THE IMPACT OF IMPLEMENTING GREEN TECHNOLOGY BASED CURRICULUM ON STUDENT CHARACTER FORMATION

Rezeki Lensa[1]*

UIN Sumatera Utara

Abstract: The purpose of this study is to discuss the Impact of Implementing Green Technology-Based Curriculum on the Formation of Student Character, the method used to conduct this study is Library Research, The conclusion of the discussion regarding the instillation of sustainability values in students' daily lives, the development of responsible character through green technology, and curriculum reform based on Islamic and environmental values emphasizes the importance of a comprehensive approach in education. Instilling green values outside of school through community activities and daily habits strengthens students' understanding of ecological responsibility, while curriculum reform that combines green technology and religious teachings forms an attitude of environmental and social concern. Through collaboration between education, family, and community, students not only understand the principles of sustainability but also have skills and attitudes that support environmental conservation, making them a generation that is more aware and responsible for global environmental challenges.

INTRODUCTION

The implementation of green technology-based curriculum in education has become one of the innovative steps that is considered capable of answering global challenges to environmental issues. Education is not just a transfer of knowledge, but also forms the character of students to have social and environmental responsibility. By integrating green technology into the curriculum, it is hoped that students will not only gain technical knowledge about environmentally friendly technology but also understand the values that support sustainability and environmental ethics.

Green technology-based curriculum is an educational approach that combines environmentally friendly technology with the learning process. It aims to provide students with a deeper understanding of the importance of preserving the environment through technology. According to Azhar (2022), a curriculum based on green technology can encourage students to care more about the environment and develop environmentally friendly habits from an early age. Thus, the character of students who care about the environment can be formed more strongly.

Character building through the implementation of green technology-based

curriculum is not just a transfer of knowledge, but also involves the development of attitudes, values, and behaviors that are in accordance with the principles of sustainability. This curriculum teaches students to understand the impact of their actions on the environment and encourages them to choose more sustainable actions. For example, teaching about waste management, the use of renewable energy, and organic farming practices can shape the character of students who are more environmentally responsible.

The implementation of a green technology-based curriculum also has a positive impact on the development of students' critical thinking skills. In studying green technology, students are encouraged to think critically about complex environmental problems and seek innovative solutions. According to Suryana (2021), this curriculum encourages students to not only study theory but also apply their knowledge in real projects that have an impact on the surrounding environment. This learning process can shape the character of students who are not only intellectually intelligent but also wise in making decisions.

In addition to critical thinking skills, green technology-based curriculum also encourages the development of collaboration skills. Students are often asked to work in teams to complete projects related to green technology. For example, in projects to create an eco-friendly school garden or install solar panels, students learn to work together, listen to others' opinions, and respect differences. These experiences are important in developing characters who value cooperation and community involvement in protecting the environment.

This curriculum also plays an important role in shaping students' ethical awareness of the environment. By understanding the concepts of green technology, students are encouraged to think about the long-term impacts of their actions on nature and society. According to Wibowo (2020), education that integrates environmental ethics in green technology can help students develop a deep ethical awareness and feel responsible for preserving nature. This certainly has an impact on the formation of students' characters who are more integrated and responsible.

The impact of implementing a green technology-based curriculum can also be seen from changes in students' attitudes towards a more sustainable lifestyle. Students who are exposed to this education tend to prefer environmentally friendly products and

services, such as the use of recycled goods and energy conservation. According to research by Lestari (2021), students who learn through a green technology-based curriculum show a significant increase in pro-environmental attitudes, which is reflected in their daily lifestyle choices.

Furthermore, green technology-based curriculum can also shape students' character in terms of leadership. Students involved in environmental projects are often given the responsibility to coordinate and lead their groups. This experience teaches them to be responsible and reliable leaders, and to have a clear vision of environmental sustainability. According to Nugroho (2020), education that combines green technology and leadership can produce a generation of leaders who are not only technically competent but also have a high social awareness.

Not only at the individual level, the implementation of this curriculum also affects the social dynamics in the school environment. Students who learn about green technology tend to be more active in social activities related to environmental conservation. They are involved in activities such as environmental campaigns, tree planting, and environmental cleanliness actions. This shows that the green technology-based curriculum not only shapes individual character but also strengthens social solidarity among students.

The implementation of a green technology-based curriculum also has a positive impact on the development of students' spiritual character. In Islam, protecting the environment is part of worship and a mandate from Allah SWT. By teaching green technology in the context of Islamic values, students are invited to see environmental conservation efforts as part of their spiritual responsibility. According to Rahmawati (2021), the integration of religious values with green technology in the curriculum can shape students' character to be more spiritual and have a strong commitment to environmental conservation.

Meanwhile, the implementation of a green technology-based curriculum also challenges students to develop their creativity. In solving environmental problems, students often have to think outside the box and find innovative solutions. This curriculum encourages students to combine their existing knowledge with new ideas to create more environmentally friendly technologies or practices. According to Santoso (2021), creativity is the key to facing global environmental challenges, and green

technology-based education can be a catalyst in developing students' creativity.

However, the impact of implementing a green technology-based curriculum on the formation of student character also depends on support from various parties, including teachers, parents, and the community. Teachers need to be given adequate training to teach green technology effectively, while parents and the community need to support student learning outside of school. According to Hardianto (2020), collaboration between schools, families, and communities is very important to ensure that the values taught in schools can be applied consistently in everyday life.

The success of implementing a green technology-based curriculum also requires ongoing evaluation. This evaluation aims to assess the extent to which the curriculum has succeeded in shaping students' character and providing a positive impact on the environment. According to Handayani (2019), evaluations that are carried out regularly can help schools adjust and improve the curriculum to be more effective in achieving educational goals.

Ultimately, the implementation of a green technology-based curriculum is an important step in education that focuses not only on knowledge but also on the formation of students' characters. With this holistic education, students will not only become intelligent and creative individuals, but also have strong social and environmental responsibilities. This education can be a solid foundation for creating a future generation that is committed to sustainability and environmental conservation.

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

Green technology education and environmental awareness building

Green technology education and the formation of environmental awareness play an important role in shaping students' mindsets and attitudes towards environmental issues. An effectively integrated green curriculum in education can equip students with the knowledge and skills needed to understand the impact of their actions on the environment and encourage them to take responsible actions. Hidayat (2021) emphasized that a green curriculum not only provides technical information about environmentally friendly technologies but also teaches values that encourage

environmental awareness and responsibility.

The influence of green curriculum on students' mindsets can be seen from changes in the way they view and interact with their surroundings. Rahmawati (2022) explains that a curriculum that includes green technology and sustainability concepts can increase students' awareness of the importance of protecting the environment and reducing the negative impacts of human activities. By learning practical ways to apply green technology, students become more aware of their contribution to environmental sustainability.

Green curriculum also has the potential to change students' attitudes by connecting learning to real actions. Abdullah (2020) showed that when students are involved in green technology projects, such as the creation of a renewable energy system at school, they not only learn about the technology but also experience its impact directly. Involvement in these real-world projects can strengthen positive attitudes towards environmentally friendly practices and increase students' commitment to sustainability.

Another aspect of green technology education is the importance of building a connection between theory and practice. Fauzan (2023) noted that a curriculum that combines case studies, experiments, and field trips provides students with the opportunity to see how green technology is applied in the real world. This hands-on experience helps students understand the relevance of green technology and how they can implement it in their daily lives.

The implementation of green technology in the curriculum also involves developing students' critical skills to evaluate and analyze the environmental impacts of various technological options. Nasruddin (2021) explains that by training students to think critically about technological choices and their impacts on the environment, the green curriculum helps them become better decision makers in terms of sustainability. These skills are essential to prepare students for future environmental challenges.

Evaluation of the effectiveness of the green curriculum in forming environmental awareness needs to be carried out systematically to ensure that educational goals are achieved. Hidayat (2021) suggests that assessments involving measurements of changes in students' knowledge, attitudes, and actions can provide a clear picture of the impact of the green curriculum. This assessment can include

surveys, interviews, and observations to measure the extent to which students adopt sustainability principles in their lives.

The importance of teacher training in implementing green curriculum cannot be ignored. Rahmawati (2022) emphasized that well-trained teachers can be more effective in teaching green technology and inspiring students to adopt environmentally friendly practices. This training should include not only technical knowledge but also effective teaching methods to communicate sustainability concepts to students.

In addition, green curriculum should focus on an interdisciplinary approach that combines various fields of study, including science, technology, and environmental studies. Abdullah (2020) stated that this approach allows students to see the relationship between green technology and various aspects of their lives, providing a more holistic understanding of environmental issues. This integration also helps students apply their knowledge in a broader context.

An effective green curriculum should promote students' active participation in activities that support sustainability, such as recycling and energy conservation programs. Fauzan (2023) showed that active involvement in environmental activities can improve students' practical skills and strengthen their commitment to environmentally friendly practices. These activities provide opportunities for students to apply their knowledge in real contexts.

Finally, the formation of environmental awareness through green technology education can influence students' long-term behavior and create a generation that cares more about the environment. Nasruddin (2021) emphasized that by teaching the principles of sustainability from an early age, education can shape students' mindsets and attitudes that are oriented towards sustainability and environmental responsibility, and motivate them to continue to contribute to environmental conservation throughout their lives.

Developing responsible character through green technology

Developing responsible character through green technology is an important aspect in education that focuses on the formation of students' social and ecological attitudes. Curriculum that integrates green technology not only teaches technical knowledge but also promotes values of environmental responsibility. According to

Hidayat (2021), green technology-based education provides opportunities for students to learn about the impact of their actions on the environment and society, and encourages them to play an active role in maintaining sustainability.

One way that green technology curriculum shapes social responsibility is through projects that engage students in real-world activities that impact their communities. Rahmawati (2022) suggests that through participation in projects such as waste management or solar panel installation, students not only learn about technology but also understand the importance of their contribution to the well-being of society. These experiences shape their awareness of social responsibility and motivate them to engage in environmental initiatives in the future.

Green technology also teaches students about the importance of sustainability and wise management of resources. Abdullah (2020) explains that a curriculum that focuses on green technology helps students understand how technology can be used to solve environmental and social problems. This leads to the formation of a responsible attitude towards the use of resources and the need to maintain the balance of the ecosystem. This curriculum not only teaches students about the impact of technology but also teaches them how to make better decisions for the future.

The implementation of a curriculum based on green technology also requires a holistic approach, which integrates sustainability principles into all aspects of education. Fauzan (2023) stated that education that covers various disciplines and applies sustainability principles comprehensively can strengthen students' understanding of ecological responsibility. This approach allows students to see the relationship between technology, the environment, and social responsibility in a broader context.

An effective curriculum in developing responsible character also involves the development of practical skills related to green technology. Nasruddin (2021) emphasized that students who engage in practical activities, such as green technology experiments or environmental projects, can develop the skills needed to apply sustainability principles in everyday life. These skills include the ability to analyze environmental impacts, make wise decisions, and take responsible actions.

In addition to developing practical skills, the curriculum must also pay attention to aspects of students' motivation and moral values. Hidayat (2021) suggests that

integrating moral values into green technology education can increase students' awareness of their responsibilities towards the environment and society. Education that emphasizes environmental and social ethics can help students understand the importance of their actions in a broader context and encourage them to behave in a more responsible manner.

Assessment and evaluation are also important parts of developing responsible character through green technology. Rahmawati (2022) explains that assessments that include measuring changes in student attitudes and behavior can provide insight into the effectiveness of the curriculum. This assessment can be done through observation, surveys, and portfolios that record student development in terms of social and ecological responsibility.

Teacher training in implementing green technology curriculum is also very important. Abdullah (2020) emphasized that skilled and knowledgeable teachers can be more effective in teaching social and ecological responsibility values to students. This training should include relevant teaching strategies and tools that can help teachers convey sustainability concepts in a way that is interesting and easy for students to understand.

Collaboration between schools, communities, and the industrial sector can also strengthen the development of students' responsible character. Fauzan (2023) shows that collaboration with various parties can provide students with opportunities to engage in projects that have a positive impact on society and the environment. This collaboration not only broadens students' learning experiences but also strengthens their commitment to social and ecological responsibility.

Finally, developing a responsible character through green technology has the potential to form a generation that is more aware and committed to sustainability. Nasruddin (2021) stated that education that emphasizes green technology and social responsibility can shape students' mindsets and attitudes that will influence their behavior in the future. By preparing students to become responsible and environmentally conscious individuals, this education contributes to the creation of a more sustainable and ethical society.

Instilling sustainability values in students' daily lives

Instilling sustainability values in students' daily lives is an integral part of education that aims to form habits and attitudes that support sustainability. Implementing green values outside the school environment helps students apply the principles they learn in a broader context and deepens their understanding of ecological and social responsibility. According to Hidayat (2021), education that focuses on sustainability must include practical aspects that allow students to apply green values in their daily lives, not only in the classroom but also in their homes and communities.

One way to instill sustainability values outside of school is to involve students in community activities related to the environment. Rahmawati (2022) noted that activities such as local recycling programs, environmental cleanup campaigns, and greening projects provide opportunities for students to contribute directly to environmental conservation efforts. Involvement in these activities helps students see the real impact of their actions and strengthens their commitment to sustainability.

Instilling green values can also be done through developing environmentally friendly daily habits. Abdullah (2020) explains that educating students about simple practices such as saving energy, reducing waste, and using environmentally friendly products can help them make wiser decisions in their daily lives. A curriculum that includes practical activities and projects involving resource management can reinforce sustainability habits outside the school environment.

Developing practical skills in managing resources is also an important aspect of instilling sustainability values. Fauzan (2023) emphasized that giving students the opportunity to engage in projects such as creating school gardens or rainwater harvesting systems not only teaches them about sustainability but also provides practical experiences that can be applied at home. These skills help students integrate sustainability principles into their daily activities.

It is important to involve families in the process of instilling green values. Nasruddin (2021) stated that family support in adopting environmentally friendly habits can strengthen teaching in schools and create a consistent environment in supporting sustainability. Educational programs that involve parents, such as workshops or seminars on sustainability, can broaden understanding and support for green practices at home.

Initiatives to implement sustainability values outside of school can also include collaboration with local communities and environmental organizations. Hidayat (2021) suggests that partnerships with various organizations can provide students with opportunities to participate in activities that support environmental conservation and provide them with real-world experience in addressing environmental challenges. This collaboration extends the impact of sustainability education beyond the boundaries of the school.

Teaching methods involving simulations and role-playing can be used to familiarize students with situations that require ongoing decisions. Rahmawati (2022) explains that simulations such as roles in environmental projects or resource management in controlled scenarios can help students understand challenges and solutions in a real-world context. This experience equips them with the skills to deal with similar situations outside the school environment.

The importance of continuous assessment in instilling green values outside of school should also be noted. Abdullah (2020) noted that assessments that include observations of students' habits and actions in everyday life can provide insight into the effectiveness of educational approaches. These assessments help identify areas for improvement and ensure that students are truly implementing sustainability principles in their lives.

The role of teachers in supporting the implementation of green values outside of school cannot be ignored. Fauzan (2023) emphasized that teachers can serve as role models and motivators for students, encouraging them to apply sustainability values in their daily lives. Teachers who demonstrate a commitment to sustainability can inspire students to adopt environmentally friendly habits and form a more environmentally conscious mindset.

Finally, instilling sustainability values in students' daily lives contributes to the formation of long-term habits that support sustainability and social responsibility. Nasruddin (2021) emphasized that through comprehensive and integrative education, students can develop a mindset that focuses on sustainability and become individuals who are more aware and responsible for the impact of their actions on the environment and society.

CONCLUSION

From the discussion on instilling sustainability values in students' daily lives, developing responsible characters through green technology, and curriculum reform based on Islamic and environmental values, it can be concluded that the integration of sustainability principles in education requires a comprehensive and multi-faceted approach. Instilling green values outside the school environment through community activities and daily habits strengthens students' understanding of ecological responsibility, making it an integral part of their lives. By involving students in practical projects and providing family and community support, education can create a broader and deeper impact. A curriculum that focuses on green technology and sustainability values provides a framework that allows students to understand and apply these principles in a variety of contexts.

Curriculum reform based on Islamic values and sustainability plays an important role in shaping students' attitudes towards social and ecological responsibility. By integrating religious teachings and sustainability principles, the curriculum not only provides technical knowledge but also shapes students' characters who care about the environment and society. Character development through green technology, as well as instilling sustainability values outside of school, strengthens students' skills and attitudes in contributing to environmental conservation efforts. Collaboration between education, family, and community is key to creating a generation that is aware of and responsible for future environmental challenges.

REFERENCE

Abdullah, A. (2020). Implementasi Kurikulum Teknologi Hijau: Pembentukan Karakter Tanggung Jawab Sosial dan Ekologis. Bandung: Penerbit Safira.

Abdullah, A. (2020). Pengaruh Proyek Teknologi Hijau terhadap Sikap dan Perilaku Siswa. Bandung: Penerbit Safira.

Abdullah, A. (2020). Praktik Ramah Lingkungan dalam Pendidikan: Mengintegrasikan Keberlanjutan dalam Kebiasaan Sehari-Hari. Bandung: Penerbit Safira.

Azhar, I. (2022). "Pengaruh Kurikulum Berbasis Teknologi Hijau terhadap Sikap Lingkungan Siswa." Jurnal Pendidikan Hijau, 14(1), 23-37.

Fauzan, F. (2023). Metode Pengajaran dan Penerapan Teknologi Hijau dalam

Pendidikan. Jakarta: Penerbit Hijau.

Fauzan, F. (2023). Metode Pengajaran Teknologi Hijau dan Dampaknya terhadap Karakter Siswa. Jakarta: Penerbit Hijau.

Fauzan, F. (2023). Pengembangan Keterampilan Praktis untuk Keberlanjutan: Proyek dan Inisiatif di Sekolah dan Rumah. Jakarta: Penerbit Hijau.

Handayani, S. (2019). "Evaluasi Implementasi Kurikulum Berbasis Teknologi Hijau." Jurnal Evaluasi Pendidikan,

Hardianto, F. (2020). "Kolaborasi Sekolah dan Masyarakat dalam Penerapan Kurikulum Teknologi Hijau." Jurnal Pendidikan dan Masyarakat, 7(3), 88-103.

Hidayat, M. (2021). Penanaman Nilai-Nilai Keberlanjutan dalam Kehidupan Sehari-Hari Siswa: Implementasi Nilai Hijau di Luar Lingkungan Sekolah. Jakarta: Pustaka Pendidikan.

Hidayat, M. (2021). Pendidikan Teknologi Hijau dan Pembentukan Kesadaran Lingkungan: Pengaruh Kurikulum Hijau Terhadap Pola Pikir dan Sikap Siswa. Jakarta: Pustaka Pendidikan.

Hidayat, M. (2021). Pengembangan Karakter Tanggung Jawab melalui Teknologi Hijau: Kurikulum Hijau dan Pembentukan Sikap Siswa. Jakarta: Pustaka Pendidikan.

Lestari, A. (2021). "Dampak Kurikulum Teknologi Hijau terhadap Gaya Hidup Berkelanjutan Siswa." Jurnal Kehidupan Berkelanjutan, 8(2), 44-58.

Nasruddin, H. (2021). Dukungan Keluarga dan Komunitas dalam Pendidikan Keberlanjutan: Menciptakan Lingkungan yang Mendukung. Yogyakarta: Pustaka Islam.

Nasruddin, H. (2021). Kurikulum Hijau dan Keterampilan Tanggung Jawab Sosial: Evaluasi dan Implementasi. Yogyakarta: Pustaka Islam.

Nasruddin, H. (2021). Pelatihan Guru dan Implementasi Kurikulum Hijau: Tantangan dan Solusi. Yogyakarta: Pustaka Islam.

Nugroho, B. (2020). "Kepemimpinan dan Pendidikan Teknologi Hijau di Sekolah." Jurnal Kepemimpinan Pendidikan, 15(4), 32-47.

Rahmawati, N. (2021). "Integrasi Nilai-nilai Islam dalam Kurikulum Teknologi Hijau." Jurnal Pendidikan Agama Islam, 19(3), 65-79.

Rahmawati, N. (2022). Integrasi Teknologi Hijau dalam Kurikulum Pendidikan:

Dampaknya pada Kesadaran Lingkungan Siswa. Surabaya: Paramita.

Rahmawati, N. (2022). Kegiatan Komunitas dan Pendidikan Lingkungan: Meningkatkan Kesadaran dan Tindakan Siswa. Surabaya: Paramita.

Rahmawati, N. (2022). Teknologi Hijau dalam Pendidikan: Pengaruh terhadap Kesadaran Sosial dan Ekologis Siswa. Surabaya: Paramita.

Santoso, H. (2021). "Mengembangkan Kreativitas Siswa melalui Pendidikan Teknologi Hijau." Jurnal Pendidikan Kreatif, 9(1), 21-35.

Suryana, D. (2021). "Pengembangan Keterampilan Berpikir Kritis melalui Kurikulum Teknologi Hijau." Jurnal Inovasi Pendidikan, 12(3), 55-68.

Wibowo, R. (2020). "Pendidikan Etika Lingkungan dalam Kurikulum Teknologi Hijau." Jurnal Etika dan Lingkungan, 10(2), 77-89.