IMPLEMENTATION OF DEEP LEARNING IN THE PESANTREN CURRICULUM: A LITERATURE STUDY

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Abstract

This study aims to examine the implementation of the deep learning approach in the pesantren curriculum through a literature study. The deep learning approach in the context of learning refers to a learning process that emphasises conceptual understanding, deep reflection, and the interconnectedness of meaning between concepts. Pesantren as traditional Islamic educational institutions have distinctive learning characteristics, such as sorogan, bandongan, and halaqah methods, which basically have the potential to be developed towards deeper learning. Through literature analysis, it was found that the principles of deep learning are in line with pesantren educational values such as tafakkur, tadabbur, and deliberation. However, the implementation of this approach faces challenges, including a one-way learning culture and the limitations of innovative pedagogy. This study recommends the development of an integrative curriculum and training for educators so that learning in pesantren can take place in a more critical, reflective, and meaningful manner.

Keywords: Pesantren; Learning; Deep Learning; Curriculum; Islamic Education

INTRODUCTION

Education is a long-term investment that can shape individuals better, especially in facing global challenges today. The approach to learning has undergone significant changes, following the changing times. The learning approach used by a teacher in the teaching process plays an important role in determining the success of effective learning. Not only focus on the learning approach, but must pay attention to the learning methods that will be used, so that students understand not only in theory but are able to think critically, creatively, collaboratively, communicatively. For a long time, pesantren as educational institutions originating from Indonesia, have implemented the

concept of deep learning. These pesantren still use traditional learning methods, with a very in-depth learning system. Teachers in pesantren do not only teach, but provide memorable learning to their santri, by continuing to monitor, if one of the santri has difficulty in learning or in the process of memorising a book or the Qur'an.

In addition to providing lessons, the life system in pesantren is often a liaison between santri and their parents. Deliberation in a pesantren creates mindful learning, learning that emphasises full awareness, to invite santri to deliberate or discuss outside of class hours, to discuss issues that have not been answered in the classroom. Especially if it is bahtsul masail season, diving into the books, exchanging ideas with each other (Prasetiadi et al., 2023). Whereas joyful learning in a pesantren, when santri read 'lalaran' using popular songs, in addition, joyful learning in pesantren is also when there is a pilgrimage to the grave of the wali, a spiritual journey and respect for the wali who spread Islam in Indonesia, from Central Java to East Java.

The aspects of education in pesantren are complete, including intellectual intelligence portrayed through madrassas and kitab taught daily, daily to enhance spirituality through strict rules to carry out the prananta of worship, and emotionally established. By applying the deep learning approach in the pesantren curriculum, there is an opportunity to produce learning that is not merely rote or routine (Lestari et al., 2024). This approach allows santri to gain a deeper understanding of the meaning of the text, build a critical understanding of the content of the book, and relate their knowledge to real-world situations through daily relationships between santri. The purpose of this study is to determine the application of deep learning in a boarding school by utilising various learning methods.

METHOD

This study uses a qualitative approach with a literature study method (library research) (Tanzeh, 2018). Literature study is a data collection technique carried out by reviewing various relevant written sources, such as books, scientific journals, and other documents, both in print and digital formats. This approach was chosen because it is in accordance with the research objectives which are conceptual and analytical.

The main data sources in this study include literature on pesantren education and literature that examines the deep learning approach in learning.

Additional sources are also obtained from journal articles and previous research that are relevant to the integration of deep learning in pesantren education. The data collection technique is carried out by identifying and collecting various references. After the data is collected, the analysis is carried out descriptively-qualitatively. The stages of analysis include data reduction, data presentation, and drawing conclusions.

FINDINGS AND DISCUSSION

Concept of Deep Learning Approach

In the world of modern education, the emergence of learning approaches that are oriented towards deep understanding is the answer to the challenges of education that are only rote and mechanistic. One of the prominent approaches is deep learning, which is a learning strategy that focuses on the internal process of learners to understand concepts thoroughly, analyze, integrate information, and apply knowledge in real situations (Khotimah & Abdan, 2025). This approach places learners not only as recipients of information, but as active subjects in constructing their knowledge through meaningful reflection and dialog. The concept of deep learning was first introduced by Marton and Säljö in 1976, who distinguished between deep and surface learning approaches. In the deep approach, students try to understand the material holistically, relate new ideas to the cognitive framework they already have, and evaluate information critically (Fitriani & Santiani, 2025). In contrast, the surface approach only emphasizes memorization and end result orientation such as test scores, without any understanding of the full meaning.

Deep learning is a comprehensive learning approach, which includes cognitive, affective and metacognitive aspects. It is oriented towards deep understanding, critical reflection, and contextual application of knowledge. Through the proper implementation of deep learning strategies, the educational process will be able to produce individuals who not only master knowledge, but are also able to think independently, creatively, and socially responsible. Deep learning is closely related to the theory of constructivism developed by Piaget and Vygotsky. According to this view, learning occurs when individuals construct their knowledge actively through experience, social interaction and reflection on the information received. In this context, the role of the teacher is no longer as the only source of information, but as a

facilitator who guides learners in interpreting and developing the meaning of the material learned (Tohari & Rahman, 2024).

The implementation of deep learning in the classroom requires the implementation of learning strategies that stimulate the active involvement of learners. These strategies include the use of open-ended questions, problem-based learning, collaborative projects, group discussions, and metacognitive reflection (Hafizhatunnisa & Sukaesih, 2024). These strategies assist learners in developing higher order thinking skills, such as analysis, evaluation and synthesis, which are key characteristics of meaningful learning. This approach is also very relevant to the needs of 21st century education that demands mastery of soft skills, critical thinking, and adaptability to change. In a complex and dynamic environment, it is not enough for learners to master information, but they must be able to understand the context, develop solutions, and actively contribute to their social environment. Furthermore, deep learning does not only cover cognitive aspects, but also affective and spiritual dimensions. Reflective learning allows learners to assess not only what they know, but also how and why they learn. This process involves metacognitive aspects, where learners are aware of their own thinking and learning strategies, and develop an attitude of responsibility towards the learning process (Bistari et al., 2025).

A learning environment that supports deep learning is usually characterized by an open, dialogical atmosphere that encourages free exploration of ideas. In such an atmosphere, learners feel safe to ask questions, express opinions, and test alternative solutions. The teacher, in this case, does not act authoritarian, but rather builds a partnership with learners to create a participatory and meaningful learning space. Learning that emphasizes deep understanding also contributes to character building and integrity. When learners are trained to reflect on the values contained in knowledge, they not only master the theoretical aspects, but also understand the moral and social impacts of applying the knowledge (Raup et al., 2022). This is important in shaping learners who are not only smart, but also wise and responsible. The application of deep learning also encourages learners to become lifelong learners (Dasar, 2025). The learner-centered learning process, supported by reflection, intrinsic motivation, and the search for meaning, creates a mindset that is constantly evolving and open to change. However, the implementation of the deep learning approach requires support from an education system that favors the process, not just the outcome. Learning evaluation needs to be directed towards measuring conceptual understanding and critical thinking

skills, not just the quantity of information mastered. Teachers also need training and professional development to be able to implement deep learning strategies effectively in their classrooms.

Characteristics of Learning in Pesantren

Pesantren is known for its independent culture, discipline, simplicity, and mutual cooperation with each other (Muntaqo et al., 2020). Santri are required to live independently from waking up to sleeping again. A simple lifestyle is also one of the clearly visible characteristics of santri. Kyai acts as the main figure and role model for santri, both in learning activities and in daily life in pesantren. This makes the relationship between santri and kyai very closely intertwined either physically or mentally with respect and obedience (Muhajir & Dawwas, 2022). Indeed, in its learning system, pesantren has differences with other educational institutions where they use two main methods, namely the bandongan (group) and shorogan (individual) systems. In the sorogan method, students learn individually directly with the ustadz and give their books so that two-way learning occurs, while the bandongan method is carried out in groups where the kyai or ustadz reads, explains, and reviews the books which are then listened to by a group of students (Slamet & Asiah, 2021).

Pesantren have the freedom to determine the education system to be applied compared to formal schools that are in accordance with traditional values with the demands of the times and are also free from the limitations of a curriculum that looks rigid, so it can be ensured that santri not only understand their faith and other branches of religious knowledge monotonously, but also develop the qualities of independence, simplicity, and a strong sense of social responsibility (Mubarok, 2021). This will help them to be able to contribute positively to their religion, nation, and country later after leaving the pesantren which will help the santri prepare themselves to face the various challenges that exist, while still practicing the Islamic principles on which they are based. In addition, this pesantren provides education that focuses on developing the spirituality of the santri through various religious activities such as wirid and learning the yellow book. This system also aims to equip students to become successful, dedicated human beings who are able to actively apply Islamic teachings in society (Wulandari et al., 2023). In pesantren life, it is also believed that the kyai's pleasure is the main factor in the success of the students later, where the kyai not only imparts knowledge but also attentively guides the santri based on their specific needs for their

daily lives. With this free education system, pesantren are better able to develop religious education and lifeskills that are suitable for today's era. This helps santri prepare themselves to face the various challenges that exist, while still practicing the Islamic principles that are the foundation (Raharjo, 2024).

The teaching and learning system in pesantren is not only about memorizing or passively receiving knowledge from the kyai or ustadz, but also by implementing a fun, deep and meaningful learning experience where they can reflect on the meaning of the knowledge learned, and implement it in their daily lives (Fikri et al., 2025). Here, kyai and ustadz also act as personal mentors who really care and pay attention to each student which can make them enthusiastic and actively involved during the learning process. But not only the methods previously mentioned, pesantren also carry out several other activities such as joint discussions or called bahtsul masail, deliberations, joint worship activities, and some lifeskill training such as knitting, sewing, gardening, and graphic design training in some pesantren for now. Through several approaches in this learning system, pesantren have succeeded in creating a learning atmosphere that does not only focus on knowledge, but also builds the character and critical thinking skills of santri as a whole. That way, they are well prepared to face various challenges in life, armed with strong knowledge and solid morals (Mukromin, 2024)

Relevance of Deep Learning to Pesantren Learning

The concept of deep learning in education refers to a learning approach that emphasizes deep understanding, critical reflection, and interconnectedness between concept (Diputera et al., 2024). Pesantren education, as one of the oldest and most deeply rooted Islamic education systems in Indonesia, places spiritual, intellectual, and social values in a single learning process (Asmuri et al., 2025). Values such as tafakkur (contemplation), tadabbur (experiencing), and mudzakarah (scientific discussion) are the main foundations in the pesantren learning pattern which is based on achieving deep understanding, not just memorization. These values are philosophically very much in line with the principles of deep learning in modern education, namely mindful learning, meaningful learning, and joyful learning.

Tafakkur means an activity that reflects the process of contemplating, thinking, and considering deeply and seriously (Enghariano, 2019). In pesantren, tafakkur can be interpreted as a contemplative process in which santri are invited to reflect and fully realize the relationship between the

knowledge they learn and the reality of life and the greatness of the Maker. This is in line with the concept of mindful learning, which emphasizes the importance of full awareness (mindfulness) in the learning process (Diputera et al., 2024). Within this framework, santri do not only receive information passively, but are also aware of the context, values, and implications of the knowledge they learn. Activities such as muraqabah and muhasabah after congregational prayers as a form of self-introspection, as well as contemplation of the verses of the Qur'an in tafsir learning that are linked to social reality, are examples of the application of mindful learning that has long been part of the educational tradition in pesantren. In general, tadabbur means a deep activity carried out by someone with full sincerity to reflect, understand, and think carefully about the consequences or endings of a matter (Hamzah, 2019). In pesantren, tadabbur of Allah's verses serves as a means to connect texts with context. This process is in line with the principle of meaningful learning, namely learning that links new knowledge with previously possessed cognitive structures (Islami, 2021). For example, santri are invited to explore the meaning of the verses of the Qur'an related to contemporary social issues (such as justice, the environment, or poverty), then discuss them in a halaqah forum to find contextual and applicable meanings in everyday life. Through tadabbur, students not only understand the verses textually, but also explore deeper meanings and their practical relevance in everyday life.

Mudzakarah is a method of delivering learning materials through two-way discussions involving interaction between santri (Ramadhan & Nuradilah, 2023). In pesantren, mudzakarah is a tradition of discussion and scientific deliberation that lives among santri, both in formal activities such as bahtsul masail and in everyday interactions. This process strengthens the principle of joyful learning, namely learning that takes place in a joyful, interactive, and motivating atmosphere (Rahma & Hidayah, 2022). In mudzakarah, santri learn through dialogue, healthy debate, and collaboration. This not only improves conceptual understanding, but also builds critical thinking skills, openness to differences, and fosters a spirit of togetherness in seeking the truth. This kind of learning makes knowledge feel alive, enjoyable, and easier to absorb.

When tafakkur, tadabbur, and mudzakarah are connected to the principle of deep learning, it is seen that pesantren education has actually implemented deep learning long before the term was known in contemporary educational literature. Learning in pesantren is not only informative, but transformative. It forms character, fosters spiritual and social sensitivity, and

encourages complete and reflective understanding. Thus, the implementation of deep learning in the pesantren curriculum is not an attempt to replace tradition, but to strengthen and integrate the noble values of pesantren with a modern learning approach based on understanding, awareness, and happiness in learning.

Implementation Strategy of Deep Learning in Pesantren Learning

With technological advances, especially in the field of artificial intelligence and deep learning, there is an opportunity to improve the effectiveness of learning in pesantren. However, the use of this technology must be done by considering the values and traditions of pesantren. A part of artificial intelligence known as deep learning enables the processing of complex data through artificial neural networks. This technology can be used in pesantren to address learning problems such as understanding classical Arabic texts, limited teaching resources, and the need for more adaptive and individualised learning (Lestari et al., 2024). One of the relevant applications is the application of deep learning models in the introduction of kitab kuning texts that use bare Arabic letters or Pegon Arabic. In addition, an in-depth understanding of the classical Arabic language context can help in the development of Arabic language learning.

Speech recognition technology can be used in the field of Qur'anic memorisation to automatically evaluate santri recitation, provide feedback, and record the progress of memorisation on a regular basis. The development of adequate digital infrastructure in pesantren is necessary to implement this strategy. This infrastructure includes internet access, hardware, and santri-friendly learning platforms (Husairi & Sodikin, 2023). Training and improving digital literacy for teachers and santri are also important to ensure that this strategy is successful. In addition, this strategy will be successful if pesantren collaborate with technology institutions such as universities, research institutions, or start-up companies that have expertise in this field.

The pesantren curriculum must be adapted to utilise technology while maintaining strong traditions and spirituality, which are the foundation of pesantren education. The implementation of deep learning in pesantren has many advantages, but also faces several problems. Some of these problems include lack of technological understanding, fear of change, lack of funding, and the need to adjust to the local context (Raup et al., 2022). To overcome these problems, policy makers in pesantren, especially kiai, should use effective communication strategies to inform them about the benefits of

technology and the importance of adapting to developments. Pesantren education can experience sustainable positive changes by implementing deep learning, supporting qualified human resources, and maintaining the core principles of pesantren.

CONCLUSION

The concept of the deep learning approach is a comprehensive learning approach, which includes cognitive, affective, and metacognitive aspects that focus on conceptual understanding, active involvement, meaningful connections, and reflection. This approach is oriented towards deep understanding, critical reflection, and contextual application of knowledge. Therefore, in its application, deep learning requires a learning system that can provide stimulation for students to be actively involved. With the efforts that have been designed, this can achieve learning objectives that are in accordance with developing a responsible attitude towards the learning process. The pesantren learning system generally uses two learning methods, namely bandongan and shorogan, but in addition to its learning system, Islamic boarding schools also carry out deliberation activities, bahtsul masail, other religious activities such as congregational prayer, wirid, and tahlil, and some of the pesantren have implemented life skill development programs. The values of tafakkur, tadabbur, and muzakarah are the main foundations in the pesantren learning system which are based on achieving deep understanding, where this is philosophically very much in line with the principles of deep learning in modern education, namely mindful, meaningful, and joyful.

The relevance between in-depth learning and pesantren education lies in the same goal of developing individuals who are not only able to understand the material cognitively but also apply, integrate, and blend it in everyday life while developing a character based on integrity. Pesantren implement a collaborative, continuous, and experience-based learning process. The implementation of in-depth learning in the pesantren learning system can be done through the use of critical discussion techniques, case-based problem solving, contextual and reflective learning methods, and santri-centered collaborative learning that can be applied in bahtsul masail and deliberation activities. And the implementation of the in-depth learning model in the introduction of yellow book texts that use standard Arabic letters or Pegon Arabic. In addition, a deep understanding of the context of classical Arabic can help in the development of Arabic language learning. Thus, the

implementation of the deep learning approach in pesantren learning that is relevant and contextually reflective, as well as collaborative learning that focuses on santri is a way to implement comprehensive learning within the framework of pesantren education that encourages critical thinking, active participation of students in the educational process, and links lessons to real-world scenarios so that they can later face the dynamics of modern life.

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