

An Analysis of Diversity Inventory of Typical Sciences of the Donggo Tribe in Science Learning Based on an Ethnoscience Approach in Elementary Schools

Nurwalidainismawati

Elementary School Teacher Education, Bima, Indonesia

Email : Nurwalidainismawati@habi.ac.id

Abstract

This study aims to identify and examine various forms of ethno-scientific activity from the customs of the Donggo people in the form of a science inventory that can be used in learning science in elementary schools. The method in this study is a qualitative method using an ethnoscience approach. The data collection process was carried out through open interviews with the indigenous people of Donggo (Bima) in order to obtain inventory data so that it could be further analyzed and described. As a result, original science which is a cultural heritage by the Donggo people can be used as a recommendation for learning science, especially in class IV, which can be taught scientifically to elementary school students. on plant material.

Keywords: *Natural Science Learning, Indigenous Science, Donggo Tribe Society, Ethnoscience.*

INTRODUCTION

Indonesia is a country that has great cultural diversity in it. Mira, S., (2015) said that the Indonesian nation is a multicultural nation (many cultures). When viewed from the meaning of diversity itself with the existing cultural diversity, it can be said that basically Indonesian culture varies. Research conducted by the Central Statistics Agency in 2010 found that there are various kinds of ethnic groups in Indonesia, between ethnic groups have various differences, and this is what forms diversity in Indonesia (Siska, D., 2017). For this reason, learning Natural Sciences (IPA) as part of education has a very important role in responding to issues in society about learning Natural Sciences which can be linked to cultural diversity in the local area.

Natural Science learning activities (IPA) carried out in elementary schools can provide opportunities for students to practice developing science skills. Of course, this can make students able to have a scientific attitude in carrying out the learning process, including being able to examine what is in the science learning activity itself. Science learning basically contains three main dimensions which include products, processes and scientific attitudes (Juniati, N. W., & Widiyana, I. W., 2017). Likewise in learning, some community traditions that are included in the form of local wisdom carried out by the majority of the community can be carried out and studied scientifically and this can be

proven through science learning from a scientific point of view. Prayekti inside Ardianto, D., & Rubini, B. (2016) said that Natural Sciences (IPA) has a very important role in preparing students to be able to have literacy activities such as in terms of critical thinking, creative, logical and initiative towards science activities in response to issues on the impact of science and technology developments in society. Likewise, local wisdom in the Donggo tribe can be studied using a scientific approach.

The Donggo tribe is the indigenous people of the community located in the province of West Nusa Tenggara, who are residents who live in the mountains and highlands in the western and southeastern parts of the Bima bay. Inayati, N., (2016) said that the indigenous people of the Donggo tribe are commonly called the Donggo Ele people who live around the Lambitu mountains, while Donggo Ipa live to the west of Bima bay, which is in the Soromandi mountain range. The Donggo people generally have unique traditions in their daily life. By utilizing nature as a good part in the form of regional local wisdom. S.S. Geriya, Gobyah and Ridwan said that local wisdom is a community behavior that from generation to generation will develop into a behavior that is embedded and firmly held and followed by the community in an area (Ihlas, I., & Kaharuddin, K. (2020). Many traditions in the Donggo Tribe are presented in a science inventory which is packaged in

science learning activities, which of course studies are carried out scientifically based on the context of science by mixing community culture with scientific studies in an ethnocentric manner.

Ethnoscience itself is a study of knowledge activities that are developed based on a cultural perspective with natural phenomena that occur. Suastra., (2006) in Shidiq, A. S. (2016) said that ethnoscience or it can be said as genuine science (*indigenous science*) is a knowledge system that is developed then clarifies objects and activities against natural phenomena, where genuine science has a process of observation, clarification and problem-solving activities by incorporating all aspects of native culture. This means that the culture that develops in society can be studied scientifically using ethnos scientific studies. Sudarmin and Pujiastuti, S., E., (2015) said that ethnoscience is an organized learning activity in a system of knowledge taken from local culture and wisdom of the community and then associated with certain natural phenomena and events. Through an ethno-science approach to the material being studied by students, students will not see that science is part of a foreign culture that develops in society, but is seen as part of the culture and local wisdom presented. Sudarmin, Pujiastuti, S., E, Suastra and Aikenhead Shidiq, A. S. (2016) said that the way to teach ethnoscience-based science learning can be done with a student *center* (focused on students) to be able to improve students' responses to science activities and to increase the practical use of science itself, such as human values and the relationship that exists between individuals and their environment.

Previous research has also examined cultural inventories, but what distinguishes these two studies is the ethnicity used as an ethnocentric study. The study conducted by previous researchers named Supriyadi and Evy Nurvitasari was conducted in 2019 intended for junior high school science learning with research methods using observation, participants, in-depth interviews and documentation. The results obtained from

previous research are that there are 11 original science topic points that have logical explanations that can be scientifically used in science learning in the form of original science data about the Malind tribe which can be used as a reference or illustration in science learning conducted at school. Meanwhile, the research conducted by the current research is focused on learning conducted on elementary school students who study original science with scientific studies on learning science material for elementary school students.

The purpose of this research is to find out and examine various forms of ethno scientific activity from the habits of the Donggo people which can then be studied scientifically in a conceptualized form in the form of a scientific inventory that can be used in contextual teaching Natural Sciences (IPA) as a form of local wisdom of the community. Ethnoscience-based learning activities essentially do not separate themselves from cultural science and local wisdom that develop in society which can later be used as an approach in learning that can be used to increase students' motivation and interest in science.

RESEARCH METHODS

This research is a type of qualitative research using an ethnoscience approach. Researchers in this case act as direct participants in conducting research. The ethnocentric approach is a study that examines original science with a scientific study of the traditions of the Donggo people. The data collection process was carried out through open interviews with the indigenous people of the Donggo (Bima) Tribe. The data were then analyzed by presenting the results of the interviews which were then reviewed and compared the results of the interviews conducted by the researchers with explanations carried out scientifically (science).

RESULTS AND DISCUSSION

Based on the results of data collection carried out, it was found that the traditions that developed in the Donggo people had genuine

scientific content. In carrying out this research, the researcher explored the traditions or habits carried out by the Donggo people regarding the use and utilization of resources provided by nature, marriage traditions and daily traditions of the community which are described in the form of regional local wisdom.

The original science that developed in the Donggo people was then interpreted based on the results of observations made in the Donggo people in depth by following rules related to the scientific method. The original findings of science on the Donggo tribe can be described in the following table

Table 1. The activities of the Donggo tribe in utilizing the resources provided in nature and tradition in certain events in terms of explanation natural science and scientific science explanation

Indigenous Science Activities of the Donggo Tribe	Learning Science Materials	Community Indigenous Knowledge	Scientific Knowledge
<i>Katuk</i> leaves	Plant body parts (related to plant structure and function)	Parts of the plant body (related to plant structure and function) The Donggo people use <i>Katuk</i> leaves as a concoction that can be used to reduce fever in children, as for the methods used: 1. A mixture of <i>Katuk</i> leaves, groats, and candlenut (male and female candlenuts) is ground to extract the juice, while the dregs are used as a scrub. 2. <i>Katuk</i> leaves that are pounded/squeezed can be extracted to be drunk directly. 3. <i>Katuk</i> leaf shoots can be consumed directly to facilitate breastfeeding in nursing mothers.	1. <i>Katuk</i> leaves (<i>Sauropus Androgynous</i> L. Merr) contain protein, fat, calcium, phosphorus, iron, vitamin A, vitamin B1 and vitamin C (to increase body resistance and form collagen). 2. Raw groats contain <i>teaminan</i> (vitamin B1) which serves to support the immune system, produce energy, and can prevent decreased appetite.
Remedy to get rid of dandruff on the hair	Plant body parts (related to plant structure and function)	1. Wash your hair using tamarind which is taken from the fiber and flesh of the fruit which is soaked in water and kneaded. The results of the squeeze are then used for shampooing.	1. <i>Gunung</i> acid (Javanese acid) contains alpha hydroxy acids (AHA) which can be used to help get rid of dead skin, help deal with limp (oily) hair and shine hair.
The concoction overcomes flatulence and itching in the body	Plant body parts (related to plant structure and function)	1. The way you can do that is by soaking a handful of rice (optional) soaked in water until soft. The rice that has been softened is pounded by mixing salt which can then be rubbed on the affected part of the body.	1. Rice contains amylose, amylopectin, hydrolyzed starch or dextrin and kojic acid which can whiten the skin as a result of starch fermentation during soaking so that it can make the skin bright, healthy and moist. 2. The content of salt has two basic

			components, namely sodium and chlorine. The sodium in salt has benefits as a scrub to treat skin problems
Ingredients smooth and soften the skin	Plant body parts (related to plant structure and function)	1. The method that can be used is to use a handful of roasted white rice (<i>tepung sangria</i> rice) mixed with <i>guring</i> tamarind water as a body scrub.	1. Amylose rice flour, amylopectin, hydrolyzed amylopectin and kojic acid which can whiten the skin as a result of starch fermentation during soaking so that it can make facial skin healthy and well cared for, moisturize the skin and brighten the skin. 2. <i>Gunung</i> acid (Javanese acid) contains alpha hydroxy acids (AHA) which can be used to help get rid of dead skin, help deal with limp (oily) hair and shine hair.
Eliminates itching on the body due to uniform bites and hives	Plant body parts (related to plant structure and function)	Using soaked rice that is ground with a mixture of salt	The content of salt has two basic components, namely sodium and chlorine, where the sodium in salt has benefits as a scrub to treat skin problems.
Relieve headaches and cool headaches	Root and fruit (Coconut and <i>Curcuma</i>)	1. The people of Donggo believe that washing their hair using <i>Curcuma</i> rhizomes and grated old coconut can be used to treat pain or a feeling of heaviness in the head. What is done is the coconut that has been split (conditionally) is then burned and grated with the ginger rhizome. The grated results of the two are mixed with a little water to release the coconut milk and juice from the coconut and ginger. Furthermore, the result of the mixture is deposited overnight to wash your hair in the morning. 2. In addition to using <i>Curcuma</i> to treat headaches, it is believed that using the shoots of white pumpkin (water gourd) can make you feel comfortable when you have a headache. The way of making it is almost the same as the ginger mixture. Grated/pounded then mixed with a little squeezed water to remove the coconut milk and juice on the grated pumpkin.	1. Coconut milk contains laurate which is used to strengthen hair so it doesn't fall out easily. 2. Content in Comedy (Curcuma Xanthorrhiza Roxb) some of which consist of curcuminoids which function as antibacterial while the content of flavonoids is efficacious in curing inflammation. 3. Extract on water gourd (<i>beer bottles</i>) can be used to ward off bacteria <i>pseudomonas aeruginosa</i> and <i>streptococcus pyogenes</i> which triggers a skin infection characterized by rash, pain, redness and itching.
The tradition of <i>Kalei Bunti</i> or <i>Kalondo Wei</i>	Muscle style (hand strength)	1. The <i>Kalondo Wei</i> tradition (bride's procession) uses throne chairs which are carried by 4-6 people who are	1. The bouncing activity is a concept in the use of muscle

		<p>paraded around the village using shoes(singing) accompanied by musical instruments to war (a type of tambourine) equipped with a special dance.</p> <p>This tradition is a sign for a woman who will release her bachelor period (marry) with the man of her choice</p>	<p>forces on parts of the human body, or scientifically referred to as the application of the concept of biomechanical activity, where when a person's hand is given a load, the load will affect the muscle force and the activity of the moment of force on the elbow.</p> <p>The effect of heavy loads on muscle force shows that the greater the weight given to the arms/hands, the greater the muscle strength required</p>
Map of the country	Plant body parts (related to plant structure and function)	<p>The pre-wedding tradition where <i>Kapanca</i> comes from market leaves which means attaching henna leaves to the bride's nails which is carried out by seven traditional women. Peta <i>Kapanca</i> is a symbol for the bride and groom that soon they will carry out their duties as a wife or housewife</p>	<p>henna leaves (<i>Lawsonia inermis</i> Linn, genus <i>Lawsonia</i>), has phytoconstituent compounds such as flavonoids, coumarins, triterpenoids, steroids, xanthenes which have traditionally been able to treat headaches, boils, syphilis, wounds, scabies, skin diseases, anti-bacterial, antifungal effects and so on. Henna leaves contain Lawson's dye which can be extracted to dye wool and silk.</p>
<i>Boho o'i ndeu</i> (<i>Boho o'i mbaru</i>)	Renewable and non-renewable natural resources	<p>1. The activity of sprinkling coconut water which is halved over the heads of the two is replaced by the oldest culture (oldest person) where the bride and groom are in a sarong circled with white thread. The goal is for the two newlyweds to remain in a strong and lasting marriage bond</p>	<p>1. Watering coconut water contains nitrogen as a component amino acid which will form enzymes and hormones that function to regulate metabolism can have an influence on plant vegetative growth, because watering coconut water can meet plant nutrient needs so that it can form and shape plant metabolic processes and have a good influence on plant growth and development</p>

Production of <i>uma leme</i>	Renewable and non-renewable natural resources	<p>1. <i>Uma leme</i> was built by the ancestors in ancient times in a shape like the letter A with a height of 5 meters made from natural materials such as reeds, rice straw and so on. According to the beliefs of the Donggo people, the manufacturing process is carried out before dawn so that they are strong from the wind. earthquake</p>	<p>1. Scientifically this is included in the activity of an inclined plane. The purpose of the inclined plane is to minimize effort when moving heavy loads. In a house design like this, it is called a saddle house design, which is the shape of the roof of the house which consists of two inclined planes that meet in a straight line (ridge) with the advantage of being able to easily detect leaks and having radiation and heat power used for areas tropical</p>
-------------------------------	---	---	--

The results of the research above can be taught to elementary school students who are carried out scientifically in class IV where the material is covered in material on the structure and function of plants, styles, and resource utilization. In order for the data obtained to be valid, the researcher carried out a triangulation process, where the data was obtained from indigenous tribal people who inhabit the Donggo Ipa area (Donggo District and Soromandi District). The results of the triangulation obtained from observations and interviews with the indigenous people of the Donggo Ipa tribe were then compared with the results of a literature study. The community groups belonging to the Donggo (Dou Donggo) tribe include those who inhabit the Bajo, Doridungga, O'o, Kala, Manggekomp, Jango, Mpili, Mbawa, and so on areas.

The results of data collection showed that in the construction of *uma leme*, the community did not have a definite reason for the shape of the roof which was leme (soaring high), but they believed that the construction of houses in the A shape could maintain the robustness of their dwellings/dwellings when an earthquake occurred. The manufacturing process also still uses traditional materials, *uma leme* is believed to have a magical/supernatural meaning, even though its existence has now begun to fade, in the Mbawa region it still stores and preserves *uma leme*. The following is an excerpt of the interview conducted:

Researcher: Is it *uma leme*
have limits
altitude for
roof, and how to measure it?

W01 : For the high roof
about 5 Meters, us
don't have measuring tools
standard, only
use one
bamboo or wood for
measure

Researcher: How is the process
The construction?

W01 : Development process
done at night
before dawn appears,
materials used
we take it from nature
strong and sturdy.

From the results of these interviews, it was found that the activity of building houses (*uma leme*) by the Donggo tribe was carried out by analyzing the heritage from their ancestors. In addition to building houses (*uma leme*), the Donggo people (Donggo/dou Donggo people) also have unique traditions, namely the *Kapanca* map, *boho oi* nude, and the *Kalei Bunti* tradition. This tradition is a series of traditional wedding events carried out by the bride as a form of gratitude because soon a woman will let go of her bachelor period and will assume responsibility as a wife who will serve her husband, take care of the children and the household she is fostering. However, in recent times, along with the times, these traditions have begun to fade due to the impact of technological progress itself. The following are excerpts from interviews with the indigenous people of the Donggo tribe.

Researcher: What is the tradition on
wedding procession
it still continues
done?

W02 : The tradition of map *Kapanca*
and *Kalei Bunti* arrived
now still on
done, as
cultural heritage
cannot be lost,
although not
implemented in
whole but wrong

one of the activities exists
still continues
held.

Researcher: What are the series of events
Which is conducted?

W02 : Events performed that
starting with the beach
(*melamar*), like *mbolo*
(Residents *rembuk* and
handai taulan), *waa coi ra*
come ra nee (intro
and dowry offerings),
ngaji zama (study),
Kalei Bunti (*arak-arak*
bride), map
process (process
acculturation of Islamic culture
and archipelago), *boho oi*
ndeui (watering) and
last reception.
The series of events
carried out for 3 days 3
night

The Donggo tribe is a tribe that has a very strong tradition and is attached to the hearts of its people. Even in the midst of progress, this tradition is still being carried out. The beautiful and cool nature in the highlands of the Donggo tribe region has resulted in many plants provided by nature to be enjoyed and used by the local community to be used as medicine or traditional ingredients, which until now amid increasing medical activity, the Donggo tribe still preserves these ingredients for the main alternative before using alternative concoction drugs. The following is an excerpt from an interview about one of the heat-reducing ingredients in children.

Researcher: In the rainy season
now, many children
experienced child
fever, is it
society has
Herb itself?

W03 : When the children are sick
we have potions
especially when kids
we had a fever, and arrived
it's still us
take care and we use.
The *ramoon*
give that effect
cool on the body

*both outside the body
as well as inside.
In addition to reducing fever
also can make
child fell asleep with
rest well.*

The original scientific activities found in the Donggo people are interactions and activities that are still being carried out today. Not only the traditional traditions and medicinal herbs that exist in the Donggo tribe, but other traditions such as art, musical instruments, dance, and so on are a form of attachment between humans and nature. The philosophy that occurs cannot be separated from the interaction between humans and nature. The development of the times that is happening now will certainly allow for a cultural shift to occur between communities in the Donggo tribe. So that in order to preserve the original science activities which are reflected in the form of regional local wisdom, it is necessary to have a study that will link the original science with the science that is studied scientifically in terms of concepts, theories and legally based on laboratory tests. It is hoped that this will provide a different and certainly new nuance in teaching science to elementary school students who are close to their lives according to the findings of previous researchers.

CONCLUSION

Based on the results and discussion above, I can synthesize and at the same time draw a conclusion that genuine scientific activity in the Donggo tribe is a real experience carried out by humans with what is in nature, original science which is a cultural heritage by the Donggo people. which can be used as a science learning recommendation that can be taught scientifically in class IV where the material is covered in material on the structure and function of plants, styles, environmental influences, natural resources, and so on. The suggestion that the researcher gives is that learning activities carried out in elementary schools, especially in science/science learning, should be taught by linking genuine science activities that occur in society, so that learning becomes very enjoyable because there is a

close cultural blend with the community that is studied scientifically. so that here students will get two things in their knowledge activities towards learning science: first about science material, the second about original science material based on community activities using scientific studies scientifically. So that in this case the learning activities will be very fun and the usefulness value will be obtained directly by students for the learning activities carried out.

BIBLIOGRAPHY

- Aikenhead, G., S., (2005). Education Cuinica, 16.3.
- Aminullah, M., & Nasaruddin, N. (2017). Wajah Islam Nusantara Pada Tradisi Peta Kapanca Dalam Perkawinan Adat Bima. *TAJDID: Jurnal Pemikiran Keislaman dan Kemanusiaan*, 1(1), 1-24.
- Ardianto, D., & Rubini, B. (2016). Literasi sains dan aktivitas siswa pada pembelajaran IPA terpadu tipe shared. *Unnes Science Education Journal*, 5(1).
- Endang S., dan Wiyanto. (2010). Ilmu Pengetahuan Alam (IPA) 4 untuk Siswa SD/MI Kelas 4 . Pusat Kurikulum Perbukuan
- Hidayat, I. R. S., Napitupulu, R. M., & SP, M. (2015). *Kitab Tumbuhan Obat*. AgriFlo.
- Ihlas, I., & Kaharuddin, K. (2020). Pendidikan Multikultural Dalam Kearifan Lokal Suku Donggo Bima. *eL-Muhbib: Jurnal Pemikiran dan Penelitian Pendidikan Dasar*, 4(1), 82-98.
- Inayati, Nurul (2016). *Islamisasi Di Donggo*. Universitas Islam Negeri Alauddin Makassar.
- Juniati, N. W., & Widiana, I. W. (2017). Penerapan Model Pembelajaran Inkuiri Untuk Meningkatkan Hasil Belajar IPA. *Jurnal Ilmiah Sekolah Dasar*, 1(1), 20-29
- Kementrian Pendidikan Nasional
<https://annibuku.com/bse/buku-ilmu-pengetahuan-alam-4-kelas-4-sd-1035>

- Kurniawati, H. A., Kuswanto, H., Kimianti, F., & Pamungkas, W. (2019). Pengaruh Berat Beban pada Lengan terhadap Gaya Otot Bisep Sebagai Media Pembelajaran IPA Konsep Bioekanika. *INDONESIAN JOURNAL OF APPLIED PHYSICS*, 9(01), 16-21.
- Mira, Sari,. (2015). Pontensi Keberagaman budaya.<https://www.slideshare.net/miransari5/tugas-presentasi-ips-potensi-keberagaman-budaya-di-indonesia>
- Na'imah, J. (2018). Jurnal Jendela Kesehatan" POptimasi MAsker Beras Untuk Wajah". *JURNAL JENDELA KESEHATAN"POtimasi MAsker Beras Untuk Wajah"*, 4(1), 1-83.
- Ong, H. C. (2006). *Tanaman hiasan: Khasiat makanan & ubatan*. Utusan Publications.Siska Darmadi. (2017). Keberagaman Bangsa Indonesia. <https://slideplayer.info/slide/13223149/>
- Rahmadayani. S. P07534016036. (2019). *Analisa Kadar Iodium Pada Garam Dapur Dari Berbagai Merek Di Pasar Sukaramai Medan*.
- Rahmatan, H. (2016). Pengaruh penyiraman air kelapa (*Cocos nucifera* L.) terhadap pertumbuhan vegetatif lada (*Piper nigrum* L.). *Jurnal Ilmiah Mahasiswa Pendidikan Biologi*, 1(1).
- Ridwan, N. A. (2007) 'Landasan Keilmuan Kearifan Lokal', IBDA, Vol. 5, No. 1, Jan-Juni 2007, hal 27-38, P3M STAIN, Purwokerto.
- Shidiq, A. S. (2016). Pembelajaran sains kimia berbasis etnosains untuk meningkatkan minat dan prestasi belajar siswa. In *Seminar Nasional Kimia dan Pendidikan Kimia (SNKPK) VIII* (pp. 227-236).
- Suastra. (2006). Jurnal Pendidikan dan Pengajaran IKIP Negeri Singaraja, 3.
- Sudarmin and Pujiastuti, S., E., (2015). *International Journal Of Science and Reseach (IJSR)*.,4.9.