

Concept of Sound in Tifa as Papua's Contextual Learning Media

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Abstract- This study aimed to determine the use of Tifa music instruments in sound concepts as a contextual science learning media. The focus of this research is the use of Tifa music instruments which are often used in traditional ceremonies by the Malind tribe in Sota District, Merauke Regency. The research method was descriptive qualitative, where the data collection techniques applied are observation, literature study and in-depth interviews. There were three respondents that researchers interviewed. They were the indigenous societies of Malind tribe. Research data are then represented and interpreted into sound concepts. This research concluded that there are sound concepts in Tifa musical instruments that can be implemented in science learning.

Keywords—sound; Tifa; learning media.

I. INTRODUCTION

Although learning process involve so many parties, such as the teacher, the students, and stake holders; the teacher would hold a very important role in ensuring that the learning process take place. One of a teacher's many tasks it to be able to stimulate and improve understanding of learner concepts [1]. The stages of a student's learning begin with the concept that students have no knowledge, then students go through the learning process, focus on what is learned, receive and remember, reproduce, generalize and carry out exercises and understand something new. Students are considered to undergo a learning process if they achieve the competence that they have learned during the learning process, proven though a certain measurable performance. [2]. To make sure the learning competence targeted is achieved, a teacher needs to be innovative in the strategies and media that are employed to make the learning process interesting, thus the students will be motivated and interested in learning. In indogenous societies like the Malind tribe in Sota District, Merauke Regency, the percussions have become an integral part of the society. Malind tribe has a percussion instrument called Tifa. Tifa is made from a hollowed wooden part with a membrane cover on one of the holes. Thus, to employ a Tifa in the learning process can be beneficial to make the teaching learning process interesting.

Percussions are one of the oldest musical instrument known to human civilization [3]. Percussions are played by

hitting a surface or a string by using hands, fingers, or sticks and other support media. Some musical instruments that are classified as percussion instruments are gamelan, arumba, kendang, kolintang, tifa, talempong, rebana, bedug, jimbe and many others [3].

The development of technology today is the impact of the development of science. Because technology is inevitable, it requires people to be involved if they do not want to be left behind by development. That is how the interaction between science and technology and society became one important dimension [4]. This is in accordance with the concept of STEM (Science, Technology, Engineering and Mathematics), where technology is one of the key to development.

Basically the relationship between science and culture is reciprocal. On one hand, cultural values in certain societies strongly support the development of science. On the other hand the introduction of certain science can fundamentally change the cultural values of the community it self. Science can be learned through a culture. Technology and science that exist in society, can actually be learned through the culture that exists in society. Every culture contains original science that can be studied. Assessment of the original science of a culture can be done through ethno-science approaches [5, 6, 7]. With this ethno-science approach, culture can be used as a contextual learning media. A person's identity can be seen from his culture. While science has a relationship with someone's life. So culture and science can go hand in hand. By examining science through the surrounding culture, one can get to know the culture and obtain science from it.

Culture-based learning is based on recognition of culture as an important part of education. Learning with culture can keep students from being isolated from their local culture. At the same time, culture-based learning can also increase students' appreciation of local culture. Therefore, the culture that is around can be used as a medium for studying science contextually. The culture-based learning process does not only transfer culture and cultural manifestations but uses culture and cultural manifestations to make students able to create meaning, to train their imagination, and and to induce creativity in achieving a deep understanding of the subjects being studied [8]–[11]. AS can be seen from Figure 1, tifa

making in Malind tribe always been an integral part of the society, that children see them everyday, and they are accustomed to the process.



Fig. 1. Tifa Making Process

In learning, learning media are developed with the aim of facilitating learning [12]–[15]. Ethno-science learning is culture-based learning that has the objective to study the original science contained in culture to facilitate students' understanding of science. In addition, learning ethics aims as an effort to preserve culture [6], [16], [17]. However, learning at this time in school has not utilized culture as one of the learning media. Culture-based learning can be divided into 3 (three), namely by placing culture as a field of science, or culture as a way to learn a subject, or by placing culture as a method for achieving certain understanding.

Students who learn through culture can better appreciate the culture while studying the culture scientifically. The reality at school in Malind society shows that learning at school has not utilized culture as a learning medium, although various benefits can be obtained by learning through culture. This research reconstructs the original science that is used by the Malind tribe with the aim to be integrated into science learning.

The Malind tribe is the largest tribe in Merauke district. This tribe has many aspects in its culture. The culture owned by the Malind tribe can be studied scientifically [9], [17], [18] and can also be integrated into science learning in schools [18]. Among the cultural artifacts owned by the Malind Tribe, the Tifa plays a very important role. Tifa is a traditional musical instrument that is used in traditional ceremonies. This musical instrument is made of wood and kangaroo leather [17]. Tifa is a type of percussion instrument. Tifa bodies are generally made with wood from Papua which has thick and strong texture. Tifa body is shaped like a tube which has a hollow inside. The goal is to be able to produce a loud voice when it is being beaten.

As a traditional musical instrument, Tifa can be studied scientifically to support the culture-based learning concept. One of the many ways to incorporate Tifa into culture-based learning is by studying the sounds produced by different Tifas. Sound is a vibration that propagates through a medium. The strength of the sound produced by a Tifa is influenced by

various factors, such as sound frequency, the distance of the sound source to the listener, the shape, size, and source of the sound source, as well as the type of sound intermediary medium. This can indirectly make Tifa as a learning medium about the concept of sound itself. The purpose of using Tifa is that it can facilitate students in understanding the concept of sound and also recognize the Tifa themselves.

Based on this background, researchers are interested in conducting an ethnic study of the traditional musical instrument of the Malind tribe, namely Tifa, in discussing the concept of sound. This research is important to be done so that students in the area of Merauke can learn science through the culture that is around them. The purpose of this study is to examine the phenomena of ethno-science related to the sound concept it self.

II. RESEARCH METHODS

This study used a qualitative descriptive method. The approach used is ethno-science, where a cultural artifact is studied in relation to its cultural context. The research subject was a Malind tribe community, with their activities around the process of making Tifa and the use of Tifa in the Malind tribe of Merauke regency. The data were obtained through interviews, observation, literature study and documentation. There were three respondents that researchers interviewed, who were the member of the Malind Tribe indigenous community. The observation was done directly by observing the shape and size of the Tifa. Collecting the interview data was done by recording the the interview and tabulating the data. The research data is then reduced, presented, and verified with the aim to get a reliable data presentation.

III. RESULT AND DISCUSSION

The initial activity carried out in this study was to conduct observations accompanied by interviews with the member of the Malind community. Both aimed to reconstruct indigenous science in the use of Tifa as a Papuan traditional musical instrument. Interviews with respondents produce information about how to use Tifa and the use of the elements in Tifa. The researchers began the interview by asking questions related to Tifa as a musical instrument used in traditional ceremonies. The results of the interview the first respondent are as follows:

"That's what it called the language here (Indonesian) said it was membranophone. Because it is covered with the leather/membrane. [Tifa] is played by beating until it produces sound. Tifa is a traditional music instrument. Papuan instruments, one of which is membranophone".

From the above quote, it can be observed that the Malind tribe considers Tifa as part of its identity. Even though the subject adopt Indonesian terms to explains the parts of the Tifa, the subject emphasized Tifa is specific to the Papuan culture, implying that the musical instrument specifically originated from the Papuan tribes.

Related to the size of the drums and the sound they produce. The first respondent's answer is presented as follows.

"yes, the size is different. The motive is different too. The sound is according to the size. The greater the size of Tifa, it makes the sound is also getting bigger."

From the quote above, it can be observed that the Malind tribe has a simple way to explain the differences in the volume of the sounds produced by the differences in the size of the Tifa.

Regarding to the kind of leather which is used at the Tifa, the answer of the first respondent is:

"It must be a kangaroo leather. You cannot use deer leather because Tifa is not a drum. No goats, no cattle. It must be a kangaroo because Tifa is kangaroo friends. Tifa is a kangaroo friend"

From the interview above, it can be conceived that the Malind tribe considers the use of kangaroo's hides as the differentiating characteristic that marks Tifa out from other membranophone percussions. What is more important than just the material properties of the kangaroo's hides as the only acceptable material for making Tifa is that the belief that the Tifa is a kangaroo's friend. An important cultural values that needs to be underlined here, related to the position of Tifa as a ceremonial musical instrument and at the same time as kangaroo's friend is the message that without kangaroo's hide, there will be no Tifa and without Tifa, the Malind tribe will not have the ceremonial musical instrument, hence invalidating the ceremony itself. This is an important value that teaches animal preservation, especially kangaroos as one of the native animals in the Island of Papua New Guinea.

However, there were also other member of the community that has more scientific explanation about the choice of hides to use as Tifa's membrane. Regarding animal leather used on the Tifa, the answers of the second respondent are presented as follows.

"... it's thick (meaning that cowhide can't be used because it's thick). The leather used was from animals that had thin leather such as lizards, snakes, and kangaroos. So it has a loud voice"

In the above statement, it is explained that the right membrane to be used in Tifa depends on the loudness targeted for each specific design, in which the thinner the membrane, the louder the voice produced will be. Here, he also stated that other thin leather can also be utilized, for example lizard's skin and snakeskin.

To this statement, another respondent was adamant that other skin should not be used as membrane to make the Tifa. The third respondent's answered concerning the animal leather used in the Tifa is presented as follows.

"Tifa Malind is made from kangaroos leather. ... it must use kangaroos leather. Other (animal) leather may not be."

The statement of this third respondent echoes the opinion of the first respondent that the leather used as the membrane for the Tifa should be kangaroo's hides. This third respondent also emphasized the importance to use the Kangaroo hides for ceremonial Tifa.

In the process of making kangaroo leather is dried first and then heated in order to be pulled tight when mounted on the top of the drums. The tighter the animal leather that is used as a cover will make the drums more loud and strong.



Fig. 2. The Shape of A Tifa from the Malind Tribe

Overall, the shape of the drums belonging to the Malind tribe is presented in Figure 2. In general, the body of the Tifa have a tubular shape. They are made from hardwood that is local to the Papuan forests. The woods are then hollowed out, as what can be observed from Figure 3 below. Tifa has a handle on the body. Because the tifa is more streamlined and not too heavy, the tifa sounds are lighter, and buzz like the sounds of drum.



Fig. 3. The Inside Part of Tifa

Tifa also has a part that functions as a sound regulator made of the honey candle (derived from honeycombs). It can be seen at Figure 4.



Fig. 4. The Upperside Of Tifa With The Sound Regulator Made Of Beeswax



Fig. 5. Tifa In Big And Extra Big Sizes

Based on information from the respondents which related to the use of Tifa and the function of the elements, the use of drums contains scientific elements that can be integrated into learning. Tifa can be used as a learning medium. The concepts of science in Tifa that can be integrated into learning, namely:

1. The leather/membrane on the drums uses kangaroo leather.

The use of leather /membrane on the Tifa is only permitted to use the leather of lizard leather, snake leather, and kangaroo leather. The most frequently encountered is the Tifa using kangaroo leather. Compared to other animal leather, kangaroo leather is thinner so it produces a louder sound. Scientifically thin thickness of the leather /membrane will affect the resonance of the sound produced. If the leather /membrane is hit then the membrane will vibrate to produce a sound.

2. Different Tifa sizes

Tifa has different sizes, ranging from small to large sizes. The sound produced by Tifa depends on its size. The bigger size produces a bigger and louder sound. And conversely the smaller the Tifa, the smaller the sound produced and less loud. The difference in sound on each of the sizes of the drums is caused by the space on the underside of the drums. The bigger size of Tifa, has a greater space in Tifa. Sound waves that produced from the leather/membrane which beaten and then fill the space in the Tifa produce a unique sound.

Based on the research data, the researchers made a matrix of connections between science concepts and local wisdom in the form of musical instruments. This matrix contains the concepts of physics that can be explained by using Tifa as a contextual learning medium. The matrix is presented in Table 1.

TABLE I. MATRIC RELATIONSHIP OF TIFA MUSIC TOOLS WITH BASIC COMPETENCE IN SMP

No.	Basic competencies	Science Concepts in Tifa
3.10	Understand the concepts of vibration, waves, sound and hearing, and their application in the sonar system in animals and everyday life.	The Tifa music instruments are played by being hit. When the membrane in the drape is struck, it produces a sound.
4.10	Make observations or experiments about vibrations, waves, and sounds	This concept is related to sound resonance

Based on the matrix of Tifa's relationship with basic competence in junior high school, it shows that the concept of science, especially in sound material, can be explained by using learning media by using the ethnoscience approach. Some sound concepts that can be explained through the learning of Tifa, for example, understanding sound, nature of sound, sound source, sound requirements, sound frequency, and application of sound propagation. Sound is something that is produced by a vibrating object. An object can make a sound if the object vibrates. Through this musical instrument, we can explain how an object can produce sound. For example when Tifa was hit. Next, we can explain, how to make tifa produce a louder sound than other percussion instruments, using the skin of a kangaroo as a membrane to produce a louder sound. Educators can also explain why a smaller size of the drums produces smaller sounds.

The concept that can be explained is sound resonance. This proves the results of previous studies that culture can be used to teach science [6], [16], [19]-[20]. Thus, local wisdom can be used to teach science in schools. To teach science using local wisdom, contextual learning can be used. The use of local

wisdom in learning makes it easy for students to understand the concept of science easily. This proves previous research which states the ease of understanding concepts through local wisdom [7], [21]–[24].



Fig. 6. Small Sized Tifas

The state of art of this research is related to the application of science learning using media based on local wisdom of the Malind tribe of Merauke, Papua. This study has limitations in the form of research time. As a result, local wisdom that is used as the object of research has not been fully studied using the ethnographic approach. The results of this study have not been discussed in depth related to Tifa as a learning medium. Need a deeper study to develop ethnoscience-based science learning tools.

IV. CONCLUSIONS

This research concludes that there is a science element that can be studied from the Tifa music instrument. Using Tifa as a science learning medium on sound concepts can be made alternative in learning contextual science in Papua. This can increase the curiosity of learning while also making students aware of learning science that has benefits and links to everyday life. This study can be developed to make Tifa as a learning medium for explaining sound concepts. There is a need for further research to examine more closely related elements of science in Tifa. So that, it can be developed into a learning media based on original science.

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