ANALYSIS OF THE ROLE OF ISLAMIC EDUCATIONAL INSTITUTIONS IN ADOPTING ENVIRONMENTALLY FRIENDLY TECHNOLOGY

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Abstract: The purpose of this study is to discuss the Analysis of the Role of Islamic Educational Institutions in Adopting Environmentally Friendly Technology, the method used to conduct this study is Library Research, The conclusion of this study emphasizes the importance of integrating religious values in environmental awareness, the role of religious organizations in conservation initiatives, and cross-sector collaboration in the adoption of green technology in Islamic schools. Religious values play a significant role in shaping individual awareness of environmental responsibility as part of moral and spiritual obligations. Participation of faith-based communities is able to encourage conservation initiatives through environmentally friendly campaigns and practices. In addition, collaboration between Islamic educational institutions, the government, and the technology industry encourages the adoption of green technology in schools, creating a sustainable environment and forming a more environmentally conscious generation.

INTRODUCTION

Climate change and environmental degradation are global issues that require serious attention from various parties, including Islamic educational institutions. As institutions responsible for the education of the next generation, Islamic educational institutions have a strategic role in adopting environmentally friendly technology as part of efforts to preserve nature and sustainable development. Islamic teachings themselves emphasize the importance of maintaining the balance of the ecosystem as part of human responsibility as caliphs on earth. Therefore, the integration of Islamic values with environmentally friendly technology in educational institutions is an important step in forming a generation that cares about the environment.

Green technology is a technology designed to reduce negative impacts on the environment, both in terms of energy use, waste management, and conservation of natural resources. The use of this technology in educational institutions not only contributes to environmental conservation, but also educates students to adopt sustainable lifestyles. Islamic educational institutions can act as models in the application of green technology that can then be emulated by the wider community. For

example, the application of solar panels in Islamic schools can teach students about the importance of renewable energy and its benefits for the environment.

In the Islamic perspective, preserving the environment is part of worship. The Qur'an and Hadith contain many verses and hadiths that emphasize the importance of preserving nature. Verses that talk about human responsibility towards nature, such as in Surah Al-Baqarah verse 205 and Surah Ar-Rum verse 41, become the theological foundation for Muslims to play an active role in preserving the environment. Thus, the adoption of environmentally friendly technology in Islamic educational institutions can be seen as an implementation of Islamic teachings in a contemporary context. For example, the application of energy-saving technology in madrasas can be a real form of efforts to preserve nature as taught in Islam.

Islamic educational institutions in Indonesia, such as Islamic boarding schools, madrasahs, and Islamic universities, have great potential in adopting environmentally friendly technologies. However, the adoption of these technologies still faces various challenges, including limited funding, lack of knowledge about environmentally friendly technologies, and lack of awareness of the importance of environmental issues among educational administrators. Therefore, greater efforts are needed to educate administrators and educators in Islamic educational institutions about the importance of environmentally friendly technologies and how to integrate them into the education system.

The role of government and non-governmental organizations is also very important in supporting the adoption of environmentally friendly technology in Islamic educational institutions. The government can provide incentives or financial assistance to educational institutions that are committed to adopting environmentally friendly technology. Meanwhile, non-governmental organizations can provide training and technical assistance to help educational institutions in selecting and implementing technology that suits their needs and conditions. In some areas, there are already examples of successful implementation of environmentally friendly technology in Islamic schools, such as effective waste management programs in Islamic boarding schools in West Java.

The adoption of environmentally friendly technology in Islamic educational institutions must also be accompanied by changes in the curriculum that include

environmental education more comprehensively. Environmental education is not only limited to teaching materials in the classroom, but must also be reflected in school policies and daily practices. For example, policies to reduce the use of plastic, school greening programs, and the use of renewable energy can be part of an environmentally friendly school culture. Thus, students not only learn about the importance of protecting the environment, but also experience it directly in everyday life at school.

In addition, the involvement of all school residents, including students, teachers, and staff, in environmental programs can strengthen the commitment of Islamic educational institutions to environmental conservation. Active participation of all parties in environmental programs, such as recycling activities, tree planting, or waste management, can foster a sense of collective responsibility for the environment. In this case, Islamic educational institutions can function as agents of change that inspire the community to care more about the environment.

Adoption of environmentally friendly technology can also be part of the efforts of Islamic educational institutions to increase competitiveness at the national and international levels. Educational institutions that are able to integrate environmentally friendly technology into their education system will be more appreciated and recognized as modern and progressive institutions. This is important in the context of globalization where environmental issues are one of the main focuses. Islamic educational institutions that are environmentally friendly can be an example for other educational institutions and strengthen the positive image of Islam as a religion that cares about the environment.

On the other hand, the main challenge in adopting environmentally friendly technology in Islamic educational institutions is the limited resources, both in terms of funds and technical knowledge. Many Islamic educational institutions, especially in remote areas, still have difficulty accessing environmentally friendly technology due to high costs and lack of experts. To overcome this problem, collaboration between the government, the private sector, and educational institutions is needed to provide affordable and easily accessible solutions. For example, partnership programs between Islamic educational institutions and technology companies can be one solution to overcome this obstacle.

In addition, efforts are also needed to increase awareness of the importance of

environmental issues among managers and educators in Islamic educational institutions. This awareness can be increased through training, seminars, and workshops that teach about the importance of adopting environmentally friendly technologies and practical ways to implement them. Thus, managers and educators will be better prepared and motivated to integrate environmentally friendly technologies into their educational systems.

One important aspect in the adoption of environmentally friendly technology in Islamic educational institutions is the development of a curriculum based on Islamic values and principles of sustainability. This curriculum must be able to integrate Islamic teachings on the environment with modern knowledge and technology. In this way, students will receive a comprehensive education that is relevant to today's environmental challenges. Environmental education based on Islam can also shape students into individuals who have strong environmental ethics and are ready to contribute to environmental conservation efforts.

The success of adopting environmentally friendly technology in Islamic educational institutions will also be greatly influenced by the support of the surrounding community. Educational institutions that are active in environmental issues can become centers of environmental activities for their communities. For example, schools can work together with the community in environmental programs such as waste management, reforestation, and the use of renewable energy. This collaboration will not only strengthen the role of educational institutions in environmental conservation, but will also increase environmental awareness among the wider community.

In the long term, it is expected that the adoption of environmentally friendly technology in Islamic educational institutions can make a real contribution to global efforts in addressing environmental issues. Environmentally friendly Islamic educational institutions can become agents of change that carry the Islamic message about the importance of preserving nature to a wider level. Thus, the role of Islamic educational institutions in environmental conservation will be further strengthened and recognized as an integral part of global efforts to achieve sustainable development.

RESEARCH METHODS

This study uses a library research method, where the data used comes from

various literatures relevant to the topic. Library research is a method carried out through the collection and analysis of existing related literature without conducting experiments or collecting data directly from the field. Library research aims to review and analyze previous relevant scientific works in order to find, explain, and understand concepts or theories that support the arguments presented.

In library research, the data sources used consist of books, scientific journals, articles, and other documents relevant to the research topic. This secondary data is analyzed by identifying theories, concepts, and previous findings related to the research problem. Sugiyono (2017) explains that library research is important to find a strong theoretical basis and help researchers clarify the research context. In addition, library research can also be used to identify research gaps that have not been discussed by previous research.

Data analysis techniques in library research are carried out through the process of identification, evaluation, and synthesis of relevant literature. The data obtained are then analyzed critically to understand the relationship between concepts and compile a synthesis of findings related to the focus of the research. According to Zed (2014), library research requires a deep understanding of relevant literature so that researchers can formulate strong arguments. The analysis process is also carried out by mapping various existing findings and comparing them with the theories used in this study.

In terms of data collection techniques, library research uses documentation studies as the main tool. Arikunto (2010) stated that documentation studies are one of the effective data collection methods for library research, because researchers can access information that has been tested for credibility and is academically recognized. The use of secondary data from various sources also allows researchers to compare findings from various literatures and draw conclusions based on the synthesis of previous theories and research.

Therefore, this library research method is very relevant to be used in this study, because it can help researchers identify and elaborate theories and concepts that support research problems. By using various valid and accredited literature, this study is expected to provide academic contributions in developing a broader understanding of the topic being studied.

RESULTS AND DISCUSSION

1. Islamic educational institutions' initiatives in green technology

Islamic educational institutions in Indonesia have begun to integrate green technology into their learning and operational systems as a form of concern for the environment. One example is the implementation of solar panels in several Islamic schools to reduce dependence on fossil fuels. These schools have utilized solar energy as an environmentally friendly renewable resource. According to Rahmawati (2020), this initiative not only helps reduce school electricity costs but also becomes a learning medium for students about the importance of using sustainable energy.

In addition to solar panels, several Islamic schools have also implemented wastewater treatment systems as part of green technology. This system helps minimize the impact of environmental pollution by processing wastewater into clean water that can be reused. Fadli (2019) noted that schools that have implemented this system have succeeded in reducing clean water usage by up to 30%, a significant step in water conservation in educational environments. The use of this technology is also in line with Islamic teachings on the importance of preserving natural resources that have been bestowed by God.

Another innovation carried out by Islamic educational institutions is waste management that focuses on the 3R concept (Reduce, Reuse, Recycle). Islamic boarding schools in West Java have developed community-based waste management programs involving students and school staff. According to Maulana (2021), this program not only reduces the amount of waste disposed of in landfills but also provides economic value by recycling waste into marketable products. This initiative shows how Islamic schools can be agents of change in terms of environmental management through green technology.

Organic farming programs have also become part of green innovation in Islamic educational institutions. In several Islamic boarding schools in East Java, an environmentally friendly integrated farming system has been implemented, where students are taught farming techniques without the use of chemicals. Suryadi (2020) emphasized that this organic farming program not only aims to provide healthy food, but also as an effort to maintain soil fertility in the long term. Through this program, students are taught to understand the importance of ecosystem balance as part of their

responsibility as Muslims.

On the other hand, several Islamic educational institutions have also implemented green building technology that focuses on energy efficiency and the use of environmentally friendly building materials. Rahman (2019) noted that several modern Islamic boarding schools have designed buildings that maximize air circulation and natural lighting, thereby reducing dependence on the use of air conditioning and lamps. The use of environmentally friendly building materials, such as bamboo and recycled wood, is also part of efforts to reduce the carbon footprint in the school environment.

In West Sumatra, Islamic schools have started a tree planting project as part of an environmental conservation effort. According to Saragih (2021), this program not only involves students in planting trees but also provides them with an understanding of the importance of forests for the balance of the ecosystem. This tree planting is also in line with Islamic teachings which teach that planting trees is one of the charities whose rewards continue to flow. Thus, this project focuses not only on environmental impacts, but also spiritual ones.

Islamic educational institutions are also innovating in the use of green technology through the development of curricula that integrate environmental education. Several schools have included material on the importance of protecting the environment and environmentally friendly technology into Islamic religious subjects. Hidayat (2022) stated that this religious-based environmental education helps students understand that protecting the earth is part of their worship to Allah. With this approach, green technology is not only taught as scientific knowledge, but also as a religious obligation.

In addition to technological innovation, Islamic educational institutions are also involved in green campaigns involving local communities. In Jakarta, for example, several Islamic schools have involved parents of students and the surrounding community in a city greening program. Abdullah (2020) noted that this program succeeded in planting thousands of trees in previously barren areas. This initiative shows that green technology in Islamic schools is not only limited to the classroom, but also involves the active participation of the surrounding community in protecting the environment.

The development of renewable energy such as biofuel is also one of the green

innovations in several Islamic boarding schools in Central Java. According to Sutarno (2021), these Islamic boarding schools have started producing biofuel from organic waste generated in the school environment. The biofuel is used to meet energy needs in the school kitchen and laboratory, thereby reducing dependence on fossil fuels. This initiative shows how green technology can be integrated into daily activities in Islamic schools.

In conclusion, the initiatives of Islamic educational institutions in green technology show that these schools do not only act as places of academic learning, but also as agents of change in environmental conservation efforts. Innovative projects that have been implemented, such as the use of solar energy, waste management, organic farming, and environmentally friendly development, are real evidence that Islamic education can be a pioneer in the application of green technology in Indonesia. This innovation is also in line with Islamic teachings which emphasize the importance of preserving nature as part of worship to Allah.

2. The role of Islamic value-based curriculum in the adoption of green technology

Islamic education plays an important role in shaping environmental awareness, especially through a curriculum based on Islamic values. The adoption of green technology in Islamic education does not only focus on technical aspects, but also the underlying spiritual values. An Islamic-based curriculum is designed to reflect human responsibility as caliphs on earth, emphasizing the importance of preserving the environment. According to Hidayat (2021), Islamic education integrates environmental concepts through a holistic approach that includes moral and spiritual dimensions, so that students not only learn about green technology but also understand the importance of protecting the environment as part of their faith.

In an Islamic value-based curriculum, environmental lessons are often linked to the teachings of the Qur'an and Hadith. Islamic teachings emphasize human responsibility to protect nature, which is reflected in many verses of the Qur'an about the importance of maintaining the balance of nature and the prohibition of destroying the earth. This, according to Nasution (2020), is translated into subject matter that teaches students about green technologies such as renewable energy, water resource management, and organic farming. Thus, Islamic education not only emphasizes

scientific knowledge about technology but also instills moral awareness to protect the environment.

In addition, the integration of environmental principles into the Islamic-based curriculum also involves a practical approach. Many Islamic schools have incorporated environmental projects such as waste recycling, water conservation, and reforestation into their learning programs. According to Fadli (2019), these activities aim to provide students with direct experience of how green technology can be applied in everyday life. With this approach, students not only learn theoretically, but are also trained to become pioneers in the use of environmentally friendly technology in the future.

The role of teachers in teaching Islamic value-based curriculum is also very important. Teachers not only act as teachers, but also as role models in terms of environmental concern. Maulana (2021) stated that many Islamic schools have provided training for teachers to integrate environmental education into their teaching. Through this training, teachers are equipped with knowledge and skills about green technology, so that they can teach these concepts more effectively to students. Teachers are also expected to be able to guide students in carrying out environmental projects that are in accordance with Islamic teachings.

The Islamic value-based curriculum also provides space for the development of innovation in green technology. Several Islamic schools have utilized environmentally friendly technologies such as solar panels and wastewater treatment systems as part of their learning activities. According to Rahmawati (2020), the integration of this technology not only provides practical benefits for schools but also provides real examples for students of how green technology can be applied in everyday life. This shows that Islamic education has an important role in encouraging sustainable technological innovation.

Islamic education also pays attention to the social aspect in adopting green technology. In many cases, environmental projects developed by Islamic schools involve the surrounding community, thus creating collaboration between schools and the community in protecting the environment. Abdullah (2020) noted that this community-based approach allows Islamic education to expand the positive impact of adopting green technology, not only in the school environment, but also in the wider community. Thus, Islamic education acts as a bridge between technology and society in

realizing environmental sustainability.

The Islamic value-based curriculum approach in adopting green technology also includes aspects of environmental ethics. Islamic education teaches that humans must treat nature with respect, because nature is God's creation. Saragih (2021) explains that education on environmental ethics is delivered through materials related to human responsibility as caretakers of nature. Thus, green technology is not only seen as a technical solution to environmental problems, but also as a manifestation of a spiritual commitment to preserving God's creation.

Several Islamic schools have also developed special programs to support the adoption of green technologies, such as organic farming and community-based waste management. According to Suryadi (2020), these programs not only aim to teach students about agricultural techniques and waste management, but also to foster a sense of responsibility towards the environment. By utilizing green technology, students are taught to manage natural resources in a sustainable manner, in accordance with Islamic teachings on the importance of preserving nature as part of worship.

In addition to environmental programs, some Islamic schools have also included renewable energy education in their curriculum. In these schools, students are taught about the importance of using clean and sustainable energy, such as solar and wind energy. Rahman (2019) stated that education about renewable energy not only provides scientific knowledge to students but also instills awareness of the importance of protecting the environment from damage caused by the use of fossil fuels. Thus, the Islamic value-based curriculum plays an important role in forming a generation that cares about environmental sustainability.

In conclusion, Islamic value-based curriculum plays a significant role in the adoption of green technology. Through the integration of environmental principles based on Islamic teachings, Islamic education is able to instill environmental awareness in students, both through theoretical and practical approaches. Initiatives developed by Islamic schools, such as waste management, renewable energy use, and organic farming, demonstrate how green technology can be adopted in an education system based on spiritual values. Thus, Islamic education contributes directly to environmental conservation efforts in Indonesia.

3. Collaboration with external parties for the adoption of green technology

Collaboration between educational institutions, government, and the technology industry is a crucial factor in developing a sustainable school environment. Adopting green technology in educational environments requires synergy from various parties to ensure the successful implementation and dissemination of environmentally friendly technology. According to Rahmawati (2021), this collaboration allows schools to obtain more sophisticated technological support and funding for sustainable projects, such as the use of renewable energy and more efficient waste management. This shows that the involvement of government and industry is an inseparable part of efforts to adopt green technology.

The government has a vital role in providing regulations and policies that support the implementation of green technology in schools. Through progressive policies, the government can encourage schools to adopt environmentally friendly technologies, such as solar panels, wastewater management systems, or the construction of energy-efficient school buildings. Abdullah (2020) stated that the Indonesian government has launched various initiatives to support the implementation of green technology in the education sector, one of which is through the Adiwiyata School program, which aims to increase awareness and environmentally friendly actions among students.

On the other hand, the technology industry plays a role as a provider of green solutions and innovations. Collaboration between schools and the technology industry allows for the transfer of knowledge and access to the latest technologies that can be applied in educational environments. According to Santoso (2019), technology companies often offer collaborative programs with schools, such as providing energy-efficient devices or training for teachers on how to integrate green technology into learning. Thus, schools can take advantage of the latest technological developments to create a more environmentally friendly and efficient learning environment.

The success of adopting green technology in schools also depends heavily on strong partnerships between government, industry, and educational institutions. Rahman (2020) emphasized the importance of collaboration involving all stakeholders to create an educational ecosystem that supports environmental sustainability. With close collaboration, schools can obtain resources, whether in the form of funding, technology,

or training, which will accelerate the transformation process towards sustainable schools. In addition, this collaboration can also create opportunities to conduct research and development of green technology that is more in line with local needs.

In the context of education, this collaboration is not only beneficial for schools, but also provides benefits for the government and industry. The government can achieve broader environmental policy goals through sustainable education, while industry can expand the reach of its products and innovations through the introduction of green technology in schools. According to Iskandar (2021), this collaboration also serves as a means to build environmental awareness among the younger generation, who will become leaders and decision makers in the future. Thus, the positive impact of this collaboration can be felt by various parties in the long term.

One real example of this collaboration is a program carried out by the DKI Jakarta government together with several technology companies to introduce energy-saving technology in public schools. Sari (2019) noted that this program includes the installation of solar panels, the use of renewable energy, and a more environmentally friendly wastewater treatment system. This collaboration not only provides direct benefits to schools in terms of energy and water savings, but also serves as a means of education for students about the importance of green technology in everyday life.

In addition, the Green School program initiated by several private schools in Bali is another successful example of collaboration between the education sector and the technology industry. According to Purnama (2020), these schools collaborate with local technology companies to build school buildings based on renewable energy and utilize environmentally friendly building materials. This program shows that cross-sector collaboration can produce significant innovation in creating sustainable schools.

The adoption of green technology also opens up opportunities for students to be actively involved in environmental projects. Collaboration with industry allows students to learn technology firsthand, such as how wastewater treatment systems work or how solar panels work. According to Fadli (2020), involving students in these environmental projects is an important part of the educational process, as it gives them the opportunity to learn about sustainability in a practical and contextual way. This also supports the formation of a generation that is more environmentally conscious and innovative in seeking green solutions.

Collaboration involving government, industry, and schools not only has a positive impact locally, but also has the potential to influence environmental policy nationally. A study conducted by Zulkifli (2020) shows that school initiatives that collaborate with external parties in adopting green technology can be a model for the development of broader environmental policies in the education sector. By utilizing the results of research and innovation resulting from this collaboration, the government can formulate more comprehensive policies and support sustainable education.

In conclusion, collaboration between educational institutions, government, and the technology industry is key to adopting green technology to create a sustainable school environment. This collaboration provides access to the resources, technology, and knowledge needed to develop innovative green solutions. In addition, this collaboration also provides long-term benefits for education, society, and the environment as a whole, by creating a generation that is more aware of the importance of maintaining the sustainability of the earth.

CONCLUSION

The conclusion of the three discussions above highlights the importance of integrating religious values in preserving the environment, the involvement of religious organizations in environmental initiatives, and cross-sector collaboration for the adoption of green technology in Islamic schools. First, religious values have a significant influence in shaping individual awareness of the responsibility to preserve the environment. Through religious teachings, individuals can understand that preserving nature is part of their moral and spiritual obligations, which are in line with the principles of sustainability. The participation of faith-based communities in environmental activities shows that religious groups are able to encourage environmental conservation initiatives through awareness campaigns, social movements, and environmentally friendly practices, both at the local and national levels. With this approach, a strong network is formed in society that is committed to preserving the environment as part of worship and obedience to religious teachings.

In addition, the role of Islamic educational institutions in adopting green technology and collaborating with external parties such as the government and the technology industry plays a crucial role in creating a sustainable school environment.

Innovations implemented in Islamic schools, both through the use of renewable energy and efficient waste management, show that Islamic education can be a pioneer in adopting environmentally friendly technology. This cross-sector collaboration not only accelerates the transformation of the school environment, but also provides long-term benefits in forming a more environmentally conscious generation. With the synergy built between educational institutions, the government, and the technology industry, an ecosystem is created that supports the development of sustainable education that is in line with religious and environmental principles.

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