Indonesian Journal of
Mathematics and Natural Sciences Education
p-ISSN: 2721-172X e-ISSN: 2721-1746
Vol. 4 No. 1 Year 2023; Pages 43-52
http://mass.uinkhas.ac.id DOI: 10.35719/mass.v4i1.114

Preliminary Study in the Development of Ethnoscience-Based Learning Media for Secondary School Students

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Abstract

This study aims to examine the results of a preliminary study on the development of ethnoscience-based science learning media in the form of perceptions about the original science of the community regarding the process of making rengginang lorjuk processed from Talang Siring sea into scientific science. This research is based on the still limited reconstruction of original science that develops in society into scientific science that can be studied and used as a source of learning independently. This research is crucial to do, considering that no one has comprehensively analyzed this topic. The subject in this study was one of the residents of the Talang Siring coastal area who had a home business in the form of rengginang lorjuk production. The research method uses descriptive qualitative. The data in this study were obtained from the results of (1) interviews; (2) Observation; and (3) Documentation. The research data obtained was then analyzed in several stages, namely data reduction, data display, and concluding/verification. Based on the results of scientific studies, it can be concluded that there is a relationship between indigenous knowledge (Indigenous Knowledge) and scientific knowledge (Scientific Knowledge).

Keywords: Ethnoscience, Learning, Media, Preliminary

INTRODUCTION

Indonesia has the potential for marine fish resources of 6.26 million tonnes per year with fishermen utilizing up to 5.6 million tonnes, including Lorjuk (Wahyurini, 2017). Lorjuk is another name for bamboo shells which are commonly called by people in East Java, these shells have high economic value. Lorjuk is one of the fishery commodities which has its uniqueness, it can be found along the coast, but not all beaches can be found lorjuk, only in certain areas. One of the areas on the island of Madura that has the potential for lorjuk commodities is Pamekasan Regency, especially in its coastal areas. One of them is Talang Siring Beach which is located in Talang village, Larangan District, Pamekasan Regency.

The people of Talang village on average work as fishermen, especially those close to the Talang Siring coastal area. Many housewives in this village make processed food from ingredients derived from seafood. Marine-processed products made from lorjuk that have been made by the people of the Talang Siring coastal area include lorjuk campor, lorjuk petis, and lorjuk rengginang. Some of the foods and snacks that have been sold and are available in shops around Talang Siring Beach are rengginang lorjuk, lorjuk peanuts, and lorjuk petis which are used as souvenirs. One of the most common processed marine products

from Talang Siring Beach is rengginang lorjuk which is made from sticky rice and lorjuk. The Talang people usually make rengginang lorjuk for personal consumption, to serve guests at family events, or to be traded in traditional markets.

The process of making rengginang lorjuk is carried out traditionally using the knowledge they get that has been passed down from generation to generation based on the local wisdom of the local community or commonly referred to as genuine science. Indigenous science is an indigenous culture that has been attached to a society that they maintain and trust from one generation to the next through a process of adaptation to the environment and culture in the area where they live. While scientific science is formal knowledge in the form of concepts, principles, theories, and laws that have been through scientific research. The process of translating original science concepts from a culture that develops in a society into scientific knowledge is called the reconstruction of original science into scientific science (Parmin et al., 2017). The actual process of making rengginang without them realizing it can be studied related to science is called ethnoscience.

Ethnoscience comes from the Greek words "Ethnos" which means nation and "Scientia" which means knowledge, Werner in Hume (1999:13). Ethnoscience is the knowledge that is unique to a nation. Sturtevant (1961:99) quoted by Hume (1999:12), defines ethnoscience as a system of knowledge and cognition typical of a given culture. Ethnoscience can be defined as a set of knowledge possessed by a society/tribe which is obtained by using certain methods and following certain procedures which are part of their tradition, the truth of which can be tested empirically. The research was conducted in Talang Village, Larangan District, Pamekasan Regency. This ethnoscience research was conducted using an approach in the form of STEAM (Science, Technology, Engineering, Art, and Mathematics). Science relates to the materials needed in the study of the topics chosen in research. Technology is related to the tools used in the study of research topics. Engineering relates to the techniques or procedures used in the study of research topics. Art is related to the appearance of beauty in the study of research topics. While Mathematics is related to the amount, size, dosage, or composition needed in the study of research topics. The use of this approach aims to facilitate researchers in determining the aspects to be studied while in the field.

This research is important because it can equate and find out about the knowledge of the local community (Indigenous Knowledge) and knowledge based on science (Scientific Knowledge) related to the research topic, namely the process of making rengginang lorjuk. In addition, this research can also be used as an ethnoscience-based learning media. The problem raised in this study is regarding the process of making rengginang processed by the Talang Siring Sea which is carried out traditionally by the people of Talang

 https://doi.org/10.35719/mass.v4i1.114

Village and is connected with scientific knowledge.

This study aims to analyze the results of a preliminary study on the development of ethnoscience-based science learning media for secondary school students in the form of perceptions about the original science of the community regarding the process of making rengginang lorjuk processed from Talang Siring sea into scientific science.

METHOD

This research is field research where this research focuses more on data that has been collected from informants. In practice, the authors made observations, documented, and interviewed (Darmalaksana, 2020). The object of this research is the manufacture of rengginang lorjuk, while the subject is Mrs. Saniya who lives in Candi Hamlet, Polagan Village, Pamekasan, at the age of 65 years. The research was conducted in October 2022, at Talang Siring Pamekasan.

This study used a descriptive qualitative method. Qualitative research for a study that is descriptive in nature is also called descriptive qualitative (Kim et al., 2016). Qualitative descriptive research is a method that describes a situation/phenomenon that occurs using sentences that are then drawn conclusions. The data in this study were obtained by conducting (1) interviews; (2) Observation; (3) Documentation to find out how lorjuk rengginang is made. Interviews were conducted by asking questions related to the manufacture of lorjuk rengginang. The interviews in this study were conducted with questions and answers to Mrs. Saniya who is a resident of Polagan Siring Village and is used to making rengginang lorjuk as a traditional food. Observations were made by observing directly the materials needed to make lorjuk rengginang, the tools used, and the stages of making lorjuk rengginang.

Researchers go directly to make observations, by making observations, researchers can obtain data about the object of research. Documentation is done by taking photos of the making of lorjuk rengginang. Documentation is a complement to the interviews and observations that have been done in qualitative research. To carry out data analysis, 3 stages were carried out, namely (1) Data reduction, this step was carried out by focusing on important things from the data that had been obtained. This process took place from observation and interviews until data was collected (Yuliani, 2018). (2) Display data, meaning that in qualitative descriptive research, data is presented in the form of sentences, and tables are made so that it is easier to understand (Rejeki et al, 2020). (3) Concluding/verification, this conclusion is a new finding in the form of descriptions and descriptions of objects that were previously unclear to become clearer.

RESULTS AND DISCUSSION

Preliminary study of the development of ethnoscience-based science learning media in the form of exploring the original knowledge

possessed by the community regarding the process of making rengginang lorjuk. The data from the research results are then transformed into scientific knowledge so that it can be used as study material in ethnoscience-based science learning media. The results of the reconstruction of the community's original knowledge into scientific knowledge are presented in Table 1 as follows.

Table 1. The results of the reconstruction of the community's original knowledge into scientific knowledge

Overview of Study Topics	Indigenous Knowledge	Scientific knowledge	Information
Factors/ characteristics	Rengginang is a traditional food that has a round and flat shape made from the main ingredients of sticky rice, shrimp paste, shallots, garlic, and other seasonings.	Rengginang is a kind of cracker made from the sticky rice that is round and flat and dried by drying it under the hot sun, then frying it in large quantities of hot oil.[1] Different from other types of crackers, rengginang is not crushed so that the shape of the sticky rice grains is still visible.	[1]Fiertarico, et al. 2019
Materials (Science)	The shells used are bamboo shells (lorjuk). These shells are often found around Talang Beach, apart from that these shells are very suitable when used as additional ingredients in making rengginnag because they have a distinctive and tasty aroma.	Lorjuk is often found on the coast with high salt content. Its habitat is usually in sandy and muddy areas. 1 Lorjuk has a distinctive and delicious taste. Lorjuk is very popular because it not only tastes delicious and delicious but is also high in nutrition. One of the nutrients contained in bamboo shells (lorjuk) is fatty acids. Some fatty acids are essential, for example, linoleic and linoleic fatty acids. Unsaturated fatty acids	[1]PPHP Directorate General, 2010. [2]Valclavik and Cristian, (2008) in Anonymous (2015).

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Overview of Study Topics	Indigenous Knowledge	Scientific knowledge	Information
		are used to maintain structural parts of cell membranes and have an important role in brain development	
	Sticky rice used use white sticky rice. Completely milky white, nothing clear in the granules. Its shape is longer than ordinary rice, it is also whole, not brittle and broken.	White glutinous rice called (*Oryza sativa* glutinosa) is one of the rice varieties belonging to the Graminae family. 1 Grains of rice mostly consist of about 80-85% starch contained in the endosperm which is composed of starch granules measuring 3-10 millimicrons. Glutinous rice also contains vitamins (especially in the aleurone), minerals, and water. From its chemical composition, it is known that the main carbohydrate constituent of glutinous rice is starch. Starch is a glucose polymer carbohydrate that has two structures, namely amylose, and amylopectin	[1]Maflahah, et al. 2020. [2]Priyanto, T. 2012
	Salt is added to rengginang as a flavor enhancer. Kitchen salt is a flavoring ingredient that has a salty taste.	Salt is a white crystal with the largest content of chemical compounds, namely sodium chloride (NaCl)> 80%, as well as other compounds such as magnesium chloride ($MgCl_2$), magnesium sulfate ($MgSO_4$), and calcium chloride ($CaCl_2$)1 with a required humidity level of around 0 .5% and SO_4 compounds do not exceed the limit of 2.0%, iodine levels range from 30-80 ppm.[2] Table salt can be used by the general public as a	[1]Budiarto & Rini. 2019. [2]Karwiti, et al. 2018. [3]Kartika, et al. 2019.

Overview of Study Topics	Indigenous Knowledge	Scientific knowledge	Information
		spice and flavor enhancer in food.[3]	
	Garlic has a content that can make the clams not fishy.	Garlic (*Allium sativum*) contains compounds belonging to the group of organosulfur and phenolic compounds which act as antioxidants. 1 Garlic as a food flavoring agent has a distinctive taste and aroma due to the presence of essential oils, namely allisin, allin, scordinin, and sativine 2 as well as various components such as sulfur, protein, fat, phosphorus, iron vitamins A, B1, and C.[3]	[1]Prasonto, et al. 2017. [2]Srihari, et al. 2015. [3]Shakir, et al. 2017.
Measures, concentrations, and measures (Mathematics)	When making rengginang from 3 kg of glutinous rice, one tablespoon of shrimp paste is enough, as well as about 50 ml of complementary spices that have been mashed after being mixed with water. The measure must be just right, not too little or even too much, because it will affect the aroma and taste of the rengginang	When making rengginang with the right dosage, it will create nutritional value and a distinctive aroma from rengginang. The right dose will meet the nutritional intake needed by the body.[1] If one of these ingredients is reduced or added, it will affect the nutrition of rengginang, malnutrition, and excess nutrition in food when consumed by humans will have an impact on health.[2]	[1]Untoro, et al. 2012. [2]Rahman, et al. 2017.
	How many doses of lorjuk can affect the taste, aroma, and color of rengginang. If the dose of lorjuk is too little, then the resulting rengginang is not quite right. The aroma and taste of rengginang are not so pronounced.	The process of adding and subtracting lorjuk to the manufacture of rengginang will affect the taste and nutritional value of the rengginang itself. The addition of lorjuk will affect the meat content which causes a distinctive aroma in rengginang but if you reduce lorjuk it will affect	[1]Untoro, et al. 2012.

https://doi.org/10.35719/mass.v4i1.114

Overview of Study Topics	Indigenous Knowledge	Scientific knowledge	Information
		the nutritional value, texture, aroma, and taste of rengginang.	
	When frying rengginang, you have to use oil with a large amount and in really hot conditions and medium heat so that the rengginang can expand perfectly.	The use of low heat during frying will result in an enzymatic brown color browning process that occurs in rendang due to the non-enzymatic browning reaction (Maillard reaction) that occurs during the frying process and it also affects the taste of the processed food.	[1]Setiawan, et al. 2013
Tools and techniques (Technology), as well as procedures (Engineering)	The steamer or pot is used to steam the sticky rice. The rengginang mold is used to print the rengginang so that it is round and flat. The pestle is used to grind the spices. The basin is used to place the steamed glutinous rice then mixed with spices and kneaded. Nets are used to dry the printed rengginang.	The kitchen utensils used are simple, for example, nets for drying rengginang. Net drying tools are known to have pores that can absorb moisture quickly, so bacteria cannot grow on the surface. 1 Besides using a pestle, grinding spices can be done in a blender. Refinement is added with water to simplify the process.2	[1]Sutoko, et al. 2019. [2]Alfathir & Eltiasih. 2018.
	The sticky rice that has been boiled is then added lorjuk, shrimp paste, and all the spices that have been mashed so that the mixture is perfectly mixed	If the kneading process is continued, there will be further loosening because the dough will become soft and sticky due to the excessive breaking of disulfide bonds (-SS-). During the kneading process, the cohesive elastic properties of gluten will form which will bind water molecules. The mixing process is defined as a process of collecting and blending ingredients.2	[1]Basuki, et al. 2013. [2]Priyati, et al. 2016.

Overview of Study Topics	Indigenous Knowledge	Scientific knowledge	Information
Appearance, form, beauty (Arts)	Rengginang is made flat to make it more attractive and during the drying process it can dry faster	Food is shaped flat and round because food requires skill in developing attractive shape variants so that it is more attractive to buyers The formation of a flat round on the product to obtain good results when fried and even maturity when frying.2	[1]Hasan & Riskiana. 2018. [2]Hidayat, et al. 2016.

Based on the results of the topic study in terms of Science, which discusses the main ingredients, additional ingredients, and complementary materials used in the process of making rengginang lorjuk. The results of Cross Bordering indicate that there is a match between the original knowledge of the community and scientific knowledge. This can be seen from the explanations from the informants about the use of white sticky rice as the main ingredient, the use of lorjuk shells and shrimp paste as additional ingredients, and the use of complementary ingredients such as shallots, garlic, candlenuts, sesame, salt, and flavorings have similarities with scientific science so that scientific explanations can add to the original knowledge of society.

Study of the topic in terms of Technology, this section discusses the tools and techniques in the process of making rengginang lorjuk. The results of Cross Bordering show that there is a match between the original knowledge of the community and scientific knowledge. This can be seen from the use of the tools used in the process of making rengginang lorjuk, such as steam pans, basins, pestles, molds and nets for drying rengginang which have scientific similarities so that this can strengthen public knowledge.

Study of the topic in terms of Engineering, this discussion concerns the procedures for making rengginang lorjuk. The results of Cross Bordering show that there is a match between the original knowledge of the community and scientific knowledge. The suitability can be seen from the answers of the informants regarding how to steam the sticky rice, mix the sticky rice with spices, print rengginang, and dry-drying, which have similarities in scientific terms, so that they can strengthen the answers of the informants.

The topic study is viewed from Arts, this discussion concerns the appearance, shape, and beauty of the processing of lorjuk rengginang. The results of Cross Bordering show that there is a match between the original knowledge of the community and scientific knowledge. This can be seen from the explanations of the informants regarding the characteristics possessed by rengginang, it can be seen from the brownish color due to the influence

 https://doi.org/10.35719/mass.v4i1.114

during frying and from the additional ingredients in the form of shrimp paste and lorjuk used which are then strengthened by scientific explanations because they already have similarities.

Study of the topic in terms of Mathematics, this discussion concerns the concentration, size, and dosage of ingredients, as well as the spices used in the process of making rengginang lorjuk. The results of Cross Bordering show that there is a match between the original knowledge of the community and scientific knowledge. This can be seen from the respondents' explanations regarding the composition and dosage of glutinous rice, the amount of shrimp paste used, and the length of drying time when viewed from a scientific point of view also have similarities, so this can strengthen public knowledge.

Based on the results of studies on indigenous knowledge and scientific knowledge on the topic of rengginang lorjuk in terms of STEAM (Science, Technology, Engineering, Art, and Mathematics) it has a match. Indigenous knowledge of the community based on the results of interviews with informants about rengginag lorjuk after being strengthened by scientific knowledge through literature studies and several previous studies are compatible and mutually reinforcing in terms of STEAM (Science, Technology, Engineering, Art, and Mathematics). The community's knowledge, when viewed from the scientific point of view, is compatible, but at some point, the community has not been able to explain or in other words, they do not know what they are doing because sometimes they just follow what other people have done, be it their parents or other people. Even so, in general, the community is good in terms of knowledge, let alone very good experience in the process of making rengginang lorjuk. So public knowledge is the result of remembering from experience to experience to produce neat pure knowledge and scientific science is systematic knowledge based on observation and experimentation, both of which have information with high consistency on something agreed upon.

The science learning process requires teaching materials and learning media, one of which is integrated with ethnoscience. Ethnoscience is a strategy for creating a learning environment by integrating culture as part of the science learning process so that it is useful for one's life (Munandar et. Al., 2022). Science learning can be developed by focusing on the uniqueness and superiority of an area, including local (traditional) culture and technology. Learning that implements local cultural traditions can lead students to love their region and nation. Students can gain direct knowledge from cultural practitioners or the local community. The recommended scientific approach in education in Indonesia today is ethnoscience, namely original knowledge in the form of language, customs, and culture, morals; as so is the technology created by a particular society or person which contains scientific knowledge.

Science topics related to local wisdom can be used as a method that is very close to the existence of students to be stimulated in learning science. The application of ethnoscience can be used as a means to motivate, stimulate students, and overcome boredom and difficulties in learning science (Pertiwi et al., 2019). This is because ethnoscience is a part of students' daily lives which is the initial conception they have of the local socio-cultural environment. The most important thing in the form of implementing ethnoscience-based learning is teaching materials, learning resources,

CONCLUSION

Based on the research that has been done, it can be concluded that the results of the preliminary study on the development of ethnoscience-based science learning media show that there is an ethnoscientific study in the process of making rengginang lorjuk as a traditional food. There is scientific science which is the result of reconstruction from original knowledge obtained from generation to generation. The topic of ethnoscience study on the process of making rengginang lorjuk has a correlation with science or natural science concept material, which is related to additive material.

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BRIEF PROFILE

First author is a student in Natural Science Education Study Program, Universitas Trunojoyo Madura. The second author is a lecturer in Natural Science Education Study Program, Universitas Trunojoyo Madura, which the knowledge area is concentrating on science. The third author is a lecturer in Natural Science Education Study Program, Universitas Trunojoyo Madura, which the knowledge area is concentrating on the learning media. Lastly, the fourth author is also a lecturer in Natural Science Education Study Program, Universitas Trunojoyo Madura, which the knowledge area is concentrating on the assessment and learning strategy.

https://doi.org/10.35719/mass.v4i1.114