

IMPLEMENTING DEEP LEARNING THROUGH THE DEVELOPMENT OF ECO-PESANTREN AS A SCHOOL CULTURE AT PPM BAITUSSALAM

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Abstract

This study aims to find out: (1) To describe the implementation of Deep Learning in the management of Eco Pesantren. (2) To describe and analyse the potential of Eco Pesantren program at PPM Baitussalam Prambanan. (3) To describe the development of Eco Pesantren at PPM Baitussalam. This research method uses qualitative methods. The research object was carried out at PPM Baitussalam. The target subjects of the research were the head of the Pondok, the principal, the person in charge of the Pondok Kerumahtanggan section, and the students. The data collection techniques used were observation, interview, and documentation. The data analysis technique used was qualitative data analysis of the Miles and Huberman model consisting of data reduction, data presentation, and conclusion drawing. The results showed that first, Eco Pesantren is an environment-based pesantren education programme that is in line with the concept of deep learning in involving students in pesantren activities. Second, PPM Baitussalam has potentials that can be developed for the Eco Pesantren program, including the pesantren's business charities (minimarket, canteen, student organisation, catfish farm, vegetable and fruit farm). Third, the potential for developing school culture at PPM Baitussalam can be in the form of integrated waste management. Organic waste in the form of leftover consumption and restaurant waste can be reprocessed into organic catfish feed so as not to produce disturbing waste. Non-organic waste can be utilised as a means for students' economic literacy by creating a system like a waste bank. The use of Smart Cards in the financial transaction activities of students can function like an ATM that will be directly integrated with the Smartsystem at the financial centre of the boarding school. With the management of the Eco Pesantren, it is expected that sustainable environmental management will be created.

Keywords: *Implementation, Deep Learning, Eco Pesantren, PPM Baitussalam*

Introduction

Deep learning is a learning approach that emphasises the interconnectedness of understanding the meaning and relationship between concepts comprehensively. This learning model focuses on developing a deeper understanding of the subject matter through a holistic learning experience, meaning that students are not only cognitively but also emotionally engaged in their learning process (Wijaya et al., 2025). The main objective of this approach is to ensure students not only understand the essence of a concept, but are also able to relate it to a relevant practical context in real life. This approach encourages students to develop a more complex and integrated understanding, allowing them to apply their knowledge in a variety of different situations and contexts. Thus, deep learning not only prepares students for academic exams, but also equips them with the necessary abilities to face real-world challenges (Hariyanti, 2024). The implementation of deep learning strategies

has an effect size of 0.69, which indicates a significant positive impact on student learning outcomes (Arnold, 2011). In line with this, deep learning is described as a learning process that involves students' active participation in the exploration and application of key concepts, which helps students develop critical thinking skills and prepares them for real-world challenges.

In line with the intensification of deep learning in relation to learning management, one of the ways that can be done is by developing school culture. School culture is one of the benchmarks for the success of the education process. A good school culture is expected to succeed in improving the quality of education that not only has academic value but also affective value (Indrajati, 2017). Boydak Ozan & Demir (2012) explained that school culture is a characteristic of each school. Schools have their own culture which includes values, beliefs, norms, stories, ceremonies, and school symbols. School culture should be shaped to enable staff and students to socialise and transfer cultural heritage over time. School culture can be identified through its aspects. Culture is manifested in the school environment. Schein (2010) proposed three levels as aspects of school culture, namely artifacts, espoused values, and basic underlying assumptions. All aspects of school culture will form a system that characterises each school. Zamroni (2016) explained that artifacts are manifested in the condition of the building, cleanliness, and behaviour of the school community. So the development that focuses on environmental management is very important to do in order to form a good school culture.

The development of school culture in terms of environmental management can be done in Islamic boarding schools. This is based on the stigma against Islamic boarding schools which is often synonymous with weak environmental management, especially in waste management, waste, water use, nature conservation, environmental conservation, energy utilisation and so on. Culture development in terms of environmental management is also called Eco-Pesantren. Eco-Pesantren is derived from two word elements, namely eco and pesantren. Eco or eco - adapted into Indonesian with connotations closely related to the science of ecology, which is the study of the interaction of living things with the surrounding natural environment. While pesantren is a typical Indonesian Islamic educational institution that has elements of pesantren, namely: cottage, mosque, classical book teaching, santri and kyai. Thus, eco-pesantren is an effort to label 'environmentally friendly' or green at a stage where the pesantren can show its contribution or participation in environmental preservation or conservation (Mangunjaya, 2014).

Eco-pesantren is also used as one of the faith-based environmental education models recommended by the 1st International Conference of Muslim Action on Climate Change to be implemented on an international scale. World Muslim scholars recognise that pesantren in Indonesia have advanced understanding in managing the environment such as processing waste into compost and goods of economic value, which can increase income from the compost (Fatimatuzzahroh et al., 2015).

The research object in this article is Pondok Pesantren Modern Baitussalam Prambanan (PPM Baitussalam). PPM Baitussalam is a boarding school located in

Prambanan Sleman DIY which has a large number of students and several businesses owned by the boarding school that allows for the development of Eco-Pesantren in the pesantren environment. PPM Baitussalam has several regulations for boarding school residents known as 5 Orders. The 5 rules in question are Orderly Heart, Orderly Time, Orderly Environment, Orderly Language, and Orderly KBM. In relation to environmental management, Orderly Environment means that cleanliness is part of faith. Keeping the environment clean and tidy is a form of our gratitude for the shelter and facilities that God has entrusted to us. It is not only the responsibility of the cleaning service or security guard, but every individual should feel responsible for the cleanliness of the surrounding environment. Even picking up small rubbish is a rewarding good deed (Baitussalam, 2024). Therefore, the development of Eco Pesantren as a school culture is worth developing as a means to realise sustainable development.

Research Methods

This research uses a descriptive qualitative approach. Descriptive qualitative research is research that provides a description of a particular situation in detail accompanied by evidence, making it easier to obtain the desired data (Sugiyono, 2021). This research was conducted at PPM Baitussalam Sleman Yogyakarta. PPM Baitussalam is located in Bokoharjo Village, Sleman Regency. The exact location is behind the Prambanan Temple complex building. PPM Baitussalam has the potential to be developed as an Eco-Pesantren model as part of a deep learning approach as an educational approach amid the unending waste problem in Yogyakarta. Data were collected through observation, interview, and documentation. The data analysis technique used was qualitative data analysis of the Miles and Huberman model consisting of data reduction, data presentation, and conclusion drawing (Miles et al., 2014).

Results and Discussion

Profile of PPM Baitussalam Prambanan

PPM Baitussalam is located in the area of Prambanan District, Sleman Regency, Yogyakarta Special Region. PPM Baitussalam has several school units ranging from daycare centres (TPA), early childhood centres, kindergartens, to high school level. Some students at PPM Baitussalam attend school with a full day school system for PAUD to elementary school units, while others are required to live in the boarding school for junior high school and high school units. The number of students who live in the boarding school is around 445 for junior high school students and 262 for high school students (Dapodik, 2024). Junior and senior high school students who are at PPM Baitussalam are required to live in the hut or mandatory dormitory. All activities include the learning process, daily activities from cleaning themselves, studying, eating, drinking, are carried out in the hut.

The daily activities of PPM Baitussalam students will certainly produce waste in the form of organic and non-organic waste. Organic waste comes from the remaining consumption of all residents of the pesantren and the remaining waste of cooking ingredients from the pesantren kitchen. This is because all residents of the

pesantren will get lunch and breakfast and dinner for students who live in the pesantren. With a total of more than 1,000 people, it is possible to produce organic waste that can support the implementation of deep learning through Eco Pesantren at PPM Baitussalam.

In addition to organic waste, there is also quite a lot of non-organic waste generated from the activities of all pesantren residents. The waste can be in the form of used bottles, used food plastics, used cardboard, used paper/books, etc. The waste will physically interfere with the comfort of activities if not managed properly. Piles of used goods that are not taken care of will disturb the view and cause mosquito nests that can have the potential to interfere with health.

According to data obtained from the housekeeping department of PPM Baitussalam, which takes care of the waste section, there are about 7 quintals of waste generated by the boarding school residents for each day. This amount consists of organic waste and non-organic waste (Samsol Hadi, 2024). Organic waste includes leftover rice, vegetables, and side dishes, while non-organic waste includes plastic food wrappers, used plastic bottles, used paper, and so on. If focused on used plastic bottles, field observation data states that on average 1 (one) santri will buy at least 1 (one) bottle drink. So if calculated based on the number of students in junior and senior high school, there will be around 707 used plastic bottles produced with various sizes per day. That number will continue to grow if the consumption of drinks wrapped in plastic bottles continues to increase. Therefore, a programme is needed that can solve the problem of waste generated by PPM Baitussalam residents.

Therefore, a sustainable waste management pattern is needed to create a comfortable boarding school for the learning process. This waste management is also one of the environmental-based education patterns where the process involves students directly. Thus, students will gain field experience regarding the process of handling environmental problems.

Implementation of Deep Learning in Pesantren Management

The urgency of implementing deep learning is increasing along with the demands of 21st century competencies. Astuti (2024) expanded the concept of deep learning by identifying six key competencies called '6C': Character, Citizenship, Collaboration, Communication, Creativity, and Critical Thinking. Her research showed that schools that implemented the deep learning approach experienced significant improvements in students' learning motivation and the development of higher order thinking skills. Furthermore, it is explained that Critical Thinking, Creativity, Communication and Collaboration skills are supporting the implementation of 21st century learning which is used by students in solving problems by reasoning critically and creatively, conveying ideas, questions, ideas, being able to establish good communication and being able to work together in achieving common goals (Fitriyani & Teguh Nugroho, 2022).

Fullan and Langworthy state that deep learning is learning that utilises the power of new collaborations to engage students in applying the learning process: discovering and using existing knowledge, then creating and using new knowledge

in the world (Fullan & Langworthy, 2014). Students are expected to understand that learning is the result of deep learning, needed for the future. It is also expected that this model can address the problems of morality, character, and learning motivation that are happening in the educational environment (Anwar, 2017). According to ESQ's analysis, there are seven moral crises plaguing Indonesian society: honesty crisis, responsibility crisis, discipline crisis, togetherness crisis, justice crisis, and caring crisis. In line with this idea, deep learning aims to shape students' character as learners (Rukiyati, 2013).

Deep learning in Islamic education is not only related to the mastery of worldly knowledge (such as mathematics, science, or language), but also involves a deeper understanding of Islamic religious teachings, such as *aqidah* (faith), *ibadah* (religious rituals), and *adab*. In Islamic education, deep learning encourages students to see the connection between worldly and religious sciences. For example, natural, mathematical or social sciences are not seen as separate from Islamic teachings, but as part of God's creation that should be studied and understood with the intention for the good of mankind (AF, 2024).

Eco-Pesantren as a School Culture

According to Seymour and Sarason (in Hanum, 2013), school culture has a culture that must be understood and involved if an effort to make changes to it is not merely for show. Through a good school culture, the school can also be developed into an effective school. To create a positive school culture as analyzed in several relevant previous studies (Rahayuningsih & Iskandar, 2022), several steps can be taken, one of which is maintaining a safe and comfortable environment. Maintaining a safe and comfortable school environment can help students feel more at ease and focused in their learning.

The principle of becoming an environmentally friendly pesantren is called Eco Pesantren. Pesantren has the responsibility to provide education that positively values efforts for environmental preservation. Pesantren has a continuous habit of developing *fiqh al-biah* because it plays a very important role in the real efforts of Muslims who are obliged to maintain and preserve environmental sustainability, not only within the boundaries of ethics and morals but also extending to the strengthening of legal instruments (Faizin, 2016).

The development of Eco Pesantren is worthy of being developed as one of the school cultures. Several indicators that can strengthen this argument include, first, that Eco Pesantren is a principle of environmental management that is collaborative in nature. All components will be involved in this program, starting from the institution's leadership, student organizations, to the general student body. The participation of all pesantren residents will collaborate and feel a sense of responsibility to maintain the school environment through the implementation of Eco Pesantren. Second, Eco Pesantren is oriented towards creating a comfortable and orderly environment. A pesantren free from waste problems will create a comfortable learning environment. Students will feel comfortable in studying and carrying out all activities in the pesantren environment. Therefore, this is also a positive culture that deserves to be developed.

Third, Eco Pesantren can also serve as a means for students to develop leadership skills. The existence of intra-school student organizations can be empowered in environmental management as an effective learning tool. Student participation in student organizations to manage waste serves as a form of learning to cultivate responsibility in problem management. Fourth, the development of Eco Pesantren as a school culture is also worth developing because it can encourage student participation in decision-making, such as in planning school activities. This can help them feel more ownership of their learning environment and contribute to decision-making that can affect school life.

Development of Eco-Pesantren at PPM Baitussalam

The development of Eco-Pesantren at PPM Baitussalam can be carried out through environmental management based on household waste management. PPM Baitussalam has several types of businesses and routine activities that can support the implementation of Eco Pesantren. In the field of charitable enterprises, known as PEP (Pondok Economic Development), PPM Baitussalam has Alfasalam, which caters to the daily needs of the students. Gedang Kluthuk Restaurant and the pesantren canteen provide daily meals for the students, offering a variety of dishes. The cultivation of catfish, vegetables, and fruits is also developed to supply protein for all the residents of the pesantren. The student organization serves as a means of education in leadership and nationalism for the students, acting as an extension of the leadership to collectively develop the pesantren. Some of these resources can support the implementation of the Eco Pesantren program. In the following discussion, Eco Pesantren at PPM Baitussalam will be presented in terms of organic and inorganic waste management.

1) Organic Waste Processing

The issue of fishery waste also occurs at Pondok Pesantren Baitussalam Prambanan (PPM Baitussalam). The boarding school located in the Prambanan Sleman area also faces the same issue regarding the handling of fishery waste, particularly catfish farming. At PPM Baitussalam, the catfish dish has become one of the main menus consumed by middle and high school students who are studying at the pesantren. In addition to the waste from consumption, PPM Baitussalam also has a pond for producing organic catfish, which is prepared for guests visiting the Gedang Kluthuk Restaurant managed by PPM Baitussalam. However, the waste from the heads and bones of the catfish leftovers from consumption has not been utilized properly and is currently only being thrown in the trash. In fact, if processed properly, the waste from catfish processing could be more beneficial.

The processing of catfish head and bone waste has started to develop. The products produced include food ingredients that are the result of processing catfish head and bone waste into catfish flour. Processing fish bones into fish meal will reduce the amount of fishery waste and will help in reducing fishery waste (Meiyasa & Tarigan, 2020). In addition to processing catfish head and bone waste into useful food products, another method that can be employed is converting that waste into

pellets or catfish feed. Thus, a cycle will be created to eliminate the waste resulting from catfish processing.

The catfish cultivated by PPM Baitussalam are organic catfish that use minimal processed feed. As a result, the catfish that will be consumed have higher nutritional content and better taste. Therefore, it is not surprising that the catfish dish has become one of the mainstays at PPM Baitussalam and is favored by the students residing at the pesantren. Based on data from field observations, a single meal consumed by the residents of PPM Baitussalam generates approximately 8 kg of catfish head and bone waste. This amount does not include the waste generated from the restaurant managed by PPM Baitussalam. With those conditions, data was obtained indicating a significant potential for processing catfish head and bone waste. The high volume of catfish production and consumption will increase catfish waste production, which will indirectly cause environmental pollution. The accumulation of catfish waste will impact environmental cleanliness, causing unpleasant odors and becoming a breeding ground for organisms that will lead to various diseases. The source of waste generated from the production and consumption of catfish usually comes from the bones and heads of the catfish. In this part, the waste generated, if not managed properly, will have negative effects on health and the environment.

The waste from catfish, which comes from the head and bones, turns out to have a nutritional content consisting of 58.3% calcium phosphate, 1.0% calcium carbonate, 2.1% magnesium phosphate, 1.9% calcium fluoride, and 30.6% protein (Septriansyah, 2000 in Muhidin, 2020). This nutritional content can be utilized as feed for cultured animals, one of which is catfish. Fish waste that is processed into aquaculture feed is generally known as pellets. Pellets are a form of artificial feed made from various ingredients that are processed and molded into stick or round shapes (Zaenuri et al., 2014). The production of pellets using raw materials from fish head and bone waste provides several benefits. The benefit obtained from this processing is the independence in fish feed production. The presence of an integrated waste processing cycle at PPM Baitussalam, particularly from fish head and bone waste.

2) Management of InOrganic Waste

PPM Baitussalam has various extracurricular activities that serve as a means of developing the interests and talents of the students. One of the extracurricular activities organized at PPM Baitussalam also includes a student organization (OSIS) called OSBA (Organisasi Santri Baitussalam). In the OSBA management structure, there are several divisions, such as the security division, gardening division, guest reception division, cleanliness division, etc. One of the divisions of OSBA is the cleanliness division, which is responsible for ensuring the cleanliness of the dormitory and its surroundings. One of the flagship programs that can be developed from the Cleanliness Division is the Waste Cooperative program. The management of this waste cooperative becomes the responsibility of the OSBA Cleanliness Division, which is under the guidance of the dormitory supervisor and under the direction of the Deputy Head of Student Affairs. The work program of

the Waste Cooperative focuses on managing inorganic waste such as used plastic bottles, plastic buckets, used paper, and other inorganic waste originating from the students, which is then processed and will be returned to the students in the form of pocket money.

The lack of a good waste recycling program further encourages OSBA to initiate this program. OSBA has become the main driving force in managing the Waste Cooperative as one of the flagship work programs to address environmental issues. The activities held are not just about providing facilities for collecting waste, but also include socialization programs on proper waste sorting. This is done as an educational means for other students so that the cleanliness of the pesantren is maintained, thereby creating a shared comfort. A massive campaign is being conducted to promote that waste, especially used plastic bottles and cartons, has economic value and can be beneficial for the students (Muthi'ah, 2024).

In its technical implementation, the development of the Waste Cooperative has a flow starting from waste collection to the sales process. The explanation of the process is as follows, (1) The waste comes from the students of PPM Baitussalam; (2) The Waste Cooperative receives the waste and then separates it into organic and inorganic waste; (3) The organic waste is separated and will be collected by the dormitory cleaning staff; (4) Inorganic waste, such as used bottles and plastic, is placed in the designated containers according to each class; (5) The Waste Cooperative weighs the waste and sells it to collectors; (6) The money obtained from the sale of inorganic waste will be given to the financial officer of each class; (7) The money received by the students from the sale of waste will be saved as the class fund, which can be topped up through each student's smart card account.

The proceeds from the sale of waste will be returned to the students as class funds. The money from the sale of the students' waste was initially handed over to the Mudabirrah or the student supervisor in the dormitory, but over time, the proceeds from the sale were handed over to each class treasurer. The recap of incoming money is recorded in the savings book carried by each treasurer, ensuring that all incoming money is neatly documented. Thus, with this process, the waste generated by the students will return to the students in the form of money that can be used for the needs of the student cohort (Jaini, 2024).

The existence of the Waste Cooperative as a cooperative that serves as a waste management platform among the students shows a positive impact. First, the principle of from the students, by the students, and for the students. This principle is part of the waste management process flow at the Waste Cooperative. Waste originating from the students will be managed by the students and will be returned to the students in the form of money. The money obtained will go into the class batch fund, which is already recorded in the savings book. Thus, if a class batch needs additional funds for class activities, there will be no need for extra contributions. If managed individually, the money will be topped up in each student's smartsystem account, which is integrated with their pocket money.

Second, there is an increase in awareness among the students to sort waste. The students have become increasingly accustomed to the activity of sorting and

collecting waste that has economic value. They will remind each other to sort the economically valuable waste to be deposited into the Waste Cooperative, which will later become the class fund. The more waste that is deposited into the Waste Cooperative, the greater the amount that the class cohort will receive.

Third, the increase in the character of living clean among the students. This result can be directly observed in the field where there is very little litter such as plastic bottles, used paper, and non-organic waste scattered in PPM Baitussalam. The students seem to have gotten used to placing their trash in the proper places, and this will become a good habit for the cleanliness and comfort of the PPM Baitussalam environment.

Fourth, encouraging student involvement in managing the environment can also foster a positive school culture. Students actively participate in school activities by giving them the opportunity to become members of school organizations or assigning additional tasks to students to work on projects that involve interaction and engagement with other students (Kusumawati & Maruti, 2019). This helps students to enhance their sense of ownership and pride towards the school.

Conclusion

The Eco Pesantren Program is one of the potentials that can be developed into a school culture. In addition, the development of school-based cultural schools is also an implementation of the deep learning approach in education. Collaborative principles, cooperation, involvement of all school components, openness, and development have been fulfilled to become one of the characteristics of school culture. PPM Baitussalam has those potentials, making it possible to develop, one of which focuses on waste management. Waste management within the Eco Pesantren program is also part of the efforts to implement sustainable development programs. The guarantee of environmental sustainability through the recycling of organic waste is evidence that Eco Pesantren supports the Sustainable Development program. The concept of processing inorganic waste as a waste bank also becomes part of sustainable development in the realm of economic sustainability necessary to preserve nature, society, and humanity needed for income and living standards. Therefore, the development of pesantren with the Eco Pesantren principle, besides being part of the school culture, also becomes part of the sustainable development program.

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Interview List

Samsol Hadi (Head of the Household Affairs Division at PPM Baitussalam)
Muthi'ah Nur Rosyidah (Chairperson of OSBA PPM Baitussalam)
Jaini Ihwaniah (Head of Female Student Care)