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Beyond Gifted Classrooms; Environment-Integrated Curriculum Model in the Rural School

Husnul Khotimah [1], Zamroni [2]

[1] *Nurul Jadid University, East Java, Indonesia*
[2] *UIN Sultan Muhammad Aji Samarinda, Indonesia*
[1] *Corresponding Author: husnulkhotimah@unuja.ac.id*

Abstract : *This study aims to develop a contextual curriculum model that integrates environmental education into learning in rural schools by utilizing local natural resources as meaningful learning contexts. Rural schools face distinctive educational challenges, including limited access to learning resources, inadequate infrastructure, geographical constraints, and diverse socioeconomic backgrounds, which require curriculum approaches that are adaptive to local conditions. This study employed a qualitative case study approach to explore how environmental education can be integrated into curriculum planning and learning practices in rural educational settings. Data were collected through field observations, semi-structured interviews, and document analysis involving teachers, school leaders, and relevant educational stakeholders. Data were analyzed through data reduction, data display, conclusion drawing, and verification. The findings reveal three interconnected strategies for developing a rural environmental education curriculum. First, Project-Based Learning (PjBL) positions students as active learners through authentic projects that address environmental issues in their immediate surroundings. Second, expeditions and outdoor learning activities provide direct experiential learning that enables students to observe, explore, and understand local ecosystems and environmental conditions. Third, a local natural resource-based curriculum connects learning content with the ecological, cultural, and socioeconomic characteristics of the surrounding community. These findings indicate that integrating environmental education with local resources can make learning more relevant, experiential, and meaningful while strengthening students' environmental awareness and appreciation of local resources. The study highlights the importance of contextual curriculum development for promoting sustainable learning in rural schools.*

Keywords : *Curriculum Model; Environmentally Integrate; Rural School.*

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INTRODUCTION

Increasingly urgent environmental issues necessitate the strengthening of environmental education, particularly in rural areas. Rural schools possess significant potential to shape environmentally conscious young generations, given their proximity to nature (Chawla, 2020). By integrating environmental learning into the curriculum, schools can leverage local potential (Liu et al., 2023), boost student learning motivation, and prepare them to face future challenges (Roehrig, Dare, Ring-Whalen, et al., 2021). This environment-integrated curriculum model is not only relevant to the local context but also aligns with sustainable development goals (Weiss et al., 2021). Consequently, rural schools can serve as hubs for learning and action toward a more sustainable future.

Relevant prior research indicates that effective educational tour packages and interpretation media can enhance participant understanding and engagement, as demonstrated in studies on interactive interpretation tools (Roehrig, Dare, Ellis, et al., 2021). Furthermore, 21st-century integrated curriculum approaches which combine various disciplines and skills have been shown to help students develop essential capabilities for navigating complex societies (Asad et al., 2021). Community service programs involving diverse stakeholders and holistic approaches contribute to community empowerment and child development, a finding supported by research highlighting the benefits of community engagement (Lansing et al., 2023). Follow-up plans, such as developing nature-based curricula and providing training for teachers and parents, are also supported by research emphasizing the importance of ongoing training and advocacy for program success (Loose et al., 2023).

The environment-integrated curriculum model in rural schools faces several significant challenges that require attention (Loose et al., 2023; Tsauri et al., 2025). A major issue is the insufficiency of resources and facilities such as a lack of laboratories and technology-based educational tools that hinders the implementation of environment-based curricula (Regmi et al., 2020). Furthermore, there are gaps in the training and support provided to educators tasked with adapting this curriculum; the program's effectiveness may be compromised if teachers do not receive adequate training (Gul & Khilji, 2021). Community engagement and support also present challenges, as the program's success relies on active participation from parents and local communities participation that is often insufficient (Gross et al., 2020). Additionally, the lack of periodic evaluation and progress measurement makes it difficult to assess the program's effectiveness or make necessary adjustments (Huber & Helm, 2020). Addressing these issues is essential to ensuring the effective implementation of the environmental curriculum and maximizing its benefits for students and rural communities.

The study introduces novelty through the development of a curriculum model that integrates environmental education with the local context, leveraging rural resources and culture to enrich the learning experience. Accordingly, the authors aim to examine the implementation of this integrated environmental curriculum model at SDN 3 Wates, Mojokerto. The research seeks to develop a curriculum model relevant to rural schools, enhance the quality of environmental education, strengthen community engagement, introduce a new evaluation model to measure curriculum success, and formulate practical recommendations for the improvement and sustainability of the environmental education program.

METHOD

This study employed a qualitative case study approach to investigate and understand the implementation of an environmentally integrated curriculum model in a rural school. A qualitative case study was considered appropriate because the study focused on exploring educational practices, experiences, interactions, and contextual factors surrounding the integration of environmental education into the curriculum. The research was conducted at SDN 3 Wates Mojokerto, which was selected purposively because of its rural educational context and the challenges associated with limited access to educational resources, technological learning facilities, laboratories, and environmental learning materials. The participants were selected using purposive sampling, based on their direct involvement, experience, and knowledge of curriculum planning and the implementation of environmental education. The participants consisted of one principal, three vice principals, and four teachers, resulting in a total of eight informants. Their different institutional roles enabled the researcher to obtain diverse perspectives on the development and implementation of the environmentally integrated curriculum.

Data were collected through semi-structured interviews, direct observation, and documentation. Interviews were conducted with the principal, vice principals, and teachers to obtain in-depth information concerning curriculum planning, environmental education practices, the use of local environmental resources, learning strategies, and challenges encountered in implementation. Direct observations were conducted to examine the actual implementation of the curriculum, including teacher–student interactions, environmental learning activities, classroom practices, outdoor learning, and the utilization of local natural resources as learning contexts. Documentation was used to complement the interview and observation data by examining relevant school documents, curriculum plans, institutional policies, learning materials, activity reports, and photographic records. The combination of these three techniques enabled methodological triangulation and provided a comprehensive understanding of the environmentally integrated curriculum model in the rural school.

Table 1. Research Informants

Position	Number	Gender		Informant Code
		Male	Female	
Principal	1	1	-	KS
Vice Principals	3	2	1	WKS
Teachers	4	2	2	GR
Total	8			

The collected data were analyzed using the interactive data analysis model of Miles and Huberman, as cited in Latifah, (2023), which consists of three interconnected stages: data reduction, data display, and conclusion drawing and verification. First, data reduction was conducted by selecting, summarizing, coding, and categorizing information obtained from interviews, observations, and documents according to the research focus. Data that were irrelevant to the study were excluded, while information related to environmental curriculum

integration, project-based learning, outdoor activities, and the utilization of local natural resources was organized into thematic categories. Second, the reduced data were displayed in the form of systematic descriptive narratives and thematic matrices to facilitate the identification of patterns and relationships among the findings. Third, conclusions were drawn by interpreting the emerging patterns and were continuously verified by comparing the findings across different informants and data sources. The researcher also employed source and method triangulation by comparing information obtained from principals, vice principals, and teachers and by cross-checking interview findings with observations and documentary evidence. This process was conducted to strengthen the credibility and trustworthiness of the research findings and to ensure that the conclusions accurately represented the implementation of the environmentally integrated curriculum in the rural school.

RESULT AND DISCUSSION

Results

1. Project-Based Learning

Project-Based Learning (PjBL) is an instructional approach that places students at the center of the learning process by engaging them in real-world projects to address authentic questions. PjBL focuses not only on the final outcome but also on the learning process itself, involving students in investigation, collaboration, and problem-solving. Consequently, PjBL not only enhances students' academic achievement but also fosters essential 21st-century skills such as critical thinking, communication, and creativity that are vital for the future. Although implementing PjBL requires careful planning and adequate support, its significant benefits for students make it a highly relevant and effective instructional approach.

"*I view PjBL as a highly engaging instructional approach. Here, students do not merely receive material passively; instead, they are actively involved in the learning process. They are encouraged to seek solutions to real-world problems, such as designing a mini-garden within the school grounds. In doing so, they learn through hands-on practice*." (Gr. 15/7)

"*The biggest challenge lies in time management. PjBL requires more time compared to conventional teaching methods. Furthermore, not all students share the same level of interest in every project. Therefore, specific strategies are needed to motivate all students to participate actively*." (Gr. 13/7)

These insights highlight the strengths of Project-Based Learning (PjBL) as an engaging and active instructional approach. In PjBL, students do not simply receive information passively; they are directly involved in finding solutions to real-world problems, such as designing a school garden. This fosters meaningful learning, as students connect theory with practice. Ultimately, PjBL encourages students to take an active role in their learning and develop 21st-century skills such as critical thinking, collaboration, and problem-solving. The steps involved in project-based learning are outlined below. Chart 1: Steps in Project-Based Learning.



Figure 1: Steps of Project-Based Learning

2. Expeditions and Outdoor Activities

Expeditions and outdoor activities offer unique and invaluable experiences. Through direct interaction with nature, individuals can develop various skills such as navigation, survival techniques, and teamwork. These activities also benefit physical and mental health while fostering an awareness of the importance of environmental conservation. Organizing expeditions and outdoor activities presents various challenges, such as unpredictable weather, difficult terrain, and the risk of accidents. However, with careful planning and adequate preparation, these challenges can be overcome. Overall, expeditions and outdoor activities serve as effective means for personal growth, broadening horizons, and building a closer connection with nature.

"Expeditions and outdoor activities offer extraordinary learning experiences for students. Students can learn a great deal outside the classroom such as independence, teamwork, and, of course, knowledge about the natural world." (School Principal, 20/7)

"Careful planning is the key. We need to select a safe location, prepare adequate equipment, and, naturally, ensure the students are in good health before setting out." (Teacher, 24/7)

The data indicates that expeditions and outdoor activities provide rich learning experiences for students that extend beyond the confines of the classroom. Through these activities, students can develop skills such as independence and teamwork, as well as gain knowledge about nature. However, the success of an expedition relies heavily on meticulous planning. Factors such as selecting a safe location, preparing appropriate equipment, and verifying the health status of participants are crucial considerations. With proper planning, an expedition becomes more than just a recreational outing; it serves as an effective educational tool for shaping resilient students who care about the environment.

3. Local Natural Resource-Based Curriculum

A curriculum based on local natural resources offers learning experiences that are relevant to the surrounding environment. Students can gain an understanding of their environment and develop life skills. This approach has been shown to enhance academic achievement, learning interest, and student awareness regarding environmental sustainability. A local natural resource-based curriculum represents a learning approach that is highly relevant to modern education. It integrates the potential of the surrounding natural environment into the teaching and learning process, enabling students to understand their local environment and develop relevant life skills. This curriculum has proven effective in boosting academic achievement and student interest, as well as fostering environmentally friendly behavior.

"*Students who learn in this manner tend to achieve better academic results, show greater enthusiasm for lessons, and possess a heightened awareness of the importance of environmental preservation. They are also more motivated to adopt eco-friendly behaviors in their daily lives*." (Vice Principal, 4/7)

"*This curriculum offers a learning method that is highly relevant to students' daily lives. By directly incorporating surrounding natural resources into the learning process, students gain a better understanding of their local environment and develop useful practical skills.*" (10th Grade Teacher, 7)

The data indicates that learning directly connected to the surrounding environment makes it easier for students to grasp academic concepts. They can witness firsthand how theories studied in the classroom are applied in real-life situations. When learning material is relevant to their lives, students feel more motivated to learn. They become more actively engaged in the learning process and perceive the lessons as valuable. Nature-based learning fosters a sense of love and concern for the environment. Students gain a deeper understanding of the importance of preserving nature and feel motivated to take action for the environment. Direct learning experiences with nature cultivate eco-friendly habits and attitudes among students; they become more conscious of the environmental impact of their actions and strive to minimize negative effects. The following are the elements of a local natural resource-based curriculum.

Table 1: Elements of a Curriculum Based on Local Natural Resources

Element	Description	Implementation
Local Knowledge	- In-depth understanding of natural resources - In-depth understanding of local culture and wisdom	- Study of the region's distinctive flora and fauna - History of resource utilization
Practical Skills	- Ability to manage natural resources - Farming/cultivation, etc.	- Practical activities in the school garden
Entrepreneurship	- Developing products or services based on local resources	- Marketing of handicraft products

Environmental Conservation	-	Recognizing the importance of preserving nature	-	Reforestation activities - Organic waste management

Discussion

One of the greatest challenges in implementing PjBL is thorough planning. Selecting a relevant project topic, formulating clear learning objectives, and creating a realistic schedule require time and careful consideration (Torres-Ronda et al., 2022). Teachers must also prepare the necessary resources, including materials, tools, and technology (Sauerbrei et al., 2020). Another challenge lies in time management, as PjBL often requires more time than conventional teaching methods (Agyei-Manu et al., 2023; Mundiri et al., 2026). Classroom management in PjBL presents its own set of challenges; teachers must be able to facilitate student collaboration, provide appropriate guidance, and navigate various group dynamics (Allemang et al., 2022; Muhaeminah & Munawwaroh, 2025). Teachers must also be prepared to address differences in students' abilities and interests. Since not all students share the same level of motivation to engage in the project, teachers need to employ effective strategies to involve everyone.

Assessing student learning outcomes in PjBL is also a complex task. Assessment focuses not only on the final project product but also on the learning process such as collaboration, critical thinking, and communication skills (Sarker, 2021). Teachers need to develop comprehensive assessment rubrics to measure various aspects of student competence. Furthermore, providing constructive feedback is essential to ensure students continue to learn and grow. Assessment in Project-Based Learning (PjBL) is a complex process (Oluyisola et al., 2022). Teachers evaluate not only the students' final project outcomes but also the learning process they underwent. Assessed aspects include students' abilities to collaborate, think critically, and communicate. To ensure objective assessment, teachers need to develop comprehensive rubrics. Additionally, constructive feedback is vital for helping students learn and develop. After assessing students, teachers must provide feedback; this feedback should be constructive, offering insights that help students improve. Effective feedback motivates students to continue learning and growing.

Project-based learning involves a series of structured steps designed to facilitate a deep, hands-on learning experience. It begins with project planning, where students and teachers collaborate to define project goals and tasks. Next, students conduct research to gather relevant data before designing and developing a solution or final product. During the implementation phase, students put their ideas into practice. Once the project is complete, evaluation and assessment take place to gauge the quality of the outcome and the work process, followed by a presentation of the results to a relevant audience. Finally, reflection and feedback provide an opportunity to analyze the experience, understand the lessons learned, and identify areas for improvement in future projects. These steps not only develop students' practical and critical thinking skills but also enable them to apply their knowledge in real-world contexts. This method aims to boost student engagement with the subject matter, foster deep understanding, and prepare them for challenges and situations encountered in the professional world and daily

life. Furthermore, project-based learning supports the development of communication, time management, and problem-solving skills, while offering opportunities for reflection and constructive feedback to enhance students' capabilities and readiness for the future.

Schools play a pivotal role in initiating and facilitating expedition and outdoor activities (O'Malley & Pierce, 2023). They have the authority to design curricula that integrate these activities and to allocate the necessary resources, thereby creating a more dynamic and meaningful learning environment for students (Sletten et al., 2022). Thorough preparation is essential before conducting an expedition (Quay et al., 2020). This involves selecting a safe location aligned with the activity's objectives, providing adequate equipment, and assembling a competent support team. This team should consist of teachers, school staff, or other experts possessing knowledge and skills in areas such as scouting, first aid, and risk management.

Expedition activities have a significant positive impact on student development. Beyond acquiring academic knowledge, students can also develop essential life skills (Mäkelä & Aktaş, 2023). Expeditions can improve students' physical and mental health while fostering an appreciation for nature and the environment (Lee et al., 2022). Despite these benefits, organizing expeditions presents challenges, such as budget constraints, participant safety concerns, and the need for permits from relevant authorities (McGenity et al., 2020). To address these challenges, schools need to collaborate with various stakeholders, including local governments, non-governmental organizations, and private companies. Furthermore, involving parents in the planning and implementation processes is crucial.

Implementing a curriculum based on local natural resources presents its own set of challenges for schools. A primary challenge is the availability of adequate natural resources in the school's vicinity (Gupta & Gupta, 2021), as not all regions possess the same level of biodiversity or natural potential. Additionally, the initiative requires teachers who are competent in integrating subject matter with the surrounding environment. However, with careful planning and effective collaboration among schools, the community, and the government, these challenges can be overcome (Rawat et al., 2024). A key factor in the successful implementation of this curriculum is active community involvement. Local communities can serve as sources of knowledge regarding local natural resources and act as partners in learning activities (Litvinenko et al., 2022; Sletten et al., 2022). For instance, fishermen can provide insights into marine life, farmers can explain agricultural processes, and traditional leaders can share knowledge about local wisdom. By engaging the community, students gain the opportunity to learn directly from credible sources and acquire more meaningful experiences.

A curriculum based on local natural resources yields not only short-term positive impacts on students but also long-term implications. Students who grow up with a deep understanding of their surrounding environment tend to become responsible citizens who care about environmental sustainability (Milgin et al., 2020). They will be better equipped to make wise decisions regarding natural resource utilization and sustainable development.

Furthermore, this curriculum can contribute to the preservation of local culture and the development of a natural resource-based economy. The following are the elements of a local natural resource-based curriculum.

The listed elements demonstrate an approach to natural resource management and sustainability. Local knowledge encompasses a deep understanding of local ecosystems and culture through the study of flora, fauna, and the history of their utilization. Practical skills involve the ability to manage and utilize resources effectively, such as through hands-on farming activities in school gardens (Lee et al., 2022; Rosyadi et al., 2023). Entrepreneurship emphasizes the development of products or services based on local resources, with a focus on marketing handicrafts. Meanwhile, environmental conservation focuses on raising awareness about the importance of preserving nature through activities such as reforestation and organic waste management. The combination of these elements aims to create a balance between resource utilization and conservation, while fostering innovation and environmental responsibility.

CONCLUSION

This study concludes that Project-Based Learning (PjBL), expeditions and outdoor learning activities, and a local natural resource-based curriculum constitute complementary approaches for integrating environmental education into rural school learning. PjBL engages students in authentic projects that encourage investigation, collaboration, critical thinking, and problem-solving. Expeditions and outdoor activities provide direct experiential learning by allowing students to observe and explore their surrounding environment, while also developing teamwork, independence, environmental awareness, and practical skills. Meanwhile, the local natural resource-based curriculum connects learning content with the ecological, cultural, and socioeconomic characteristics of students' surroundings, making learning more contextual and relevant to their everyday lives.

The integration of these three approaches creates a contextual and experiential curriculum model that connects theoretical knowledge with real-world practice. Rather than treating environmental education as an additional subject, the model positions the local environment as a meaningful learning resource and learning space. This integration can strengthen students' engagement, motivation, environmental awareness, collaboration, and problem-solving abilities while enabling them to appreciate and utilize local natural resources responsibly. Therefore, an environmentally integrated curriculum based on local contexts offers a promising approach for rural schools, particularly those facing limitations in conventional learning resources and infrastructure. The model demonstrates that educational innovation does not necessarily depend on sophisticated facilities but can be developed by strategically utilizing the natural and social resources available within the local environment.

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