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Leveraging Local Wisdom in Curriculum Design to Promote Sustainable Development in Rural Schools

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ABSTRACT

Background. Rural schools often face challenges in promoting sustainable development due to limited resources and the disconnect between global educational frameworks and local contexts. Local wisdom, rooted in the cultural and environmental knowledge of rural communities, offers valuable insights that can be integrated into curriculum design to foster sustainability and relevance in education. Despite its potential, the integration of local wisdom into formal education remains underutilized in many rural areas, limiting the impact of education on sustainable development.

Purpose. This study aims to explore how local wisdom can be leveraged in curriculum design to promote sustainable development in rural schools.

Method. Using a qualitative case study approach, the research involved interviews and focus group discussions with educators, community leaders, and students from three rural schools. The study examined existing curricula, identified elements of local wisdom, and explored ways to incorporate these elements into formal education. Data were analyzed thematically to identify key strategies for integrating local wisdom into teaching practices.

Results. The findings reveal that incorporating local wisdom into the curriculum enhances students' understanding of sustainable practices by connecting global sustainability goals with local knowledge and practices. Educators and community leaders played a critical role in bridging this gap, creating a more relevant and contextually grounded learning experience for students. The study also highlights the importance of collaboration between schools and local communities in fostering a sense of ownership and responsibility for sustainable development.

Conclusion. In conclusion, leveraging local wisdom in curriculum design can significantly contribute to sustainable development in rural schools by creating more relevant, practical, and community-centered learning experiences. Further research is recommended to explore scalable models for integrating local knowledge into educational frameworks.

KEYWORDS

Curriculum Design, Education, Local Wisdom, Rural Schools, Sustainable Development

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INTRODUCTION

Local wisdom, often defined as the cultural knowledge and practices unique to specific communities, is an invaluable resource for promoting sustainable development. It encompasses the customs, traditions, and

ecological knowledge that has been passed down through generations (Afrizon dkk., 2020). In rural communities, where people are closely connected to their environment, this knowledge often plays a crucial role in managing natural resources and ensuring long-term environmental sustainability (Calabrese Barton dkk., 2021). Despite its importance, local wisdom is rarely integrated into formal education systems, which often rely on standardized curricula disconnected from the local context.

Sustainable development, as outlined by the United Nations' Sustainable Development Goals (SDGs), emphasizes the need for education that is relevant, inclusive, and capable of fostering environmental stewardship (Fatchurahman dkk., 2021). Schools, particularly in rural areas, have a critical role to play in achieving these goals. However, conventional education systems tend to focus on globalized knowledge, overlooking the local wisdom that could make sustainability education more practical and relatable (Amini, 2020). Research indicates that education which incorporates local knowledge not only improves students' understanding of sustainability but also strengthens their connection to their community and environment (Doyan A., 2023).

In rural schools, where access to resources and materials may be limited, integrating local wisdom into the curriculum can provide a more affordable and context-specific way of teaching sustainability (Eliza dkk., 2024). The use of local knowledge allows educators to draw on the lived experiences of students and their families, making lessons more relevant and engaging. Studies have shown that students are more likely to apply sustainable practices when these practices are tied to their daily lives and local culture. This suggests that curriculum design based on local wisdom could significantly enhance the effectiveness of education for sustainable development in rural areas (Fauziah dkk., 2023).

There is a growing recognition of the importance of place-based education, which emphasizes learning that is rooted in the local environment and culture. Place-based education aligns closely with the concept of local wisdom, as it encourages students to learn from their immediate surroundings and to develop a sense of responsibility for the well-being of their community (Long, 2020). In rural schools, where students often have a strong connection to their land and natural resources, place-based education can provide a powerful framework for promoting sustainability. Local wisdom offers a rich foundation for this approach, allowing educators to teach sustainability through examples that are directly relevant to students' lives (Nofrizal dkk., 2024).

Global education policies, while focusing on sustainability, often fail to consider the unique needs and strengths of rural communities. Standardized curricula may neglect the specific environmental challenges and resources that rural students encounter in their daily lives (Suastra dkk., 2024). This disconnect between global frameworks and local realities can lead to a lack of engagement among students and missed opportunities for promoting sustainable development (Purnomo dkk., 2023). By integrating local wisdom into the curriculum, educators can create a more inclusive and effective approach to sustainability education that respects and utilizes the knowledge already present in rural communities.

Current efforts to promote sustainable development through education have emphasized the importance of innovation and adaptability (Ferdi Hasan & Monita, 2024). However, the role of traditional knowledge systems, such as local wisdom, is often overlooked in these discussions. There is an increasing need to recognize that sustainable development does not only come from modern scientific knowledge but also from the practices and values embedded in local cultures. Incorporating local wisdom into curriculum design offers a way to bridge this gap, ensuring that education for sustainability is both forward-looking and grounded in the cultural and environmental realities of rural communities (Olsen dkk., 2020).

Despite the growing recognition of local wisdom's value, there remains a significant gap in how it is integrated into formal education systems, particularly in rural schools. While research has established the benefits of place-based and context-specific learning, little is known about the practical methods for incorporating local wisdom into the curriculum on a larger scale (Schostak, 2020). Many educational frameworks still prioritize globalized, standardized content, leaving limited room for the inclusion of locally grounded knowledge that could make education more relevant to students' lives (Suastra dkk., 2024).

The gap extends to understanding how local wisdom can be systematically and effectively applied in promoting sustainable development. While there are anecdotal examples of successful integration in certain regions, there is a lack of comprehensive studies that examine how local cultural and environmental knowledge can be embedded into formal curricula in diverse rural contexts (Triastari dkk., 2021). This leaves educators and policymakers without clear models or strategies for how to incorporate these valuable insights into day-to-day teaching and learning activities.

The role of community collaboration in curriculum development is another area where knowledge is limited. Although community leaders and elders often possess valuable local wisdom, there is little guidance on how to involve them in the process of curriculum design (Widianto dkk., 2020). Questions remain about how to balance the knowledge of local communities with the broader educational objectives set by national or global education standards. This gap in understanding how to facilitate meaningful community involvement in education hampers efforts to make curricula more reflective of local values and sustainable practices.

There is also insufficient research on the long-term impacts of integrating local wisdom into school curricula. While short-term benefits, such as increased student engagement and relevance of learning, have been observed, the broader effects on student outcomes, community development, and environmental sustainability over time are still largely unknown. Understanding these long-term impacts is essential for designing curricula that not only teach sustainability but also foster a lasting commitment to sustainable practices in rural communities.

Filling the gap in integrating local wisdom into curriculum design is critical for promoting sustainable development in rural schools. Local knowledge offers a rich source of environmental, cultural, and social insights that are directly relevant to the challenges these communities face. Incorporating this wisdom into the education system can help make learning more applicable and engaging for students, while also fostering a deeper connection to their local environment and heritage. By aligning educational content with the lived experiences of students, schools can enhance the relevance and effectiveness of sustainability education, particularly in resource-limited rural areas.

Addressing this gap is essential not only for improving student outcomes but also for promoting community-based approaches to sustainability. When local wisdom is recognized and incorporated into the curriculum, students learn to appreciate the knowledge of their elders and communities, creating a sense of ownership over sustainable practices. This community involvement can strengthen the link between schools and their surrounding environments, ensuring that the lessons learned in the classroom are applied to real-world challenges. In turn, this fosters a generation of students who are more likely to actively participate in the sustainable development of their communities.

This study aims to explore effective strategies for integrating local wisdom into rural school curricula to promote sustainable development. The research hypothesizes that incorporating local cultural and environmental knowledge into the curriculum will lead to increased student

engagement, a stronger understanding of sustainability, and greater community involvement in education. By identifying practical methods for leveraging local wisdom, this research seeks to provide a framework that can be adapted to various rural contexts, offering a pathway for educators and policymakers to create more relevant and impactful learning experiences.

RESEARCH METHODOLOGY

This study employs a qualitative case study research design to explore how local wisdom can be integrated into curriculum design for sustainable development in rural schools. A case study approach allows for an in-depth examination of specific schools and communities where local wisdom is already part of the cultural fabric. The goal is to identify strategies, practices, and challenges in incorporating local knowledge into formal education. This design is appropriate for understanding complex social phenomena in a natural setting, providing rich data that can inform future curriculum development (Wiyanarti dkk., 2024). The population for this study includes educators, community leaders, and students from three rural schools located in different regions. A purposive sampling method was used to select schools that represent diverse environmental and cultural contexts. In each school, five educators, three community leaders, and ten students were chosen to participate in interviews and focus group discussions. These participants were selected based on their roles in education, knowledge of local wisdom, and involvement in sustainability practices within the community (Yetti, 2024). This sample size allows for a comprehensive understanding of the various perspectives involved in curriculum development.

Data were collected using three main instruments: semi-structured interview guides, focus group discussion protocols, and document analysis. The interview guides were designed to explore participants' experiences with integrating local wisdom into education, their perceptions of its relevance to sustainability, and any challenges they faced. Focus group discussions were conducted with students to gather their views on the curriculum and its connection to their daily lives and local environment (Calabrese Barton dkk., 2021). Document analysis was used to review existing curriculum materials, school policies, and local cultural resources that are currently being utilized or have the potential to be incorporated into the curriculum. The research procedures began with an initial site visit to each school to build rapport with participants and familiarize the researchers with the local context. Interviews and focus group discussions were conducted over a period of two months, with each session lasting approximately one hour. All interviews and discussions were recorded and transcribed for analysis. Document analysis was carried out simultaneously, with researchers reviewing relevant materials provided by the schools and local communities. Data were then analyzed thematically, with recurring themes related to the integration of local wisdom, curriculum design, and sustainability identified and categorized. Findings from each school were compared to identify common strategies and challenges, as well as region-specific insights

RESULT AND DISCUSSION

The study collected qualitative data from interviews, focus group discussions, and document analysis across three rural schools. Table 1 presents the thematic analysis results, showing the frequency of key themes related to the integration of local wisdom in the curriculum and their perceived impact on sustainable development education. These themes include the relevance of local wisdom (85%), community involvement in curriculum design (70%), student engagement (65%), and challenges in integrating local knowledge (45%). Each school displayed varying degrees of success in incorporating local wisdom, with higher levels of community involvement correlating with better integration of sustainability concepts.

Table 1. Presents the thematic analysis results

Key Themes	School A (%)	School B (%)	School C (%)	Overall (%)
Relevance of Local Wisdom	90	80	85	85
Community Involvement in Curriculum	75	65	70	70
Student Engagement	70	60	65	65
Challenges in Integrating Local Knowledge	50	40	45	45

The findings indicate that the schools which had a higher percentage of community involvement saw greater student engagement and curriculum relevance. Challenges in integrating local knowledge, such as lack of resources and teacher training, were identified in all three schools, though the severity varied.

The data suggest that community involvement plays a crucial role in successfully integrating local wisdom into rural school curricula. Schools with higher community participation reported better alignment between the curriculum and local sustainability practices. This alignment helped students see the relevance of what they were learning to their own lives and environment, which in turn increased engagement. For example, School A, with the highest level of community involvement, also had the highest student engagement and the most effective use of local wisdom in teaching sustainability concepts.

Educators noted that the integration of local wisdom made the curriculum more practical and accessible for students. Many students were already familiar with the local customs and practices discussed in class, which allowed them to relate better to the material. This practical connection to their everyday experiences helped solidify their understanding of sustainability. In contrast, schools with less community involvement found it more challenging to integrate local knowledge meaningfully, resulting in lower engagement. Challenges in the integration process, such as inadequate resources and teacher preparedness, were consistently identified across all schools. Teachers expressed difficulties in finding appropriate materials that link local knowledge to the national curriculum, and some felt underprepared to teach topics that require a deep understanding of local cultural practices. This highlights the need for better training and resources to support educators in using local wisdom effectively in their teaching.

The thematic analysis also revealed that integrating local wisdom into the curriculum requires a balance between respecting traditional knowledge and meeting modern educational standards. While schools were eager to include local knowledge, they also had to ensure that the curriculum met national education standards, which sometimes limited how deeply local wisdom could be integrated.

The study also provided insights into how different types of local wisdom were utilized in the curriculum. Many schools focused on environmental knowledge, such as sustainable farming practices, water management, and forest conservation, which were directly relevant to the students' rural environments. For example, School B incorporated lessons on traditional irrigation systems, which helped students understand water conservation techniques that their families practiced for generations. This contextualized learning allowed students to see the connection between global sustainability concepts and their local practices.

In addition to environmental knowledge, cultural traditions were also a prominent aspect of the curriculum. Schools used local art, music, and storytelling as tools to convey sustainability principles. For instance, students in School C learned about sustainable agriculture through traditional folktales that highlighted the importance of preserving natural resources. These cultural elements not only made learning more engaging but also helped preserve local traditions and promoted intergenerational knowledge transfer.

The focus group discussions with students revealed that they enjoyed learning about sustainability through examples from their own community. They appreciated the hands-on approach and found that lessons tied to their local environment were easier to understand. Students also expressed pride in their local culture being recognized and valued in the classroom, which boosted their motivation to participate in sustainability activities. However, the study also found that some aspects of local wisdom, particularly spiritual and ceremonial practices, were more challenging to integrate into the formal curriculum. While these practices are important to the community, they were harder to align with educational goals and standards, suggesting the need for creative ways to incorporate these aspects without conflicting with formal education requirements.

To further analyze the relationship between community involvement and student engagement, a chi-square test was conducted to determine if there was a statistically significant association. The results indicated a significant relationship between community involvement in curriculum design and student engagement levels ($p < 0.05$). Figure 1 illustrates the positive correlation between higher community involvement and student engagement across the three schools, with School A showing the strongest correlation.

The analysis confirms that when local communities are actively involved in curriculum design, students are more engaged and likely to retain the sustainability lessons taught. This correlation suggests that integrating local knowledge and involving community stakeholders are critical for creating an educational environment where students feel connected to the material. This also points to the importance of fostering partnerships between schools and communities for successful curriculum implementation. The analysis also highlighted that the schools facing more challenges in integrating local wisdom had lower student engagement levels. This suggests that overcoming obstacles such as limited resources and teacher training is essential to maximizing the benefits of local wisdom in education. Without sufficient support, schools may struggle to fully realize the potential of this approach, leading to reduced effectiveness in promoting sustainable development.

The relationship between the integration of local wisdom and sustainable development education is strongly supported by the data. Schools that successfully incorporated local wisdom saw higher engagement and a more profound understanding of sustainability among students. The connection between what students learned in the classroom and what they experienced in their daily lives played a significant role in enhancing this understanding. The data suggest that rural schools can leverage their unique cultural and environmental knowledge to make sustainability education more effective and relevant to their students.

Community involvement emerged as a key factor in the successful integration of local wisdom. In schools where community members, such as elders and local experts, were involved in curriculum design, students were more likely to engage with the material and apply what they learned. This partnership between schools and communities ensured that the curriculum was not only culturally relevant but also practical for the students' immediate environments. The data suggest that this approach fosters a sense of ownership among students, which is crucial for promoting long-term sustainable practices.

The challenges faced by schools with less community involvement highlight the importance of external support and resources in overcoming barriers to integration. Teachers in these schools reported feeling isolated in their efforts to include local knowledge, emphasizing the need for a more collaborative approach. The data show that without community involvement and adequate resources, schools struggle to implement curriculum changes that align with both local wisdom and sustainability goals. The relationship between curriculum relevance and student outcomes is also evident in the data. Students who found the curriculum more relatable and practical were more likely to retain the information and apply it outside of the classroom. This reinforces the idea that leveraging local wisdom in education can lead to better student outcomes, particularly in rural settings where the connection between education and community life is strong.

A case study of School A provides further insight into how local wisdom can be effectively integrated into the curriculum. Located in a region with a strong agricultural tradition, the school partnered with local farmers and community leaders to incorporate traditional farming practices into lessons on sustainable agriculture. The school's curriculum included hands-on activities such as planting crops, managing water resources, and learning about soil conservation techniques that had been used by the community for generations. These activities were complemented by classroom lessons on global sustainability concepts, which helped students connect local practices with broader environmental goals.

Teachers at School A reported that students were highly engaged in these activities, as they could immediately see the relevance of what they were learning. The practical application of sustainability principles in their own environment made the lessons more impactful. For example, students who participated in the traditional irrigation lessons were able to explain how their family's water management practices contributed to conserving local water resources, showing a clear understanding of the relationship between local knowledge and sustainability.

The involvement of community leaders was key to the success of School A's curriculum. Elders and local experts regularly visited the school to share their knowledge and help design activities that were culturally relevant and educational. This partnership not only enriched the curriculum but also strengthened the connection between the school and the community. Teachers noted that students were more motivated to participate in class because they felt their culture and knowledge were being respected and valued. This case study illustrates the potential of integrating local wisdom into formal education to promote sustainable development. The success of School A highlights the importance of collaboration between schools and communities, as well as the need for practical, hands-on learning experiences that connect students to their environment.

The data from School A, along with the other schools, reveal that integrating local wisdom into the curriculum requires a balance of community involvement, practical application, and alignment with formal educational standards. The involvement of community members in curriculum design was a critical factor in ensuring that the lessons were relevant and engaging for students. This partnership helped bridge the gap between local knowledge and global sustainability concepts, making the curriculum more accessible and effective.

The hands-on approach to learning was another key element of success. Students were able to apply what they learned in real-world settings, which not only reinforced their understanding of sustainability but also allowed them to contribute to their community's sustainable practices. The connection between classroom learning and practical application was a recurring theme in the focus group discussions, with students expressing a sense of pride in using their knowledge to benefit their environment.

The challenges faced by schools with less community involvement underscore the importance of providing teachers with the resources and support they need to integrate local wisdom into the curriculum. While community partnerships were critical to the success of some schools, others struggled to make meaningful connections between local knowledge and the curriculum. This highlights the need for external support, such as teacher training and curriculum development resources, to ensure that all schools can benefit from this approach. Overall, the data suggest that integrating local wisdom into the curriculum can enhance students' understanding of sustainability and promote more engaged, motivated learners. However, the success of this approach depends heavily on the involvement of the community and the availability of resources to support teachers in this endeavor.

The results of this study demonstrate that integrating local wisdom into rural school curricula has a positive impact on student engagement, understanding of sustainability, and community involvement. Schools that actively partnered with their local communities to incorporate traditional knowledge into the curriculum saw higher levels of student participation and better retention of sustainability concepts. These findings suggest that rural schools can leverage local wisdom to create more relevant, impactful learning experiences that connect students to their environment and culture.

The data also highlight the challenges of integrating local wisdom, particularly in schools where community involvement is limited or where teachers lack the necessary resources. Addressing these challenges requires a collaborative effort between schools, communities, and external support networks to ensure that local knowledge is effectively incorporated into the curriculum. Without this support, schools may struggle to achieve the full benefits of this approach.

The case study of School A reinforces the importance of hands-on, practical learning in promoting sustainable development education. By allowing students to apply what they learned in real-world settings, the school created a learning environment that was both engaging and relevant to the students' lives. This approach not only improved students' understanding of sustainability but also fostered a sense of pride and responsibility for their community.

In conclusion, the study shows that leveraging local wisdom in curriculum design can significantly enhance sustainable development education in rural schools. However, success depends on strong community partnerships, practical learning opportunities, and adequate support for teachers. These findings provide valuable insights for policymakers and educators looking to create more effective sustainability education programs in rural contexts.

The findings of this study demonstrate that integrating local wisdom into rural school curricula significantly enhances student engagement and their understanding of sustainable development. Schools that involved community members in curriculum design saw a higher degree of relevance between what students learned in the classroom and their daily lives (Eliza dkk., 2024). This connection fostered greater motivation among students to participate in sustainability activities and apply the knowledge they gained. The practical integration of local knowledge into the curriculum, especially through hands-on activities, allowed students to see the immediate relevance of sustainability concepts to their communities, thus making learning more meaningful and impactful (Agustina dkk., 2023).

Educators in schools with strong community partnerships reported that students were more responsive and engaged in lessons tied to local practices. The integration of traditional ecological knowledge, such as sustainable farming or water management, helped reinforce global sustainability concepts by grounding them in local contexts. However, schools that lacked community involvement faced challenges in aligning the curriculum with local wisdom, resulting in

lower student engagement and difficulty connecting the content to real-life practices. Teachers in these schools cited a lack of resources and support as key barriers to implementing a more locally relevant curriculum (Hasaniyah dkk., 2023).

The study also highlighted that integrating local wisdom into formal education not only preserves cultural knowledge but also strengthens the relationship between schools and their communities. Students expressed pride in seeing their cultural practices reflected in the curriculum, which reinforced their connection to their heritage and the environment (Kaunang dkk., 2021). The challenges faced by some schools, particularly in resource-poor settings, underscored the need for external support to facilitate the successful inclusion of local wisdom in sustainability education.

Overall, the research indicates that leveraging local wisdom in curriculum design provides a promising approach to promoting sustainable development in rural schools. This method enhances the relevance of education, deepens student understanding of sustainability, and fosters a collaborative relationship between schools and local communities. However, success depends on overcoming challenges related to resources, teacher training, and community involvement.

The results of this study align with previous research emphasizing the importance of place-based education and the role of local knowledge in promoting sustainability. Similar studies have shown that when education is grounded in the local environment and culture, students are more likely to engage and retain the information. This study confirms those findings, demonstrating that students are more motivated and perform better when they see how their learning applies directly to their community. The hands-on, experiential learning approach observed in the study echoes the conclusions of other research showing that active learning environments lead to better student outcomes.

However, this study expands on earlier research by focusing specifically on rural schools, where the integration of local wisdom can address both educational and community development needs. Previous studies have often focused on urban or suburban settings, where the link between education and local environmental practices may not be as pronounced. By highlighting the success of rural schools in using local knowledge for sustainability education, this study adds to the growing body of literature advocating for more context-specific curriculum designs, particularly in regions that rely heavily on traditional ecological knowledge.

This study also contrasts with research that favors a more standardized, globalized approach to education. While global standards are important for ensuring educational equity, the findings here suggest that too much emphasis on standardized curricula can alienate students in rural areas by disconnecting their education from their everyday experiences. The research provides evidence that curriculum designs that balance global frameworks with local knowledge are more effective in rural settings, where students' lives are deeply intertwined with their communities and environment.

The study's focus on community involvement further distinguishes it from previous research. While many studies highlight the importance of teacher involvement in curriculum design, this research underscores the value of involving community elders and local experts (Olsen dkk., 2020). These individuals offer unique insights that can enrich the curriculum and make it more culturally relevant. The study shows that a collaborative approach to curriculum design, where community members contribute their knowledge, creates a more holistic and impactful learning experience for students.

The results of this study indicate that rural education can be a key driver of sustainable development when local knowledge is leveraged effectively. The positive outcomes in schools where local wisdom was incorporated into the curriculum show that education does not have to rely solely on global knowledge systems to be effective. Instead, schools can draw on the wealth of

knowledge already present in their communities to teach sustainability in ways that are more relevant and impactful. This suggests that educational policies need to consider the unique cultural and environmental contexts of rural communities to fully realize the potential of sustainability education. The findings also reflect the importance of partnerships between schools and communities. When community members are actively involved in the educational process, students benefit from a richer learning experience that is grounded in both local and global knowledge. This collaboration not only enhances student engagement but also strengthens the community's commitment to sustainable practices. The study highlights the potential for schools to act as centers of sustainability within their communities, using education to promote broader environmental stewardship.

The challenges identified in the study, such as the lack of resources and teacher training, point to a broader issue within rural education systems. While local wisdom is a valuable resource, its integration into formal curricula requires support in the form of training, materials, and collaboration with local stakeholders. The study suggests that without this support, schools may struggle to incorporate local knowledge meaningfully, which could limit the effectiveness of sustainability education. This research signals a need for educational reforms that prioritize local contexts and community involvement, particularly in rural areas. It shows that sustainable development education is most effective when it is both globally informed and locally relevant, suggesting that a one-size-fits-all approach to education may not be suitable for diverse rural communities.

The implications of this study are significant for policymakers, educators, and community leaders looking to promote sustainable development in rural areas. The integration of local wisdom into school curricula offers a powerful tool for making education more relevant and effective. By involving community members in curriculum design and focusing on local knowledge, schools can enhance student engagement and foster a deeper understanding of sustainability. This approach not only benefits students but also strengthens community ties and promotes a culture of sustainability that extends beyond the classroom. For policymakers, the study highlights the need to support rural schools in integrating local wisdom into their curricula. This could involve providing resources for teacher training, developing culturally relevant materials, and encouraging partnerships between schools and local communities. Educational policies should recognize the value of local knowledge in promoting sustainable development and create frameworks that allow schools to adapt their curricula to meet the unique needs of their communities.

The study also has implications for how sustainability is taught in schools. Traditional methods that focus solely on global environmental issues may not resonate with rural students who are more directly connected to their local environment. By grounding sustainability education in local wisdom, schools can make these lessons more practical and impactful, leading to better outcomes both in the classroom and in the community. This approach not only helps students understand sustainability but also encourages them to become active participants in their community's efforts to promote environmental stewardship.

For community leaders and educators, the findings suggest that collaboration is key to successful curriculum design. Schools that partner with local communities to incorporate traditional knowledge into the curriculum create a more engaging and relevant learning environment for students. This collaboration also helps preserve local wisdom, ensuring that it is passed down to future generations while being integrated into modern educational practices.

The success of schools that integrated local wisdom into their curricula can be attributed to the relevance and practicality of the knowledge they included. Local wisdom, particularly in rural

areas, is deeply rooted in the community's daily practices and survival strategies. When students see the direct connection between what they are learning in school and their everyday lives, they are more likely to engage with the material and retain the information. This alignment between education and experience is a key reason why the schools in the study saw higher levels of student engagement and understanding of sustainability.

The involvement of community members in curriculum design also contributed to these positive outcomes. Community leaders and elders possess a wealth of knowledge about sustainable practices that have been refined over generations. By incorporating this knowledge into the curriculum, schools were able to provide students with practical examples of sustainability in action. This not only made the lessons more engaging but also validated the cultural and environmental knowledge of the community, creating a sense of pride and ownership among students.

The challenges faced by schools that struggled to integrate local wisdom highlight the importance of resources and support. Teachers who lacked training in how to incorporate local knowledge into their lessons reported feeling underprepared, which limited their ability to engage students effectively. Similarly, schools without strong community partnerships found it difficult to make the curriculum relevant to students' lives. These barriers explain why some schools were less successful in leveraging local wisdom for sustainability education. The findings suggest that rural schools have a unique opportunity to lead the way in sustainability education by drawing on their local knowledge. However, this potential can only be realized if schools are given the support they need to develop relevant, culturally grounded curricula that align with both local and global sustainability goals.

The next step for rural schools is to continue developing and refining curriculum designs that integrate local wisdom and promote sustainable development. This will require ongoing collaboration between educators, community members, and policymakers to ensure that schools have the resources and support they need. Teacher training programs should be expanded to include methods for incorporating local knowledge into formal education, and schools should be encouraged to partner with local experts to develop culturally relevant materials.

Further research is needed to explore how these strategies can be scaled and adapted to different rural contexts. While this study provides valuable insights into how local wisdom can be used to promote sustainability education, it is important to examine how these approaches can be applied in other regions with different cultural and environmental contexts. Longitudinal studies could also help assess the long-term impact of integrating local wisdom into the curriculum on student outcomes, community development, and environmental sustainability.

Educational policies must also evolve to support the integration of local wisdom into formal curricula. This could involve creating more flexible curriculum guidelines that allow schools to adapt their teaching to local contexts while still meeting national education standards. By doing so, policymakers can help ensure that sustainability education is both globally informed and locally relevant, providing students with the knowledge and skills they need to contribute to their communities and the wider world.

Ultimately, this study suggests that leveraging local wisdom in rural schools offers a powerful approach to promoting sustainable development. By focusing on what is already known and practiced within their communities, students can learn to apply sustainability principles in meaningful ways, ensuring that they are equipped to address the environmental challenges of the future.

CONCLUSION

The most significant finding of this study is that integrating local wisdom into curriculum design significantly enhances student engagement, relevance of education, and understanding of sustainable development in rural schools. Schools that actively involved community members in the development of their curricula saw higher student participation and stronger connections between the content taught and the students' daily lives. This integration of traditional ecological knowledge with modern sustainability education provides a practical and culturally relevant approach that promotes both environmental stewardship and cultural preservation. This study also highlights the importance of hands-on learning and experiential activities in making sustainability education more impactful for students. When students can relate classroom learning to their real-world environments and local practices, they are more likely to retain the information and apply it in meaningful ways. The combination of local wisdom and formal education offers a unique pathway to teaching sustainability that fosters a deep sense of connection between students, their communities, and their natural environment.

The primary contribution of this research lies in its exploration of how local wisdom can be systematically integrated into rural education to promote sustainable development. This study provides a practical framework for leveraging local knowledge, focusing on community collaboration and hands-on learning as key strategies for enhancing education in rural settings. By showing that community involvement and the inclusion of culturally relevant content lead to better educational outcomes, this research adds to the growing body of literature advocating for place-based education and context-specific curriculum design. The methodology of involving multiple stakeholders in curriculum development, including community elders, teachers, and students, offers a replicable model for other rural schools seeking to incorporate local knowledge into their teaching. This approach not only enriches the curriculum but also strengthens the connection between schools and their communities. It positions rural schools as centers for both education and cultural preservation, contributing to the broader goal of sustainable development.

This study does, however, have limitations. The research was conducted in a small number of rural schools, which may limit the generalizability of the findings to other regions or educational contexts. Additionally, the short duration of the study did not allow for a thorough assessment of long-term impacts on student outcomes or community development. Further research is needed to explore how these strategies can be scaled to different rural contexts and to measure the long-term effectiveness of integrating local wisdom into sustainability education. Future studies could focus on the development of resources and training for educators to better integrate local knowledge into the formal curriculum. Research could also explore how local wisdom can be incorporated into urban educational settings or in regions with less-defined cultural traditions. Longitudinal studies examining the impact of this approach on student outcomes and environmental practices over time would provide valuable insights into the lasting benefits of using local wisdom in education.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

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