

Ethnoscience: A Philosophical Study with Anthropological, Ontological and Axiological Perspectives

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Abstract. One of the emerging scientific developments is science-based local wisdom, or "ethnoscience." This research examines the urgency of ethnoscience when viewed from a philosophical perspective with an anthropological, ontological, and axiological perspective approach. This research uses a library research method with relevant sources related to the studied topic, such as books, scientific articles, and other relevant sources. The results of this study present how critical philosophical studies are to a science that is being developed, especially those that involve community culture. In addition, anthropological, ontological, and axiological perspectives provide an idea of a point of view that not only always refers to the research process but also the need to pay attention to the norms and values of the local culture. That way, future research related to ethnoscience has excellent potential to continue to be carried out through rational considerations and benefit science, culture, society, and the nation.

Keywords: ethnoscience; norms; perspective; philosophy

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DOI : <https://doi.org/10.20527/jvk.v39i1.17912>

Received: 29 November 2023

Accepted: 2 February 2024

Published: 26 April 2024

How to cite: Amiruddin, M. Z. B., Nahadi, N., Anwar, S., & Samsuddin, A. (2024). Ethnoscience: a philosophical study with anthropological, ontological, and axiological perspectives. *Vidya Karya*, 39(1), 12-22.

INTRODUCTION

As a country rich in diverse cultures and traditions, Indonesia has unique and valuable local wisdom. This wisdom includes understanding nature, the environment, and how humans interact with them (Staudinger et al., 2003; Yuliana et al., 2021). As an essential part of societal development, science education must integrate local wisdom into the curriculum and teaching methods. However, local wisdom is often ignored or minimally considered in the current educational reality, thus creating a mismatch between what is taught in schools and existing cultural values and local knowledge (Levinson & Holland, 1996; Rogan & Grayson, 2003; Sher, 2019).

Considering local wisdom in science education is important to create more meaningful and relevant learning for students, specifically in Indonesia. According to Cobern & Loving (2001); Murti (2020); Noor & Sugito (2019), by understanding and respecting local wisdom, students will more easily understand complex scientific concepts and feel a deeper connection between science and their cultural realities. Local wisdom is a way of life and knowledge as well as various life strategies in the form of activities carried out by local communities in responding to various problems to fulfill their needs (Amiruddin et al., 2023; Amiruddin & Suliyannah, 2023; Arrafi et al., 2023; Sari et al., 2023). In addition, the term

Ethnoscience emerged, an approach to science learning that implements local wisdom (regional culture) using certain cultural products (Abonyi et al., 2014; Fasasi, 2017). It can also increase students' interest in science and motivate them to explore further in science.

Although many efforts have been made to incorporate local wisdom into science education, many challenges must be overcome. One of the main challenges is integrating local knowledge into existing science curricula while ensuring that students understand universal science (Tohri et al., 2022; Zidny et al., 2020). Therefore, a careful and balanced approach is needed to combine local wisdom with nationally recognized science. Another term that is often used is ethnoscience.

As an exciting branch of anthropology, ethnoscience takes us into the world of traditional knowledge and understanding held by various groups of people in Indonesia and even the world. According to Gómez-Baggethun (2022); Hird et al., (2023); Rarai et al., (2022), this is not just a collection of local knowledge but also a form of knowledge that reflects the ontological views and values that grow in ethnic cultures. In ethnographic and anthropological research, it is important to explore and understand the ethics and axiology inherent in this traditional knowledge while reflecting on its implications for the growth of science more broadly.

Anthropological, ontological, and axiological perspectives can provide valuable frameworks to address these issues. Anthropology helps us understand how local wisdom is reflected in community culture and traditions (Lubis, 2019; Luzbetak, 2015; Sillitoe, 1998). Ontology helps us understand basic concepts about the universe and different worldviews (Al-Ababneh, 2020; Muller et al., 2019; Sire, 2020). Axiology allows us to consider the values and ethics contained

in local wisdom (Hayati & Dalimunthe, 2022; Suprpto et al., 2021). With this approach, we can create science education that respects and integrates local Indonesian wisdom, bridges the gap between science and culture, and creates students who are more connected to the environment and have ethical awareness of the use of science. Several questions will be answered in this research as follows:

RQ1. What is the anthropological perspective on ethnoscience?

RQ2. What is the perspective of ontology towards ethnoscience?

RQ3. What is the axiological perspective on ethnoscience?

RQ4. What is the contribution of ethnoscience?

METHOD

This research uses the literature study method (library research). A literature study (library research) is a study that uses collection materials in the form of books, journals, and other sources that are considered relevant without conducting field research (Connaway et al., 2017; Connaway & Radford, 2021). To answer the questions in this research, the author used various documents considered relevant for solving the problem through several stages presented in Figure 1.

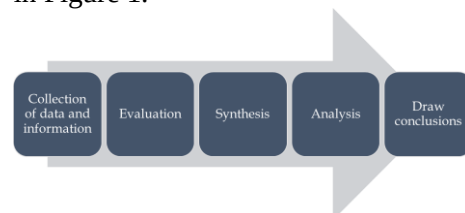


Figure 1 Research steps

Based on Figure 1, this research was carried out by selecting and choosing books, journals, and other literature related to the philosophy of science, wisdom local, and anthropology, which stands alone as a science by fulfilling the elements of ontology and axiology.

To ensure the validity and legitimacy of various sources, the author evaluated, conducted content analysis and synthesized related sources. This means that written sources relating to the existence of local wisdom, which are integrated into independent science, are carried out by evaluating, comparing, analyzing, and synthesizing various sources so that they can be formulated to conclude.

RESULT AND DISCUSSION

Anthropological Perspectives on Ethnoscience

The anthropological perspective on ethnoscience or ethnic science is very positive and focuses on understanding, appreciating, and researching the traditional knowledge of a particular ethnic group or society. Anthropological perspective on ethnoscience can vary depending on the anthropologist's approach and point of view. According to Franz Boas (1896, 1904); Boas et al., (2021), it is important to understand that the knowledge and beliefs of one group cannot be measured or assessed by the standards of another culture. In context ethnoscience, Boas encouraged respect for local knowledge and understanding it within the cultural framework of origin in accordance with the concept that has been introduced, namely the concept of cultural relativism.

"There are no universal truths regarding values or norms; every society has its way of understanding and living life. Cultural relativism teaches us to appreciate differences and accept that each culture has its intrinsic values."

In the context of cultural relativism, each society has a unique frame of reference that shapes how it views the world and should not be measured by the standard values or norms of other cultures. Understanding a culture must be placed in the context of the culture itself, without imposing views or values from outside. That matters according to

the basic approach of ethnoscience, which emphasizes the importance of understanding local knowledge and the worldview of a particular community (Rist & Dahdouh-Guebas, 2006; Sotero et al., 2020; Zidny et al., 2020). Besides that, ethnoscience often involves active community participation in the research process. Data is usually collected through interviews, observation, and direct interaction with community members who have traditional knowledge.

According to Malinowski et al., (1986), functionalism is emphasized. Malinowski's functionalist approach provides the theoretical foundation to understand the role and function of various cultural elements, including traditional knowledge, in maintaining the stability and survival of society (Brusotti, 2022).

In context ethnoscience, this allows researchers to understand the relationship between local knowledge and the practical needs of society more deeply. For example, traditional knowledge is used in daily practices, such as treating diseases, agriculture, or other activities that support community life. An approach to ethnoscience can open broader horizons related to how wisdom is associated locally with explainable science and proven by existing facts.

However, in philosophical terms, not everything can be measured through science or scientific methods. For example, the public believes that coconut water has the potential to neutralize toxins in the body. This becomes a public belief that is proven to cure diseases. However, there is ethnic not blame trust, which is adhered to by the public, but looking at the content of what is in coconut water so that it can neutralize existing poison. As it is ethnic, it can strengthen indigenous science, transforming it into a scientific science that the general audience can trust.

According to Evans-Pritchard (1969), a social anthropologist known for his contributions to understanding the Azande people in Sudan and the Nuer tribe in Ethiopia. In the context of knowledge ethnoscience, Evans-Pritchard emphasizes the analysis of the social structure and social context of society to understand how traditional knowledge is organized and maintained. Evans-Pritchard views knowledge ethnoscience as a product of social structures and the broader social context of society, emphasizing how knowledge is closely related to social structures and interactions.

Sometimes, local knowledge can be threatened with extinction due to modernization, urbanization, or other external pressures (Fernández-Llamazares et al., 2021; Pilgrim et al., 2008). One thing that can be done is to integrate indigenous science with local wisdom to become scientific knowledge with cultural elemental notes. It is not lost, and just modified knowledge science works to explain everything scientifically. In other words, it can explain how culture can be produced and play a societal role. In addition, it can also protect and promote the diversity of cultural knowledge as an integral part of human heritage.

Ontology Perspectives in Ethnoscience

An ontological perspective on ethnoscience or ethnic science is concerned with understanding how reality is interpreted and understood by certain societal or cultural groups (Ellen 2004; Ludwig and Weiskopf 2019; Rist and Dahdouh-Guebas, 2006). Ontology covers fundamental questions about the nature of reality and existence. In the context of ethnoscience, ontology is related to how the nature of indigenous science (indigenous science) is transformed into scientific science,

which is often heard with the term ethnoscience.

A deep ontology perspective of ethnoscience accepts that various groups can have different ontological views of reality and objects (Weiskopf 2020; Wilcock, Brierley, and Howitt 2013). What is considered a real entity or object can vary between societal groups? In this case, to integrate science into local wisdom, what we can be sure of also has limitations, which draft those in science must be adapted to local wisdom, including what is and what is not and vice versa.

One of the thoughts that can be associated with ontology is theory from the perspective of Friedrich Nietzsche (Page, 1998), which states below:

"Ontology or reality depends on a particular perspective or point of view. In this view, reality can be viewed from multiple perspectives, and each perspective uniquely contributes to the overall understanding."

By applying the theory of perspectivism to ethnoscience, researchers can appreciate and understand the richness of various local points of view regarding traditional knowledge. It also allows recognition of the active role of non-human entities and how interactions between humans and nature shape people's understanding of the world around them. In the study of ethnoscience, an ontological perspective that is open and respectful seeks to understand different ontological views in different societal groups (Chilisa, 2019; Furlan et al., 2020). Apart from that, it can also help in a deeper understanding of how certain groups of people understand and perceive their reality and in recognizing the diversity of ontological viewpoints worldwide.

Additionally, one that supports perspective ontology is the theory of constructivism. Although theoretical constructivism is often associated with epistemology, it can also provide

ontological support. The constructivist view recognizes that social realities and local knowledge can result from social construction (Burningham & Cooper, 1999; Elder-Vass, 2012; Jovchelovitch, 2001). In context, ethnoscience can be translated as an understanding that local knowledge is reflected in how people construct their meaning about nature and its elements. This theory is supported by several research results from Amiruddin et al. (2022), Arrafi et al. (2023), and Uge et al. (2019); through a wisdom approach, local science can give something meaningful to local wisdom and learning with contextual examples for more meaningful learning.

According to SUDARMİN et al. (2020), the essence of ethnoscience can be grouped into three, namely, (1) grouping through regional languages, (2) norms and ethics based on regional culture, and (3) indigenous knowledge systems are described according to culture. The main goal of ethnicity is to provide contextual examples for students to learn abstract things where these cultures have a relationship that can be explained scientifically. That way, learning can be interpreted by giving real examples of the learning carried out.

Axiological Perspective on Ethnoscience

The axiological perspective on ethnoscience relates to value considerations, ethics, and judgments about traditional knowledge and practices within a particular community group. According to Handoyo (2015) and Hartman (2011), axiology is a branch of philosophy that considers values, morality, and judgments about good or bad. The axiological perspective considers how knowledge and practice are assessed from an ethical and values perspective. This involves questions about whether ethnic knowledge is considered positive, useful, or respected, or conversely considered negative,

detrimental, or incompatible with certain values.

Deep axiological perspective ethnoscience helps researchers understand how values and ethics play an important role in how community groups understand and engage with indigenous knowledge transformed into general knowledge through scientific explanations. This reflects the need to respect and protect ethnic knowledge in a manner consistent with society's cultural values.

The view of scientists in deep axiology ethnoscience tends to reflect prudence and ethical responsibility towards the community that is the subject of research. Some aspects of keywords in perspective scientist to deep axiology ethnoscience are presented in Figure 2.

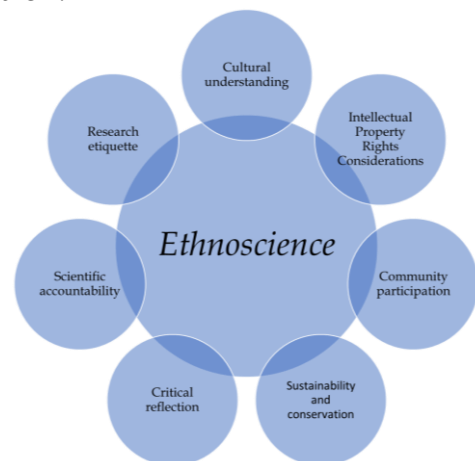


Figure 2 Perspective Scientist to deep axiology ethnoscience

Figure 2 presents the perspective of scientists on deep axiology in ethnoscience. According to Khusniati et al., (2023); Yuliana et al., (2021), scientists involved in research in ethnoscience understand the importance of research ethics. In line with what has been said, understanding related to the local cultural context of wisdom must be truly understood in a complex manner. This is important for the correct interpretation of traditional knowledge and for ensuring that research does not

exploit or denigrate local culture. In line with Nadasdy (1999); Sorokin (2017), to integrate culture with known science, it is very necessary to notice the process so that there is no manipulation of results outside of existing cultural truths. Therefore, it is important to respect the intellectual property rights of local communities to avoid unauthorized expropriation and consider mechanisms for the fair distribution of benefits.

According to Chilisa (2019); Mercer et al., (2010); Zakiyah & Sudarmin (2022), incorporating a participatory approach in research ethnosience Involving local communities in research planning, data collection, and developing research results will be of great help in transforming genuine science becomes scientific science. This is because the

public can help identify traditional knowledge relevant to the local wisdom and the scientific concepts discussed and researched. From the results obtained, evaluating the ethical implications of the research already carried out before being used in the learning process or published is necessary.

The Contribution of Ethnosience

In supporting the anthropological point of view, ontology, and axiology can be carried out through literature from the study results published in a reputable journal. Based on this, the author selected five articles on ethnosience and see what form of contribution they made to each field studied. The results of the review are presented in Table 1.

Table 1 Review contribution of ethnosience

No	Authors	Results	Recommendation
1	(Dewi et al., 2021)	The scientific literacy instrument validity test results show that all instrument items are valid. In addition, the findings indicate that the learning approach is contextually based on ethnosience (CCLBE) and can improve students' scientific literacy	Next, researchers will conduct similar research similar to demonstrate the effectiveness of the model CCLBE, especially in assessing students' scientific literacy from other learning areas
2	(SUDARMİN et al., 2020)	Through an ethnosience-based approach, the inquiry was able to explain Taxus Sumatrana and its role as an anticancer through the results of laboratory experiments.	Ethno-STEM inquiry model in integrated inquiry-based science learning ethnosience should be expanded to other subjects and topics.
3	(Ardianti & Raida, 2022)	The t-test results show that the value count amounts to $2.452 > t_{table} 2.011$, so there is a significant difference in the post-test average of experimental and control class students. The average score of student responses to using the PjBL model with the ethnosience approach is 89.6, with perfect criteria. Applying the PjBL model with the approach of ethnosience influences the understanding of	The limitation of this research is the lack of knowledge of students and teachers in identifying local advantages. This is an important part of implementing based learning ethnosience. Thus, studying more broadly related to wisdom locally in other learning contexts is important.

No	Authors	Results	Recommendation
4	(Zidny & Eilks, 2022)	scientific concepts. Most students found the lesson plans motivating and inspiring. They recognize that learning chemistry can be linked to knowledge of their native cultural environment. This can potentially increase students' awareness of knowledge around the cultural climate to increase scientific and cultural literacy.	Further research needs to explore more aspects of learning with ethnoscience in general and the practices of ethnoscience in the fields of chemistry and agriculture in particular
5	(Fasasi, 2017)	A significant main effect of treatment on science attitudes ($F(1, 347) = 296, p < 0.05$) was noted, with the instruction group ethnoscience performing better than the Modified Lecture Method group.	Further research should be conducted regarding the effects of ethnoscience Instructions (EI) on other learning outcomes in science.

Based on Table 1, it can be seen that the contribution of ethnoscience is significant. It can be ascertained that the potential of the ethnoscience being integrated into various scientific sectors is exciting to research. If we look at it from the point of view of ontology, the axiology is undoubtedly in line with the values contained therein. This is because the published article above was indexed in past previous reviews. That way, everything becomes a study of ethnoscience. It is confirmed through rational thinking before being accepted. On the other hand, science-integrated ethnoscience must also be significantly considered before carrying out this research (Ellen, 2004; Evaneshko & Kay, 1982; Nurhasnah et al., 2022).

However, several things must be considered when implementing ethnoscience in the science being researched, such as (1) the capability of local wisdom in explaining the science being discussed, (2) appropriate cultural context, (3) scientific relevance, (4) research ethics, (5) communication and dissemination of results. Conduct ethnoscience research. Paying attention to these aspects can ensure that the research is conducted with respect for the diversity of local knowledge and can make a meaningful contribution to local

and global scientific understanding through generally accepted scientific processes and considerations.

CONCLUSION

Based on the results of the literature review that has been conducted on ethnoscience from the point of view of anthropology, ontology, and axiology, it can be concluded that to integrate ethnoscience with the science under study requires rational thinking, the basis for integrating ethnoscience what is done, and cultural values and norms that must be adhered to in accordance with the local wisdom under study. In addition, the ethics of scientific research must also be adjusted to the cultural standards of the local community. In addition, the integration of ethnoscience cannot be forced to not violate cultural rules and values in accordance with anthropological and axiological perspectives. The results of this study can have implications for the addition of information related to ethnoscience from a philosophical point of view. Thus, research is not just research but has a strong basis for why the research needs to be done. In future research, it is necessary to pay attention to the things that have been conveyed such as research ethics in line with the culture of

the community so that the science obtained is not imposed according to the will of the researchers, but in accordance with what is found in the field.

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