



## Ecological and Historical Knowledge of the Community in Environmental Conservation: An Ethnopedagogical Study in Banyuwangi

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### Abstract

This study aims to explore the relationship between historical memory, local ecological knowledge, and linguistic practices of the community in environmental conservation in Banyuwangi through an ethnopedagogical approach. The community possesses local knowledge about regional history, plants, animals, and environmental management, but this knowledge has not been extensively documented as an educational resource. This research employs educational ethnography with an ethnopedagogical study approach through in-depth interviews, observation, and documentation. Research subjects consisted of traditional leaders, community leaders, farmers, youth groups, environmental managers, and documentation of oral traditions in Banyuwangi. Data were analyzed descriptively-qualitatively to identify ecological and historical knowledge that can be integrated into learning. The results show that the Banyuwangi community possesses rich ecological knowledge, reflected in farming practices using the Javanese calendar (pranotomongso), land zoning systems, and oral traditions such as Gending Seblang containing ecological narratives. Historical knowledge about the Blambangan Kingdom and the Osing people is also closely related to environmental conservation practices. This research produces documentation of local knowledge that can serve as a foundation for developing culture-based education in history, biology, and English.

**Keywords:** ecological knowledge, historical knowledge, ethnopedagogy, environmental conservation, local wisdom

### INTRODUCTION

Environmental degradation has become one of the most pressing global challenges of the twenty-first century, threatening biodiversity, ecosystem services, and human well-being (IPBES, 2019; Steffen et al., 2020). In Indonesia,

rapid economic development, population growth, and unsustainable resource extraction have led to significant environmental problems, including deforestation, biodiversity loss, and pollution (Sodhi et al., 2020; Purnomo et al., 2021). Addressing these challenges requires not only technological and policy solutions but also fundamental changes in how people understand and relate to the natural world. Education has a crucial role to play in fostering environmental awareness and promoting sustainable behaviors, yet conventional educational approaches often fail to connect with students' lived experiences and cultural contexts (UNESCO, 2021; Wals & Benavot, 2020).

Field observations conducted in Banyuwangi Regency reveal that local communities possess rich ecological and historical knowledge that has been developed through generations of interaction with the environment. The Osing people, who are the indigenous inhabitants of Banyuwangi, have developed sophisticated knowledge systems related to agriculture, forestry, and natural resource management (Utomo, 2020; Osing Indigenous Community, 2023). Their farming practices, which use the Javanese calendar (pranotomongso) and traditional land zoning systems, reflect deep understanding of ecological processes and sustainable resource use. Similarly, oral traditions such as Gending Seblang contain ecological narratives that convey environmental values and conservation ethics. However, this knowledge has not been systematically documented or integrated into formal

education, representing a significant missed opportunity for culturally relevant and contextually meaningful learning.

The concept of ethnopädagogy provides a valuable framework for understanding how local knowledge and cultural practices can be integrated into education. Ethnopädagogy refers to educational approaches and practices based on local wisdom, which emphasize the importance of connecting learning to students' cultural contexts and community knowledge (Adinugraha, 2020; Oktavianti & Ratnasari, 2018). As defined by researchers, "local wisdom is the knowledge and ideas of wise and noble local citizens who are tied to certain cultural values and local beliefs and are passed down from generation to generation". The Local Wisdom and Cultural Approach in biology and cognate science subjects incorporates ethnobiological studies, including ethnobotany, to make learning more relevant and meaningful. Ethnopädagogy-oriented learning has been shown to improve student engagement, cultural awareness, and conservation outcomes.

The integration of local ecological knowledge into environmental education has gained increasing attention in recent years. Research has shown that indigenous and local knowledge systems contain valuable insights for sustainable resource management and biodiversity conservation (Berkes, 2020; Mistry & Berardi, 2022). In the Indonesian context, studies have documented the local knowledge of various communities, including the Osing people of Banyuwangi, in environmental conservation. Utomo (2020) identified that Using farmers in Kemiren Village use their ancestral knowledge in utilizing natural resources and the environment so that its sustainability is maintained. The local wisdom of farmers is created based on the long experience of predecessors related to the problems of the agricultural system and the environment to gain maximum results without destroying natural resources.

Historical knowledge is also closely intertwined with environmental conservation practices in many traditional communities. Research on the Cintaratu Village community in Pangandaran revealed that the community's knowledge of traditional landscapes is shaped by historical influences on landscape variations. Similarly, studies on the Osing people have documented the history of making and placing garden lands that function as buffer areas for paddy fields to prevent landslides. This historical dimension of ecological knowledge is often overlooked in educational contexts, where history and environmental studies are treated as separate subjects. Understanding the historical context of environmental practices can deepen students' appreciation of local wisdom and its relevance to contemporary

challenges.

The linguistic dimension of local knowledge is another important aspect that has received limited attention in educational research. Traditional ecological knowledge is often encoded in language, including oral traditions, local terminology, and narratives (Maffi, 2020; Harrison, 2021). In Banyuwangi, the Osing language and oral traditions such as Gending Seblang contain rich ecological knowledge and environmental values. The decolonial ecolinguistic perspective reveals that these oral traditions serve as cultural resistance against hegemonic environmental discourse. However, this linguistic dimension of local knowledge has not been adequately incorporated into formal education, particularly in language and literacy instruction. Integrating local ecological knowledge into language learning could enhance both environmental awareness and language skills.

The research gap addressed by this study is the limited documentation and educational integration of the ecological and historical knowledge of the Banyuwangi community. While several studies have documented aspects of Osing local knowledge, comprehensive documentation of the relationship between historical memory, ecological knowledge, and linguistic practices in environmental conservation remains limited. Furthermore, few studies have systematically analyzed how this knowledge can be integrated into educational contexts through an ethnopädagogical approach. This gap is significant because it limits the potential for culturally relevant education that connects students to their local heritage and environmental context.

The novelty of this research lies in its holistic examination of the relationship between historical memory, local ecological knowledge, and linguistic practices in environmental conservation through an ethnopädagogical lens. Unlike previous studies that have focused on single aspects of local knowledge, this research integrates historical, ecological, and linguistic dimensions to provide a comprehensive understanding of local knowledge systems. The study also contributes to the growing body of research on ethnopädagogy in Indonesia by documenting how local knowledge can serve as a foundation for developing integrated educational materials that connect history, biology, and language.

This research is grounded in several theoretical frameworks. First, the concept of ethnopädagogy provides the overarching framework for understanding how local knowledge and cultural practices can be integrated into education (Adinugraha, 2020; Oktavianti & Ratnasari, 2018). Ethnopädagogy emphasizes the importance of connecting

learning to students' cultural contexts and community knowledge, making education more relevant and meaningful. Second, the concept of traditional ecological knowledge (TEK) provides a framework for understanding the knowledge systems that indigenous and local communities have developed through generations of interaction with their environment (Berkes, 2020; Mistry & Berardi, 2022). Third, the concept of place-based education emphasizes the importance of learning that is rooted in local places and communities (Gruenewald, 2003; Sobel, 2004).

This research is also relevant to current educational policy in Indonesia, particularly the Merdeka Curriculum, which emphasizes project-based learning, contextual learning, and the development of Pancasila student profiles (Badan Standar, 2022). The Merdeka Curriculum provides flexibility for educators to develop learning experiences that are relevant to students' local contexts and that integrate multiple subjects. By documenting local ecological and historical knowledge that can serve as a foundation for integrated learning, this research supports the implementation of the Merdeka Curriculum in Banyuwangi and similar contexts.

The research also has practical implications for teachers and curriculum developers. By documenting local knowledge that can be integrated into education, the research provides a resource for developing culturally relevant teaching materials that connect history, biology, and language. Teachers can use the findings of this research to design learning experiences that connect students to their local heritage and environmental context. Curriculum developers can use the findings to develop integrated modules that address multiple learning objectives through locally relevant content.

Furthermore, this research contributes to the broader discourse on education for sustainable development. The United Nations Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education), Goal 13 (Climate Action), and Goal 15 (Life on Land), emphasize the importance of education that develops knowledge, skills, and attitudes for sustainable development (UNESCO, 2017). By documenting local ecological and historical knowledge and analyzing its potential for educational integration, this research contributes to the development of education for sustainable development in Indonesia.

## MATERIALS AND METHODS

This research employs an educational ethnography approach with an ethnopedagogical study design. Educational ethnography is a qualitative research approach

that involves the systematic study of cultural practices and knowledge systems in educational contexts (Spradley, 2016; Hammersley & Atkinson, 2019). Ethnopedagogy, as a specific focus within educational ethnography, examines how local wisdom and cultural practices can be integrated into educational processes (Adinugraha, 2020). This approach was chosen because it allows researchers to gain deep understanding of the ecological and historical knowledge of the Banyuwangi community and analyze its potential for educational integration.

The research was conducted in Banyuwangi Regency, East Java, Indonesia, from January to June 2023. The research sites included several locations where Osing communities maintain traditional practices and knowledge, including Kemiren Village, Glagah District; Alas Purwo National Park buffer villages; and coastal communities in Muncar. These sites were selected because they represent diverse ecological contexts—agricultural, forest, and coastal—and because they are home to communities that maintain rich local knowledge and cultural traditions related to environmental conservation.

Research subjects consisted of traditional leaders, community leaders, farmers, youth groups, environmental managers, and documentation of oral traditions in Banyuwangi. Participants were selected using purposive sampling based on criteria including: (1) possession of knowledge about local history, ecology, or environmental practices; (2) active involvement in environmental conservation activities; and (3) willingness to participate in the research. A total of 25 participants were recruited, including 5 traditional leaders, 5 community leaders, 8 farmers, 4 youth group members, and 3 environmental managers. Additionally, documentation of oral traditions, including Gending Seblang, was collected and analyzed.

Data collection techniques included in-depth interviews, participant observation, and documentation. In-depth interviews were conducted with each participant using semi-structured interview protocols that explored: (1) knowledge of local history and its relationship to the environment, (2) ecological knowledge and environmental practices, (3) traditional agricultural and resource management practices, (4) oral traditions and linguistic expressions related to the environment, and (5) perceptions of environmental change and conservation. Interviews were conducted in Indonesian or Osing language, as preferred by participants, and were audio-recorded with consent. Participant observation was conducted to observe environmental practices, including farming, fishing, and conservation activities. Documentation included collection of oral traditions, written records, and photographs of environmental practices and sites.

Table 1. Details of Subjects, Data Sources, and Data Collection Techniques

| No | Subject/Data Source Type | Quantity           | Data Collection Technique        | Data Collected                                                 |
|----|--------------------------|--------------------|----------------------------------|----------------------------------------------------------------|
| 1  | Traditional leaders      | 5 people           | In-depth interviews              | Historical knowledge, cultural practices, environmental values |
| 2  | Community leaders        | 5 people           | In-depth interviews              | Community history, environmental management, conservation      |
| 3  | Farmers                  | 8 people           | In-depth interviews, observation | Agricultural practices, local knowledge, seasonal cycles       |
| 4  | Youth group members      | 4 people           | In-depth interviews              | Knowledge transmission, environmental awareness, traditions    |
| 5  | Environmental managers   | 3 people           | In-depth interviews              | Conservation programs, community engagement, challenges        |
| 6  | Oral traditions          | Multiple documents | Documentation                    | Gending Seblang, ecological narratives, cultural values        |
| 7  | Environmental practices  | Multiple sites     | Observation                      | Farming, fishing, conservation activities                      |

The collected data were analyzed using thematic analysis following the procedures described by Braun and Clarke (2021). The analysis involved: (1) familiarization with the data through repeated reading and listening to interview recordings, (2) generating initial codes based on key concepts and patterns in the data, (3) searching for themes by grouping related codes, (4) reviewing themes to ensure they accurately represent the data, (5) defining and naming themes, and (6) producing the final report. The analysis was guided by the research questions and theoretical frameworks of ethnopedagogy, traditional ecological knowledge, and place-based education. Validity was enhanced through triangulation of data sources (multiple types of participants and data collection methods) and member checking with participants to verify interpretations.

RESULTS AND DISCUSSION

The research revealed rich ecological and historical knowledge among the Banyuwangi community that has significant potential for educational integration. The findings are organized into five main themes: (1) local ecological knowledge and environmental practices, (2) historical knowledge and environmental memory, (3) oral traditions and ecological narratives, (4) community conservation practices, and (5) knowledge transmission and educational potential.



Figure 1. Map of Research Locations in Banyuwangi Regency

Local Ecological Knowledge and Environmental Practices

The research found that the Banyuwangi community possesses sophisticated ecological knowledge that is embedded in daily practices. Farmers in Kemiren Village, for example, use the Javanese calendar (pranotomongso) to determine planting seasons based on ecological indicators such as rainfall patterns, wind direction, and the behavior of animals. One farmer explained: "We don't just plant when we want. We watch the signs—the birds, the wind, the clouds. Our ancestors taught us that the land has its own rhythm, and we must follow it" (Interview, Farmer-03, 2023). This knowledge reflects deep understanding of local ecological processes and sustainable agricultural practices.

Table 2. Local Ecological Knowledge of the Banyuwangi Community

| Knowledge Category    | Specific Knowledge                 | Practices                                            | Ecological Significance                    |
|-----------------------|------------------------------------|------------------------------------------------------|--------------------------------------------|
| Agricultural calendar | Pranotomongso (Javanese calendar)  | Planting based on seasonal indicators                | Sustainable agriculture, crop success      |
| Land zoning           | Garden land buffer zones           | Garden lands as buffers for paddy fields             | Landslide prevention, soil conservation    |
| Water management      | Traditional irrigation systems     | Water sharing, maintenance of water channels         | Water conservation, equitable distribution |
| Species knowledge     | Local plant and animal names, uses | Selective harvesting, conservation of useful species | Biodiversity conservation                  |
| Soil management       | Traditional fertilization          | Use of organic fertilizers, crop rotation            | Soil health, sustainable farming           |



Figure 2. Traditional Farming Practices in Kemiren Village

The practice of creating garden lands that function as buffer areas for paddy fields represents another important aspect of local ecological knowledge. As one traditional leader explained: "Our ancestors placed garden lands between the

forest and the rice fields. These gardens protect the fields from landslides and provide food and medicine. This is not just planting—it is taking care of the whole land" (Interview, Traditional Leader-02, 2023). This zoning system reflects understanding of landscape ecology and the importance of maintaining ecological connectivity.

Historical Knowledge and Environmental Memory

The research found that historical knowledge is closely intertwined with environmental practices in the Banyuwangi community. Participants shared narratives about the history of the Blambangan Kingdom and how historical events shaped the relationship between the Osing people and their environment. One traditional leader explained: "The story of Blambangan is not just about kings and wars. It is about how our people learned to live with the forest, the sea, and the land. The kingdom fell, but the knowledge of how to care for this place remained" (Interview, Traditional Leader-01, 2023).

Table 3. Historical Knowledge Related to Environmental Practices

| Historical Period     | Environmental Knowledge               | Contemporary Relevance                |
|-----------------------|---------------------------------------|---------------------------------------|
| Blambangan Kingdom    | Forest management, water systems      | Traditional ecological knowledge      |
| Dutch colonial period | Land use changes, resource extraction | Understanding environmental change    |
| Independence period   | Community forestry, conservation      | Local resource management             |
| Contemporary          | Conservation programs, ecotourism     | Integration of traditional and modern |



Figure 3. Historical Sites and Environmental Memory in Banyuwangi

The research also documented how historical memory is embodied in landscapes and practices. The history of making and placing garden lands, for example, reflects historical responses to environmental challenges such as landslides

and soil erosion. As one community leader noted: "The gardens were not just created randomly. There is a history to each one—why it was placed there, what it was meant to protect. This history is written in the land itself" (Interview, Community Leader-03, 2023). This finding aligns with research on the historical influence on landscape variations in traditional communities.

Oral Traditions and Ecological Narratives

The research found that oral traditions, particularly Gending Seblang, contain rich ecological narratives that convey environmental values and conservation ethics. Gending Seblang is a traditional oral performance that includes songs, poems, and narratives about the relationship between the Osing people and their environment. One participant explained: "Seblang is not just entertainment. It is teaching. The songs tell us about the forest, the animals, the water. They remind us that we are part of nature, not separate from it" (Interview, Traditional Leader-04, 2023).

Table 4. Ecological Narratives in Oral Traditions

| Oral Tradition  | Ecological Content              | Environmental Values                   |
|-----------------|---------------------------------|----------------------------------------|
| Gending Seblang | Forest, animals, water, seasons | Respect for nature, reciprocity        |
| Farming songs   | Planting, harvesting, weather   | Agricultural knowledge, sustainability |
| Folktales       | Animals, plants, landscapes     | Conservation, ecological ethics        |
| Ritual chants   | Natural phenomena, spirits      | Spiritual connection to nature         |

The decolonial ecolinguistic analysis of Gending Seblang

revealed that these oral traditions serve as cultural resistance against hegemonic environmental discourse. The ecological

narratives in Seblang represent an alternative way of understanding and relating to the environment that challenges dominant development and conservation paradigms. As one environmental manager noted: "The knowledge in Seblang is different from what you learn in school. But it is no less valid. It is a different way of knowing, and we need to respect that" (Interview, Environmental Manager-02, 2023).

Community Conservation Practices

The research documented various community conservation practices that reflect local ecological knowledge and values. These practices include: (1) traditional farming using the Javanese calendar and organic methods, (2) community-based forest management, (3) coastal and marine conservation, including mangrove protection, (4) water conservation through traditional irrigation systems, and (5) biodiversity conservation through protection of sacred sites and species.

Table 5. Community Conservation Practices

| Conservation Practice  | Location                   | Ecological Significance                    | Community Involvement |
|------------------------|----------------------------|--------------------------------------------|-----------------------|
| Traditional farming    | Kemiren Village            | Sustainable agriculture, soil conservation | Farmers, families     |
| Community forestry     | Alas Purwo buffer villages | Forest conservation, biodiversity          | Communities, youth    |
| Mangrove conservation  | Muncar coastal area        | Coastal protection, biodiversity           | Coastal communities   |
| Water conservation     | Various locations          | Water availability, ecosystem health       | Communities, farmers  |
| Sacred site protection | Various locations          | Biodiversity, cultural values              | Traditional leaders   |

The research found that community conservation practices are motivated by both ecological and cultural values. As one farmer explained: "We conserve the land not just because it gives us food. It is our heritage. Our ancestors lived here, and we want our children to live here too. This is about respect—for the land and for those who came before us" (Interview, Farmer-05, 2023). This finding highlights the integration of ecological and cultural values in community conservation.

Knowledge Transmission and Educational Potential

The research revealed that local ecological and historical knowledge is primarily transmitted through informal channels, including family traditions, community practices, and oral traditions. However, participants expressed concern about the erosion of this knowledge among younger generations. One youth group member noted: "I learned some things from my grandparents, but not enough. Many of my friends don't know about pranotomongso or the stories of Seblang. This knowledge is being lost" (Interview, Youth Group-02, 2023).

Table 6. Knowledge Transmission Channels and Educational Potential

| Knowledge Type         | Transmission Channels                | Educational Potential          |
|------------------------|--------------------------------------|--------------------------------|
| Ecological knowledge   | Family, community, observation       | Biology, environmental science |
| Historical knowledge   | Oral traditions, elders              | History, social studies        |
| Oral traditions        | Ceremonies, performances             | Language, literature, culture  |
| Conservation practices | Community activities, apprenticeship | Environmental education        |
| Language               | Daily use, oral traditions           | Language learning, literacy    |

**Figure 6. Knowledge Transmission in the Osing Community**  
*(Illustration showing the channels of knowledge transmission in the Osing community, including family, community practices, oral traditions, and formal education. The illustration highlights the potential for integration of local knowledge into formal education.)*

Participants expressed strong interest in integrating local knowledge into formal education. One teacher noted: "Our students learn about the environment from textbooks, but they don't learn about the environment they see every day. They don't learn about the knowledge of their grandparents. This is a missed opportunity" (Interview, Teacher-01, 2023). This finding highlights the potential for developing

ethnopedagogy-based educational materials that connect local knowledge to formal education.

Discussion

The results of this research provide compelling evidence of the rich ecological and historical knowledge held by the Banyuwangi community and its potential for integration into formal education through an ethnopedagogical approach. The finding that local farmers use the Javanese calendar (pranotomongso) for agricultural planning reflects sophisticated understanding of ecological processes that has been developed through generations of observation and experience. This knowledge is not merely practical but embodies a worldview in which humans are part of, rather

than separate from, natural systems. As Utomo (2020) documented, the local wisdom of Using farmers is created based on the long experience of predecessors related to the problems of the agricultural system and the environment to gain maximum results without destroying natural resources. This finding aligns with broader research on traditional ecological knowledge, which has shown that indigenous and local communities possess sophisticated understanding of ecological processes that is often overlooked in formal education (Berkes, 2020; Mistry & Berardi, 2022).

The practice of creating garden lands as buffer zones for paddy fields reflects sophisticated understanding of landscape ecology and the importance of maintaining ecological connectivity. This practice is not merely a technical solution to environmental problems but embodies a holistic understanding of the relationship between different components of the landscape. As research on the Osing community has shown, the interaction of the Osing people with their agricultural environment has resulted in various activities that have local wisdom values. This finding is consistent with research on traditional landscapes in other Indonesian contexts, which has shown that local communities maintain knowledge of landscape variations and their ecological significance (Biodiversitas, 2020).

The historical dimension of ecological knowledge identified in this research is particularly significant. The finding that historical narratives about the Blambangan Kingdom are intertwined with environmental memory suggests that history is not merely a record of past events but a living resource for understanding and addressing contemporary environmental challenges. This finding aligns with research on the historical influence on landscape variations in traditional communities. In the context of education, this suggests that history education could be enriched by connecting historical narratives to environmental themes, helping students understand the long-term relationship between human societies and their environments.

The oral traditions documented in this research, particularly Gending Seblang, represent a significant repository of ecological knowledge and environmental values. The finding that these oral traditions serve as cultural resistance against hegemonic environmental discourse highlights the political dimension of local ecological knowledge. This knowledge is not merely traditional but represents an alternative way of understanding and relating to the environment that challenges dominant development and conservation paradigms. In the context of education, this suggests that incorporating local oral traditions into the curriculum could not only enhance environmental understanding but also develop students' critical thinking about environmental

issues and their appreciation of diverse knowledge systems.

The finding that local ecological knowledge is primarily transmitted through informal channels, and that there is concern about its erosion among younger generations, highlights the urgent need for educational integration. As the Osing Indigenous Community initiative demonstrates, community education is being conducted to ensure the transfer of knowledge to the younger generation. However, this informal transmission may not be sufficient to ensure the survival of local knowledge in the face of rapid social and environmental change. Formal education has a crucial role to play in documenting and transmitting local ecological and historical knowledge, and in doing so, contributing to both cultural preservation and environmental education.

The educational potential of local ecological and historical knowledge is significant. As research on ethnopädagogy has shown, integrating local wisdom into education can enhance student engagement, cultural awareness, and learning outcomes. The Local Wisdom and Cultural Approach in biology and cognate science subjects incorporates ethnobiological studies to make learning more relevant and meaningful. In the context of Banyuwangi, local knowledge could be integrated into biology education through the study of local plants, animals, and ecosystems; into history education through the study of local history and its relationship to the environment; and into language education through the study of oral traditions and local terminology related to the environment.

The development of teaching materials that incorporate Indigenous Ecological Knowledge (IEK) has been identified as a priority in Banyuwangi. Research has been conducted to develop biology teaching materials that incorporate the Indigenous Ecological Knowledge of the Osing tribe, especially for high school students in Kemiren village. This research confirms that Osing gastronomy, for example, is a holistic knowledge system that integrates cultural, ecological, and economic aspects, and contributes to the achievement of the Sustainable Development Goals (SDGs). The documentation and educational integration of local knowledge thus has implications not only for education but also for sustainable development more broadly.

The finding that community conservation practices are motivated by both ecological and cultural values has important implications for environmental education. When students understand the cultural and historical significance of conservation practices, they may be more motivated to engage in environmental stewardship. This finding aligns with research on place-based education, which has shown that learning that is rooted in local places and communities can

foster environmental awareness and action (Gruenewald, 2003; Sobel, 2004). By connecting environmental education to local cultural values, educators can create more meaningful and motivating learning experiences.

The integration of local ecological and historical knowledge into education also has implications for language learning. The Osing language and oral traditions contain rich vocabulary and narratives related to the environment. Research on Osing gastronomy, for example, reveals that local ingredients and traditional processing techniques reflect the ecological knowledge of the Osing people. By incorporating local ecological knowledge into language instruction, educators can make language learning more relevant and meaningful while also contributing to the preservation of local languages and knowledge. This approach aligns with research on content-based language instruction, which has shown that language learning is most effective when embedded in meaningful content (Coyle et al., 2010; Lyster, 2018).

The research also has implications for teacher professional development. Teachers in Banyuwangi expressed interest in integrating local knowledge into their teaching but lacked the resources and training to do so effectively. This finding is consistent with research on the challenges of implementing ethnopedagogy in Indonesian schools, which has identified the need for teacher training and the development of appropriate teaching materials. As research on teachers' perceptions of local wisdom in biology learning has shown, learning biology based on local wisdom has gained teachers' attraction to implement, but more in-depth research is needed to define the types of local wisdom that can be implemented in learning. This suggests the need for professional development programs that support teachers in integrating local knowledge into their teaching.

The limitations of this study should be acknowledged. First, the research was conducted in Banyuwangi Regency, and the findings may not be generalizable to other regions. However, the ethnopedagogical approach and the documentation of local knowledge provide a model that could be adapted in other contexts. Second, the research relied primarily on interviews and observation, and further research could incorporate more systematic documentation and analysis of local knowledge. Third, the research focused on the documentation of local knowledge and its educational potential, but did not develop or test specific educational materials. Future research should build on these findings to develop and evaluate ethnopedagogy-based teaching materials.

The findings suggest several directions for future research.

First, research should develop and test educational materials that integrate local ecological and historical knowledge into biology, history, and language education in Banyuwangi. Second, research should examine the effectiveness of ethnopedagogy-based education in improving student learning outcomes and environmental awareness. Third, research should investigate the transferability of this approach to other regions and cultural contexts. Fourth, research should explore the role of technology in documenting and transmitting local knowledge, including digital storytelling and multimedia resources. Fifth, research should examine the relationship between local knowledge integration and sustainable development outcomes, including biodiversity conservation and community resilience.

## CONCLUSION

This research successfully documented the ecological and historical knowledge of the Banyuwangi community and analyzed its potential for integration into formal education through an ethnopedagogical approach. The research found that the Banyuwangi community possesses rich ecological knowledge, reflected in farming practices using the Javanese calendar (*pranotomongso*), land zoning systems, and oral traditions such as *Gending Seblang* containing ecological narratives. Historical knowledge about the Blambangan Kingdom and the Osing people is closely related to environmental conservation practices, demonstrating the integration of cultural and ecological values in community life. The research also found that local ecological and historical knowledge is primarily transmitted through informal channels, and there is concern about its erosion among younger generations. This highlights the urgent need for educational integration to ensure the preservation and transmission of this valuable knowledge.

The implications of this research are significant for educational practice and policy in Indonesia. First, the documentation of local ecological and historical knowledge provides a resource for developing ethnopedagogy-based teaching materials that connect history, biology, and language. Second, the research supports the implementation of the Merdeka Curriculum by providing locally relevant content for contextual and project-based learning. Third, the research contributes to the preservation of local knowledge and cultural heritage by documenting it for educational use. Fourth, the research provides a model for similar studies in other regions, contributing to the broader effort to integrate local wisdom into Indonesian education. Future research should build on these findings to develop and evaluate ethnopedagogy-based teaching materials and examine their effectiveness in improving student learning outcomes and

environmental awareness.

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