



An Ethnoscience Study of the *Bunuk* Tradition of the Loli Village Community as a Biology Learning Resource

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Abstract: The integration of local wisdom into biology learning remains limited, even though ethnoscience has strong potential to provide contextual and meaningful learning experiences for students. One form of local wisdom found in South Central Timor Regency is the *bunuk* tradition practiced by the community of Loli Village. This study aimed to analyze the potential of the *bunuk* tradition as a biology learning resource for senior high school students. This study employed a descriptive qualitative approach involving community members who inherit and practice the *bunuk* tradition. Data were collected through interviews, observations, and documentation, and were analyzed using data triangulation techniques. The results showed that the *bunuk* tradition contains ethnoscience values related to environmental conservation, ecosystem balance, and interactions among living organisms within ecosystems. The feasibility assessment conducted by biology teachers indicated that the *bunuk* tradition met the criteria of being economical, practical, flexible, and aligned with the objectives of biology learning. The findings suggest that the *bunuk* tradition can function as a contextual biology learning resource that supports meaningful learning while preserving local cultural values. This study contributes to the development of ethnoscience-based biology learning and provides a reference for integrating local wisdom into science education.

Keywords: Ethnoscience; *Bunuk* tradition; Learning resources; Biology learning

Introduction

The integration of ethnoscience and scientific knowledge grounded in local traditions and culture into the learning process is recognized as a promising approach to addressing challenges in education. One approach that combines culture, local knowledge, and indigenous knowledge within a community is the ethnoscience approach (Aulia et al., 2023; Nurhayati et al., 2021). Through ethnoscience, students are introduced to scientific concepts through local values and practices that they already know and experience in their daily lives (Wijaya et al., 2023). The ethnoscience approach can be considered an alternative for bridging the gap between contemporary scientific knowledge and local wisdom (Al-Fialistyani et al., 2020; Aprilia & Lutfi, 2023; Wardani et al., 2023). Integrating local knowledge into learning is not a mistake, as community traditions possess unique characteristics and are rich in theoretical

values (Handayani et al., 2018). Ethnoscience refers to knowledge derived from facts and beliefs within community life that have been passed down from generation to generation (Risdianto, 2021). In biology learning, ethnoscience can provide deeper context regarding biodiversity, ecosystems, and the relationship between humans and nature. Ethnoscience-based learning utilizes local wisdom, including local food, traditions or customs, traditional weaving, rituals or customary ceremonies, traditional musical instruments, and traditional languages (Silla et al., 2023). Learning through an ethnoscience approach also supports students in developing a strong cultural identity and understanding the relationship between culture and science as part of education. This encourages students to perceive science as a part of life rather than merely material to be memorized (Tilsen et al., 2021). Ethnoscience learning is a strategy for creating a learning environment and designing learning

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experiences that integrate culture as part of the learning process (Lidi et al., 2022). This enables students to understand how local communities adapt and utilize such knowledge as a learning resource.

Amid the rapid development of globalization and modernization, there are concerns that ethnosience is gradually being neglected. In fact, the potential of ethnosience can serve as a highly valuable learning resource, particularly in biology learning at the senior high school level. Biology learning that does not involve scientific knowledge and the surrounding environment or local potential may lead to student boredom and reduce the quality of learning (Andarias et al., 2022). The integration of local potential, natural resources, and the environment into the curriculum enables students to better understand and actively engage in learning (Imtihana & Djukri, 2020).

Integrating ethnosience into biology learning allows students to learn about the importance of conservation, strategies, and practices that have proven effective in maintaining ecosystem balance, understanding local values and biodiversity, becoming more sensitive to environmental issues, and contributing to the preservation of culture and natural resources.

South Central Timor Regency (TTS) is one of the regencies in East Nusa Tenggara Province (NTT) that possesses rich cultural traditions and highly valuable traditional knowledge, particularly in the context of ethnosience. In the TTS region, especially in Loli Village, Polen District, there is a tradition known as *bunuk*, which has been practiced for generations. The *bunuk* tradition is recognized as a prohibition marker used to indicate that certain areas or plants, such as oranges, mangoes, areca nuts, and other garden products that are marked or surrounded, must not be harvested or collected carelessly. This prohibition applies to the residents who establish the *bunuk*. Students and teachers have not yet realized that the *bunuk* tradition and heritage constitute a tangible biology learning resource available in their surroundings that can provide real and concrete experiences related to biological concepts.

The ethnosience potential of the *bunuk* tradition among the people of Loli Village, TTS Regency, is highly promising. The preparation and implementation processes of the *bunuk* tradition involve biological concepts that students can learn directly. The *bunuk* tradition is not merely an inherited customary practice, but it can also serve as a biology learning resource rich in scientific knowledge. Research conducted by Sudirman et al. (2025) found that the ethnosience approach is a creative alternative that integrates cultural values and scientific ideas to improve the relevance and contextualization of learning. Most studies indicate the

flexibility of ethnosience as a multidisciplinary approach that can be applied to various science concepts, although its application in biology remains limited (7.40).

The novelty of this study lies in the investigation of the *bunuk* tradition as an ethnosience-based biology learning resource, particularly in Loli Village, South Central Timor Regency (TTS). Previous studies have generally discussed ethnosience within the broader context of local culture, while research specifically examining the *bunuk* tradition and its relationship to biology learning remains limited. In addition, this study seeks to identify the relationship between local community cultural practices and biological concepts that can be integrated into learning activities. Therefore, this study not only focuses on preserving local culture but also on developing contextual and relevant biology learning resources for students.

This research is important because it holds educational, cultural, and environmental value. From an educational perspective, this study provides an alternative biology learning resource that is more contextual, enabling students to better understand learning materials through real experiences in their surrounding environment. From a cultural perspective, this research can help preserve the *bunuk* tradition as part of the cultural heritage of the people of Loli Village. From an environmental perspective, the conservation values embedded in the *bunuk* tradition can serve as an educational medium for students regarding the importance of maintaining ecosystem balance and utilizing natural resources sustainably.

Based on the background described above, the researcher is interested in conducting a study entitled: "A Study of the Potential of the *Bunuk* Tradition of the Loli Village Community, South Central Timor Regency, as a Learning Resource in Biology Learning at Senior High School." This study aims to explore the potential of the *bunuk* tradition of the Loli Village community, TTS Regency, as a learning resource in biology learning at senior high schools. The results of this study are expected to enrich the curriculum with relevant local content and provide recommendations for teachers to be more creative in integrating local knowledge with learning materials, thereby making the teaching and learning process more effective and meaningful.

The objective of this study is to identify the potential of the *bunuk* tradition of the Loli Village community, TTS Regency, as a learning resource in senior high school biology learning.

Method

This study employed a qualitative descriptive method to examine the potential of the *bunuk* tradition

as a biology learning resource in senior high schools. The research was conducted in Loli Village, Polen District, South Central Timor Regency (TTS), from October to December 2024. The subjects of this study were community members who inherit and practice the *bunuk* tradition, while the object of the study was the potential of the *bunuk* tradition as a biology learning resource. This study utilized both primary and secondary data sources. Primary data were obtained directly from the community members who inherit and practice the *bunuk* tradition. Secondary data were collected from existing sources, including documentation in the form of photographs and relevant previous studies. The study began with the identification of problems related to the suboptimal utilization of the *bunuk* tradition as an ethnoscience-based biology learning resource. This was followed by a literature review concerning ethnoscience in biology learning, local wisdom, and the *bunuk* tradition. The next stage involved the development of research instruments, including interview guidelines, observation sheets, and documentation instruments. Data collection was conducted through interviews with community members who practice the *bunuk* tradition, direct observations of the implementation process of the *bunuk* tradition, and documentation in the form of photographs and other supporting data. The data obtained were analysed using data triangulation techniques to ensure the validity of the information.

Data analysis was carried out through the processes of data reduction, data presentation, and conclusion drawing.

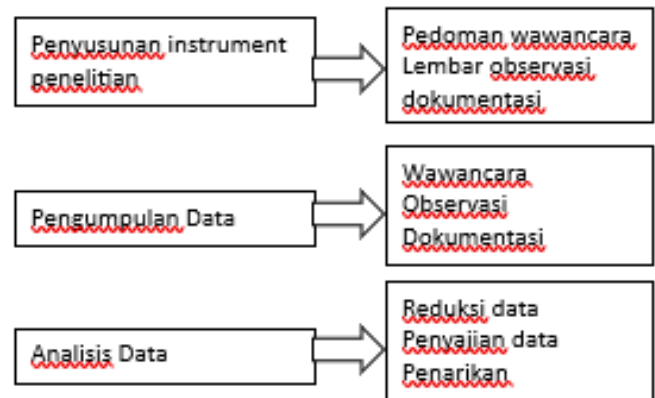


Figure 1. Research stages

The potential and feasibility of the *bunuk* tradition as a biology learning resource were assessed based on the criteria of economic value, practicality, flexibility, and suitability with learning objectives. Furthermore, the data were analysed by assigning feasibility scores according to Table 1. The total scores obtained were then converted into qualitative feasibility categories based on the rubric presented in Table 2. The research flowchart can be seen in Figure 1.

Table 1. Assessment Criteria Scores for Learning Resources (Arikunto, 2010)

Score	Description	Descriptor
4	Very economical Very practical Very flexible Highly suitable with learning objectives	Distance from school is very close (0-2.5 km) Very easy to implement Suitable for more than two basic competencies All components of the learning resource are aligned with learning objectives
3	Economical Practical Flexible Suitable with learning objectives	Distance from school is close (2.6-5.0 km) Easy to implement Suitable for two basic competencies Most components of the learning resource are aligned with learning objectives
2	Less economical Less practical Less flexible Less suitable with learning objectives	Distance from school is far (5.1-7.5 km) Difficult to implement Suitable for only one basic competency Only a few components of the learning resource are aligned with learning objectives
1	Very uneconomical Very impractical Very inflexible Very unsuitable with learning objectives	Distance from school is very far (7.6-10 km) Very difficult to implement Not aligned with basic competencies Components of the learning resource are not aligned with learning objectives

Table 2. Feasibility Assessment Scale for Learning Resources (Arikunto, 2010)

Range	Assessment Category
3.1 - 4	Strongly meets the criteria
2.1 - 3	Meets the criteria
1.1- 2	Does not meet the criteria
0-1	Strongly does not meet the criteria

Result and Discussion

Study of the Bunuk Tradition in Relation to Senior High School Biology Materials

Bunuk is a practice carried out by members of the *Atoin Meto* ethnic group in Timor who speak the *Dawan* language. The *bunuk* tradition is a prohibition marker

placed on plants or animals with the purpose of preventing them from being taken before the harvest period. The *bunuk* tradition is applied to animals such as cattle, buffaloes, and bees, as well as to plants such as areca nut trees, coconut trees, betel plants, and others. In its implementation, when this tradition is carried out within a small group or family, it is referred to as *bunuk*.

Bunuk serves as a preventive effort to avoid irresponsible behavior, such as theft of crops or livestock that should be enjoyed collectively by family members or village communities. *Bunuk* has been practiced for generations by communities in the Timor region, making it an integral part of customary values and traditions that continue to be upheld by the local people. *Bunuk* contains the meaning of prohibition as an effort to protect and preserve agricultural or forest products for the collective welfare of the community.

There are implicit yet clear rules applied in the implementation of the *bunuk* tradition. Among them are that the leader of the *bunuk* customary ceremony is the *mafefa* or customary spokesperson (*amolok*), while the supreme leader is the *usif* (king or ruler of the customary territory). The penalties for violating the *bunuk*

ceremony include customary fines and the belief in sanctions imposed by nature itself.

For the Atoni Meto people, forests are essential to all aspects of life and therefore must be protected. Consequently, nature must be preserved, protected, and utilized wisely to provide sustainable benefits. In their efforts to prevent forest and environmental destruction, the Atoni Meto people in the past had already developed a forest and environmental management approach known as *bunuk*. *Bunuk* reflects the way of life (*lebensweis*) of the Atoni Meto people in maintaining peace and reconciliation through collective agreements reinforced by customary rituals. *Bunuk* functions as customary law, social habits, and social norms. It guarantees the establishment of harmonious relationships between the Atoni Meto people and nature, while also ensuring the sustainability of all living creatures within it (Usbobo, 2019).

The *bunuk* tradition practiced in Loli Village can be utilized as a learning resource for senior high school students because it is closely related to biology materials, as presented in Table 3.

Table 3. Study of the *Bunuk* Tradition in Relation to Senior High School Biology Materials

Implementation of <i>Bunuk</i> /Banu	Indigenous Community Knowledge	Scientific Knowledge	Explanation
Preparation stage of the <i>bunuk</i> ceremony (Nasaeba <i>Bunuk</i>), including: (a) The head of the family/customary leader reaches an agreement to determine the implementation time of the <i>bunuk</i> tradition. The determined time is then communicated to family members or village communities.	The <i>bunuk</i> tradition is understood by the people of Loli Village as a prohibition against harvesting plants or animals before the appropriate time. The community believes that anyone who violates the prohibition will receive customary sanctions, customary fines, or punishment from God as the owner of life.	The <i>bunuk</i> tradition is related to environmental conservation efforts and maintaining ecosystem balance.	<i>Bunuk</i> , as a prohibition marker, binds the community not to damage or harvest natural resources before the determined time. <i>Bunuk</i> represents customary activities and collective agreements or consensus regulating human relationships and relationships between humans and nature. Its purpose is to protect the environment and ensure sustainability for the welfare of the community. The community obeys the customary law of the <i>bunuk</i> tradition because they fear customary fines or sanctions from nature.
Implementation of the <i>Bunuk</i> ceremony (Nasaeba <i>Bunuk</i> Ritual). At the determined time, all family members or villagers gather to carry out the <i>bunuk</i> tradition. The head of the family/customary leader places symbolic markers on designated trees.			
Completion stage of the <i>bunuk</i> tradition. After the designated harvest time arrives, all family members or community members are invited to gather for the ceremony of removing the <i>bunuk</i> marker as a sign that the implementation of <i>bunuk</i> has ended. The harvest obtained will be shared among everyone to be enjoyed together. The ceremony of removing the <i>bunuk</i> marker ends with thanksgiving prayers and communal meals.			



Figure 2. Implementation of the *Bunuk* tradition by one of the community members of Loli Village, South Central Timor Regency (TTS)

The scientific knowledge embedded in the *bunuk* tradition is related to environmental conservation, ecosystem balance, and interactions within ecosystems. The feasibility potential of the *bunuk* tradition was examined through questionnaires distributed to Biology teachers at the Christian Senior High School of Loli Village, South Central Timor Regency. The results of the feasibility assessment are presented in Table 5.

Table 5 shows that the *bunuk* tradition has the potential and feasibility to be used as a biology learning resource because it strongly meets the criteria in terms of economic value, practicality, flexibility, and suitability with learning objectives. From the economic

aspect, this finding is supported by field conditions, where the distance between the school and the location of the *bunuk* tradition implementation ranges from 0–2.5 km. In fact, the Christian Senior High School of Loli Village is located less than 1 km away from the implementation site. From the practicality aspect, it was found that most residents of Loli Village, TTS Regency, work as farmers and own plantation land in the surrounding area. This condition supports the implementation of the *bunuk* tradition, making it very easy to apply by both teachers and students. From the flexibility aspect, the *bunuk* tradition can be utilized as a biology learning resource for several topics, including: (1) Grade X material in Basic Competency (KD) 3.2: Analysing various levels of biodiversity in Indonesia, including threats and conservation efforts; (2) Grade X material in Basic Competency (KD) 3.10: Analysing ecosystem components and the interactions among those components; and (3) Grade XII material in Basic Competency (KD) 3.1: Explaining the influence of internal and external factors on the growth and development of living organisms. From the aspect of suitability with learning objectives, the *bunuk* tradition contains learning resource components that align with the objectives of senior high school biology learning, particularly topics related to environmental conservation, ecosystem components, and interactions within ecosystems.

Table 4. Relationship Between the *Bunuk* Tradition and Senior High School Biology Basic Competencies

Material	Basic Competence	Biological Concepts in the <i>Bunuk</i> Tradition
Environmental conservation	Grade X material in Basic Competency (KD) 3.2: Analyzing various levels of biodiversity in Indonesia, including their threats and conservation efforts	The <i>bunuk</i> tradition is related to environmental conservation because the prohibition against harvesting before the appropriate time reminds people to be responsible for preserving the environment.
Ecosystem balance	Grade X material in Basic Competency (KD) 3.10: Analyzing ecosystem components and the interactions among those components	Plants and animals harvested at the designated time are related to ecosystem balance. The awareness of community members not to harvest before the appropriate time allows plants and animals to mature so that they can be utilized collectively. This helps maintain ecosystem balance.
Interactions among living organisms within ecosystems	Grade X material in Basic Competency (KD) 3.10: Analyzing ecosystem components and the interactions among those components	The awareness of community members not to harvest plants or animals before the appropriate time is related to the relationship and interaction between humans and nature as a resource that is beneficial for human survival.

Table 5. Results of the Feasibility Assessment of the *Bunuk* Tradition as a Biology Learning Resource

Feasibility Assessment Results				Category
Economical	Practical	Flexible	Suitable with Objectives	
4	4	4	4	4 Strongly meets the criteria

The *bunuk* tradition will make it easier for students to understand concepts related to environmental conservation, ecosystem components, and interactions within ecosystems because students learn through real experiences obtained from their surrounding environment. This will certainly foster enthusiasm and

motivation in participating in learning activities and positively impact students' understanding of biology materials.

As members of the community, students learn the meaning of the *bunuk* tradition as a collective agreement to protect the environment. Learning customs and

traditions through culture or local wisdom is meaningful because it contains character values that can be instilled in students.

The relationship between ecosystem balance and interactions within ecosystems lies in the fact that the *bunuk* tradition reflects the relationship between humans and nature. This can be seen in human efforts to preserve existing ecosystems so that ecosystem balance is maintained and interactions within ecosystems can function according to the laws of nature. Humans respect ecosystems and nature as God's creation and strive to live harmoniously alongside nature.

Research conducted by Pretty (2019) entitled *The Intersections of Biological and Cultural Diversity*, explains that nature-based cultural traditions, such as *bunuk*, strengthen the relationship between humans and their ecosystems, making them highly relevant to the topic of interactions among living organisms. Chalmers et al. (2015) in their study entitled *Expert and Generalist Local Ecological Knowledge: A Sustainable Asset for Natural Resource Management*, reviewed how indigenous local ecological knowledge can be utilized for education and sustainable environmental management. Ethnoscience-based learning contexts are not limited to theory alone but also include real practices and contribute to improving cognitive outcomes, value characteristics, and conservation behavior (Utari et al., 2020)

The utilization of the *bunuk* tradition as a biology learning resource provides students with awareness of the importance of preserving the environment and ecosystems. When viewed from the perspective of the modality of universal natural law as a characteristic of human understanding of their existence in the world, this certainly fosters a sense of love for the surrounding environment and ecosystems (Manu & Manu, 2022). Love for the environment needs to be instilled in students' minds when studying the structural elements of living organisms. In the reality of the existence of every living organism, there exists a modality of universal natural law that supports and sustains it in terms of form, content, and function for the continuity of life.

Several previous studies have also supported these findings. Berkes (2018) in *Sacred Ecology* (4th edition), explained that traditional ecological knowledge plays an important role in environmental conservation, ecosystem balance, and interactions among living organisms. McMillen et al. (2016), in their study entitled *Cultural Ecosystem Services and Traditional Ecological Knowledge*, explained that traditional cultural practices directly contribute to ecosystem balance and environmental conservation.

The findings of this study are also supported by ethnoscience research in biology learning. Fuadi et al.

(2024) found that ethnoscience in biology teaching improves students' cognitive abilities because ethnoscience learning enriches students' experiences by introducing local culture and cultural diversity within the surrounding community. In addition, Wazni et al. (2023) found that local culture contains scientific concepts that can be integrated into science learning. Their study showed that local knowledge regarding the traditional *bale* house of the Sasak community can be integrated into biology concepts related to the structure and function of plant tissues. Hikmawati et al. (2020) demonstrated that ethnoscience-based learning can improve students' understanding of scientific concepts while strengthening environmental conservation character. An ethnoscience study in biology learning related to the traditional Lampung culinary dish *Seruit* also found connections between biological concepts and local community knowledge (Carolina et al., 2024). This is relevant to the *bunuk* tradition, which teaches communities to maintain natural balance through customary rules regarding the timing of harvesting crops and animals. Learning activities that incorporate local cultural practices such as these can help students understand that biological concepts are not separate from the everyday lives of the community.

The findings of this study are also consistent with the statement by Primadianningsih et al. (2023) who argued that ethnoscience-based learning can connect scientific knowledge with local culture, making the learning process more meaningful. The *bunuk* tradition provides students with practical learning experiences regarding the relationship between humans and the environment, particularly in maintaining ecosystem balance and preserving natural resources. These contextual experiences can support students in developing a deeper understanding of biological concepts compared to purely theoretical learning. Sterling (2017): in *Culturally Grounded Indicators of Resilience in Social-Ecological Systems*, stated that cultural traditions such as *bunuk* are considered indicators of ecological and social resilience, including efforts to preserve the environment and relationships among living organisms within a system.

Tengö et al. (2017): in *Weaving Knowledge Systems in IPBES, CBD and Beyond: Lessons Learned for Sustainability*, emphasized the importance of integrating local and scientific knowledge in science education for environmental and ecosystem conservation. Reyes-García et al. (2019): in *The Contributions of Indigenous Peoples and Local Communities to Ecological Restoration*, highlighted the significant role of local traditions and indigenous beliefs in maintaining biodiversity and ecosystem functions. Kassam (2021) in his study *Biocultural Diversity and Indigenous Ways of Knowing: Human Ecology in the*

Arctic, discussed how indigenous ways of life and traditions are closely related to the principles of modern biology and ecology. Mazzocchi (2018) in *Traditional Knowledge and Ecological Literacy in Environmental Education*, supported the integration of traditional knowledge into science curricula to enhance understanding of ecosystem interactions and environmental conservation. Naidoo et al. (2020) in their study on cultural values and traditional ecological knowledge, emphasized that cultural values and traditions such as *bunuk* form an important foundation for conservation strategies and environmental balance.

The utilization of ethnoscience in biology teaching offers many advantages, including: (1) improving students' understanding, skills, and positive attitudes toward biology learning; (2) connecting knowledge with the realities experienced by students; (3) appreciating and preserving local community knowledge related to biology materials; (4) developing students' nationalist and multicultural character; and (5) encouraging imagination while preserving local traditions within the community (Alamsyah et al., 2022).

Ethnoscience studies in biology are also related to the universal laws governing living organisms. Cultural values within communities are preserved through customary practices passed down from generation to generation as ancestral traditions, as found in the social structure of the Atoni Meto community in Timor, specifically in Loli Village, Polen District, South Central Timor Regency. Other studies have shown that ethnoscience can improve students' scientific reasoning and foster understanding and engagement with biodiversity materials (Hamidah et al., 2023). In addition, to increase students' interest and understanding of ecology and biodiversity, it has been proposed to design interactive books based on ethnoscience studies (Setiyo et al., 2022).

Furthermore, students also learn to recognize and appreciate their culture. Culture-based learning provides deep meaning and contributes to character education. This is in line with the study conducted by Lidi et al. (2021) which examined the potential of the local wisdom of Tambi Uma from the Ende ethnic group as a source of biology learning and character education. The study proved that the Tambi Uma tradition has potential as a learning resource and contains character education values. Students' values and character can be shaped and instilled through the values that exist within their surrounding community (Love, 2022). Ilhami et al. (2021) found that the local wisdom of *manongkah kerang* in Indragiri Hilir Regency, Riau, contains scientific concepts and conservation values, making it a potential science learning resource, particularly for ecosystem-related materials.

Learning resources refer to anything that is useful in the learning process. Learning resources can be obtained in various ways. Mulyasa (2017) defined learning resources as anything that can facilitate learning, enabling students to acquire the necessary information, knowledge, experience, and skills. Learning resources are also defined as resources that can be utilized for teaching and learning purposes, either directly or indirectly, partially or entirely. Types of learning resources include: (a) humans; (b) materials; (c) environments; (d) tools and equipment; and (e) activities. Ethnoscience can bridge the relationship between modern science and local knowledge, resulting in learning processes that are relevant and contextual. This method not only broadens students' learning experiences but also deepens their understanding of natural science concepts, actively engages students, and fosters a sense of appreciation and love for culture (Sari et al., 2025).

Biology, as a science characterized by using living organisms as objects of study, naturally has learning resources with distinct characteristics compared to other learning resources. Suhardi (2007) stated that biology learning resources are anything, whether objects or phenomena, that can be used to obtain experiences for solving specific biological problems. The existence of learning resources can facilitate and support the learning process. In biology learning, the natural environment serves as a laboratory that plays an important role because natural phenomena can generate scientific problems. To obtain biological objects of study, nature and all its phenomena provide information that can be utilized in human life.

Teachers or educators can make biology lessons more interesting and culturally relevant by utilizing resources available within the surrounding community and emphasizing their application in real life (Saro et al., 2023). Teachers can also create inclusive and effective learning environments by integrating ethnoscience with various learning approaches such as contextual, collaborative, and problem-based approaches (Sari & Putra, 2022).

Local wisdom within the students' environment can be utilized as a learning resource. Its use as a learning resource can positively influence students in preserving the cultural values of the local community by encouraging them to emulate the wisdom values embedded within it. The internalization of local wisdom can foster students' character development because character development requires cultural awareness and cultural intelligence.

The *bunuk* tradition has the potential to serve as a learning resource and enables students to understand their existence as noble creatures of God who are

responsible for protecting and preserving the environment.

Conclusion

The conclusion of this study shows that the *bunuk* tradition of the Loli Village community, South Central Timor Regency (TTS), has potential as a biology learning resource for Grade X senior high school materials, particularly those related to environmental conservation, ecosystem balance, and interactions within ecosystems. The local wisdom values embedded in the *bunuk* tradition reflect a harmonious relationship between humans and the environment, making it relevant to be integrated into contextual biology learning. This study contributes scientifically by strengthening the utilization of local wisdom as a biology learning resource that supports meaningful learning. In addition, the findings of this study have practical implications for the development of teaching materials, learning media, and learning activities that integrate local culture to improve students' understanding while also instilling awareness of environmental and cultural preservation among future generations.

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Author Contributions

All authors made significant contributions to the completion of this manuscript. Theodora Sarlotha Nirmala Manu (TSNM) developed the interview instruments, conducted interviews, analyzed data from the biological material perspective, and drew conclusions. Yanti Daud (YD) developed observation guideline instruments and tested data credibility using triangulation methods. Eritrika Adriana Nulik (EAN) analyzed research data from a cultural perspective and assisted in the research output process.

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Conflicts of Interest

The authors declare that there are no conflicts of interest regarding this research.

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