Only 35% of classes showed active participation and dynamic interaction, while the other 65% of classes tended to be passive, with the dominance of teachers as the centre of conversation.

Various obstacles and challenges are also encountered during the learning process. Almost half of teachers (45%) complained about the limitations of adequate learning media as the main obstacle in optimising the teaching and learning process. In addition, 40% of teachers feel that the available time is not enough to implement deep learning effectively. From the student side, 35% admitted that the material presented was less interesting and difficult to relate to their real experience, so that learning motivation was low. Student involvement in learning is also still a problem, with 30% of teachers and students assessing that students' active participation in the classroom is still minimal.

The need for the development of more innovative and effective learning models is very clear from the data collected. Most teachers (75%) and students (70%) want a more interactive and contextual learning model, which not only conveys the material theoretically but is also able to relate the values of Pancasila to the real situation around them. Support for the implementation of deep learning for character building is also very high, with 80% of teachers expressing their willingness to adopt the model. Meanwhile, 65% of students hope that Pancasila learning can be made more applicable and fun, so that they are more motivated to learn and internalise character values.

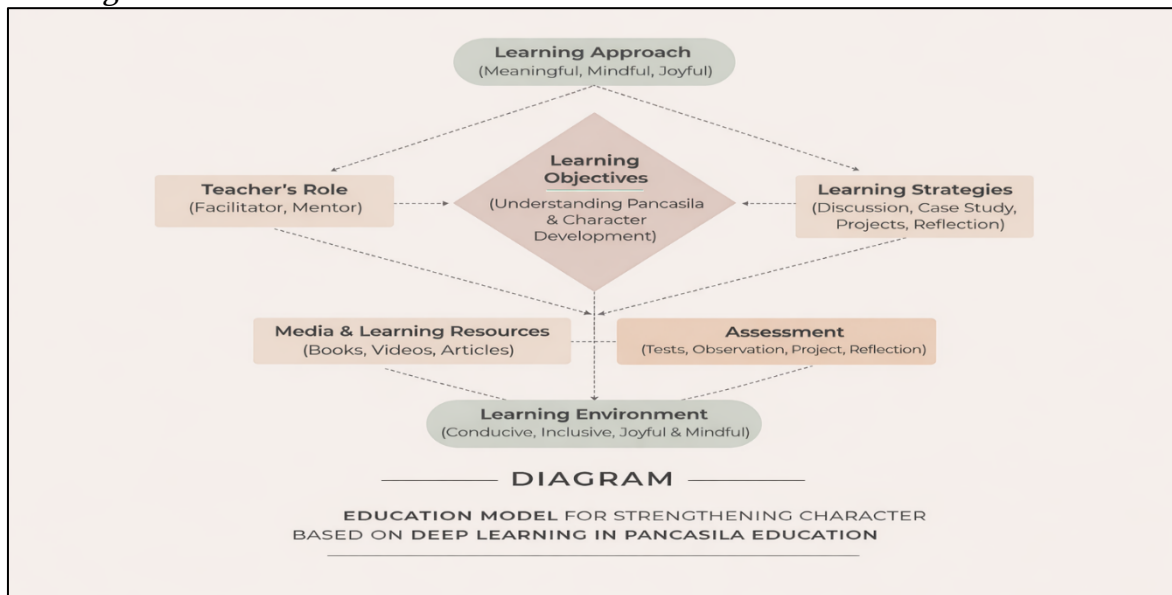
However, to realise this, 60% of teachers emphasised the need for adequate training and mentoring so that they are able to implement the new learning model optimally. The results of interviews and observations reinforce this picture; the majority of teachers (70%) admit that so far, Pancasila learning is still dominated by lecture methods that do not actively involve students. Students also revealed that learning felt monotonous and lacked the relevance of Pancasila values to their real experiences, which was felt by around 65% of respondents.

Phase II: Preparation of development patterns (prototype)

The second stage of this research began with the preparation of a prototype learning model based on the initial data that had been obtained through the data collection stage. This prototype serves as the foundation for developing a deep learning-based Pancasila *learning* model, which is expected to produce an effective, relevant, and applicable model in the field. The following is a prototype of the Deep Learning-Based Character Strengthening Model in Pancasila Learning.

Figure 2.

Diagram of the deep learning-based character-strengthening education model in Pancasila learning



Source: Research Data, 2026.

Phase III: Validation of development patterns (prototype)

After the prototype of the Pancasila learning model based on deep learning has been compiled, the next stage is to validate it to ensure that the model has relevance, feasibility, and practicality in the context of real learning. This validation is a crucial step in the *Research and Development* (R&D) cycle, which aims to obtain constructive feedback from various parties who have competence and direct interest in model development.

Validation is carried out through two main scopes, namely limited validation and broad validation. Limited validation involves a number of Pancasila Education experts, experienced teachers, and stakeholders such as school principals and education supervisors. These experts provide an assessment of the substance aspects of the model, its suitability with the curriculum, and its alignment with the principles of deep learning and character building. Validation by experts is an important step to ensure *content validity* and ensure that the product developed meets the necessary academic and practical standards.

Furthermore, extensive validation was carried out by involving teachers from several schools who are potential users of the model. At this stage, teachers are asked to assess the practicality and ease of implementation of the model in daily learning situations. Their opinion is very important because teachers are the spearhead of the implementation of the learning model in the classroom. As revealed by Dick et al. (1996), end-user involvement in the validation process can increase the relevance and acceptability of the product, while also identifying potential barriers that may arise during implementation.

Phase IV: Experiment

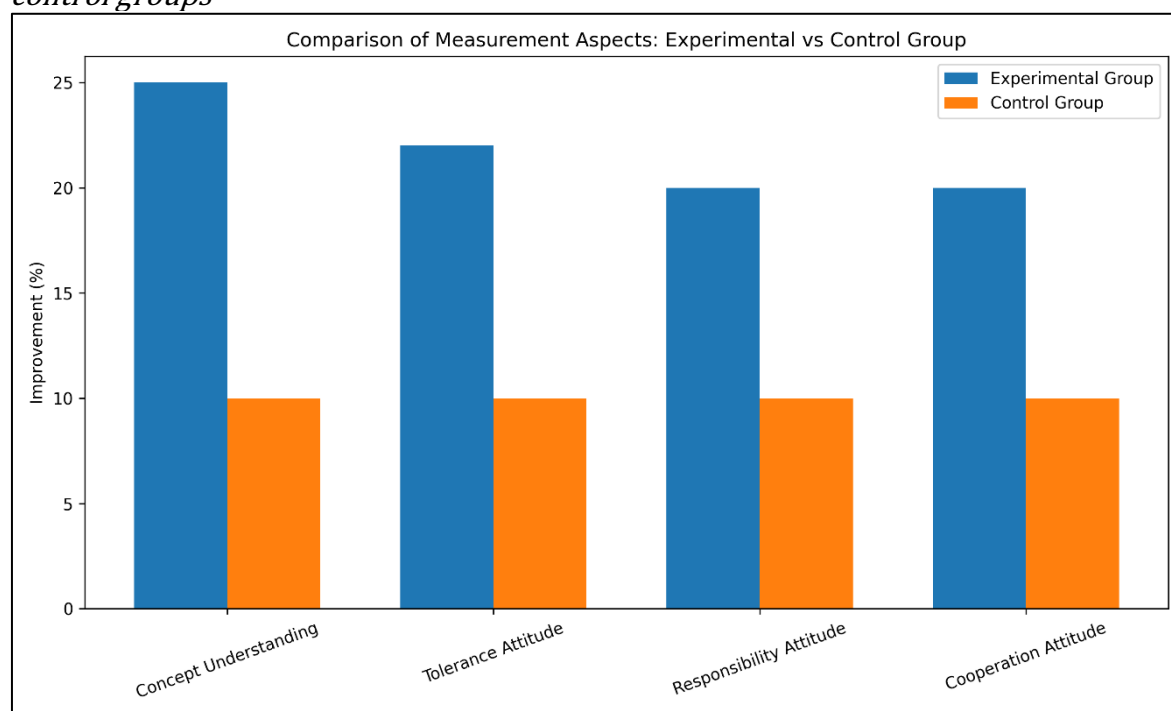
The fourth stage in this study is an experiment, which aims to test the effectiveness of the prototype of a Pancasila learning model based on deep learning in a real context in schools. After preparation and validation, the model was implemented in several junior high schools in Bandar Lampung City to see how well it could improve learning outcomes while strengthening students' character. This trial is an important step to assess the success of the model in the field before it is recommended more broadly.

Based on the results of the research, it can be concluded that the prototype of the Pancasila learning model based on deep learning has proven to be effective in improving understanding of concepts while strengthening students' character. Significant improvements

in both cognitive and affective aspects suggest that this model is worthy of further development. With teacher training and adjustments to learning policies, this model has strong potential for wider implementation in schools.

Figure 3.

Improvement (%) in concept understanding and character attitudes in the experimental and control groups



Source: Research Data, 2026.

Phase V: Analysis of the effectiveness of development patterns (prototype) based on experimental results

The fifth stage in the development of the Pancasila learning model is to analyse the effectiveness of the prototype based on the results of the experiments that have been carried out. This analysis has an important goal, namely, to evaluate the extent to which the deep learning-based learning model is able to improve understanding of the concept of Pancasila while strengthening the character of students. Thus, the results of this analysis not only assess academic achievements but also measure the success of the model in shaping individuals with integrity, tolerance, and responsibility. The results of the descriptive analysis showed that the experimental group experienced an average increase in the Pancasila concept understanding score of 25%, much higher than the control group, which only experienced an increase of 10%. In addition, aspects of character strengthening, such as tolerance, integrity, responsibility, and cooperation, also showed a significant increase in the experimental group.

In addition, the analysis also showed that a number of factors play an important role as mediators that strengthen the effectiveness of the model. This shows that in the application of deep learning technology as an innovation in Pancasila learning, emphasising an interactive approach that is oriented to context and deep learning experiences (Hijran & Zahri, 2025). The factors include the quality of teacher implementation, the support of the school environment, and the level of student involvement. Schools with solid management, plus teachers who actively implement deep learning strategies, have proven to be able to produce more optimal outcomes than schools with minimal support. This emphasises the importance of collaboration between teacher competence and institutional support in ensuring learning success.

The interpretation of these findings shows that the pattern of developing Pancasila learning based on deep learning not only contributes to improving cognitive aspects but is also effective in strengthening the character of students as a whole. This success is in line with deep

learning theory that emphasises the importance of active engagement, critical reflection, and meaningful experience as the foundation of the successful learning process.

Phase VI: Preparation of the final development pattern (prototype)

This final stage also involves the preparation of complete documentation that includes implementation procedures, teaching materials, assessment instruments, and implementation guidelines for teachers. Systematic documentation will make it easier for teachers to understand the steps to implement the model, while supporting future training and mentoring processes. As affirmed by Dick et al. (2009), good documentation will strengthen the transfer of educational technology and expand the impact of the model in a sustainable manner. Thus, the preparation of the final development pattern can be seen as the culmination of the entire research and development (R&D) process, where all findings, evaluations, and inputs are integrated into a single unit. The success of this stage is highly determined by the thoroughness of the revision and the active involvement of all stakeholders to produce a quality learning model and have a real impact on strengthening the character of students. The implementation of policies and basic concepts for the implementation of *deep learning* in the education system is the key to learning success (Prihantoro et al., 2025).

Conclusion

The results of preliminary data collection show that Pancasila learning has so far been dominated by conventional methods that are theoretical and do not actively involve students. The main obstacles found include limited learning media, limited time, and a lack of teacher training in implementing innovative learning methods. However, support for the implementation of deep learning is very high from teachers and students, indicating an urgent need for more interactive and contextual learning models. According to Rohmah et al. (2026), deep learning approaches can build students' character.

The prototype of the learning model developed has been validated by experts and education practitioners, and tested through experiments in several junior high schools. The results of the experiment showed a significant increase in the understanding of the concept of Pancasila by 25% in the experimental group compared to 10% in the control group. In addition, aspects of character strengthening, such as tolerance, responsibility, and cooperation, also experienced a higher increase in the experimental group. Qualitative data support this finding by showing that students are more motivated, actively think critically, and are able to internalise Pancasila values better.

Multilevel statistical analysis confirmed that the difference in improvement between the experimental and control groups was statistically significant ($p < 0.05$), as well as affirming the important role of teacher implementation quality, school environment support, and student involvement as mediators of model success. These findings are in line with deep learning theories that emphasise active engagement, critical reflection, and meaningful experiences as keys to learning success.

However, the effectiveness of this model is highly dependent on teachers' readiness and competence, as well as institutional support. To ensure the effective implementation of deep learning, teachers need to integrate it with other approaches, such as surface learning, memorisation, testing, and automation, which are often perceived less positively (Kovač et al., 2025). In addition to the application of deep learning, technology-based assessment can also be utilised to enhance the effectiveness of learning and character education in schools (Ho & Lee, 2025; Jin, 2025; Ofosu-Asare, 2026). Therefore, continuous professional development and mentoring for teachers are key factors in ensuring the sustainability and scalability of this learning model across diverse school contexts.

Overall, this study emphasises that the Deep Learning-Based Character Strengthening Education Model in Pancasila learning is effective in increasing understanding of concepts

while strengthening the character of students as a whole. This model is worthy of further development and widespread implementation with the support of teacher training, provision of relevant learning media, and adjustments to learning policies in schools.

Competing interests

The authors state unequivocally that there are no conflicts of interest, either financial or personal, that could affect the results, interpretation, or conclusions of this study. All research processes are carried out objectively and independently without any external pressure or influence from any party.

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Ethics Approval

This research is carried out in accordance with the principles of research ethics regulated in the *Helsinki Declaration* and complies with all applicable national and institutional regulations and policies. The research protocol has received official approval number 661/UN26.21/PN/2025 from LPPM UNILA before the research activities are carried out.

Informed Consent

All research participants have given informed *consent* after obtaining a complete explanation of the objectives, procedures, benefits, and potential risks of this study. Participating teachers are given full freedom to resign at any time without any consequences to their status.

Data Availability

All data that support the results of this research can be obtained from the author of correspondence (for example, Hermi Yanzi) through reasonable requests. The research data cannot be publicly accessed to maintain the privacy and confidentiality of participant information in accordance with the provisions of the research ethics.

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