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HOW STRUGGLE PRIMARY PRESERVICE TEACHERS DEFINE ETHNOSCIENCE?

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Abstract. *This research aims to analyze the perspective of Primary Preservice Teachers about Ethnoscience. This study used quantitative research with a survey method. This research was conducted at the Madrasah Ibtidaiyah Teacher Education study program, UIN Maulana Malik Ibrahim Malang. The research sample used 92 primary preservice teachers in third and fifth grade. The instrument of this research is in the form of a questionnaire which is distributed online via a google form. The research instrument was compiled based on the operational definition of ethnoscience. The questionnaire consists of 9 closed questions about the concept of ethnoscience and 1 open question about examples of ethnoscience. The research results show that in quantitative data almost all preservice teachers agree about the connection between science learning and local wisdom. However, the open-ended questionnaire showed that 93,4% of preservice teachers struggle to give an example about ethnoscience. Thus, it is recommended that preservice teachers be equipped with ethnoscience knowledge, so when they become real teachers, they know how to use ethnoscience in the classroom.*

Keywords: Ethnoscience; Primary Preservice Teachers Perspective; Science Learning; Local Wisdom.

A. INTRODUCTION

The Declaration on Science and the Use of Scientific Knowledge in paragraph 26 state that historically local and traditional knowledge systems have made valuable contributions to science and technology (Hountondji, 2006). For this reason, this knowledge should be maintained, researched, and used in learning, because local knowledge is close to students' daily lives. Meanwhile, in paragraph 87 section 3.4, the Government should provide support to establish relationships and cooperation between traditional knowledge owners (local communities) and academics and researchers to explore the relationship between knowledge systems (Hountondji, 2006). The relationship between local people who have knowledge and academics, or researchers are expected to produce empirical evidence about knowledge that comes from customs, habits, or culture and culture. Through a systematic method, empirical evidence is compiled and analyzed so that it becomes knowledge.

The knowledge that comes from the surrounding community is a meaningful source of learning. The knowledge that comes from the community has long existed and has been passed down from generation to generation. This knowledge is easier to recognize, see or even do by students. Interaction with local knowledge that comes from the community, or the surrounding environment will be more easily understood by students. According to Kiray and Simsek (Kiray & Simsek, 2021), the interaction of students with their environment continuously, will make it easier to learn concepts, build new knowledge from the results of knowledge, attitudes, skills

learned in their minds with the experiences they gain from their lives. Schools and teachers should re-evaluate the strategies, methods, or approaches used in learning by not leaving the local knowledge possessed by students or the surrounding community (Emeagwali & Shizha, 2016). Local knowledge that has been owned, should be developed, and integrated into learning. This integration will provide benefits for the ease of obtaining or understanding the material being studied. The knowledge gained by students will be more comprehensive and meaningful.

The description above shows that there is a potential relationship between local knowledge, customs, and community habits with education, especially science education. Local knowledge of the community can provide further perspectives and can help to see the characteristics of this knowledge (Zidny et al., 2020). Understanding the characteristics of science will facilitate the determination of methods, strategies, methods, and approaches to be applied in learning.

Learning based on local knowledge, or the culture of an area is known as ethnoscience. Ethnos is the culture, customs, habits, or culture of the people of an area, while science is science. Ethnoscience is related to various fields such as health, mathematics, geography, and especially education science (Sotero et al., 2020). This connection can be used in classroom learning. Based on the results of observations of various socio-cultural realities, it shows that there is effectiveness in the teaching and learning process (Sotero et al., 2020).

The superiority of ethnoscience (local wisdom) in the region is an attraction and has effectiveness in learning to improve the scientific literacy of prospective science teachers (Parmin & Fibriana, 2019). This knowledge can be used in scientifically oriented and student-centered science learning (Sumarni et al., 2020). Ethnoscience learning is expected to improve the ability to analyze and provide scientific arguments against existing phenomena. Ju and Choi (Ju & Choi, 2018) added that one approach that can help teachers in science learning today is the argumentation process, otherwise known as argument-based learning.

Through ethnoscience-based learning, students are more interested and easy to understand science concepts (Suryanti et al., 2021). Students will find it easier to share experiences or knowledge in the community. Based on this experience, it is expected to bring up arguments in the discussion so that students' thinking develops. Thinking skills that develop in discussions can bring up critical thoughts. Critical thinking about phenomena that come from society creates a great curiosity in students. Students become more interested in knowing more and comparing local knowledge with the knowledge gained in class.

The ability to think which is one of the skills of the 21st century is the ability to think critically. The ability to think critically about phenomena in society related to local knowledge has its charm. This research has a focus on looking at the critical thinking skills of level 2 and 3 students on habits, culture, or customs that exist in society, especially on plants through scientific arguments. In addition, to see how students understand the knowledge that exists in society from a scientific perspective. Students' thinking skills will be developed through discussion. Discussion activities can generate thinking and thinking skills, one of which is critical thinking (Giri & Paily, 2020).

Research on ethnoscience and local knowledge has been widely carried out, for example on students' local knowledge of fish migration, wind, fisherman refraction, ethnic and cultural education models in practice, subjects and thematic in scientific project writing, the effectiveness of ethnoscience in improving scientific literacy and scientific character of students in elementary teacher education programs (Atmojo et al., 2019). The approach is packaged in the form of an ethnoscience-based module (Sudarmin et al., 2015)

The results of the research above show that ethnoscience can be used and has an influence on learning. Most of the research conducted is about its effectiveness and influence on students' understanding. For this reason, further analysis of ethnoscience in learning is needed, both at the elementary and university levels. Thus, this study aims to analyze the perspectives of students in defining ethnoscience.

B. METHOD

This study uses a quantitative approach to the method or type of survey research. The data generated in this study will be described qualitatively. The survey method in this study was used to reveal and describe the perspectives of prospective elementary school teachers about ethnoscience. This research was conducted at the Madrasah Ibtidaiyah Teacher Education study program, UIN Maulana Malik Ibrahim Malang. The research time required is one month, including observations to obtain data and the distribution of research questionnaires. The population of this study was all students of the PGMI Study Program of UIN Maulana Malik Ibrahim Malang, amounting to about 523 students. While the sample of this study only randomly selected students who voluntarily filled out online questionnaires. The sample of this study obtained several 92 students consisting of semester III and semester V students.

The variables in this study only consisted of one dependent variable, namely the perspective of students / prospective elementary school teachers about ethnoscience. This research data collection technique was carried out by surveying by distributing online questionnaires to all students of PGMI UIN Maulana Malik Ibrahim Malang. The instrument of this research is in the form of a questionnaire which is distributed online via a google form. The research instrument was compiled based on the operational definition of ethnoscience. The questionnaire consists of 9 closed questions about the concept of ethnoscience and 1 open question about examples of ethnoscience.

C. RESULTS AND DISCUSSION

The ethnoscience data in this study was obtained from an online questionnaire instrument via google form which consisted of 9 closed questions and 1 open question. Closed questions relate to 1) the relationship between science material and daily life events, 2) the relationship between science and local wisdom, and 3) the relationship between community activities and local wisdom. Table 1 shows data on prospective primary school teacher perspectives on ethnoscience.

Table 1 shows that in general students have a positive perspective on ethnoscience. All students agree that science material is closely related to everyday life, daily life experiences can help in understanding science material. In the aspect of daily activities related to science, even though at that time they did not understand the theory or related concepts, there were 98.9% of students agreed and 1.1% of students did not agree. In addition, all students feel that science material will be more interesting if it is associated with local culture or local wisdom, but there are 2.2% of students who do not agree that science and local wisdom have a relationship, and 1,1% of students who do not agree that some people have done activities related to science and local wisdom even though they do not understand the concept of science.

In the ethnoscience questionnaire, there is an open question that identifies examples of the relationship between science and local wisdom. Students are asked to give an example of a science event related to local wisdom. Based on data analysis, there are 6.6% of students understand the events of local wisdom and its relation to science (ethnoscience), and 93.4% of students do not understand ethnoscience. Some examples of student answers related to ethnoscience examples are presented in Table 2.

Table 1. Preservice Teachers Perspective About Ethnoscience

Aspect	Percentage		
	Very Agree	Agree	Do not agree
Science material is closely related to everyday life	77.2	22.8	0.0
Experience in everyday life can help me understand science material	40.2	59.8	0.0
I have experienced or carried out activities related to science, even though at that time I had not studied related theories or concepts	38.0	60.9	1.1

It is easier for me to understand science material if it is associated with examples in everyday life	67.4	31.5	1.1
Science material will be more interesting if it is related to culture/culture/or local wisdom	35.9	64.1	0.0
Science and local wisdom have a relationship, so science is easier to understand	28.3	69.6	2.2
There are some habits in society that is a concept from science	22.8	77.2	0.0
Some parts of society have done activities related to science even though they do not know the concept	34.8	64.1	1.1
Some people believe that the activities or activities carried out have truth values even though they do not understand the theory or concept.	26.1	72.8	1.1

Table 2. Description of Preservice Teacher Answers on Examples of Ethnoscience Events

Aspect	Student Percentage	Sample Student Answers
Can understand the relationship between local wisdom and science (ethnoscience)	6.6%	"The Mauwo tradition is a Riau traditional tradition that prohibits planting oil palm on the edge of Lake Bakuok because it has the potential to reduce the availability of water supply during the dry season. This includes learning biology, helping students understand science concepts through local wisdom related to everyday life. "One of the habits of the previous South Kalimantan people which was usually done by the elderly was called Manginang. Manginang activities are chewing some spices such as betel, lime, etc."
Has not shown the relationship between science and local wisdom	93.4%	"Moving the sand from the truck to the bottom of the truck. There is a simple airplane concept in it and it also uses the force of gravity to get the sand down." "For example, when someone cooks frying sausages using butter, the butter heated in the pan melts because of the heat. So this process is called conduction heat transfer. "Breathing, inhaling O2 gas and exhaling CO2 is a process of respiration" "Immersion of plant seeds to be planted in natural science, this soaking process can help speed up the germination process in seeds. because when the seeds are soaked, the seeds will have higher water content."

Ethnoscience is knowledge obtained from one's language and culture that can be verified and can be innovated in science-based learning in the classroom (Abonyi et al., 2014). Ethnoscience is a learning approach that elevates culture or local wisdom into objects of science learning (Suastra & Pujani, 2021). Science learning that is developed from the perspective of local culture and organized local wisdom related to certain natural phenomena and events will increase students' interest in science and will be more easily understood by students (I. N. Dewi et al., 2017). Ethnicity as a national identity is something that needs to be considered in curriculum development in Indonesia, especially in the science curriculum. True scientific knowledge consists of all knowledge related to the facts of society. This pattern of knowledge development is passed down continuously between generations, is not structured and systematic in the curriculum, is informal, and is generally knowledge of people's perceptions of

certain natural phenomena (Sudarmin et al., 2015). Thus, the ethnoscience approach must link local wisdom and science.

There were 6.6% of students who succeeded in connecting local wisdom with science. However, 93.4% of students still have difficulty connecting local wisdom with science. Students' answers still provide examples of the connection between daily life events and science, for example breathing with oxygen and the process of heat flow in the frying event, and the process of moving sand from a truck. This shows that students' understanding of ethnoscience is only limited to the connection of everyday events with science, not the local wisdom of the community that must be raised in science learning. Thus, almost all students do not understand ethnoscience correctly.

Science learning is expected to be relevant to the social problems of society. The learning approach that is in accordance with the proposal is an approach that involves elements of life, finding solutions to problems based on the local potential that exists in the community (Holbrook, 2016). Science learning should also be linked to the context of local wisdom. Local wisdom is a motivational stimulus for students to form an understanding. Thus, prospective teachers are expected to understand the concept of local wisdom to be linked to science learning.

In several previous studies, ethnoscience learning has a lot of influence on 21st-century abilities. Science learning that integrates ethnoscience can improve students' scientific literacy skills (Alim et al., 2019; Atmojo et al., 2019; F. C. Dewi, 2019; Parmin & Fibriana, 2019) because ethnoscience learning gives students the freedom to carry out various activities, one of which is to train students to make conclusions. In addition, ethnoscience learning can also affect critical thinking skills (Hikmawati et al., 2021; Risdianto et al., 2020; Sudarmin et al., 2015), creative thinking skills (Andani et al., 2021; Khoiri et al., 2019; Sumarni et al., 2020), and student character (Ardianti et al., 2019; Hadi et al., 2019). Therefore, it is hoped that prospective teachers can understand the concept of ethnoscience, apply it in learning, to facilitate the 21st-century abilities of students.

D. CONCLUSION

Ethnoscience is the integration of local wisdom in science learning. With this integration, it is hoped that students will better understand science material. Primary preservice teachers' perspectives on ethnoscience show that almost all preservice teachers agree about the connection between science and local wisdom. However, 93,4% of preservice teachers are struggled to define the example of ethnoscience. Thus, it is important to include ethnoscience in science learning courses at college.

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