



Deep Learning Strategies for Integrating Character Education in Aqidah Akhlak Learning: Advancing SDG 4.7 in Indonesian Islamic Secondary Education

Muhamad Syaifudin Ahyar, Nisrina*, Widyastuti

Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Salatiga, Indonesia.

*Corresponding Author. Email: nisriinaanaa@gmail.com

Abstract: This study aims to describe the implementation of deep learning strategies integrated with character education in Aqidah Akhlak learning at MTs Negeri Salatiga and examine their relevance to the Sustainable Development Goals (SDGs), particularly SDG 4.7 on quality education. The study employed a descriptive qualitative approach, with participants selected through purposive sampling and comprising two teachers and ten students. Data were collected through observations, in-depth interviews, and documentation of teaching modules and other learning materials. The data were analyzed using an interactive model involving data condensation, data display, and conclusion drawing and verification. Data trustworthiness was enhanced through triangulation and participant feedback. The findings indicate that the implementation was systematically carried out through three stages: planning, which integrated meaningful learning objectives with the dimensions of the Pancasila Student Profile; implementation, which employed project-based learning and problem-solving activities with teachers serving as facilitators; and authentic assessment covering cognitive, affective, and psychomotor aspects. Most students demonstrated greater engagement, deeper conceptual understanding, and stronger internalization of Islamic character values, including religiosity, responsibility, honesty, cooperation, and social concern, as reflected in their active participation in discussions, collaborative activities, and projects. However, a smaller number of students demonstrated more varied responses regarding the adequacy of digital media, classroom atmosphere, and the extent to which engagement translated into confidence and mastery. These variations suggest that the implementation was not entirely uniform and was partly dependent on the quality of teacher facilitation. Overall, the findings highlight the strategic relevance of integrating deep learning strategies with character education in supporting SDG 4.7, while emphasizing the need for teachers to accommodate individual differences when fostering holistic, reflective, and globally competitive student character.

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Introduction

Amidst technological advances and the increasingly rapid flow of digitalization, educators at the Madrasah Tsanawiyah (MTs) level face significant challenges in instilling character values in students. The rapid development of information has had a dual impact, both positive and negative, on the personality development of the younger generation (Fakhrurrazi et al., 2022). This phenomenon complicates the dynamics of education in Indonesia, one of which is marked by a decline in appreciation for moral and ethical values in social life (Jemain & Hamid, 2024). Based on the Student Character Survey conducted by the Center for Religious and Religious Education Research and Development in 2021, the character index of students at the secondary education level decreased to 69.52, a decrease of two points compared to the previous year



(71.41) (Murtadlo, 2021). Generation Z grew up in an environment highly connected to the internet, smart devices, and social media, so their interactions occur more through technology than through textbooks or conventional social environments (Nuha Belvar et al., 2024). The implementation of character education in educational institutions remains largely ceremonial and has not yet reached the cognitive and affective domains in depth (Yuliani et al., 2024). The applied learning approaches tend to be conventional and do not facilitate active student involvement in internalizing character values (Rahmatika et al., 2024). This situation reflects that achieving the Sustainable Development Goals (SDGs) indicators, particularly SDG 4 concerning quality education, still faces significant obstacles in character development.

In 2025, Indonesia's Ministry of Primary and Secondary Education developed a deep learning framework built on four main layers: graduate profile, learning principles, learning experience, and learning framework. The graduate profile outlines eight core competencies students should attain by the end of their education faith and devotion to God, citizenship, critical reasoning, creativity, collaboration, independence, health, and communication. Learning principles rest on three complementary foundations awareness, meaning, and joy expressed through thought, heart, feeling, and practice. The learning experience emphasizes a gradual progression through understanding, application, and reflection to reach comprehensive mastery. Finally, the learning framework provides a systematic guide for building a holistic educational ecosystem through four elements: pedagogical practices, learning partnerships, learning environments, and digital technology use (Rahmawati et al., 2025).

In this context, a learning approach is needed that emphasizes not only cognitive outcomes but also deeply addresses affective and social aspects. One relevant strategy in the digital age is the deep learning Strategies. Deep learning techniques present promising solutions to the challenges identified within the SDGs. These strategies can tailor learning experiences by examining student performance data in order to adjust learning materials to each individual's learning style and needs, ultimately enhancing educational outcomes and lowering dropout rates (Utama et al., 2024).

Numerous studies have addressed the importance of character education, yet most remain confined to conventional approaches that fall short of fostering deep intellectual and emotional student engagement. Bahtiar Ode et al. (2024), examining character education implementation at MTs Al Madinah, Sirimau District, Ambon City, found that it is delivered through learning activities and school culture but remains largely normative and conventional, relying heavily on teacher role modeling and routine habituation, without being explicitly linked to strategies that promote reflective, deep cognitive engagement. Similarly, Mu'awanah (2020), studying MTsN 2 Kediri City, confirms that the boarding school system effectively shapes academic, religious, and disciplinary character through its round-the-clock scheduling and supervision of student activities. However, neither study connects character education implementation to the SDG 4.7 framework, which emphasizes quality, equitable education oriented toward strengthening values.

SDG 4.7 specifically aims to ensure that learners acquire the knowledge and skills necessary to advance sustainable development, including through education for global citizenship and the appreciation of cultural diversity (Rizal, 2024). This target intersects closely with the moral objectives already embedded in Islamic/madrasah curricula, where character formation (akhlak) is not an auxiliary outcome but a core purpose of instruction, which transmits historical and ethical models of responsibility, honesty, and social contribution. Both frameworks converge on the view that education should produce learners capable of ethical judgment and social responsibility, not merely cognitive mastery. However, this convergence has rarely been made explicit in empirical studies of madrasah-based character education, leaving a gap between the



normative alignment of SDG 4.7 and Islamic educational values on one hand, and classroom-level pedagogical practice on the other.

Building on this gap, this study aims to examine the implementation of deep learning strategies in integrating character education within Aqidah Akhlak learning at MTs Negeri Salatiga, along with the enabling factors and challenges encountered in its implementation, and their relevance to advancing SDG 4.7. Theoretically, this study contributes to the limited literature connecting deep learning-based instructional strategies with character education in Islamic secondary education, situated within the global framework of SDG 4.7; practically, its findings are expected to inform teachers and school leaders in designing learning strategies that more deliberately integrate cognitive, affective, and social dimensions of character formation in Aqidah Akhlak learning.

Research Method

This study employs a descriptive qualitative approach to explore in depth how deep learning strategies are implemented alongside character education integration in Aqidah Akhlak learning at MTs Negeri Salatiga, and how this relates to achieving the Sustainable Development Goals (SDGs), particularly quality education. This approach was selected for its capacity to capture the educational phenomena occurring within the learning process.

The study involved two teachers of Aqidah Akhlak and ten students, chosen through purposive sampling based on their active participation in deep learning-based instruction. This purposive approach was adopted to obtain rich, in-depth data concerning the implementation of learning strategies and character strengthening in line with the study's focus (Sugiyono, 2025). Data collection took place directly at MTs Negeri Salatiga, involving close coordination with key informants to ensure the accuracy and depth of the information gathered within the research's natural setting

Data were gathered through observation of learning activities and character-building practices, in-depth interviews with teachers and students, and documentation analysis covering teaching modules, learning tools, records of character-building programs, and other relevant supporting materials (Creswell & Poth, 2018). The research instrument was designed by the researchers based on theoretical foundations of deep learning, character education, and the Sustainable Development Goals (SDGs) specifically the quality education dimension in order to remain consistent with the study's focus and aims.

Data analysis followed Miles et al. (2014). interactive model of data condensation, data display, and conclusion drawing/verification. Raw data were first condensed selected, focused, and simplified for relevance then presented systematically in descriptive narrative form to reveal patterns, relationships, and trends across findings. Tentative conclusions were drawn and continuously verified through further data collection until consistent, valid, and credible results were obtained. Validity was strengthened through two forms of triangulation: source triangulation, cross-checking data from teachers and students as informants in different positions, and technique triangulation, comparing findings from observation, interviews, and documentation (Sugiyono, 2025).

Data are thematically analyzed to identify factors that enable the successful implementation of deep learning strategies and character education at MTs Negeri Salatiga such as increased critical thinking, learning independence, and the strengthening of Islamic character values in accordance with SDG 4.7 as well as challenges that hinder implementation, such as technology dependence, weak self-reflection, and emerging ethical and social difficulties.



Results and Discussion

Based on interviews with two Aqidah Akhlak teachers at MTs Negeri Salatiga, the planning and learning were designed with reference to the Independent Curriculum, which emphasizes meaningful, student-centered learning, and the strengthening of character values and the Pancasila Student Profile. This planning is not only aimed at achieving knowledge competencies, but also at developing religious attitudes, responsibility, honesty, and social awareness as part of the goals of character education and contributing to the achievement of inclusive, quality education.

The implementation of in-depth learning strategies and character education in the Aqidah Akhlak subject at MTs Negeri Salatiga includes:

- 1) Teachers design learning that aligns with madrasah policies, Deep Learning, and SDG 4.7.
- 2) Teachers design learning that integrates meaningful learning objectives, character building, and the Pancasila Student Profile, so that learning focuses not only on cognitive aspects but also on developing students' attitudes and values.
- 3) Teachers implement discussions, group work, presentations, case studies, and the application of Project-Based Learning and Problem-Based Learning to encourage critical and active thinking.
- 4) Teachers utilize digital media and technology to support more engaging learning.
- 5) Character values such as discipline, responsibility, cooperation, and empathy are integrated into the learning process and fostered in students.
- 6) Students are actively involved in asking questions, discussing, and expressing opinions in class.
- 7) Teachers reflect on learning and provide feedback to improve students' understanding and attitudes.

In the module, teachers evaluate through authentic assessments that not only assess students' cognitive achievements but also pay attention to the development of attitudes and behaviors. Evaluation is conducted through observation of attitudes, religious practices, project assignments, portfolios, Q&A sessions, and student reflections. Evaluation results are then discussed during supervision activities and madrasah evaluation meetings and used as a basis for improving learning strategies and strengthening curriculum policies oriented towards continuously strengthening student character.

Based on the teaching modules and Lesson Implementation Plans (RPP), learning strategies have been developed in alignment with the principles of the deep learning Strategies and character education. The learning modules include learning outcomes, learning objectives, strengthening the Pancasila Student Profile, and integrating character values into each stage of learning. During implementation, teachers act as facilitators, guiding students through the stages of understanding, applying, and reflecting on the learning. Through this process, students not only build conceptual understanding but also internalize character values such as discipline, responsibility, honesty, empathy, and critical, creative, collaborative, and reflective thinking skills.

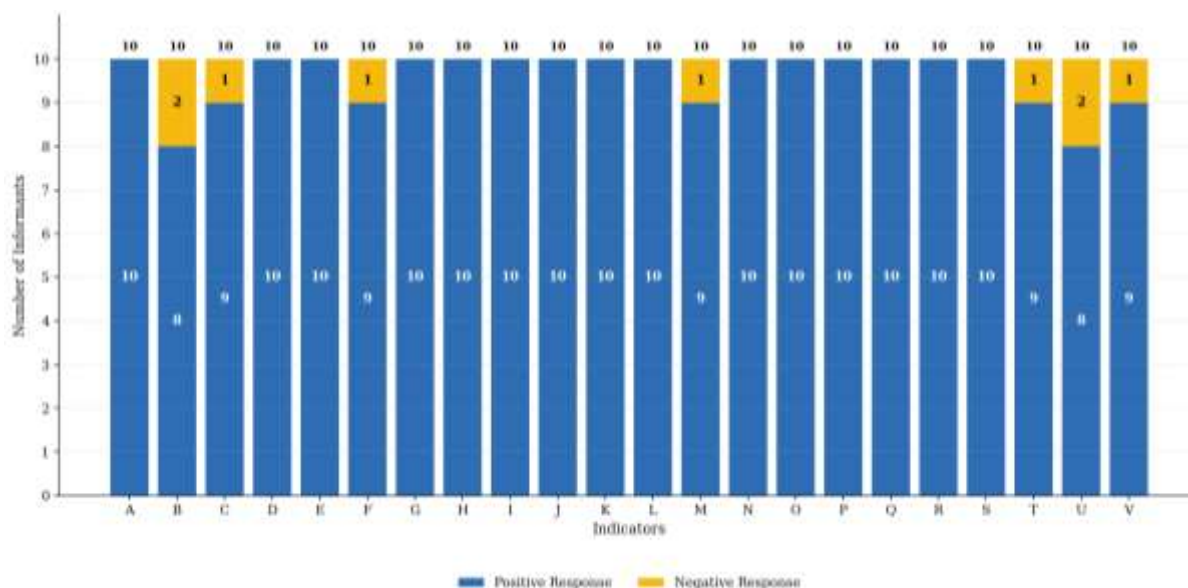


Figure 1. Results of Informant Interview Analysis

Indicator description:

- A : Deep understanding of learning materials
- B : Development of critical thinking skills
- C : Ability to find and utilize various sources of information
- D : Relationship of learning materials to daily life
- E : Development of creativity in completing assignments
- F : Self-confidence in expressing opinions
- G : Collaborative skills in group learning
- H : Understanding of character values
- I : Application of character values in daily life
- J : Teacher role models in character building
- K : Formation of discipline and responsibility
- L : Concern for others
- M : Habits of honesty in academic activities
- N : Attitudes of respect for differences of opinion
- O : Ability to solve problems positively
- P : Concern for environmental cleanliness and tidiness
- Q : Attitudes of tolerance toward cultural, religious, and ethnic diversity
- R : Habits of religious behavior in learning activities
- S : Respect for time and discipline
- T : Concern for helping friends who are experiencing difficulties
- U : Awareness of admitting mistakes and apologizing
- V : Development of curiosity about science

Of the ten students involved in immersive learning, the majority responded positively to the implementation of this approach. These changes were evident in increased student engagement and participation in discussions, group collaboration, and project-based learning facilitated through the Discovery Learning model and the use of digital technology. These students also demonstrated improved internalization of character values they reported being encouraged to be caring, honest, and responsible, and began practicing self-reflection after making mistakes. Conceptually, they felt this approach helped them understand the material more



deeply, rather than simply memorizing it, and they found the learning process more meaningful because it was linked to real-life contexts.

However, not all students displayed a uniform pattern of responses. Three students demonstrated a more critical attitude toward certain aspects, providing a richer picture of how the learning experience varies from individual to individual. One student highlighted the readiness of the teaching materials and digital media used by the teacher and felt that the process of trying out and reflecting on the material was not optimal for him indicating that the success of technology-based approaches and reflection still depends on how the media is presented and the extent to which students are actively involved in the process, rather than simply on its availability.

The second student demonstrated critical attitudes across a broader range of aspects, including a learning environment that was perceived as less than inspiring, teacher feedback that did not fully assist him in improving his learning methods, and self-confidence that remained largely unchanged after the learning process. This pattern suggests that strengthening self-confidence and meaningful learning is not always achieved automatically through changes in learning strategies alone, but is also influenced by students' emotional connection to the classroom atmosphere and the quality of the feedback interactions they receive personally.

The third student generally responded positively to almost all aspects, but specifically stated that he did not feel more confident or understand the material more deeply after implementing this approach. These findings suggest that increased learning engagement and activity do not necessarily translate directly to improved conceptual understanding or academic confidence the two appear to develop through different processes and may require time or separate forms of reinforcement beyond simply active participation in learning activities.

These findings confirm that the impact of deep learning on students was not uniform: most experienced strengthened engagement, understanding, and character, while a few showed that its effectiveness in certain aspects, media readiness, classroom atmosphere, feedback quality, and self-confidence building still varied and could be further improved. Overall, the deep learning and character education approach at MTs Negeri Salatiga continues to positively impact learning engagement and character strengthening, while opening space for teachers to better address students' diverse needs in achieving SDG 4.7 more equitably.

Deep Learning and Character Education Approach Planning

The Akidah Akhlak (Islamic Faith) learning plan at MTs Negeri Salatiga reflects a deep learning Strategies that prioritizes conceptual understanding and character development. The primary theoretical learning objectives are reflected in the lesson plan, which emphasizes the quality of the learning process, not simply the achievement of teaching materials. Effective planning functions to organize meaningful learning experiences, encourage active student engagement, develop critical thinking, and internalize values through reflective and contextual activities (Abdulayeva, 2024). This planning demonstrates a shift from content-based planning to designing student-centered learning experiences, as recommended in international studies of deep learning pedagogy (Darling-hammond et al., 2020).

This orientation was confirmed directly by the teachers. One teacher explained that every stage of instruction, from opening and core activities to the conclusion, was intentionally designed to embody the four pillars of deep learning: *“using PjBL/PBL models supported by digital technology and potentially involving the community designing a flexible and inclusive classroom atmosphere, and employing authentic assessments that incorporate student reflection”* (Mrs. Ernawati, Teacher Questionnaire, 2025). Another teacher described a similar shift in learning objectives, stating that planning entails *“formulating learning goals that focus not only*



on knowledge but also on application, collaboration, and social impact” (Mrs. Laily, Teacher Questionnaire, 2025).

The development of teaching modules and learning tools that integrate project-based learning and problem-solving. Teachers' efforts in designing authentic activities that encourage high-level cognitive engagement, which recent studies have shown to be a key prerequisite for achieving a deep learning Strategies in secondary schools (Almulla, 2020). This type of planning emphasizes the importance of constructive alignment between objectives, activities, and assessments as the foundation for meaningful learning, as recommended in international research on 21st-century learning design (Biggs & Tang, 2011).

The integration of character values into learning objectives and scenarios from the planning stage demonstrates that character education is positioned as a structural part of learning design, which aligns with findings that internalization of values is more effective when explicitly designed in curriculum planning (Singh, 2019). Planning that incorporates the values of responsibility, honesty, cooperation, and empathy strengthens the relationship between the cognitive and affective domains of learning, which empirically contributes to sustainable character development in students (Ramadhani et al., 2024).

Learning planning that is flexible and adaptive to student needs also reflects the principle of responsive curriculum planning, which emphasizes the importance of adapting learning design to the social context and student characteristics (Lestari et al., 2024). The involvement of teachers and madrasah leadership in the planning process strengthens curriculum coherence and consistent learning implementation, which are key factors in the success of school-based deep learning (Rusmini et al., 2025).

The research findings show that strengthening the eight dimensions of the Pancasila Student Profile is pursued in an integrated manner through the formulation of learning objectives, the design of learning activities, and assessment strategies tailored to the relevance of the material and the context of the activities. This finding aligns with Lickona's (1991) idea, which emphasizes the need for character education to be developed comprehensively by integrating moral, social, and intellectual aspects into the learning process. Furthermore, these findings are consistent with the deep learning framework proposed by Fullan et al. (2018), which positions character development, global citizenship, creativity, and collaboration as essential 21st-century competencies. However, the research findings indicate that not all dimensions of the Pancasila Student Profile can be optimized in a single learning plan, necessitating a continuous and integrated implementation strategy across materials and learning activities.

From a global standpoint, the results of this study show that instructional planning grounded in deep learning strategies and character education is consistent with the Sustainable Development Goals, particularly SDG 4.7, which underscores the importance of strengthening values, character, global citizenship, and sustainability within education (United Nations, 2025). In line with Fullan et al. (2018), education based on deep learning holds a strategic function in preparing students with global competencies while cultivating social responsibility. Nevertheless, its contribution toward achieving SDG 4.7 would be optimized if instructional planning more explicitly connected the reinforcement of character values and reflective learning activities to issues of sustainability and global responsibility.

From a sustainable education perspective, learning planning that integrates a deep learning Strategies and character education aligns with the principles of SDG 4, which emphasizes quality, inclusive education, and oriented toward developing 21st-century competencies (UNESCO, 2021). Planning that positions students as active subjects of learning supports the integrated development of cognitive, social, and moral competencies, which are



globally recognized as key indicators of quality learning planning in the era of educational transformation (OECD, 2021). Therefore, Islamic Religious Education (PAI) learning planning at MTs Negeri Salatiga can be understood as a strategic foundation that enables the implementation of deep learning and character education approaches in a consistent, contextual, and sustainable manner.

Implementation of the Deep learning Strategies and Character Education

Implementing deep learning through project-based learning and problem-solving in Aqidah Akhlak (PAI) created meaningful, contextual learning experiences and encouraged active student engagement in understanding and internalizing Islamic values consistent with Fullan's view that deep learning occurs when students are deeply engaged in understanding, applying, and reflecting on knowledge through authentic, real-life activities (Fullan et al., 2018). This aligns with Nurazizah et al. (2025), who found that Project-Based Learning builds an open, collaborative, reflective environment that encourages students to think from multiple perspectives and produce meaningful solutions, and with Wergin (2019) view that deep learning produces sustainable change in students' ways of thinking and acting. Through project activities such as creating videos on commendable morals, students understood Islamic values cognitively while also reflecting on and transferring them into daily practice, deepening spiritual awareness and moral reasoning within a holistic framework linking deep learning and Islamic pedagogy (Prihantoro, 2025).

The teacher's role as facilitator reflected a shift from teacher-centered to student-centered learning, consistent with Wergin (2019) view that this role gradually builds students' independence and responsibility for their own learning, requiring teachers to become facilitators who give students space to explore ideas and apply knowledge contextually (Devanti et al., 2023). This also aligns with Lickona's integration of moral knowing, feeling, and action: project-based, reflective learning gave students space to understand, internalize, and practice moral values, strengthening responsibility, cooperation, and social awareness, and encouraging the realization of moral action in students' daily lives (Aminah et al., 2022).

However, this internalization of responsibility and cooperation through project-based Akidah Akhlak learning should be read cautiously when framed as a contribution to global citizenship competencies under SDG 4.7. The values cultivated commendable morals, ukhuwah, social awareness are rooted in an intra-communal, doctrinally grounded conception of tasamuh (tolerance) and mas'uliyah (responsibility), which is not automatically equivalent to the pluralistic, cross-cultural orientation GCED envisions. A project such as producing videos on commendable morals demonstrates internalization of Islamic ethical values, but the observed practice shows no clear evidence that students were guided to extend these values toward unfamiliar cultural, religious, or national "others" the defining feature of global citizenship competence. Without this explicit bridging, claiming that deep learning in Akidah Akhlak contributes to SDG 4.7 risks conflating character education in general with global citizenship education specifically.

Overall, the implementation of a deep learning Strategies and character education strategies in the teaching of Akidah Akhlak at MTs Negeri Salatiga is not only theoretically relevant but also has a gradual positive impact on the quality of learning and character development of students. This impact is evident in increased learning engagement, value awareness, and students' ability to relate Akidah Akhlak material to daily life, although its implementation still requires strengthening and sustainability.



Learning Evaluation Using the Deep Learning and Character Education Approach

Learning evaluation within the deep learning and character education strategies at MTs Negeri Salatiga served not only to measure competency but also as a mechanism to strengthen meaningful understanding and internalize students' moral values. Teachers used authentic evaluation behavioral observation, student reflection, project assessment, and peer assessment giving students space to demonstrate competency in real-life contexts, consistent with Wiggins (1998) concept of authentic assessment as realistic, complex tasks that measure not only mastery of material but also higher-order thinking and the ability to apply knowledge in real situations.

Beyond assessing knowledge mastery, this approach fostered collaboration, critical thinking, problem-solving, and self-reflection through transparent, ongoing evaluation, supporting the development of 21st-century competencies (Papanastasiou et al., 2025). It also helped students see the relevance of learning to professional practice, increasing self-confidence, independence, and academic motivation, and prepared them to demonstrate real competency by bridging school, professional, and everyday contexts enhancing communication, in-depth understanding, and critical thinking through contextual tasks (Setiawati et al., 2024).

The character evaluation conducted by the Akidah Akhlak teacher at MTs Negeri Salatiga also reflects a holistic approach that assesses three main dimensions of student development: cognitive, affective, and psychomotor aspects. This principle aligns with studies on character learning evaluation that emphasize the importance of a combination of evaluation methods such as portfolios, peer assessment, and ongoing observation to obtain a comprehensive picture of student character development. The use of various evaluation techniques to assess moral and behavioral aspects allows teachers to capture the dynamics of character development more validly and reliably than traditional, solely quantitative assessments (Asdiawan et al., 2025).

Furthermore, the orientation of evaluation as part of the learning process reflects the principle of assessment for learning, which emphasizes that assessment must provide constructive feedback to support reflection and continuous improvement. Within a deep learning framework, evaluation not only assesses what students know, but also how they think, collaborate, and apply learned values in different contexts (Fullan et al., 2018). Continuous formative evaluation can help identify students' strengths and weaknesses early on, allowing learning strategies to be adjusted to strengthen weak areas an approach theoretically recognized for significantly improving the quality of learning and student character outcomes (Hattie, 2012). Furthermore, authentic evaluation encourages students to become reflective learners capable of evaluating their own learning progress, a key characteristic of the deep learning and continuous character education strategies.

This alignment with SDG 4.7 nonetheless remains constrained by the structural character of madrasah education itself. First, the authentic assessment instruments described behavioral observation, reflection, portfolios were designed to measure religious-moral character in general, not the specific cognitive, socio-emotional, and behavioral domains that UNESCO's GCED framework requires (e.g., critical awareness of global interdependence, cross-cultural empathy). Second, the Akidah Akhlak curriculum operates within a doctrinally normative framework, which may limit teachers' latitude to introduce pluralistic or globally comparative perspectives without appearing to compromise creedal instruction. Third, the theoretical foundation drawn upon here Fullan, Lickona, Wergin, Hattie originates from secular Western pedagogy, and is applied without a corresponding Islamic epistemological framework that would clarify how classical concepts such as *tasamuh* and *mas'uliyah* map onto, or diverge from, the global citizenship competencies these theories presuppose. These constraints suggest that while deep learning strengthens character formation within the madrasah's own moral universe, its



contribution to global citizenship competencies as defined by SDG 4.7 remains partial and requires more explicit curricular design to be fully realized.

Implementing deep learning strategies integrated with character education in Akidah Akhlak learning at MTs Negeri Salatiga positively affects both learning quality and students' character development. This is reflected in meaningful lesson planning, project-based and problem-solving implementation, and authentic evaluation spanning cognitive, affective, and psychomotor dimensions. The resulting benefits include greater learning engagement, reinforced religious and social values, and stronger critical, collaborative, and reflective thinking skills. These findings align with SDG 4.7, which stresses quality education along with the strengthening of values, character, global citizenship, and sustainability (UNESCO, 2025), positioning this approach as one that serves the madrasah's goals while contributing to sustainable, character-driven, and globally competitive education.

Conclusion

The findings indicate that deep learning strategies integrated with character education at MTs Negeri Salatiga have been implemented systematically and sustainably, as reflected in meaningful lesson planning, project-based and problem-solving approaches, and authentic assessment covering cognitive, affective, and psychomotor domains. This implementation fosters greater student engagement, deeper conceptual understanding, and the internalization of Islamic character values such as religiosity, responsibility, honesty, cooperation, and social concern. By linking learning to everyday contexts, this approach shapes not only academic achievement but also moral attitudes and behavior. These results demonstrate that integrating deep learning with character education aligns closely with SDG 4.7, which emphasizes quality education, character strengthening, global citizenship, and sustainability positioning this practice at MTs Negeri Salatiga as a strategic contribution to holistic education and the formation of globally-minded student character in the digital era.

Recommendation

1) Practical and Policy Recommendations

Several practical recommendations emerge from this study. For teachers, integrating deep learning with character education should include structured digital literacy support, since some students showed limited readiness with digital media; technology use should be scaffolded gradually rather than assuming uniform digital competence. For madrasah administrators, institutional support is needed to strengthen the link between character education and global sustainability issues under the SDG 4.7 framework, such as training or curriculum guidelines helping teachers operationalize sustainability themes in Islamic Religious Education. For policymakers at the Ministry of Religious Affairs and the Ministry of Primary and Secondary Education, findings suggest the importance of formulating policies that support digital literacy programs as a prerequisite for technology-integrated deep learning, as well as developing contextual curriculum frameworks that more systematically embed sustainability-oriented character values into madrasah education.

2) Future Research Directions

To address this study's methodological limitations, several directions are proposed. First, future studies should expand the scope of subjects and research sites to include multiple madrasahs or schools at various levels, enabling broader generalization and comparison across educational contexts. Second, mixed-methods approaches combining qualitative and quantitative measurements are encouraged, particularly to assess the long-term impact of deep



learning integration on character development more measurably and validly. Third, future research should explore more deeply how digital technology supports deep learning-based character education, examining how structured digital literacy programs can be designed and evaluated as a foundation for effective technology-integrated learning. Fourth, studies could examine how contextual curriculum development around sustainability themes within SDG 4.7 can be more systematically operationalized in Islamic Religious Education. Finally, longitudinal studies tracking students' moral and behavioral development over time are strongly recommended to validate whether character values internalized through deep learning strategies are sustainably manifested in students' daily lives beyond school.

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