




# The Implementation of Green Leadership by the School Principal in Developing a Nature-Based School

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## Article Info

## ABSTRACT

### Article history:

Submission October 20, 2024

Revised November 4, 2024

Accepted February 23, 2025

Published April 10, 2025

### Keywords:

*Green Leadership*

*School Principal*

*Nature-Based School*

*Environmental Education*

*Green Curriculum*



Nature-based education shapes environmentally conscious generations through a sustainable curriculum, eco-friendly technology, community involvement, and visionary, transformative green leadership. This study analyzes the principal's implementation of Green Leadership in developing a nature-based school at Sekolah Alam Insan Rabbani, Sungai Penuh City. The study employs a qualitative case study approach, using observation, semi-structured interviews, and document analysis as data collection methods. Data processing includes condensation, data display, and conclusion drawing, with triangulation used as a data validity technique. The research findings show that: (1) Integrating the principal's Green Leadership roles as educator, administrator, innovator, and motivator successfully promotes a culture of sustainability through exemplary behaviour, zero-waste policies, green curriculum integration, and active participation in environmental activities and community education. (2) The principal's development of a nature-based school involves integrating environmental literacy, implementing a nature-based curriculum, promoting zero-waste programs, and empowering the school and local communities through active learning, ecological activities, and ongoing synergy between the school and its surrounding environment. Conclusion: The principal plays a strategic role in integrating a green school approach through curriculum, culture, policies, environmental programs, collaboration, and capacity-building of the school community.

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## A. INTRODUCTION

Nature-based education has become increasingly relevant as it promotes applying sustainability principles to reduce environmental impact and foster environmentally conscious generations amid global challenges (Lasaiba, 2023; Nyika & Mwema, 2021). Nature-based or green schools integrate education with environmental management to shape students' character to

be caring and responsible toward the environment (Zuhriyah & Supandi, 2022; Genc et al., 2018). The curriculum of nature-based schools combines sustainability activities with the national curriculum and the distinctive nature school curriculum, which includes morality, scientific reasoning, leadership, and entrepreneurship (Situmorang & Hut, 2024; Supriyoko et al., 2022).

Nature-based education offers the younger generation theoretical understanding and hands-on experience in eco-friendly technology, community collaboration, and sustainability values to foster a sustainable society (Mulyasa, 2021; Schweitzer & Gionfra, 2018). The implementation of green schools is an initial step in cultivating environmental awareness, beginning with educating students in a healthy and sustainable environment, supported by the school principal's leadership (Pebriantika et al., 2019). In the 21st century, the urgency of global environmental sustainability highlights the importance of responsible action across sectors, including education and business (Yoo, 2024).

School leadership ensures educational quality through instruction and the learning climate, incorporating traditional, distributed, and holistic leadership approaches aligned with the concept of Environmental Education in schools (Romero & Krichesky, 2018; Gan, 2021). Sustainable leadership indicators encompass five dimensions and fifty elements, reflecting a leadership paradigm that is contextual, community-oriented, morally grounded, collaborative, and promotes continuous professional development (Huang & Wu, 2016; Lopez & Roofe, 2023). School principals with green leadership are administrators and change agents who inspire the entire school community to adopt environmentally friendly practices (Müller et al., 2020).

Research by Athamneh & Ashour (2024) shows that green leadership has been successfully implemented in various contexts, proving effective in promoting eco-friendly practices despite administrative challenges. In Malaysia, green leadership has helped create a sustainability-supportive school climate in rural areas (Rahim et al., 2024). Meanwhile, in Kenya, school principals play a crucial role in school-based environmental management despite limited resources (Kariuki et al., 2023).

Through a green leadership approach, nature-based schools can serve as centres for learning and innovation in sustainability practices. This study aims to analyze the role of school principals in implementing green leadership to develop a nature-based school, with a case study at Sekolah Insan Rabbani in Sungai Penuh City. The study focuses on uncovering the application of sustainability principles in curriculum, instruction, and environmental activities, as well as exploring the role of the principal in inspiring the school community to participate actively in environmental conservation. The results are expected to provide in-depth insights into green leadership and offer practical recommendations for school leaders to integrate sustainability values, enabling schools to foster environmentally conscious generations.

## **B. RESEARCH METHODS**

This study employed a qualitative case study approach to examine the principal's green leadership role in developing a nature-based school at Sekolah Insan Rabbani, Sungai Penuh City. This approach was chosen because it allows for an in-depth exploration of the specific context, practices, challenges, and outcomes related to the implementation of green leadership (Creswell & Poth, 2016; Yin, 2018). Data collection techniques included interviews, observations, and document analysis, as outlined in the following analytical framework:

Table 1. Research Grid of the Principal of Insan Robbani Nature-Based School

Research Focus	Sub-Focus	Indicators	Data Collection Techniques	Data Sources
Integration of Green Leadership	Green Leadership as Educator	School community's understanding of sustainability principles, principal's environmentally friendly practices, environmental themes in the curriculum, and teacher and student involvement in environmental education activities.	Interviews, Observations, Documentation	Principal, teachers, students
	Green Leadership as Administrator	Zero-waste policies, their implementation in school activities, teacher training on environmental education, and sustainability learning facilities in the school environment.	Interviews, Observations, Documentation	Principal, administrative staff
	Green Leadership as an Innovator	Environmental campaign initiatives, collaboration with the community and external parties, strategies to overcome facility and cultural constraints, and activities based on local resources to support sustainability.	Interviews, Documentation	Principal, school community, local community
	Green Leadership as Motivator	Principal's direct involvement in environmental activities, school community empowerment, moral values in leadership, and teachers' and students' perceptions of the principal.	Observations, Interviews	Principal, teachers, students
Development of a Nature-Based School	Integration of Environmental Literacy	Environmental literacy as part of the school's vision, principal's role in promoting environmental values, Green Life activities and students' direct practices, and integration of environmental values across subjects.	Interviews, Observations, Documentation	Principal, teachers, students
	Nature-Based School Program	Zero-waste, energy and water-saving policies, student participation in routine environmental activities, integration of sustainability values in subjects, and thematic environmental projects by teachers and students.	Observations, Interviews	Teachers, students, and principal
	School Community Empowerment	Environmental activities with the community, involvement of local stakeholders, student leadership in environmental activities, and program connectivity between the school and the community.	Interviews, Documentation	Principal, parents, community members
	Development of a Nature-Based Curriculum	Planning of environmentally themed curriculum, value instillation through outdoor learning activities, weekly evaluation of nature-based activities, and alignment with the national curriculum.	Interviews, Documentation	Teachers, principal

## C. RESULTS AND DISCUSSION

### 1. Integration of Green Leadership at Insan Robbani Nature-Based School

#### a. The Role of the School Principal's Green Leadership as an Educator

At Insan Robbani Nature-Based School in Sungai Penuh City, the integration of sustainability principles covering environmental, social, and economic aspects has become a central focus. However, its implementation still faces several significant challenges. First, there is a lack of shared understanding among school staff and students regarding the importance of sustainability principles. Second, resistance to necessary changes to realize sustainability programs is still evident. Third, the school is constrained by limited resources to support the optimal execution of sustainability

initiatives. Green leadership plays a crucial role in promoting responsible production by fostering green procurement, work culture, innovation, and workplace efficiency (Mutanda et al., 2024).

The principal's leadership practices at Insan Robbani reflect a high level of environmental awareness, which is manifested through concrete actions and active involvement in cultivating an environmentally friendly school culture. The principal formulates policies and exemplifies sustainable living, actively advocating waste reduction, water conservation, and tree planting as integral parts of the school's daily activities. Effective leadership must be responsive to the unique context of each institution in order to drive sustainability, as illustrated by the implementation of a zero-waste policy that encourages students to bring meals from home to reduce single-use plastics, thereby instilling environmental responsibility from an early age (Leithwood & Azah, 2017; Kohntopp & McCann, 2023).

The principal's participatory and transformational leadership is demonstrated through direct involvement in cleanliness and waste-sorting activities, motivating the entire school community to participate actively. This approach goes beyond rule-making; it emphasizes leading by example and inviting all school members to engage in positive habits that support environmental conservation. Green leadership reflects a commitment to education that aims at academic achievement and focuses on shaping students' character to become environmentally conscious individuals. This is achieved by integrating sustainability values across all aspects of education to cultivate a resilient generation capable of addressing global environmental challenges (Gough, 2015; Bagwell, 2019).

b. The Role of the School Principal's Green Leadership as an Administrator

The principal of Insan Robbani Nature-Based School in Sungai Penuh City demonstrates that administrative skills play a critical role in supporting environmental sustainability within the school. The principal actively implements structured administrative strategies to ensure the success of nature-based programs, particularly the zero-waste policy. Under this policy, the principal leads efforts to reduce waste, integrates zero-waste principles into school regulations, and ensures their implementation in learning activities and student behavior. This zero-waste policy is part of the school's long-term vision to preserve the environment. The approach goes beyond mere administration; it reflects a moral commitment to sustainable environmental education. The development of green leaders as drivers of green organizational culture is recommended through the Green Leadership Development Model, which strengthens leadership practices that support sustainability within institutions (Figueiredo et al., 2024).

Teachers at Insan Robbani School also receive direct support from the principal through training and providing educational materials related to sustainability. This indicates that the principal's administrative competencies include managing resources and building teacher capacity to deliver environmental content effectively. The school provides clear guidelines and information on how teachers and students can participate in environmentally friendly programs, such as sorting waste at home to comply with the school's zero-waste policy. An effective leader in a change-oriented culture must

mobilize the community to support sustainable transformation, as exemplified at Insan Robbani through the principal's inclusive transformational leadership. This leadership integrates internal and external efforts to cultivate broad environmental awareness, extending from the school into the surrounding community, positioning Insan Robbani as a relevant and impactful model for sustainable education (Fullan, 2020).

c. The Role of the School Principal's Green Leadership as an Innovator

The principal of Insan Robbani Nature-Based School faces several challenges in advancing sustainability efforts, particularly in managing non-organic waste and addressing the limited understanding of green environmental concepts and zero-waste principles among the surrounding community. Currently, non-organic waste at school is separated without further recycling processes, and waste sorting at home has not yet become a common cultural habit. Various initiatives have been implemented to increase environmental awareness, including communal clean-up programs and community education on the importance of waste sorting and environmental stewardship. Existing studies on green leadership typically employ empirical methods to explore its effects on financial benefits, followers' green behaviour, green attitudes, and psychological well-being (Zhong et al., 2025).

Teachers at Insan Robbani School integrate sustainability values into the learning process and encourage students to apply what they learn at school to their everyday lives, for instance, conserving energy and sorting waste at home. Despite limitations in infrastructure and the community's low awareness, the school continues to demonstrate adaptive and collaborative initiatives. Education, awareness campaigns, and strengthened external partnerships are crucial solutions that can be further developed to achieve more comprehensive and impactful sustainability outcomes. When guided by transformational green leadership, environmental management issues are closely tied to the sustainable development of organisations, encouraging eco-friendly practices, green consumer behaviour, and the pursuit of long-term competitive advantage in alignment with the Sustainable Development Goals (Vargas-Hernández, 2023).

d. The Role of the School Principal's Green Leadership as a Motivator

The Insan Robbani Nature-Based School's principal provides guidance and actively participates in various environmental activities, such as cleaning programs, tree planting, and teaching alongside students. This approach reflects participatory leadership principles, which motivate staff and students and strengthen solidarity and collective spirit within the school environment. The principal serves as a direct role model for the entire school community, referring to the figure of Prophet Muhammad as the ideal leadership model. This illustrates that spiritual values and moral exemplarity are the foundation for applied leadership. The principal's active involvement in daily activities fosters a positive, egalitarian, and inspiring work culture. The principal does not position themselves as a detached authority but as part of a team moving together to implement sustainability values. Adaptive, visionary, and strategic leadership is crucial for aligning the organisation with carbon neutrality and sustainability goals. Future research could explore applying low-carbon transformational leadership in specific sectors, particularly in developing economies (Zhang & Huang, 2024).

## 2. Development of Nature-Based School by the Head of Sekolah Alam Insan Robbani

### a. Integration of Environmental Literacy at Sekolah Alam Insan Robbani

Place-based education significantly impacts increasing students' environmental awareness (Ormond, 2013). Sekolah Alam Insan Robbani consistently integrates environmental literacy into the leadership practices of the school principal. Environmental literacy is not just an additional subject; it is at the core of the leadership vision and the school's culture. The principal plays a central role in ensuring that environmental care values are integrated into the curriculum, daily activities, and interactions between teachers, students, and the community. Waste sorting, water conservation, and gardening are part of the students' routines. Teachers also incorporate environmental values into each subject, applying a hands-on learning approach through a program called Green Life. This program provides students with direct experience to learn from nature, making nature both a source of learning and a means of fostering ecological awareness. The school's learning design ensures that students understand environmental issues theoretically and apply them through real activities.

Implementing environmental literacy at Sekolah Alam Insan Robbani is based on four main pillars: Morality, Leadership, Scientific Logic, and Business Mentality, all containing environmental care values. This demonstrates that environmental literacy is technical and linked to character and life skills. Students can apply habits such as sorting waste and conserving water at home, which ultimately helps educate their families and the surrounding community. The ecological literacy theory emphasizes the importance of education in building students' ecological awareness and skills (Stone, 2017).

### b. Nature-Based School Development Program at Sekolah Alam Insan Robbani

The central policies implemented at this school include zero waste, energy and water conservation, and a waste management program. In practice, students are directly involved in sorting organic and non-organic waste, composting, and planting trees. The school area is equipped with special bins for recycling, and waste sorting is a routine activity that students are trained in from an early age. Teachers also play a key role in integrating sustainability values into learning. They actively incorporate environmental topics into various subjects, including discussions on climate change in science classes and gardening practices in thematic projects. This fosters an awareness that daily actions have an impact on the environment.

The positive impact of implementing these policies is that children bring home good habits such as saving water and reducing plastic use while educating their families at home, creating a positive ripple effect in the community. However, challenges remain, such as the limited recycling facilities for non-organic waste and the uneven understanding of sustainability among students and the surrounding community. This strategy supports experiential learning, emphasizing the importance of hands-on experiences in strengthening students' understanding and skills (Beard, 2023).

### c. Empowering the Sekolah Alam Insan Robbani Community with Society

Sekolah Alam Insan Robbani has successfully built a strong synergy between the school and the community through a community empowerment program focused on environmental sustainability. The school principal plays a central role in creating a collaborative environment that encourages active involvement from all community

members, including students, teachers, parents, and local stakeholders. Empowerment is directed at students in the classroom and realized through participatory environmental activities, such as waste management, recycling projects, gardening, and conservation efforts. Students are trained to take on leadership roles, for example, through initiatives like overseeing waste sorting on a rotating basis and educating their peers on the importance of reducing waste.

Moreover, the concept of shared leadership, which emphasizes the importance of collaboration between the school leaders and the community, is key to successfully implementing sustainability values at the school (Wenner, 2017). These steps reflect the view of transformational leadership, which involves the entire school community in creating collective change (Asbari, 2020).

Education at Sekolah Alam Insan Robbani extends beyond the classroom to include active participation in community life, where students and the school community are empowered to become change agents in sustainability. Teachers support this approach by actively connecting school activities with the community, such as inviting parents and residents to participate in tree planting, workshops, or other joint activities. Parents are actively involved, not just as observers, but also invited to discuss ideas and directly participate in activities such as educational camping, strengthening the bond between the school and the family. The collaboration of the entire school community reinforces the implementation of sustainability values, with the principal acting as a bridge between environmental needs and educational goals through strategic partnerships with local communities, environmental organizations, and other stakeholders to ensure the success and full support of environmental programs (Azorín et al., 2020).

d. Development of Nature-Based Curriculum at Sekolah Alam Insan Robbani

Sekolah Alam Insan Robbani has effectively integrated a nature-based curriculum into its learning system. This curriculum encourages hands-on learning outside the classroom through activities such as gardening, environmental observation (camping), and other nature explorations. This approach strengthens students' theoretical understanding and enhances their environmental awareness, critical thinking skills, and problem-solving abilities in real-life contexts. The theme planning for learning is structured at the beginning of each semester, focusing on sustainability issues such as waste management and plant recognition. This shows that the nature-based approach is not merely an addition, but is at the core of the school's curriculum strategy. The place-based learning approach reinforces students' theoretical understanding and instills a sense of responsibility toward the environment, making the learning process more relevant and impactful in the long term. Meanwhile, green leadership at SAIR emphasizes the importance of transparency and empowering all school members through teacher training and active student participation in environmental programs (Kensler & Uline, 2016).

Teachers consistently integrate natural elements into almost every subject and conduct weekly evaluations to ensure the learning process remains dynamic and meets the students' needs. This method helps students see the direct connection between lessons and real-life situations, boosting engagement and learning motivation. The result is that students are more enthusiastic about going to school and often discuss their outdoor

learning experiences, such as gardening or nature exploration. This indicates that the nature-based curriculum impacts the school and influences students' learning experiences and perceptions at home.

Challenges in implementing the nature-based curriculum, such as limited facilities, weather constraints, and the need to align with national curriculum standards, still exist. However, the commitment of the school principal, teachers, and active participation of parents provides a strong foundation to overcome these obstacles. Through an experiential curriculum and a school culture that supports sustainability, the principal leads a transformation in nature-based education that reflects green leadership (Sterling, 2021).

#### **D. CONCLUSION**

The school principal plays a strategic role in integrating green school principles through curriculum, culture, policies, environmental programs, collaboration, and the capacity-building of school members to foster awareness and sustainable action in supporting environmental sustainability across all aspects of education and school life. The principal of Sekolah Alam Insan Robbani plays a crucial role in embedding sustainability principles through their role as an educator, administrator, innovator, and motivator. They promote environmental awareness by implementing zero waste policies and instilling sustainability values in staff and students. The principal is also directly involved in environmental activities, setting an example through active participation in eco-friendly programs.

Through participatory and transformational leadership, they foster a positive culture supporting sustainability at school and in the community. This reflects a commitment to education, focusing on sustainability and developing environmentally conscious character. Sekolah Alam Insan Robbani integrates environmental literacy into the curriculum and students' daily activities through a place-based learning approach. The principal leads programs such as waste management, energy conservation, and gardening, while connecting theory to real-world practice to build ecological awareness. Through the nature-based curriculum, students are directly involved in outdoor activities that strengthen their environmental understanding and skills. Collaboration with parents and the community is vital in supporting sustainability. Despite challenges related to facilities and weather, the commitment of the principal and teachers supports the transformation towards sustainable education.

#### **ACKNOWLEDGMENTS**

We express our deepest gratitude to all parties who have supported and contributed to this research, especially to the Principal of Sekolah Alam Insan Rabbani in Sungai Penuh City, who provided the opportunity and facilities to conduct this research and supported the implementation of Green Leadership in developing the nature-based school. We also extend our thanks to all Sekolah Alam Insan Rabbani members, including teachers, staff, and students, who have actively participated in data collection and the implementation of environmental programs, which were crucial for the smooth running of this research. Our sincere gratitude is also extended to the State Islamic Institute of Kerinci, Indonesia, for the academic support provided throughout the research process. Additionally, we would like to express our heartfelt appreciation to Muhammad Arib Sulaiman, Eka Putra, and Ali Marzuki Zebua for their valuable collaboration and contributions to this research. We

hope that the results of this study can provide significant contributions to the development of nature-based education in Indonesia and serve as a reference for developing more sustainable and environmentally friendly education models.

## AUTHOR CONTRIBUTIONS

- Author 1 : Designed the research concept and methodology, collected data through interviews and observations, and analyzed preliminary data to generate key findings.
- Author 2 : Managed qualitative data analysis, organized the main findings of the research, developed the research theoretical framework, and contributed to drafting the research report.
- Author 3 : Collected data and processed it, reviewed literature related to Green Leadership and nature-based education, actively participated in discussions on research findings, and contributed to writing the conclusion chapter.

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