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I Gusti Ayu Mutiara Sandhy*)

Department of Science
Education,
Universitas Pendidikan Ganesha,
Indonesia

Kompyang Selamat

Department of Science
Education,
Universitas Pendidikan Ganesha,
Indonesia

Luh Mitha Priyanka

Department of Science
Education,
Universitas Pendidikan Ganesha,
Indonesia

AN EXPLORATION OF THE INDIGENOUS SCIENCE OF *NGERUPUK* LOCAL CULTURE IN PETANG INDIGENOUS VILLAGE AND ITS RELEVANCE TO SCIENCE

Abstract: This research aims to explore the indigenous science of the *Ngerupuk* tradition as local culture in the Petang Traditional Village and analyze its relevance to junior high school science materials. This type of research is descriptive qualitative, with an ethnoscience approach. The research was conducted in the Petang Traditional Village, Badung. Through purposive sampling and snowball sampling techniques, a total of 6 research subjects were obtained, including the Community component consisting of stakeholders, Serati Banten, community leaders, and science teachers at SMP Negeri 1 Petang. Data collection techniques were carried out using observation, interviews, documentation and questionnaires. The data analysis technique uses Milles and Huberman which consists of collecting data, reduction, data display, and conclusion. The results are a number of indigenous knowledge of the community about the *Siat Api* ritual or fire war and *Mecaru panca sata* which is the main activity of the *Ngerupuk* tradition of the Evening Traditional Village. Based on scientific analysis, it was found that the findings are relevant and have a great opportunity to be studied in Phase D Middle School Science, namely in the material of classifying living things, heat and movement, organization of life, air pollution, vibrations, waves and sound.

Keyword: Local Culture, *Ngerupuk*, *Siat Api*, Middle School Science Material

*) Correspondence Author:
ayu.mutiara.sandhy@undiksha.ac.id

INTRODUCTION

Education is one of the crucial aspects for a country to be considered as a developed country. Education is the basis or main point in the quality of Human Resources (HR) in a country. These human resources play an important role as a benchmark for progress by a country. Therefore, programs to improve the quality of education become one of the main focuses by a country in improving the quality of human resources in the country. Education has a very important role in fostering a love for the nation's culture so that the younger generation is able to preserve the values contained in it to create a better human civilization.

In reality today, the achievement of science literacy scores among students is still relatively poor, which is evidenced by science literacy scores through the Program for International Student Assessment (PISA). The latest PISA results, in 2022, also show a decrease in student learning outcomes internationally due to the pandemic. Even so, Indonesia's ranking rose 5-6 positions from the previous PISA 2018. For science literacy alone, Indonesia in PISA 2022 rose 6 positions compared to before. Despite the increase in rank, it turns out that Indonesia's science literacy dropped by 13 points which is almost equivalent to the international average which dropped by 12 points. Factors that cause low science process skills include science learning that is carried out more focused on mastering science products than training science competencies, the lack of seriousness from within students when participating in science learning, to inadequate facilities and infrastructure in the classroom and outside the classroom (Prahani et al, 2021). The development of a curriculum, students are trained to be able to recognize facts, know the differences and similarities of facts, find relationships between facts so that students construct their own knowledge (Fitriyanti et al. 2017).

Expectations for science learning are not in accordance with the reality in the field. Based on the results of observations and interviews in 2023 with science teachers at SMP Negeri 1 Petang, it was found that science learning had not integrated much local culture. Science teachers at the school also stated that they had obstacles so that they could not integrate science learning with the culture or local wisdom of the area. The obstacles are caused by several factors, including the lack of teacher knowledge in studying or exploring local culture and the limited teaching materials that integrate science learning with local culture.

These problems are similar to research conducted by several researchers, such as Najib (2018) who in his research, stated that there are obstacles in learning science, one of which is that in the learning companion book used by students, there is no presentation of the relationship between science learning and the surrounding environment of students in the form of culture or local wisdom. Khilman (2018) found that there are still many teaching materials used in science learning activities that do not use local culture. In line with these problems, research conducted by Suastra (2010) states that in the process of learning science only 20% of teachers have knowledge in developing learning, especially those based on local wisdom and ethnoscience, whereas 90% of teachers who stated their desire to be able to improve it. Sudarmin (2014) explains the importance of the role of a local culture in science materials because the integration of local community knowledge with scientific science materials can lead to more meaningful learning. Therefore, media is needed to increase references for teachers and students in order to facilitate the learning process based on ethnoscience and local culture, especially for people on the island of Bali.

Bali is one of the provinces in Indonesia whose people are predominantly Hindu. Hindu life in Bali is thick with the implementation of offering ceremonies or called *yadnya* (Utari et al. 2021). Based on the data from research conducted by Suardana (2014), it is said that Balinese cultural integration can support culture-based learning so as to make learning more interesting and meaningful for students. This is because learning is tailored to the prior knowledge that students already have, making it easier for students to construct the knowledge being learned.

Local wisdom is the fruit or result of certain communities/ethnicities through their experiences and not necessarily experienced by other communities (Pamungkas et al, 2017). One of the traditional ceremonies performed by Balinese Hindus is *Ngerupuk*. In general, people do not realize that there are concepts in the local cultural procession of *Ngerupuk* that can be incorporated into science materials. This fact is due to the lack of references and sensitivity to efforts in exploring the community's local wisdom activities regarding the *Ngerupuk* ceremony that can be studied into scientific knowledge. *Ngerupuk* is one of the traditions that is familiar and very commonly known by all levels of Balinese Hindu society. The uniqueness or characteristic of *Ngerupuk* local culture is that the ceremony is held the day before Nyepi, not only that, other uniqueness can also be seen in the means used, such as using ogoh-ogoh and the use of offerings used. Thus integrating the local culture of *Ngerupuk* with junior high school science materials will certainly facilitate students in carrying out the learning process.

Based on some of the problems presented, an effort is needed to increase learning resources or references for teachers and students so that it can facilitate the implementation of science learning activities. Some students consider that science learning is a difficult, boring subject and too much to memorize (Purwati, 2012). One of the efforts that can be made to create contextualized learning activities is to involve local wisdom found in the community (Ayuni, 2021). Considering that there is no research that integrates *Ngerupuk* culture with junior high school science materials, it is very important to integrate the local culture of *Ngerupuk* in Petang Traditional Village as supporting material in science learning.

This research has a novelty that supports CRT (Cultural Responsive Teaching) or culture-based learning. The purpose of CRT is to strengthen local culture-based science learning, especially for students in Petang Traditional Village and students studying in Bali. In addition to this, this research also provides information to the general public regarding Balinese culture, especially the *Ngerupuk* Local Culture in Petang Traditional Village, which can be utilized by teachers and further researchers in utilizing and further introducing local culture.

This solution is in line with the data from research conducted by Utari et al. (2021), namely the implementation of the local culture of Tawur Kesanga using plants and animals has relevance to junior high school science materials. Data from the research by Oktaviani et al. (2021) also shows the relevance of the local culture of the *Yadnya Otonan* ceremony to junior high school science materials. Data from the research of Oktaviani et al. (2021) also have relevance to the local culture of the *Yadnya Otonan* ceremony with junior high school science materials. Data from the research of Ayunita et al. (2022), namely the analysis of *Ngaben* local culture which has relevance to junior high school science materials. Furthermore, the results of the analysis of *Ngerupuk* Local Culture can be used as supporting material in junior high school science learning.

The formulation of the problem in this research is what is the sequence of the local *Ngerupuk* culture in the Petang Traditional Village? What are the facilities used in the local *Ngerupuk* culture in the Petang Traditional Village? What scientific knowledge exists in the local *Ngerupuk* culture in the Petang traditional village as supporting material for junior high school science learning? How is scientific knowledge related to local *Ngerupuk* culture and junior high school science material?

Based on the background of the problems and solutions that have been described, it is very important to conduct this ethnoscience research, with the aim that the results of the analysis and integration of ethnoscience of *Ngerupuk* Local Culture in Petang Traditional Village can be used as a support for junior high school science materials for teachers to link science learning with local cultures in the community.

METHODS

The type of research used in this research is descriptive qualitative research with an ethnoscience approach. This research was conducted in Petang Traditional Village, Petang Village, Petang District, Badung Regency. The location was chosen because it has a local culture that is only owned by the traditional village, namely *Siat Api*.

The determination of subjects in this study was carried out by purposive sampling on the selection of community components such as 1 Bendesa or head of the traditional village, 1 serati or maker of ceremonial facilities and 1 pemangku and snowball sampling on teachers of SMP Negeri 1 Petang where 3 teachers were used. Data collection methods in this study used observation, interviews, questionnaires, and documentation.

Data analysis in qualitative research is carried out since before entering the field, during the field, and after completion in the field. Descriptive data analysis techniques use the Milles and Huberman model, which consists of collecting data, reduction, data display, and conclusion. Data validity checks used are member checks and data triangulation consisting of source triangulation and technique triangulation.

RESULT AND DISCUSSION

The results showed that, *Ngerupuk* Local Culture is a day that falls right on Tilem Sasih Kesanga before Nyepi Day according to the Balinese calendar. The *Ngerupuk* ceremony is identical to the *Mecaru* ceremony. Which has the aim of neutralizing negative things/Bhuta Kala in the surrounding environment.

Based on the results of observations and interviews regarding the implementation of a series of processions in the culmination of the *Ngerupuk* Ceremony in Petang Traditional Village, starting from *Mecaru* which is held at Catus Pata or the intersection of traditional villages. *Mecaru* is led by the Pemangku owned by the traditional village and followed by the entire traditional village community. After *Mecaru*, it is followed by the *Siat Api* Tradition led by community leaders or Bendesa and accompanied by the Traditional Village *Baleganjur Gong*. Finally, in a series of *Ngerupuk* ceremonies in the petang traditional village is *mepralina* or burning all the facilities used in carrying out the *Siat Api* tradition. The following is an excerpt from an interview with the interviewee.

Table 1. Interview Excerpts with Stakeholders

Question	Answer	Translation
What are the ceremonies of the <i>Ngerupuk</i> local cultural series?	...di sandyakala ne jam 6 peteng to <i>Mecaru panca sata</i> ne. sebenarne nak besik atau Bahasa Indonesia ne serangkaian ye, nah kan geg uning, jam 12 tengai ajak jam 6 sandyakala to be Bhuta Kala ne ngelah jam ne pesu, uli to be makanne kedua waktu ne baang ne banten kuale melenan banten ne gen, tengai taur kesanga, sandyakala caru panca sata. Yen khusus ne di Petang, suud <i>Mecaru panca sata</i> di sandyakala to, lanjut be me <i>Siat Api</i> . <i>Siat Api</i> ne ube uling-uling ade ne, melenan ajak ogoh-ogoh ne ane mare ade. <i>Siat Api</i> ne mase adalah symbol Bhuta Kala ne miegan ngeradug gumi, trus ye suud ulian ube damai...	...at sandyakala time or at 6pm the caru panca sata is held. Actually, the series of <i>Ngerupuk</i> ceremonies that are held at 12 noon and 6 pm are one series. The reason for the implementation at 12 noon and 6 pm, is because at that time Bhuta Kala has hours to move freely. Because of this, the <i>Ngerupuk</i> ceremony is divided into 2 stages, namely at 12 noon the tawur kesanga ceremony is held and at 6 pm the <i>Ngerupuk</i> and <i>Siat Api</i> are held. The tradition of <i>Siat Api</i> has been carried out from ancient times, unlike the ogoh-ogoh procession which has just been carried out. <i>Siat Api</i> is also a symbol of Bhuta kala who quarrel and want to destroy the earth, but can be resolved in a peaceful way.....

The results of observations and interviews found that the implementation of *Ngerupuk* local culture in Petang Traditional Village uses 7 kinds of banten facilities. The means of banten used are *pejati*, *pulegembal*, *biukaonan*, *prayascita durmangala*, *caru panca sata*, *ganjaran agung* and *banten sakewentenan*. The banten used in the culmination of the *Ngerupuk* ceremony in Petang Traditional Village is made from various plants and animals obtained from the environment around the traditional village. The following is an excerpt from an interview with the interviewee.

Table 2. Excerpts from the Interview with Serati

Question	Answer	Translation
What are the banten constituents and other means used in the culmination of <i>Ngerupuk</i> local culture?	<i>caru panca sata ngangge daun pisang, nasi, siap ane patuh ajak arah mata angin metatakan tiying ajak canang. Ganjaran agung misi nyuh, panak siap, canang, taluh siap, sampian. Prascita durmangala misi srembeng uli busung, nyuh gading, lis gede, lis biasa, sampian-sampian, canang, nyuh, ulam banten, nasi. Pejati misi nyuh, taluh siap, ketupat, segehan, peras, buah, canang, sampian, beras kacang saur. Pemplaspas niki yen ngangge ogoh-ogoh, dasar ne nganggo don dadap, busung, pis bolong ajak baas kuning. Biukaonnan to misi tiying, slepan, sampian, sode, canang taluh siap baas nasi. Sakewentenan to tergantung ne ngae, ne pasti to misi sampian, canang, buah, jaje apem, jaje gina dan jaje uli, taledan, kacang saur</i>	The <i>caru panca sata</i> uses banana leaves, rice, chicken whose color corresponds to the cardinal directions covered with bamboo and <i>canang</i> . Banten <i>ganjaran agung</i> contains coconut, chicks, <i>canang</i> , chicken eggs and <i>sampian</i> (shaped coconut leaves). Banten <i>prayascita durmangala</i> contains <i>srembeng</i> , <i>lis gede</i> , <i>lis biasa</i> , <i>sampian</i> which are shaped coconut leaves, ivory coconut, <i>canang</i> , coconut, meat, rice. Banten <i>pejati</i> contains coconut, chicken eggs, <i>ketupat</i> , <i>segehan</i> , <i>peras</i> , fruits, <i>canang</i> , <i>sampian</i> , rice, nuts and <i>serundeng</i> . <i>Pemplaspas</i> is used when making <i>ogoh-ogoh</i> , which contains <i>dapdap</i> leaves, molded <i>janur</i> and contains yellow rice and <i>kepeng</i> money. <i>Biukaonan</i> which contains bamboo, old coconut leaves, <i>sampian</i> , <i>sode</i> , <i>canang</i> , chicken eggs, rice and rice. <i>Sakewentenan</i> whose contents depend on who makes it, but which must contain <i>sampian</i> , <i>canang</i> , fruit, <i>jaje gina</i> , <i>jaje uli</i> , <i>taledan</i> , nuts and <i>serundeng</i> .

The results showed that the implementation of *Ngerupuk* in Petang Traditional Village has several processions, starting with *Mecaru Panca Sata*, which includes several processions including *melis*, *mebiukaonan*, and *Mecaru* led by the Petang traditional village leaders. After the completion of the *Mecaru* procession, followed by the implementation of the local culture of *Siat Api*. *Siat Api* is carried out at the *Catus Pata* or the crossroads of the Traditional Village which coincides with the place where the previous *Mecaru* was held. In *Siat Api*, the youth are divided into several parts to later throw fire takep (coconut fibers that have been filled with fire) to the center. The division is 5 people from the east, 9 people from the south, 7 people from the west, 4 people from the north and finally 8 people in the middle. Later, young people who depart from various directions will throw fire at each other until the leader, namely the *bendesa*, gives instructions to stop. Finally, when the *Siat Api* procession is almost finished, all the people around the place help to cheer each other and *Seka Gong* helps to accompany the *Gong Baleganjur* gamelan performed by village youths. *Baleganjur* is a set of *gambelan* consisting of *pelog*-tuned percussion instruments (Arsana, 2014). After the *Siat Api* is declared complete, all the facilities used in the *Siat Api* will be burned in the middle of the intersection with gasoline accompanied by *banten Pejati*.

In line with the research results, the local culture of *Ngerupuk* requires several means as mentioned in the research results. The meaning of each means of banten used is *Pejati* which means to carry out a job seriously. *Pulegembal* or *Sarad Pulegembal* is an offering that symbolizes the God Gana who is a symbol of human efforts to love nature symbolized by Dewi Durga. *Sarad Pulegembal*

symbolizes the contents of the universe such as plants, animals and humans as the concept of creating women's clothing (Udayana et al, 2022). *Banten Bayakaon* has a function as a means to eliminate all negative turmoil stemming from *ahamkara* (egoism). *Durmanggala* means cleansing and its purpose is to balance *buthakala* to be spiritually clean. *Prayascita* means with a pure mind will get happiness. *Caru Panca Sata* in the form of types of Balinese food to entertain Bhuta Kala so that it is harmonious. *Ganjaran Agung* often also called *Segehan Agung* has the meaning of the highest level of treats and is usually used in larger and more important ceremonies. *Banten Sakewentenan* is an offering offered by the community whose contents depend on the napa owned. *Canang* comes from the Kawi language which means "betel" and *canang* is usually served to honored guests.

Based on the results of interviews about the *Ngerupuk* tradition in Petang Traditional Village, community knowledge can be reconstructed into scientific knowledge/science as presented in the following table.

Table 3. Reconstruction of Original Science to Scientific Science

Indigenous Science of Society	Scientific Science
The community believes that sounding and playing Gong <i>Baleganjur</i> and cheering the community to repel Bhuta Kala from the traditional village environment.	Every human being emits electromagnetic waves that come from thoughts and feelings called vibrations. By the community ringing the Gong and letting out cheers, it can make the human body feel or emit positive vibrations that have an impact on the mind and make negative things unthinkable.
The community believes that carrying out the <i>Ngerupuk</i> and <i>Siat Api</i> traditions can neutralize <i>Bhuta Kala</i> or negative aura.	In the preparation and implementation of <i>Ngerupuk</i> and its series of events, the community welcomes it with pleasure and happiness. In a happy state, dopamine and serotonin will be produced which will make the body excited, motivated to do many activities (Ambarita, 2022). In this atmosphere, the human body secretes hormones, which are chemical messengers that coordinate various body functions. With these feelings of happiness and joy, the human mind does not lead to things that are negative.

The local culture of *Ngerupuk* in Petang Traditional Village can be integrated with science materials in Phase D, especially at the junior high school level, which will certainly make it easier for teachers and students to understand the material from the reconstruction of local culture to science learning. The integration of *Ngerupuk* local culture in Petang Traditional Village into junior high school science materials is presented in Table 4.

Table 4. Analysis of the Relevance of Ngerupuk Local Culture in Petang Traditional Village in Junior High School Science Materials

No	Learning Outcomes (LO)	Subject Matter	Science Concept in Ngerupuk Local Culture
1	Learners are able to classify living things and objects based on observed characteristics.	Classification of Living Things	Raw materials in the form of plants and animals used in making banten used in the local culture of Ngerupuk in Petang Traditional Village can be classified by species.
2	Learners are able to understand the relationship between the concepts of effort and energy, measure the amount of temperature caused by given heat energy, as well as be able to distinguish heat insulators and conductors.	Heat and Transfer	The atmosphere in the surrounding environment at the time of burning the <i>Siat Api</i> means in the local culture of Ngerupuk in Petang Traditional Village feels hot because of the transfer of heat by radiation.
3	Learners can describe atoms and compounds as the smallest unit of matter and cells as the smallest unit of living things.	Organs in the Animal Body	The concept of <i>Panca Maha Bhuta</i> is in the body of a chicken animal which is used as <i>Caru Panca Sata</i> there are constituent organs, namely <ol style="list-style-type: none"> solid elements (bones, beaks and others) liquid/apah elements (blood, etc.) Element of heat/teja (body heat) element of wind / energy (breath) elements of akasa/vacuum (cavities in the body such as the chest cavity and others)
4	Learners identify interactions between living things and their environment, and can design efforts to prevent and overcome pollution and climate change.	Air Pollution	The burning of facilities in the local culture of Ngerupuk in Petang Traditional Village produces CO and CO ₂ gases in the form of smoke billowing into the air. Pollution can occur if CO and CO ₂ levels exceed normal thresholds.
5	Learners understand vibrations and waves, light reflection and refraction including simple optical devices that are often used in everyday life.	a. Vibration b. Waves c. Sound	<i>Gamelan</i> is a means used to accompany the Ngerupuk Ceremony in Petang Traditional Village. Sound wave propagation can be found in gamelan equipment. In addition, one of the sound wave propagation media is a solid object such as gamelan <i>Baleganjur</i> which is used.

Subject: classification of living things. There are 17 types of plants used in making *Ngerupuk* banten facilities in Petang Traditional Village including:

Table 5. Plants Used as Means of *Ngerupuk*

No	Facility Name	Name of The Animal	Scientific Name
1.	<i>Pejati</i>	Coconut	<i>Cocos nucifera</i> L
		Banana	<i>Musa Paradisiaca</i> L
		Rice	<i>Oryza sativa</i>
		Soybean	<i>Glycine max</i> (L) Merril
2.	<i>Pulegembal</i>	Sugarcane	<i>Saccharum officinarum</i> L.
		Rice	<i>Oryza sativa</i>
		Banana	<i>Musa Paradisiaca</i> L
		Coconut	<i>Cocos nucifera</i> L
3.	<i>Biukaonan</i>	Bamboo	<i>Bambusa vulgaris</i>
		Coconut	<i>Cocos nucifera</i> L
		Rice	<i>Oryza sativa</i>
		Soybean	<i>Glycine max</i> (L) Merril
4.	<i>Prayascita Durmangala</i>	Coconut	<i>Cocos nucifera</i> L
		Ivory Coconut	<i>Cocos nucifera</i> var. <i>eburnea</i>
		Rice	<i>Oryza sativa</i>
		Soybean	<i>Glycine max</i> (L) Merril
5.	<i>Caru Panca Sata</i>	Banana	<i>Musa Paradisiaca</i> L
		Rice	<i>Oryza sativa</i>
		Soybean	<i>Glycine max</i> (L) Merril
		Bamboo	<i>Bambusa vulgaris</i>
6.	<i>Ganjaran Agung</i>	Coconut	<i>Cocos nucifera</i> L
		Rice	<i>Oryza sativa</i>
		Soybean	<i>Glycine max</i> (L) Merril
		Aren	<i>Arenga pinnata</i> (Wurmb.) Merr
7.	<i>Sakewentenan</i>	Apple	<i>Malus Sylvestris</i> mill
		Papaya	<i>Carica papaya</i> L.
		Durian	<i>Durio zibethinus</i> Murr
		Soybean	<i>Glycine max</i> (L) Merril
		Tangerine	<i>Citrus reticulata</i>
		Bali orange	<i>Citrus grandis</i>
8.	<i>Canang</i>	Cambodia	<i>Plumeria</i> sp.
		Water henna	<i>Impatiens balsamina</i> L.
		Ylang-ylang	<i>Cananga odorata</i>
		Gemitir	<i>Tagetes erecta</i> (L).
		Pandan	<i>Pandanus amaryllifolius</i>

Apart from plants, there are 3 types of animals used to make *Ngerupuk* Local Culture tools, as in the following table.

Table 6. Animals used as a Means of *Ngerupuk*

No	Facility Name	Name of The Animal	Scientific Name
1.	<i>Pejati</i>	Pork and chicken	<i>Sus scrofa</i> , <i>Gallus gallus domesticus</i>
2.	<i>Biukaonan</i>	Pork, chicken and anchovies	<i>Sus scrofa</i> , <i>Gallus gallus domesticus</i> , <i>Stolephorus indicus</i> .
3.	<i>Prayascita durmangala</i>	Pork and chicken	<i>Sus scrofa</i> , <i>Gallus gallus domesticus</i>
4.	<i>Caru panca sata</i>	Chicken	<i>Gallus gallus domesticus</i>
5.	<i>Ganjaran agung</i>	Chicken	<i>Gallus gallus domesticus</i>
6.	<i>Sakewentenan</i>	Chicken	<i>Gallus gallus domesticus</i>

The results of this study are in line with the data in research conducted by Oktaviani et al (2021), namely the classification of plants and animals in Yadnya Otonan Local Culture.

Subject: Heat and Transfer. One of the series in the implementation of the local culture of *Ngerupuk* in Petang Traditional Village is the process of burning the facilities used in *Siat Api*. The transfer of heat energy is divided into three, namely conduction, convection and radiation (Widodo et al., 2017). When the combustion process is carried out, the people who attend the *Ngerupuk* Local Culture will feel the heat from the burning fire. This is one of the radiation heat transfer processes. During the combustion process, heat transfer occurs by radiation or emission which causes the place around the combustion to feel hot.

Subject: Organization of Life. The purpose of implementing the local culture of *Ngerupuk* is to neutralize the negative traits that exist in humans and the surrounding environment by using chicken as a symbol of these negative traits. The elements of *Panca Maha Bhuta* in the chicken body, namely bones, muscles, meat and everything that is solid (*perthiwi*); Blood, fat, gall glands, water and everything that is liquid (*Apah*); Body heat, eye light and everything that is hot (*teja*); Breath and air in the body occur from (*Bayu*); (The chest cavity, oral cavity and everything that is hollow is formed from (*Akasa*).

The results of this study are in line with research conducted by Suardana (2014) which states that *Panca Maha Bhuta* contained in the human body include *perthiwi* found in skin, flesh, bones; *apah* found in urine, stomach acid fluid, blood plasma, tears, and mucus; *teja* in the form of body heat/body temperature; *bayu* in the form of wind in and out of breathing; and ether/*akasa* (emptiness).

Subject: air pollution. The implementation of the *Ngerupuk* local culture can cause air pollution due to the gases produced by the combustion process of the facilities used. The gases generated from the combustion process contain carbon dioxide (CO₂) and carbon monoxide (CO). This air pollution can cause health problems, especially respiratory problems in living things, and can even damage the ozone layer if its presence exceeds the level of the ozone layer.

Subject matter: vibration, waves and sound. The implementation of the *Ngerupuk* Local Cultural Summit in Petang Traditional Village is certainly inseparable from gamelan facilities which are used as processional accompaniment from start to finish. Sound is a longitudinal wave that propagates through a certain medium, sound occurs due to vibration so that a sound system is created which in turn can be heard by the human sense of hearing (Kustaman, 2017). Sound can be caused by vibrating objects (Zubaidah et al, 2017). *Gamelan* is one of the phenomena in the field of physics because it produces sound (acoustic waves) (Prasetya, 2011). When the gamelan device is hit it will experience vibrations. The workings of the tool (*Baleganjur* music device) so that it can produce sound, namely the sound of *Baleganjur* basically arises because of a vibrating object. Sound will arise due to the presence of vibrating objects. Sound is a longitudinal wave that in its propagation requires a medium in this case air so that it can be heard by the ear (Wardani, 2021).

CONCLUSION

The means used in *Ngerupuk* Local Culture in each region have various types that are adjusted to the culture in the area (*Desa Kala Patra*). The facilities used in the traditional village of petang are *pejati*, *pulegembal*, *biukaonan*, *prayascita*, *durmanggala*, *caru panca sata*, *ganjaran agung*, *banten sakewentenan*. The making of these facilities uses plant and animal materials that can be related to junior high school science material. In general, the tools used in the local culture of *Ngerupuk* are the same as other regions on the island of Bali, only the naming of these tools is different.

The series of implementation of *Ngerupuk* Local Culture in petang traditional village consists of several series, starting with *Mecaru panca sata* at the village intersection or *catus pata*, carrying out the tradition of *Siat Api*, voicing *Gongs* and cheers of the indigenous village community and

finally burning all the facilities used there is *Siat Api*. From some of these processes there is science material that can be studied.

The local culture of *Ngerupuk* in the traditional village of Petang can be integrated with the Learning Outcomes (LO) in Phase D in junior high school science subjects, namely in the material of classifying living things, heat and displacement, life organization, air pollution, vibration, waves and sound.

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I Gusti Ayu Mutiara Sandhy

Students of the Science Education Study Program, Universitas Pendidikan Ganesha, actively conducting research in the field of Science Education, can be contacted via email ayu.mutiara.sandhy@undiksha.ac.id

Kompyang Selamat

Lecturers of the Science Education Study Program, Universitas Pendidikan Ganesha, actively conducting research in the field of Science Education, can be contacted via email kompyang.selamet@undiksha.ac.id

Luh Mitha Priyanka

Lecturers of the Science Education Study Program, Universitas Pendidikan Ganesha, actively conducting research in the field of Science Education, can be contacted via email luh.mitha@undiksha.ac.id