

An Approach to Local Wisdom and Cultural in Biology Learning

Fajar Adinugraha
{fadinugraha0608@gmail.com}

Pendidikan Biologi, FKIP-Universitas Kristen Indonesia, Jakarta, Indonesia

Abstract. 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. Culture is the result of human creativity, taste, and initiative expressed via customs, arts, and religious beliefs (religion) among the local population. The Local Wisdom and Cultural Approach is an approach of teaching biology and cognate science subjects that incorporates ethnobiological studies, such as ethnobotany, ethnozoology, ethnoecology, and ethnopedagogy, as well as learning principles such as student-centered learning, joyful learning, meaningful learning, scientific learning, and local wisdom and cultural learning.

Keywords: local wisdom and cultural approach; ethnobiology; ethnopedagogy; biology; local wisdom

1 Introduction

Every student and teacher in the classroom go through the process of learning. Learning is a process of changing behavior, either visible behavior (overt behavior) or invisible behavior (inner behavior), that typically lasts for a long time [1], and is influenced by learning factors such as: 1) internal factors, such as physical and psychological aspects, 2) external factors, such as social and non-social aspects (learning facilities and infrastructure) [2]; and 3) learning approach [3]. The learning approach is one of the aspects to be concerned about. This learning approach is based on learning theories, which will later be utilized to determine acceptable learning strategies and procedures when seen from the perspective of learning relationships [4]. One of the elements of developing a learning approach is learning theory.

Because it can modify students'/learners' behavior based on their perspective to attain learning objectives, the learning approach plays a role in the learning process. The learning approach is a teacher's generalized view of the learning process that can accommodate, inspire, strengthen, and underpin learning methods [5] and serve as a guide in teaching that is still theoretical and conceptual [6], requiring the teacher's wisdom to realize the learning process [7]. Teachers and learners, for example, should be able to be described in the learning approach as learning components rooted in local cultural and environmental values. A word used to describe an approach that is based on local values and culture is "Local Wisdom and Cultural Approach."

Given the declining sense of love for culture and local wisdom among certain Indonesians, strengthening local wisdom and culture is critical. Local wisdom and culture are an important aspect of the Indonesian nation's identity that must be preserved. The Indonesian nation's identity is a reflection or display of its character, which is an accumulation or synergy of the

identity character or identity of each community (individual), with the national character displayed being the noble values contained in Pancasila [8] [9]. Because, in facing the challenges of globalization and modernization, it is necessary to recognize that local wisdom is a cultural element that must be explored, studied, and revitalized in order to prevent the erosion of the noble values of local, regional, and national culture, national identity has to do with local wisdom [10] [11]. This approach to local and cultural wisdom can be applied to Biology classes through education, specifically learning.

Ethnobiological and ethnopedagogical studies are used in the Local Wisdom and Cultural Approach [12], where ethnobiological studies are scientific studies of population knowledge related to biology, such as plants (botany), animals (zoology), and the natural environment (ecology) [13], and ethnopedology is a study of educational practice based on local wisdom [14]. However, it seems that this Local Wisdom and Cultural Approach is less popular in education circles. Based on the 2020 research, regarding the description of the learning approach in Purworejo Regency, it was concluded that the Scientific Approach and the Environmental Exploration Approach were most often used with a percentage of 83.96% and 82.90% respectively of the criteria set, while the Local Wisdom and Cultural Approach was only 68.08% of established criteria [15]. As a result, the purpose of this page is to provide an overview of the literature studies on local wisdom and culture.

2 Method

A literature review was employed as the method. Scientific articles, books, and online links are among the library's resources. Google Scholar and Scopus index library sources, as well as books with ISBNs. Local wisdom, culture, a local and cultural wisdom approach, learning theory, ethnopedagogy, ethnobiology, ethnozoology, ethnobotany, and high school biology content are some of the keywords that were employed.

3 Result and Discussion

Sub-topics will be explored in this part, such as: What is local wisdom and cultural approach in Biology? And In Biology, how do you approach local wisdom and culture?

3.1 What is local wisdom and cultural approach in Biology?

Local wisdom is also known as local policy (local wisdom), local knowledge (local knowledge), or local intelligence (local genius) in other languages [16][17]. Local wisdom is defined as a human endeavor to respond and behave in response to objects or occurrences in a specific place utilizing reason (cognition) [18]. Local wisdom, according to Law 32 of 2009, is the noble values that apply in the life of the community to protect and manage the environment in a sustainable manner, among other things [19].

Local wisdom is an idea and knowledge that is owned, guided, and implemented by a local community with wise, good value, and virtuous nature [20] [17] [21] and passed down from generation to generation in which benefits include: preservation of natural and human resources as well as customs and culture [22]. Local wisdom can be said to be a combination of cultural values and belief values [23]. Local wisdom has the following characteristics: 1) it is based on experience; 2) it has been tested over centuries of use; 3) it can be adapted to current culture; 4) it is coherent in the daily practice of the community and institutions; 5) it is commonly practiced

by individuals or society as a whole; 6) it is dynamic and constantly changing; and 7) it is strongly related to belief systems [24]. Local Wisdom is closely related to the culture.

Humans create culture, and once culture is established, it regulates human life [25]. Humans and culture have a reciprocal relationship at a specific time and place, according to Cultural Anthropology, which views culture as the result of human creations using the mind, encompassing 7 (seven) systems, including language, organization, technological means, science, religion, art, and livelihood [26]. Humans have a cause to create culture that is based on creativity, taste, and intent. Creativity is the ability to think in order to discover the truth of anything, aided by the ability to feel in the form of mood movements (like it or not, happy-distress, shame-proud, hate-love) in which there is a will (intended power) that always manifests as the fruit of thought and taste [27].

As per those descriptions of ideas and theories, culture (culture) is the outcome of human creativity, taste, and initiative manifesting itself in the shape of customs, arts, and religious beliefs (religion) among the local population. There is a link between the terms "local wisdom" and "culture" when seen from different perspectives. This can be seen in the elements that are inextricably linked to one another. Local wisdom, also known as indigenous or local knowledge, or local intelligence (local genius) in Anthropology, is the foundation of cultural identity [17].

Education and culture are 2 (two) things that are intertwined because education is always evolving in response to cultural advances, and culture can guide humans according to the rules and conventions that are utilized as life guidelines [28]. For the application of local wisdom and culture, the learning technique may be a viable option. The approach of Local Wisdom and Culture is based on ethnobiology, ethnoecology, and ethnopedagogy studies, in addition to learning theory.

3.2 In Biology, how do you approach local wisdom and culture?

After ethnobotany, ethnozoology, and ethnoecology, ethnobiology evolved as a science [29]. In general, ethnobiology is characterized as a scientific assessment of a population's knowledge of plants (botany), animals (zoology), and the natural environment (ecology) [13]. Ethnobiology includes ethnobotany, ethnozoology, ethnoecology, ethnolikenology, and ethnomycology, among other sub-disciplines [30]. Ethnopedagogy is a discipline of education that researches and develops conditions in which humans (students and teachers) can better understand themselves based on ethnic cultural values or specific community/nation groups [31].

Initially, ethnobotany focused on the study of indigenous (local) population botanical knowledge (plant science) by examining the use and economic possibilities of plant species regularly employed by local populations, and eventually anthropological and ecological components emerged [29]. Botany, ethnopharmacology, anthropology, ecology, economics, and linguistics all contribute to ethnobotany, which is a multidisciplinary science that relies on projects designed by researchers from a variety of disciplines [32]. Ethnobotany is the study of plants as food, protection or habitation, medicine, clothing, hunting, and traditional ceremonies in the context of local cultures and their environment [33]. Ethnobotany is the study of the human-plant connection [34] [32]. Ethnobotany studies the relationship between ethnicity and extant plants over time as human civilization progresses [35].

Ethnozoology is a branch of ethnobiology that studies the past and present relationships (interrelationships) between animals and humans [36] [37]. Through the collecting of data on local knowledge of local communities, ethnozoological research can make a significant contribution to the process of recognizing animal natural resources [38]. Food, symbols/myths/religion/arts/culture, and ornaments/decorations/equipment are some of the

animals/fauna that can be examined [39]. Ethnozoology makes it look into things like: a) cultural perceptions and zoological classification systems; b) stories, myths, and people's beliefs; c) biological and cultural aspects of human animal use; d) methods for obtaining various animal organs for food, traditional medicine, ritual materials, and cosmetics; e) animal maintenance by residents; and f) animal conservation management efforts [40].

Ethnoecology is inextricably linked to the sciences, such as sociology, anthropology, economics, meteorology, climatology, geology-pedagogy, geomorphology, oceanology, hydrology, phytology, and zoology, where cultural development and ecosystem changes manifest themselves in natural environmental phenomena, the community environment [41]. Ethnoecology is a field of study that studies how people use ecology and live-in balance with their natural and social surroundings [42]. Ethnoecology encompasses all studies that describe indigenous (local) peoples' reciprocal connections with the natural environment, including ethnobiology, ethnobotany, and ethnozoology [29].

Ethnopedology is the application of learning geared toward the development of local knowledge values [43]. Ethnopedology can also serve as a foundation for teacher education by fostering noble human relationships between teachers and students as a means of transmitting cultural values [44]. Ethnopedology investigates and strengthens the presence of local knowledge in the student's social environment, where teachers develop cultural values and local wisdom via the learning process, rather than evoking ethnicity but valuing culture as a national identity [45].

The Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 79 of 2014, which states that there is a need for local content containing content and learning processes about local potential and uniqueness to form students' understanding of excellence and wisdom in their area of residence, is the foundation for the Local Wisdom and Cultural Approach. Learning theory, biology curriculum, anthropology, ethnobiology, and ethnopedology are some of the concepts that must be understood in order to address local wisdom and culture in the research. The Local Wisdom and Culture Approach has principles that become its formulation, including student centered learning, joyful learning, meaningful learning, scientific learning, and local wisdom and cultural learning, which are based on descriptions of theories [46][47].

The author describes the approach to local wisdom and culture, which is shown in Figure 1, based on the theory that has been described. There are three (three) outer circles and one interior circle in Figure 1. The three outside circles represent studies or branches of knowledge that create the foundation for the center circle. Ethnobiology, ethnoecology, and ethnopedology are studied in the outer circle. The author concludes that ethnobiology comprises ethnobotany and ethnozoology because ethnobiology has a long history and has been discussed in numerous works. Why are these two fields of science documented?

This is due to the fact that it has been tailored to the biology curriculum for high school students. Ethnoecology is a branch of research that studies how ecology and ethnobiology interact. Ethnopedology is the study of the field of education that is aimed largely at teachers and future teachers. This can, however, be included in this Approach because the learning approach is for both students and teachers. An inner circle will be formed by these three scientific researches.

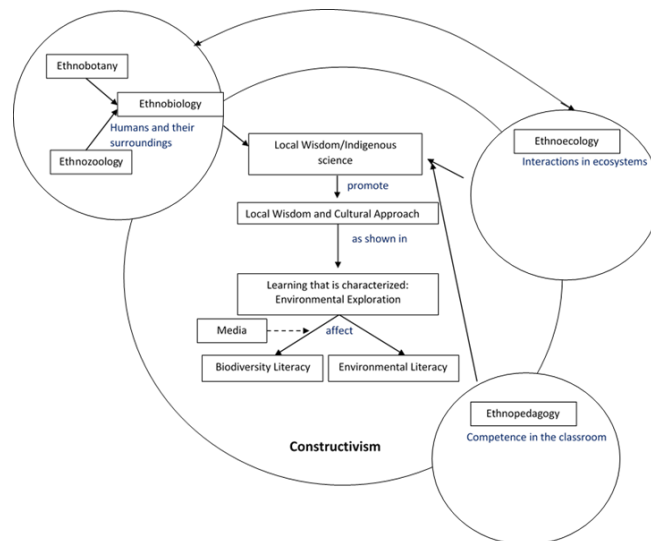


Fig 1. Biology Learning: An Overview of Local Wisdom and Cultural Approaches

This inner circle is a compilation of Biology information that can be used in the classroom. Local wisdom and indigenous science are intimately linked to the three sciences (ethnobiology, ethnoecology, and ethnopedagogy). This indigenous science and local wisdom will subsequently serve as the foundation for the Local literacy and environmental literacy. The disadvantage of this article is that it is Wisdom and Cultural Approach that can be demonstrated in learning. Exploring nature while using problem-solving techniques is the suggested approach of learning.

Learning media can be used, but it is not required, hence a dotted line has been drawn. Constructivism philosophy can be used to help with this learning. This approach is intended to promote biodiversity merely a literacy study; a more comprehensive systematic evaluation is required to establish a more trustworthy and valid idea of Local Wisdom and Cultural Approach.

4 Conclusion

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. Culture is the result of human creativity, taste, and initiative expressed via customs, arts, and religious beliefs (religion) among the local population. The Local Wisdom and Cultural Approach is an approach of teaching biology and cognate science subjects that incorporates ethnobiological studies, such as ethnobotany, ethnozoology, ethnoecology, and ethnopedagogy, as well as learning principles such as student-centered learning, joyful learning, meaningful learning, scientific learning, and local wisdom and cultural learning.

References

- [1] C. T. Anni, A. Rifai, E. Purwanto, and D. Purnomo, Learning Psychology. Semarang: Semarang State University, 2007.
- [2] S. Hidayat, Educational Theories and Principles. Tangerang: Pustaka Mandiri, 2013.
- [3] M. Syah, Learning Psychology. Jakarta: Grafindo Persada, 2009.

- [4] S. Alimah and A. Marianti, "Exploring the natural environment: approaches, strategies, models, and methods for learning character biology for conservation," Semarang: UNNES. 2016.
- [5] N. Nurmelly, "Approaches, Models, and Strategies in Learning," 2013. [Online].
- [6] Lefudin, *Learn and Learning*. Yogyakarta: Depublish, 2017.
- [7] U. Lutvaidah, "The Influence of Learning Methods and Approaches on Mastery of Mathematical Concepts," *Form. J. Ilm. Pendidik. MIPA*, vol. 5, no. 3, pp. 279–285, 2016, doi: 10.30998/formatif.v5i3.653.
- [8] Z. Sa'adah, "National Identity and the Potential of Constructive Resources as Assets for the Creative Economy in Indonesia," *J. Econ.*, vol. 11, no. 2, p. 150, 2015, doi: 10.21831/economia.v11i2.8239.
- [9] Minister of Education and Culture of the Republic of Indonesia, "Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 79 of 2014 concerning Local Content of the 2013 Curriculum," 2014.
- [10] H. I. W. Basyari, "Local Wisdom Values (Local Wisdom) Memitu Tradition in the Cirebon Community (Study of the Community of Setupatok Village, Mundu District)," *Eduomic*, vol. 2, no. 1, pp. 47–56, 2011.
- [11] I. B. Brata, "Local Cultural Wisdom Adhesives National Identity," *J. Bakti Sar.*, vol. 5, no. 1, pp. 9–16, 2016.
- [12] F. Adinugraha and A. Ratnapuri, "Biodiversity Module with Local Wisdom and Cultural Approach in Purworejo District," *SAP (Susunan Artik. Pendidikan)*, vol. 5, no. 1, 2020, doi: 10.30998/sap.v5i1.6534.
- [13] J. Iskandar, "Ethnobiology and Cultural Diversity in Indonesia," *Indones. J. Anthropol.*, vol. 1, no. 1, pp. 27–42, 2017, doi: 10.24198/umbara.v1i1.9602.
- [14] I. S. Kurniawan and R. Survani, "Integration of Ethnopedagogy in Developing Biology Learning Models," *J. Konseling dan Pendidik.*, vol. 6, no. 1, p. 15, 2017, doi: 10.29210/119200.
- [15] F. Adinugraha, A. Ratnapuri, A. I. Ponto, and Novalina, "Overview of the 2013 Curriculum Biology Learning Approach in Private High Schools in Purworejo Regency," *J. Ilmu Pendidik. Indones.*, vol. 9, no. 1, pp. 1–17, 2021.
- [16] Daniah, "Local Wisdom (Local Wisdom) as a Base for Character Education," *Pioner J. Pendidik.*, vol. 5, no. 2, pp. 1–14, 2016.
- [17] N. Nasruddin, S. D. Kusumah, and B. H. S. Purwana, *Local wisdom book in the midst of modernization*. Jakarta: Center for Cultural Research and Development Agency for the Development of Cultural Resources and Tourism Ministry of Culture and Tourism of the Republic of Indonesia, 2011.
- [18] A. F. Diem, "Wisdom of the locality (a study: local wisdom in traditional Palembang architecture)," *Berk. Tek.*, vol. 2, no. 4, pp. 299–305, 2012.
- [19] President of the Republic of Indonesia, "Law of the Republic of Indonesia Number 32 of 2009 concerning Environmental Protection and Management," 2009.
- [20] S. Affandy, "Instilling Local Wisdom Values in Improving Students' Religious Behavior," *Atthulab Islam. Relig. Teach. Learn. J.*, vol. 2, no. 2, pp. 69–93, 2019, doi: 10.15575/ath.v2i2.3391.
- [21] S. Sartini, "Exploring the local wisdom of the archipelago, a philosophical study," *J. Filsafat*, vol. 37, no. 2, pp. 111–120, 2004.
- [22] E. N. Kristiyanto, "Local Wisdom Position and Role of Society in Spatial Planning in the Region," *Rechts Vinding*, vol. 6, no. 2, pp. 159–177, 2017.
- [23] V. Ade and I. Affandi, "Implementation of Local Wisdom Values in Developing Citizenship Skills (Analytic Descriptive Study of the Talang Mamak Community, Rakit Kulim District, Indragiri Hulu Regency, Riau Province)," *J. Pendidik. Ilmu Sos.*, vol. 25, no. 1, p. 77, 2016, doi: 10.17509/jpis.v25i1.3671.
- [24] A. C. Alwasilah, K. Suryadi, and T. Karyono, *Ethnopedagogy: The Foundation for Teacher Education and Practice*. Bandung: PT Kiblat Buku Utama, 2009.
- [25] M. Mahdayeni, M. R. Alhaddad, and A. S. Saleh, "Humans and Culture (Humans and Cultural History, Humans in Cultural Diversity and Civilizations, Humans and Sources of Livelihood)," *Tadbir J. Manaj. Pendidik. Islam*, vol. 7, no. 2, pp. 154–165, 2019, doi: 10.30603/tjmpi.v7i2.1125.

- [26] S. Miko, *Cultural Anthropology*. Padang: Faculty of Literature and Arts, Padang State University, 2008.
- [27] Hadiwinarto, "The Urgency of Spiritual Counseling," *J. Bimbingan. Konseling Ar-Rahman*, vol. 4, no. 2, pp. 40–46, 2018.
- [28] Normina, "Education in culture," *Ittihad J. Kopertais Wil. XI Kalimantan*, vol. 15, no. 28, pp. 17–28, 2017.
- [29] J. Iskandar, *Ethnobiology, Ethnoecology, and Sustainable Development*. Yogyakarta: Plantaxia, 2018.
- [30] E. Anderson, D. Pearsall, E. Hunn, and N. Turner, *Ethnobiology*. New Jersey: John Wiley & Sons, Inc., Hoboken, 2011.
- [31] A. R. Hamdani et al., *Ethnopedagogy: Local Wisdom as the Foundation of Education*. Bandung: Alfabeta, 2017.
- [32] G. J. Martin, *Ethnobotany: "Human and Plant" Care Manual*. Maryati Mohamed translation. Kinabalu: Natual History Publications anad World Wide Fund for Nature, 1998.
- [33] S. Eko Atmojo, "Introduction of Ethnobotany Using Plants as Medicine to the Community of Cabak Jiken Village, Blora Regency," *J. Ilm. WUNY*, vol. 15, no. 1, 2015, doi: 10.21831/jwuny.v15i1.3529.
- [34] Astria, S. Budhi, and L. Sisillia, "Ethnobotany Study of Medicinal Plants in the Community of Semoncol Hamlet, Balai District, Sanggau Regency," *J. Hutan Lestari*, vol. 1, no. 3, pp. 1–9, 2013.
- [35] M. Silalahi, "Ethnobotany in Indonesia and its Development Prospects," *Artik. Delivered at the OMPT Canopy UI public lecture on Wednesday, November 4. 2015*, no. November, pp. 1–13, 2015.
- [36] E. Fitriah, "Research Based Learning Ethnozoology Model To Improve Science Generic Skills and Scientific Attitudes Of Biology Teacher Students," *Urecol Proceeding*, no. February, pp. 1261–1273, 2017.
- [37] Pilatus, S. . Kartikawati, and M. S. Anwari, "Ethnozoology of the Kanayant Dayak tribe in Babane Village, Bengkayang Regency," *J. Hutan Lestari*, vol. 5, no. 3, pp. 858–867, 2017.
- [38] M. Y. Farida, Jumari, and F. Muhammad, "Ethnozoology of the Anak Dalam Tribe (SAD) Kampung Kebun Duren, Lantak Seribu Village, Renah Pamenang District, Merangin Regency, Jambi Province," *J. Biol.*, vol. 3, no. 1, pp. 29–39, 2014.
- [39] U. Faizah, R. Ambarwati, and T. Haryono, "Ethnozoology in Learning Vertebrate Taxonomy at the Biology Department, FMIPA Unesa," *Pros. Semin. Biol.*, pp. 1–9, 2013, [Online].
- [40] R. R. N. Alves and W. M. S. Souto, "Ethnozoology: A Brief Introduction," *Ethnobiol. Conserv.*, vol. 4, no. 2015, 2015, doi: 10.15451/ec2015-1-4.1-1-13.
- [41] R. Hilmanto, *Etnoekologi*. 2010.
- [42] D. Ambarwati and F. Istianah, "Ethnoecology as an Effort to Shape Environmental Care Characters through the Adiwiyata Program at Lidah Kulon I/464 Public Elementary School Surabaya," *J. Penelit. Pendidik. Guru Sekol. Dasar*, vol. 6, no. 2, p. 254756, 2018.
- [43] I. Oktavianti and Y. Ratnasari, "Ethnopedagogy in Learning in Elementary Schools Through Media Based on Local Wisdom," *Refleks. Edukatika J. Ilm. Kependidikan*, vol. 8, no. 2, 2018, doi: 10.24176/re.v8i2.2353.
- [44] T. Suratno, "Interpreting Ethnopedagogy as the Foundation of Teacher Education at the Indonesian University of Education," *Proceeding 4th Int. Conf. Teach. Educ.; Join Conf. UPI UPSI*, no. November, pp. 515–529, 2010.
- [45] A. Senen, "Social Studies Education Based on Regional Cultural Values Learning Studies with Ethnopedagogical Approach," 2015. [Online].
- [46] F. Adinugraha, "Tari Dolalak as a Form of Approach to Local Wisdom and Culture (Kalbu) in Biology Subjects," *EDUKA J. Pendidikan, Hukum, Dan Bisnis*, vol. 3, no. 1, 2018, doi: 10.32493/eduka.v3i1.3803.
- [47] F. Adinugraha and A. Ratnapuri, "Biodiversity module with local wisdom and cultural approach in Purworejo district," *SAP (Susunan Artik. Pendidikan)*, vol. 5, no. 1, 2020.