RESEARCH ARTICLE | MAY 15 2023

Ethnoscience Sasirangan: A review as science learning resources

M. Misbah ✉; P. D. Amrita; Z. Zainuddin; ... et. al

AIP Conference Proceedings 2595, 040032 (2023)
https://doi.org/10.1063/5.0123822

Ethnoscience Sasirangan: A Review as Science Learning Resources

M Misbah[1, a)], P D Amrita[2], Z Zainuddin[3], N Muhammad[4], I. R. Ermawati[5], U A Deta[6], K. Syahidi[7], and Mohd Ali Ibrahim[8]

[1,3]*Physics Education Study Program, Universitas Lambung Mangkurat, Banjarmasin, Indonesia*
[2]*SMKN 3 Banjarmasin, Banjarmasin, Indonesia*
[4]*Physics Education Study Program, Universitas Khairun, Ternate, Indonesia*
[5]*Physics Education,* Universitas Muhammadiyah Prof. Dr. Hamka, *Jakarta, Indonesia*
[6]*Physics Department, Universitas Negeri Surabaya, Surabaya, Indonesia*
[7]*Physics Education, Universitas Hamzanwadi, Nusa Tenggara Barat, Indonesia*
[8]*School of Education, Universitas Teknologi Malaysia, Johor Baru, Malaysia*

[a)]Corresponding author: Misbah_pfis@ulm.ac.id

Abstract. This study aims to describe the analysis of making Sasirangan cloth related to the concept of Natural Sciences in secondary school. The study used a qualitative descriptive method. Data were obtained through interviews, literature studies and documentation. The research instrument consisted of interview guide sheets, concept analysis sheets and documentation equipment. Making Sasirangan consists of fabric preparation, colouring, thread release and colour preservation, fabric washing, drying and packaging. The identified scientific concepts include interactions between living things, concentration of solutions, acid and base solutions, physical and chemical changes, heat transfer and energy changes. Science learning resources that contain the Sasirangan science concept are expected to be used as a science learning resource to improve various science skills.

INTRODUCTION

The swift currents of globalization, modernization, and strict puritanism are feared to erode a sense of love for local wisdom. So that local culture, an ancestral heritage trampled on by foreign cultures, is eliminated in its cage and forgotten by its heirs, even many young people do not recognize their own local culture. For culture to remain strong, it is necessary to instil a sense of love for local culture, especially in the regions. One way that can be taken at school is by integrating the values of local wisdom in the learning process, extra-curricular or student activities at school [1–3]. The way that can be done is to combine learning materials with the content of local wisdom.

UNESCO has several reasons for introducing integrated science in various countries as an element in primary education. Some of these reasons are: (1) integrated science learning at primary and secondary levels can provide a solid foundation for students to study more integrated science or specialist subjects; (2) the development of modern science leads to the interdisciplinary nature of science. Integrated science combines concepts, perspectives, and methods from various disciplines to interpret scientific phenomena in everyday life. The integrated curriculum is to show how interdisciplinary knowledge is related to one another [4].

The description of the materials and examples presented in the modules is relatively close to the student's daily life [5,6] so that the learning process becomes more meaningful. It helps students understand the physics materials teachers teach, thus positively impacting students' learning outcomes[7–10]. Some studies show that learning process-oriented towards local wisdom can improve student learning outcomes [5,11]. Subject Specific Pedagogic that is

Young Scholar Symposium on Science and Mathematics Education, and Environment
AIP Conf. Proc. 2595, 040032-1–040032-8; https://doi.org/10.1063/5.0123822
Published by AIP Publishing. 978-0-7354-4491-1/$30.00

integrated with ethnoscience can improve activities and learning outcomes of the students [12]. In addition, the development of physics books based on local wisdom improves the character and mastery of student learning [13,14].

There have not been many science learning tools integrated with local wisdom typical of South Kalimantan, such as Sasirangan. At the same time, making this Sasirangan fabric is very closely related to natural science materials. Therefore, it is necessary to teach materials that integrate Sasirangan with natural science materials. It is also an effort to preserve the distinct culture of South Kalimantan. This article will discuss the integration of the process of making Sasirangan fabric with science learning.

METHODS

This type of research is qualitative descriptive research. This research aims to describe the study results of natural science concepts in making Sasirangan fabric qualitatively. The research subject consisted of 2 Sasirangan fabric craftsmen, science education experts and literature making Sasirangan fabric. The research instrument consists of an interview guideline sheet, concept analysis sheet and documentation equipment. Observation and documentation of the process of making Sasirangan fabric, interviews of 2 Sasirangan craftsmen in Kampung Sasirangan Banjarmasin, and literature studies to determine the process of making Sasirangan fabric.

RESULT AND DISCUSSION

Local Wisdom and Sasirangan's Fabric

Sasirangan is local wisdom from South Kalimantan. Sasirangan cloth is also used as school uniforms, especially for schools in the city of Banjarmasin. The manufacture of Sasirangan has a characteristic in the manufacture of motifs and the colouring process that distinguishes it from other traditional fabrics. The term Sasirangan cloth has been known as Pamintan cloth since the 16th century AD. This cloth is believed to function as a means of treatment carried out by healers. The term "begging" comes from the word Parmintaan (request) in the Banjar language. Pamintan cloth is a white cloth given a specific colour and motif to someone seeking treatment from a Pamintan cloth craftsman [15].

Observation and documentation of the process of making Sasirangan fabric, interviews of 2 Sasirangan craftsmen and craftswoman in Kampung Sasirangan Banjarmasin. Then, analysis of literature studies to determine the process of making Sasirangan fabric. A concept analysis is performed to select the natural science material corresponding to make Sasirangan fabric, as seen in Table 1 [4]. We use the *adaptation model* in integrated science materials with the Sasirangan fabric making process.

TABLE 1. Basic Competency Analysis of Natural science's subject related to Sasirangan Fabric Making

Fabric Making Process Sasirangan Fabric Making	Basic Competence	Sub Materials
Fabric Preparation	3.7 Analyzing interactions between living things and their environment as well as population dynamics due to these interactions 4.7 Presenting observations on the interactions of living things with their surrounding environment	-Interactions between living things
Colouring release of yarn and colour preservation fabric laundering	3.3 Explaining the concept of mixtures and single substances (elements and compounds), physical and chemical properties, changes physics and chemistry in everyday life 4.3 Presenting the results of the investigation or work on the solution properties, changes in physical and chemical changes, or separation of a mixture of	acid-base - Concentration-solution solution-change physical and chemical
Drying	3.4 Analyze the concept of temperature, expansion, Heat, heat transfer, and its application in everyday life, including the mechanism for maintaining body temperature stability in humans and animals	-Heat's Transfer

Fabric Making Process Sasirangan Fabric Making	Basic Competence	Sub Materials
	4.4 Conducting experiments to investigate the effect of Heat on temperature and shape of objects and heat transfer	
Ironing cloth	3.5 Analyzing concepts of energy, various energy sources, and changes in the form of energy in daily life, including photosynthesis. 4.5 Presenting experimental results on changes in energy forms, including photosynthesis	- various energy sources

Sasirangan Fabric Making Process

Step 1: Fabric preparation

Sasirangan cloth is identical to the colour and motif that looks uniform. Before entering the colouring process, white fabrics (types of cotton, Bisag, Balacu, Kaci, King, Primisima, Satin, silk, white Mori and as desired) are drawn with distinctive motifs using pencils directly or using patterns or patterns from cardboard. , then sewn (straightening) following the lines of the painting and pulling it firmly (shrink) until the fabric looks wrinkled. These cloth motifs describe the shape of plant and animal parts, types of food, spices, natural phenomena and characters in the stories of the Banjar people. The following is Figure 1 of the fabric being patterned and finished combing.

FIGURE 1. (a) Fabrics being patterned and (b) finished combing

Relation to the concept of interaction between living things:

Plant forms inspire several motifs of Sasirangan cloth. We can use it as a sample to classify plant species based on similarities and differences in their characteristics (classification). The classification criteria that we can observe in a plant consist of its reproductive organs (spores/flowers), its habitus (trees, shrubs or shrubs), leaf shape (fingered/pinnate or parallel), roots (fibrous/single), stems (branched/not branching) and the way of reproduction (generative/vegetative).

Learning activities (Question's example):

1. Decide on any Sasirangan motifs whose names and shapes illustrate living things;
2. Draw the shape of the plant as a whole (roots, stems or leaves) from the Sasirangan motif whose names and shapes include plant species;
3. Describe the characteristics of the shape of leaves, roots, stems, methods of reproduction and the habitus of each plant;
4. Group the types of plants that have the same characteristics;
5. Mention the names of 2 or more plants that have the same characteristics.

Step 2: Coloring

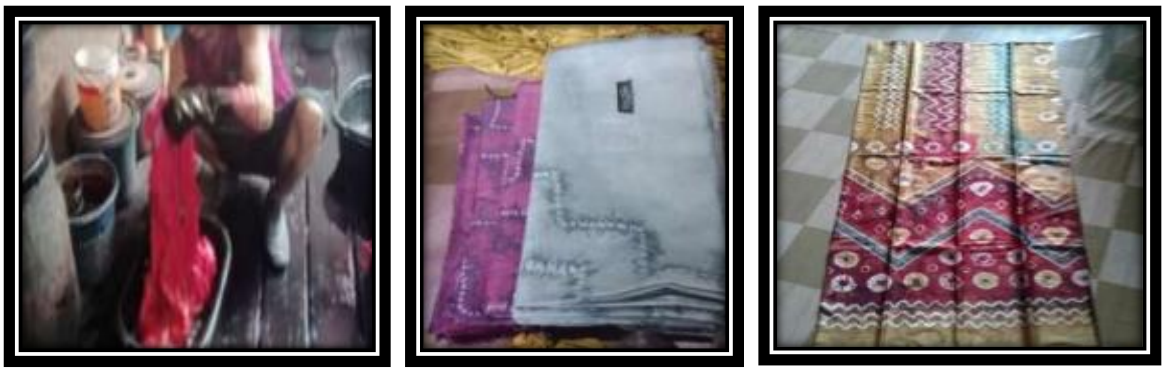
Sasirangan fabric uses synthetic and natural dyes. Synthetic dyes come from chemical and natural dyes from plant parts such as roots, stems, leaves, and others. Sasirangan fabric production in Banjarmasin itself generally still uses synthetic dyes. For example, the use of naphthol dyes and vessels. The colouring process of these two dyes can be seen in Table 2. In addition, there are natural dyes in the manufacture of Sasirangan cloth; one can use the mangosteen fruit (*Garcinia mangostana*), which produces blue, purple and red colours. The natural colour is made by finely pounding the mangosteen peeler then soaking the Mangosteen powder using ethanol and drying [16].

TABLE 2. Synthetic Dyes of Sasirangan Fabric

No.	Staining Process	Naphthol	Vessel Dyes (*Vat Dyes)*
1.	Prepare dye solution	1-2 g/L Naphthol, 2cc/L Turkey Red Oil (TRO), 6-10 cc/L caustic soda (NaOH), boiling water 1 L as well as the temperature of the water for immersion at 30 ° C + 40 ° C *	the dye vessel 2-5 g / L, TRO / wetting one cc / L, sodium nitrite ($NaNO_2$) as much as 1-2 g / L, hydrosulfite (NaHS), 2 L boiling water with a temperature range of 60°C-70°C.*
2.	Dipping cloth in	dye Naphthol dye powder is dissolved with TRO in a basin using hot water until smooth, adding caustic soda little by little. After cooling, the cloth is dipped in it. Then mix (turn over, knead) the cloth until the colour is even.	The vessel dye was dissolved with hydrosulfite, TRO, Sodium nitrite in a basin. Next, add hot water and baking soda little by little. Then, put the cloth into it until all the parts you want to dye are wet. In contrast to naphthol, this type of dye has produced colour without being dipped into the generator again, only aerated in the air. However, it still wears off if used directly, so it needs to be resurrected or locked using auxiliary materials.
3.	Generating colour	Then to generate colour using diazonium salt mixed with cold water. This salt is not durable and unstable, so stirring should be done before use. The dyeing process to dyes and colour generators is carried out back and forth to obtain the desired colour.	Then to generate colour, you can use sulfuric acid mixed with the dye solution above (divided by 2, for dye and generator). The dyeing process to the dye and salt generator is done back and forth until it gets the desired colour.
4	redo dye	Repeating immersion for kinds of different colours	

* Recipes fabric manufacture Sasirangan of Mrs Ida Kesuma

The following is Figure 2 about dyeing Sasirangan cloth, dyeing with naphthol dye, and an example of dyeing with a dye vessel (Vat Dyes) such as the indanthrene type.



(a) (b) (c)

FIGURE 2. (a) Dyeing Fabrics Sasirangan (b) Examples of Staining with Dyes Naphthol (c) Examples of Staining with Dyes Vessel*(Vatdyes)*such as The Type *Indanthrene*

Conc dye Sasirangan above concerning the value concentration of a solution. Concentration can be expressed as the ratio of the mass of the solute to the volume of the solvent expressed as the ratio of the mass of the solute to the volume of the solvent.

$$\text{Concentration (K)} = \text{Mass dissolved/Volume of solvent}$$

It is known that a worker adds 1.5 g of naphthol dye powder to 1000 cc of water. Calculate the concentration of the naphthol solution expressed in (g/L)?

Step 3: Thread release and colour preservation

The following is Figure 3 about the tread release process.

FIGURE 3. The Tread Release Process
(Source: E-Comel Sasirangan)

The thread release is carried out using a *squeegee* to prevent the fabric from being damaged while checking whether the fabric has uneven colours. If there is uneven colour, the cloth will enter the process of *counting,* namely giving colour through cotton tied to a pointed stick. In this process, there is an unused dye residue. Then, the fabric enters the curing process using a preservative solution (fixation) with the aim that the colour of the Sasirangan fabric can last a long time by dipping the solution into the fabric and soaking it for a few minutes. Fixative can be made from one type of chemical alum (Alum potassium / $(Al_2SO4)_3$, lime (Calcium Oxide / CaO) or lotus (iron (II) hydroxide / FeSO4).

Fixative contains some chemicals like alum, lime and tunjung. The solution formed is homogeneous because the constituent elements cannot be distinguished after being mixed.

Learning activity (Observation activity):

TABLE 3. Fixation solution observation sheet

No.	Solution	pH	Acid/Base	Uses in daily life
1.	Alum or alum (Alum Potassium)			
2.	Lime (Calcium Oxide)			
3.	Tunjung (Iron (II) Hydroxide)			

Step 4: Cloth Washing

In this washing step, detergent is put in a basin filled with water and then stirred until foamy, and the cloth is inserted while cleaning from the dye that is still attached. The final step is to rinse the cloth with water. This process leaves water left over from washing the fabric Sasirangan.

Related to Physics and Chemistry Change Materials:

The change of water into soapy water is related to the material change of matter. Generally, changes in matter that can be observed, namely in changes (physical properties) or called Physical changes and changes in the composition of the material, are known as chemical changes.

Step 5: Drying

Cloth drying is done in a place that is not exposed to direct sunlight. This is done so that the colour of the fabric is not damaged.

Related to Heat's transfer concept:

The process of drying cloth that is not exposed to direct sunlight is related to heat transfer. Heat (Heat) is obtained utilizing radiation (without a conducting medium). The amount of heat released from sunlight to the dried cloth is influenced by the object's temperature and mass and the liquid's specific heat. We will only consider the amount of heat and the temperature of the light. The greater the temperature of the room where the fabric is dried (temperature outside > temperature inside the house when the sun is hot) So if the heat emitted by the sun is getting bigger, the less time it will take to dry the fabric. On the other hand, the fabric still needs time to absorb the dye into the fibres before solar radiation dries it after washing. So, the dye can absorb more before the fabric dries by drying the fabric in the shade.

Step 6: Ironing the fabric

The final process before the fabric is ready to be packed ironing it to make the fabric slick and look neater.

Relate to energy resources concept:

Electrical energy can be converted into heat energy to make clothes that have been dried in the sun slippery, and the same energy changes are applied to *microwaves* to cook food.

Learning activities:

What can energy sources be used to produce electrical energy? Look for information to find out what renewable and non-renewable sources of electrical energy are today! Renewable energy is energy continuously produced by nature, while non-renewable energy cannot be produced by nature because the amount is limited only to a specific time.

Integrated Models

Local wisdom and science learning can be integrated into several models, including [17].

- Adaptation Model: The adaptation model does not change the science learning that has been carried out usually. However, the context and examples of applying a concept can be related to the local wisdom in an area. Then, the lesson plans, implementation, and evaluation that will be carried out contain local wisdom in tribal communities.
- Addition Model: Addition can also be interpreted as a compliment. In its implementation, the integration between learning science and the local wisdom of traditional villages can be poured into enrichment preparation. This enrichment material is structured to give students more insight into local wisdom in traditional villages by adding knowledge material. The addition integration model is carried out when teachers have difficulty integrating the

material into local wisdom from the previous model.

- Correction Model: Technically, this model can be applied at any time, not limited to one subject matter. It is just that teachers must first identify the science misconceptions that occur in students about their experiences in the context of their local wisdom. The learning process carried out in the classroom is intended to facilitate conceptual change in students. One of the learning theories considered relevant to this correction model is Piaget's cognitive learning theory (schema theory). According to this theory, students' cognitive structure will adapt and continue to experience mental development because of their interaction with the environment (school). When explored more deeply, this scheme is identical to the pre-paradigm, especially in the accommodation and equilibrium phase, namely the entry phase where students can form new schemas according to new stimuli or modify existing schematics to suit actual scientific facts.
- Neglected Model: This model is used if the local wisdom of the traditional village is not scientific, and local wisdom does not even need to look for a scientific explanation. The wisest way is to leave it as it is. NS, the omission model, is carried out to maintain a harmonious rhythm between human beings and humans with nature. Master must not insist that Local wisdom must be logical and acceptable to science with this omission model. Let local wisdom remain sustainable and honest without the need to intervene.

The implementation of the models in the science teaching and learning process is seen in Table 4.

TABLE 4. Example of implementation integration between local wisdom and science learning process

Models of integration	The stage of the learning process
Adaptation Model	Context and examples of the application of a science concept integrated with local wisdom content in lesson plan until evaluation process
Addition Model	Context and examples of the application of a science concept integrated with local wisdom content in the enrichment process
Correction Model	Science learning is used to clarify misconceptions about local wisdom
Neglected Model	Incorporating local wisdom as originally content though it is not scientifically acceptable

It is hoped that the results of this research can be developed to design media, learning resources or teaching materials to introduce further the process of making Sasirangan fabric and the philosophy contained in it. Local wisdom is dynamic, sustainable and acceptable to the community [18]. In addition, local wisdom passed down from generation to generation contains ways within local communities to fulfil their lives, including knowledge, economics, technology, social organization, language, communication and the arts. People understand what to do and what activities to do about human resources and natural resources.

Learning based on the local wisdom of Banjar is expected to improve character values, foster students' love for Banjar culture and its environment [19–24]. Students' learning outcomes are classically completed using science modules based on local wisdom [7]. When students learn science and information from an environment similar to the concepts of scientific knowledge learned in school, they can gain great attention in memory. Integrating local wisdom into context-based Physics learning materials makes it easy for students to understand physics lessons [25–27]. As well as science learning based on local potential can improve students' critical thinking skills [28].

CONCLUSION

The research concludes with making Sasirangan consisting of fabric preparation, colouring, thread removal and colour preservation, fabric washing, drying, and packaging. The identified scientific concepts include interactions between living things, concentration of solutions, acid and base solutions, physical and chemical changes, heat transfer and energy changes. Science learning resources containing the Sasirangan science concept are expected to be used to improve various science skills.

REFERENCES

1 M. Nadlir, J. Pendidik. Agama Islam (Journal Islam. Educ. Stud. **2**, 299 (2014).

2 M. Wati, M. Misbah, S. Haryandi, and D. Dewantara, Momentum Phys. Educ. J. **4**, 102 (2020).

3 M. Wati, M.R. Putri, M. Misbah, S. Hartini, and S. Mahtari, J. Phys. Conf. Ser. **1422**, 012008 (2020).
4 N. Winarno, D. Rusdiana, R. Riandi, E. Susilowati, and R.M.A. Afifah, J. Educ. Gift. Young Sci. **8**, 795 (2020).
5 A. Azizahwati, Z. Maaruf, R.M. Yassin, and E. Yuliani, *Pengembangan Modul Pembelajaran Fisika SMA Berbasis Kearifan Lokal untuk Meningkatkan Hasil Belajar Peserta didik* (Himpunan Fisika Indonesia Cabang Jateng & DIY, Yogyakarta, 2015).
6 H. Pujiastuti, D.A. Suvati, R. Haryadi, and I. Marethi, J. Phys. Conf. Ser. **1480**, 012052 (2020).
7 S. Hartini, M. Misbah, H. Helda and D. Dewantara, AIP Conf. Proc. **1868**, (2017).
8 D.T. Wahyuningtyas and R.N. Shinta, J. Pendidik. (Teori Dan Prakt. **2**, 12 (2017).
9 S. Annur, H. Fahrunnisa, A. Salam, S. Mahtari, M. Misbah, and D. Dewantara, in *Semin. Nas. Fis. (SNF 2018,* (2018), pp. 122–127.
10 L. Fitriah, E. Ma'rifah, and M. Misbah, J. Phys. Conf. Ser. **1796**, 012001 (2021).
11 M. Wati, S. Hartini, N. Lestari, S. Annur, and M. Misbah, Int. J. Recent Technol. Eng. **7**, 720 (2019).
12 S.E. Atmojo, J. Pendidik. Sains **6**, 5 (2018).
13 M.A. Martawijaya, J. Sains Dan Pendidik. Fis. **4**, 285 (2013).
14 L. Fitriah, Berk. Ilm. Pendidik. Fis. **7**, 82-96 (2019).
15 S. Seman, *Sasirangan Kain Khas Banjar* (Lembaga Pengkajian dan Pelestarian Budaya Banjar, Kalimantan Selatan, 2008).
16 Fahmi, *Penggunaan zat pewarna kain sasirangan sebagai sumber belajar ilmu pengetahuan alam* (FKIP Universitas Lambung Mangkurat (ULM) Press, Banjarmasin, 2015).
17 D. Nasrudin, I. Suhada, C. Rochman, I. Helsy and A. H. Hermawan, Adv. Soc. Sci. Educ. Humanit. Res. **261**, 236–239 (2018).
18 W. Edorita and Z. Jayakusuma, Riau Law J. **2**, 262 (2018).
19 S. Hartini, S. Firdausi, M. Misbah, and N.F. Sulaeman, J. Pendidik. IPA Indones. **7**, 130 (2018).
20 M. Misbah, D. Dewantara, and S. Mahtari, Int. J. Appl. Phys. Sci. **4**, 21 (2018).
21 M. Misbah, M. Hirani, S. Annur, N.F. Sulaeman, and M.A. Ibrahim, JIPF (Jurnal Ilmu Pendidik. Fis. **5**, 1 (2020).
22 P.D. Amrita, F. Haroky and H. Kuswanto, AIP Conf. Proc. **2215**, 040002 (2020).
23 S. Hartini, M.F. Isnanda, M. Wati, M. Misbah, S. An'nur, and S. Mahtari, J. Phys. Conf. Ser. **1088**, 12045 (2018).
24 C. Damayanti, N.R. Dewi, and I. Akhlis, Unnes Sci. Educ. J. **2**, 274 (2013).
25 W. Sari, K. Wiyono, D. Setyawan, A. P. Asiandu, K. Sa'diyah, E. Vianita, D. Septialti and Sutinah, J. Pendidik. Fis. Keilmuan **6**, 93-106 (2021).
26 M. Satriawan and R. Rosmiati, J. Penelit. Pendidik. Sains **6**, 1212 (2016).
27 R.M. Mungmachon, Int. J. Humanit. Soc. Sci. **2**, 174 (2012).
28 A. Anisa, J. Inov. Pendidik. IPA **3**, 1 (2017).

Dr. Imas Ratna Ermawati, M.Pd - Ethnoscience Sasirangan: A review as science learning resources

by Dr. Imas Ratna Ermawati, M.pd Uploaded By Grecy

Submission date: 23-Feb-2024 09:50AM (UTC+0700)
Submission ID: 2302110348
File name: ARTIKEL_INTERNASIONAL_IMAS-MISBAH_2023_-_Imas_Ratna_Ermawati.pdf (1.02M)
Word count: 4134
Character count: 22417

RESEARCH ARTICLE | MAY 15 2023

Ethnoscience Sasirangan: A review as science learning resources

M. Misbah ✉; P. D. Amrita; Z. Zainuddin; ... et. al

AIP Conference Proceedings 2595, 040032 (2023)
https://doi.org/10.1063/5.0123822

Ethnoscience Sasirangan: A Review as Science Learning Resources

M Misbah[1, a)], P D Amrita[2], Z Zainuddin[3], N Muhammad[4], I. R. Ermawati[5], U A Deta[6], K. Syahidi[7], and Mohd Ali Ibrahim[8]

[1,3]*Physics Education Study Program, Universitas Lambung Mangkurat, Banjarmasin, Indonesia*
[2]*SMKN 3 Banjarmasin, Banjarmasin, Indonesia*
[4]*Physics Education Study Program, Universitas Khairun, Ternate, Indonesia*
[5]*Physics Education,* Universitas Muhammadiyah Prof. Dr. Hamka, *Jakarta, Indonesia*
[6]*Physics Department, Universitas Negeri Surabaya, Surabaya, Indonesia*
[7]*Physics Education, Universitas Hamzanwadi, Nusa Tenggara Barat, Indonesia*
[8]*School of Education, Universitas Teknologi Malaysia, Johor Baru, Malaysia*

[a)]Corresponding author: Misbah_pfis@ulm.ac.id

Abstract. This study aims to describe the analysis of making Sasirangan cloth related to the concept of Natural Sciences in secondary school. The study used a qualitative descriptive method. Data were obtained through interviews, literature studies and documentation. The research instrument consisted of interview guide sheets, concept analysis sheets and documentation equipment. Making Sasirangan consists of fabric preparation, colouring, thread release and colour preservation, fabric washing, drying and packaging. The identified scientific concepts include interactions between living things, concentration of solutions, acid and base solutions, physical and chemical changes, heat transfer and energy changes. Science learning resources that contain the Sasirangan science concept are expected to be used as a science learning resource to improve various science skills.

INTRODUCTION

The swift currents of globalization, modernization, and strict puritanism are feared to erode a sense of love for local wisdom. So that local culture, an ancestral heritage trampled on by foreign cultures, is eliminated in its cage and forgotten by its heirs, even many young people do not recognize their own local culture. For culture to remain strong, it is necessary to instil a sense of love for local culture, especially in the regions. One way that can be taken at school is by integrating the values of local wisdom in the learning process, extra-curricular or student activities at school [1–3]. One way that can be done is to combine learning materials with the content of local wisdom.

UNESCO has several reasons for introducing integrated science in various countries as an element in primary education. Some of these reasons are: (1) integrated science learning at primary and secondary levels can provide a solid foundation for students to study more integrated science or specialist subjects; (2) the development of modern science leads to the interdisciplinary nature of science. Integrated science combines concepts, perspectives, and methods from various disciplines to interpret scientific phenomena in everyday life. The integrated curriculum is to show how interdisciplinary knowledge is related to one another [4].

The description of the materials and examples presented in the modules is relatively close to the student's daily life [5,6] so that the learning process becomes more meaningful. It helps students understand the physics materials teachers teach, thus positively impacting students' learning outcomes[7–10]. Some studies show that learning process-oriented towards local wisdom can improve student learning outcomes [5,11]. Subject Specific Pedagogic that is

Young Scholar Symposium on Science and Mathematics Education, and Environment
AIP Conf. Proc. 2595, 040032-1–040032-8; https://doi.org/10.1063/5.0123822
Published by AIP Publishing. 978-0-7354-4491-1/$30.00

integrated with ethnoscience can improve activities and learning outcomes of the students [12]. In addition, the development of physics books based on local wisdom improves the character and mastery of student learning [13,14].

There have not been many science learning tools integrated with local wisdom typical of South Kalimantan, such as Sasirangan. At the same time, making this Sasirangan fabric is very closely related to natural science materials. Therefore, it is necessary to teach materials that integrate Sasirangan with natural science materials. It is also an effort to preserve the distinct culture of South Kalimantan. This article will discuss the integration of the process of making Sasirangan fabric with science learning.

METHODS

This type of research is qualitative descriptive research. This research aims to describe the study results of natural science concepts in making Sasirangan fabric qualitatively. The research subject consisted of 2 Sasirangan fabric craftsmen, science education experts and literature making Sasirangan fabric. The research instrument consists of an interview guideline sheet, concept analysis sheet and documentation equipment. Observation and documentation of the process of making Sasirangan fabric, interviews of 2 Sasirangan craftsmen in Kampung Sasirangan Banjarmasin, and literature studies to determine the process of making Sasirangan fabric.

RESULT AND DISCUSSION

Local Wisdom and Sasirangan's Fabric

Sasirangan is local wisdom from South Kalimantan. Sasirangan cloth is also used as school uniforms, especially for schools in the city of Banjarmasin. The manufacture of Sasirangan has a characteristic in the manufacture of motifs and the colouring process that distinguishes it from other traditional fabrics. The term Sasirangan cloth has been known as Pamintan cloth since the 16th century AD. This cloth is believed to function as a means of treatment carried out by healers. The term "begging" comes from the word Parmintaan (request) in the Banjar language. Pamintan cloth is a white cloth given a specific colour and motif to someone seeking treatment from a Pamintan cloth craftsman [15].

Observation and documentation of the process of making Sasirangan fabric, interviews of 2 Sasirangan craftsmen and craftswoman in Kampung Sasirangan Banjarmasin. Then, analysis of literature studies to determine the process of making Sasirangan fabric. A concept analysis is performed to select the natural science material corresponding to make Sasirangan fabric, as seen in Table 1 [4]. We use the *adaptation model* in integrated science materials with the Sasirangan fabric making process.

TABLE 1. Basic Competency Analysis of Natural science's subject related to Sasirangan Fabric Making

Fabric Making Process Sasirangan Fabric Making	Basic Competence	Sub Materials
Fabric Preparation	3.7 Analyzing interactions between living things and their environment as well as population dynamics due to these interactions 4.7 Presenting observations on the interactions of living things with their surrounding environment	-Interactions between living things
Colouring release of yarn and colour preservation fabric laundering	3.3 Explaining the concept of mixtures and single substances (elements and compounds), physical and chemical properties, changes physics and chemistry in everyday life 4.3 Presenting the results of the investigation or work on the solution properties, changes in physical and chemical changes, or separation of a mixture of	acid-base - Concentration-solution solution-change physical and chemical
Drying	3.4 Analyze the concept of temperature, expansion, Heat, heat transfer, and its application in everyday life, including the mechanism for maintaining body temperature stability in humans and animals	-Heat's Transfer

Fabric Making Process Sasirangan Fabric Making	Basic Competence	Sub Materials
	4.4 Conducting experiments to investigate the effect of Heat on temperature and shape of objects and heat transfer	
Ironing cloth	3.5 Analyzing concepts of energy, various energy sources, and changes in the form of energy in daily life, including photosynthesis. 4.5 Presenting experimental results on changes in energy forms, including photosynthesis	- various energy sources

Sasirangan Fabric Making Process

Step 1: Fabric preparation

Sasirangan cloth is identical to the colour and motif that looks uniform. Before entering the colouring process, white fabrics (types of cotton, Bisag, Balacu, Kaci, King, Primisima, Satin, silk, white Mori and as desired) are drawn with distinctive motifs using pencils directly or using patterns or patterns from cardboard. , then sewn (straightening) following the lines of the painting and pulling it firmly (shrink) until the fabric looks wrinkled. These cloth motifs describe the shape of plant and animal parts, types of food, spices, natural phenomena and characters in the stories of the Banjar people. The following is Figure 1 of the fabric being patterned and finished combing.

FIGURE 1. (a) Fabrics being patterned and (b) finished combing

Relation to the concept of interaction between living things:

Plant forms inspire several motifs of Sasirangan cloth. We can use it as a sample to classify plant species based on similarities and differences in their characteristics (classification). The classification criteria that we can observe in a plant consist of its reproductive organs (spores/flowers), its habitus (trees, shrubs or shrubs), leaf shape (fingered/pinnate or parallel), roots (fibrous/single), stems (branched/not branching) and the way of reproduction (generative/vegetative).

Learning activities (Question's example):

1. Decide on any Sasirangan motifs whose names and shapes illustrate living things;
2. Draw the shape of the plant as a whole (roots, stems or leaves) from the Sasirangan motif whose names and shapes include plant species;
3. Describe the characteristics of the shape of leaves, roots, stems, methods of reproduction and the habitus of each plant;
4. Group the types of plants that have the same characteristics;
5. Mention the names of 2 or more plants that have the same characteristics.

Step 2: Coloring

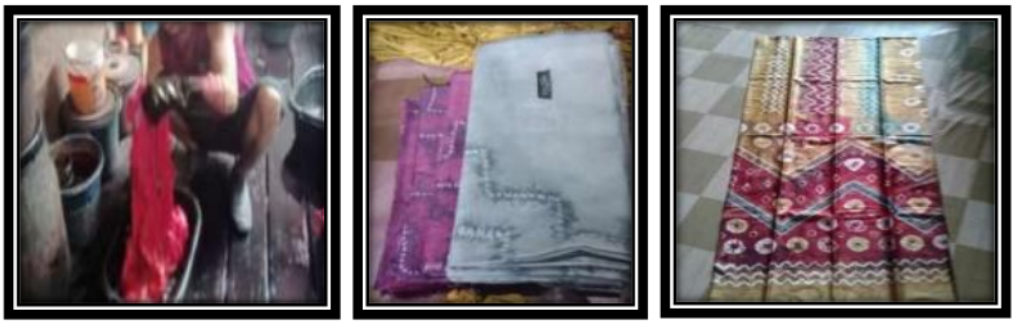
Sasirangan fabric uses synthetic and natural dyes. Synthetic dyes come from chemical and natural dyes from plant parts such as roots, stems, leaves, and others. Sasirangan fabric production in Banjarmasin itself generally still uses synthetic dyes. For example, the use of naphthol dyes and vessels. The colouring process of these two dyes can be seen in Table 2. In addition, there are natural dyes in the manufacture of Sasirangan cloth; one can use the mangosteen fruit (*Garcinia mangostana*), which produces blue, purple and red colours. The natural colour is made by finely pounding the mangosteen peeler then soaking the Mangosteen powder using ethanol and drying [16].

TABLE 2. Synthetic Dyes of Sasirangan Fabric

No.	Staining Process	Naphthol	Vessel Dyes (*Vat Dyes)*
1.	Prepare dye solution	1-2 g/L Naphthol, 2cc/L Turkey Red Oil (TRO), 6-10 cc/L caustic soda (NaOH), boiling water 1 L as well as the temperature of the water for immersion at 30 ° C + 40 ° C *	the dye vessel 2-5 g / L, TRO / wetting one cc / L, sodium nitrite ($NaNO_2$) as much as 1-2 g / L, hydrosulfite (NaHS), 2 L boiling water with a temperature range of 60°C-70°C.*
2.	Dipping cloth in	dye Naphthol dye powder is dissolved with TRO in a basin using hot water until smooth, adding caustic soda little by little. After cooling, the cloth is dipped in it. Then mix (turn over, knead) the cloth until the colour is even.	The vessel dye was dissolved with hydrosulfite, TRO, Sodium nitrite in a basin. Next, add hot water and baking soda little by little. Then, put the cloth into it until all the parts you want to dye are wet. In contrast to naphthol, this type of dye has produced colour without being dipped into the generator again, only aerated in the air. However, it still wears off if used directly, so it needs to be resurrected or locked using auxiliary materials.
3.	Generating colour	Then to generate colour using diazonium salt mixed with cold water. This salt is not durable and unstable, so stirring should be done before use. The dyeing process to dyes and colour generators is carried out back and forth to obtain the desired colour.	Then to generate colour, you can use sulfuric acid mixed with the dye solution above (divided by 2, for dye and generator). The dyeing process to the dye and salt generator is done back and forth until it gets the desired colour.
4	redo dye	Repeating immersion for kinds of different colours	

* Recipes fabric manufacture Sasirangan of Mrs Ida Kesuma

The following is Figure 2 about dyeing Sasirangan cloth, dyeing with naphthol dye, and an example of dyeing with a dye vessel (Vat Dyes) such as the indanthrene type.



(a) (b) (c)

FIGURE 2. (a) Dyeing Fabrics Sasirangan (b) Examples of Staining with Dyes Naphthol (c) Examples of Staining with Dyes Vessel*(Vatdyes)*such as The Type *Indanthrene*

Conc dye Sasirangan above concerning the value concentration of a solution. Concentration can be expressed as the ratio of the mass of the solute to the volume of the solvent expressed as the ratio of the mass of the solute to the volume of the solvent.

Concentration (K) = Mass dissolved/Volume of solvent

It is known that a worker adds 1.5 g of naphthol dye powder to 1000 cc of water. Calculate the concentration of the naphthol solution expressed in (g/L)?

Step 3: Thread release and colour preservation

The following is Figure 3 about the tread release process.

FIGURE 3. The Tread Release Process
(Source: E-Comel Sasirangan)

The thread release is carried out using a *squeegee* to prevent the fabric from being damaged while checking whether the fabric has uneven colours. If there is uneven colour, the cloth will enter the process of *counting,* namely giving colour through cotton tied to a pointed stick. In this process, there is an unused dye residue. Then, the fabric enters the curing process using a preservative solution (fixation) with the aim that the colour of the Sasirangan fabric can last a long time by dipping the solution into the fabric and soaking it for a few minutes. Fixative can be made from one type of chemical alum (Alum potassium / $(Al_2SO4)_3$, lime (Calcium Oxide / CaO) or lotus (iron (II) hydroxide / FeSO4).

Fixative contains some chemicals like alum, lime and tunjung. The solution formed is homogeneous because the constituent elements cannot be distinguished after being mixed.

Learning activity (Observation activity):

TABLE 3. Fixation solution observation sheet

No.	Solution	pH	Acid/Base	Uses in daily life
1.	Alum or alum (Alum Potassium)			
2.	Lime (Calcium Oxide)			
3.	Tunjung (Iron (II) Hydroxide)			

Step 4: Cloth Washing

In this washing step, detergent is put in a basin filled with water and then stirred until foamy, and the cloth is inserted while cleaning from the dye that is still attached. The final step is to rinse the cloth with water. This process leaves water left over from washing the fabric Sasirangan.

Related to Physics and Chemistry Change Materials:

The change of water into soapy water is related to the material change of matter. Generally, changes in matter that can be observed, namely in changes (physical properties) or called Physical changes and changes in the composition of the material, are known as chemical changes.

Step 5: Drying

Cloth drying is done in a place that is not exposed to direct sunlight. This is done so that the colour of the fabric is not damaged.

Related to Heat's transfer concept:

The process of drying cloth that is not exposed to direct sunlight is related to heat transfer. Heat (Heat) is obtained utilizing radiation (without a conducting medium). The amount of heat released from sunlight to the dried cloth is influenced by the object's temperature and mass and the liquid's specific heat. We will only consider the amount of heat and the temperature of the light. The greater the temperature of the room where the fabric is dried (temperature outside > temperature inside the house when the sun is hot) So if the heat emitted by the sun is getting bigger, the less time it will take to dry the fabric. On the other hand, the fabric still needs time to absorb the dye into the fibres before solar radiation dries it after washing. So, the dye can absorb more before the fabric dries by drying the fabric in the shade.

Step 6: Ironing the fabric

The final process before the fabric is ready to be packed ironing it to make the fabric slick and look neater.

Relate to energy resources concept:

Electrical energy can be converted into heat energy to make clothes that have been dried in the sun slippery, and the same energy changes are applied to *microwaves* to cook food.

Learning activities:

What can energy sources be used to produce electrical energy? Look for information to find out what renewable and non-renewable sources of electrical energy are today! Renewable energy is energy continuously produced by nature, while non-renewable energy cannot be produced by nature because the amount is limited only to a specific time.

Integrated Models

Local wisdom and science learning can be integrated into several models, including [17].

- Adaptation Model: The adaptation model does not change the science learning that has been carried out usually. However, the context and examples of applying a concept can be related to the local wisdom in an area. Then, the lesson plans, implementation, and evaluation that will be carried out contain local wisdom in tribal communities.
- Addition Model: Addition can also be interpreted as a compliment. In its implementation, the integration between learning science and the local wisdom of traditional villages can be poured into enrichment preparation. This enrichment material is structured to give students more insight into local wisdom in traditional villages by adding knowledge material. The addition integration model is carried out when teachers have difficulty integrating the

material into local wisdom from the previous model.

- Correction Model: Technically, this model can be applied at any time, not limited to one subject matter. It must that teachers must first identify the science misconceptions that occur in students about their experiences in the context of their local wisdom. The learning process carried out in the classroom is intended to facilitate conceptual change in students. One of the learning theories considered relevant to this correction model is Piaget's cognitive learning theory (schema theory). According to this theory, students' cognitive structure will adapt and continue to experience mental development because of their interaction with the environment (school). When explored more deeply, this scheme is identical to the pre-paradigm, especially in the accommodation and equilibrium phase, namely the entry phase where students can form new schemas according to new stimuli or modify existing schematics to suit actual scientific facts.
- Neglected Model: This model is used if the local wisdom of the traditional village is not scientific, and local wisdom does not even need to look for a scientific explanation. The wisest way is to leave it as it is. NS, the omission model, is carried out to maintain a harmonious rhythm between human beings and humans with nature. Master must not insist that Local wisdom must be logical and acceptable to science with this omission model. Let local wisdom remain sustainable and honest without the need to intervene.

The implementation of the models in the science teaching and learning process is seen in Table 4.

TABLE 4. Example of implementation integration between local wisdom and science learning process

Models of integration	The stage of the learning process
Adaptation Model	Context and examples of the application of a science concept integrated with local wisdom content in lesson plan until evaluation process
Addition Model	Context and examples of the application of a science concept integrated with local wisdom content in the enrichment process
Correction Model	Science learning is used to clarify misconceptions about local wisdom
Neglected Model	Incorporating local wisdom as originally content though it is not scientifically acceptable

It is hoped that the results of this research can be developed to design media, learning resources or teaching materials to introduce further the process of making Sasirangan fabric and the philosophy contained in it. Local wisdom is dynamic, sustainable and acceptable to the community [18]. In addition, local wisdom passed down from generation to generation contains ways within local communities to fulfil their lives, including knowledge, economics, technology, social organization, language, communication and the arts. People understand what to do and what actions to do about human resources and natural resources.

Learning based on the local wisdom of Banjar is expected to improve character values, foster students' love for Banjar culture and its environment [19–24]. Students' learning outcomes are classically completed using science modules based on local wisdom [7]. When students learn science and information from an environment similar to the concepts of scientific knowledge learned in school, they can gain great attention in memory. Integrating local wisdom into context-based Physics learning materials makes it easy for students to understand physics lessons [25–27]. As well as science learning based on local potential can improve students' critical thinking skills [28].

CONCLUSION

The research concludes with making Sasirangan consisting of fabric preparation, colouring, thread removal and colour preservation, fabric washing, drying, and packaging. The identified scientific concepts include interactions between living things, concentration of solutions, acid and base solutions, physical and chemical changes, heat transfer and energy changes. Science learning resources containing the Sasirangan science concept are expected to be used to improve various science skills.

REFERENCES

1 M. Abdir, J. Pendidik. Agama Islam (Journal Islam. Educ. Stud. **2**, 299 (2014).
2 M. Wati, M. Misbah, S. Haryandi, and D. Dewantara, Momentum Phys. Educ. J. **4**, 102 (2020).

3 M. Wati, M.R. Putri, M. Misbah, S. Hartini, and S. Mahtari, J. Phys. Conf. Ser. **1422**, 012008 (2020).
4 N. [illegible]narno, D. Rusdiana, R. Riandi, E. Susilowati, and [illegible].A. Afifah, J. Educ. Gift. Young Sci. **8**, 795 (2020).
5 A. Azizahwati, Z. Maaruf, R.M. Yassin, and E. Yuliani, *Pengembangan Modul Pembelajaran Fisika SMA Berbasis Kearifan Lokal untuk Meningkatkan Hasil Belajar Peserta didik* (Himpunan Fisika Indonesia [illegible]bang Jateng & DIY, Yogyakarta, 2015).
6 H. [illegible]ujiastuti, D.A. Suvati, R. Haryadi, and I. Marethi, J. Phys. Conf. Ser. **1480**, 012052 (2020).
7 S. Hartini, M. Misbah, H. Helda and D. Dewantara, AIP Conf. Proc. **1868**, (2017).
8 D. [illegible]Wahyuningtyas and R.N. Shinta, J. Pendidik. (Teori Dan Prakt. **2**, 12 (2017).
9 S. Annur, H. Fahrunnisa, A. Salam, S. Mahtari, M. Misbah, and D. Dewantara, in *Semin. Nas. Fis. (SNF 2018,* [illegible]18), pp. 122–127.
10 [illegible] Fitriah, E. Ma'rifah, and M. Misbah, J. Phys. Conf. Ser. **1796**, 012001 (2021).
11 M. Wati, S. Hartini, N. Lestari, S. Annur, and M. Misbah, Int. J. Recent Technol. Eng. **7**, 720 (2019).
12 S.E. Atmojo, J. Pendidik. Sains **6**, 5 (2018).
13 M.A. Martawijaya, J. Sains Dan Pendidik. Fis. **4**, 285 (2013).
14 L. [illegible]iah, Berk. Ilm. Pendidik. Fis. **7**, 82-96 (2019).
15 S. Seman, *Sasirangan Kain Khas Banjar* (Lembaga Pengkajian dan Pelestarian Budaya Banjar, Kalimantan [illegible]atan, 2008).
16 Fahmi, *Penggunaan zat pewarna kain sasirangan sebagai sumber belajar ilmu pengetahuan alam* (FKIP Universitas Lambung Mangkurat (ULM) Press, Banjarmasin, 2015).
17 D. Nasrudin, I. Suhada, C. Rochman, I. Helsy and A. H. Hermawan, Adv. Soc. Sci. Educ. Humanit. Res. **261**, 236–239 (2018).
18 W. [illegible]lorita and Z. Jayakusuma, Riau Law J. **2**, 262 (2018).
19 S. Hartini, S. Firdausi, M. Misbah, and N.F. Sulaeman, J. Pendidik. IPA Indones. **7**, 130 (2018).
20 [illegible]Misbah, D. Dewantara, and S. Mahtari, Int. J. Appl. Phys. Sci. **4**, 21 (2018).
21 [illegible]Misbah, M. Hirani, S. Annur, N.F. Sulaeman, and M.A. Ibrahim, JIPF (Jurnal Ilmu Pendidik. Fis. **5**, 1 (2020).
22 P. [illegible]Amrita, F. Haroky and H. Kuswanto, AIP Conf. Proc. **2215**, 040002 (2020).
23 [illegible]Hartini, M.F. Isnanda, M. Wati, M. Misbah, S. An'nur, and S. Mahtari, J. Phys. Conf. Ser. **1088**, 12045 (2018).
24 C. Damayanti, N.R. Dewi, and I. Akhlis, Unnes Sci. Educ. J. **2**, 274 (2013).
25 W. Sari, K. Wiyono, D. Setyawan, A. P. Asiandu, K. Sa'diyah, E. Vianita, D. Septialti and Sutinah, J. Pendidik. [illegible] Keilmuan **6**, 93-106 (2021).
26 M. Satriawan and R. Rosmiati, J. Penelit. Pendidik. Sains **6**, 1212 (2016).
27 R.M. Mungmachon, Int. J. Humanit. Soc. Sci. **2**, 174 (2012).
28 A. Anisa, J. Inov. Pendidik. IPA **3**, 1 (2017).

Dr. Imas Ratna Ermawati, M.Pd - Ethnoscience Sasirangan: A review as science learning resources

ORIGINALITY REPORT

18%	16%	11%	6%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	download.atlantis-press.com Internet Source	2%
2	files.eric.ed.gov Internet Source	2%
3	journal.uny.ac.id Internet Source	1%
4	Fitri Bimantoro, David Arizaldi Muhammad, Hendy Marcellino, Arik Aranta. "Classification of fish types using scale-invariant feature transform, bag of features and support vector machine", AIP Publishing, 2023 Publication	1%
5	Submitted to Colorado School of Mines Student Paper	1%
6	www.researchgate.net Internet Source	1%
7	e-journal.iain-palangkaraya.ac.id Internet Source	1%

8	jurnal.fkip.unila.ac.id Internet Source	1 %
9	Nurlaili Wisda Agustin, Sarwanto, Agus Supriyanto. "Enhancement of critical thinking skill in physics through experimental method: Is it effective?", AIP Publishing, 2023 Publication	1 %
10	Yudha Irhasyuarna, Ellyna Hafizah, Mella Mutika Sari, Siti Nurhaliza, Indah Najmi Fajar. "The development of interactive media in the context of wetland local wisdom on science materials for junior high schools to practice science literacy", AIP Publishing, 2022 Publication	1 %
11	ejournal.uncen.ac.id Internet Source	<1 %
12	Dindin Nasrudin, Chaerul Rochman, Dedi Kuntadi. "From the field to the classroom: Developing students' sustainability literacy through socio-scientific issues", AIP Publishing, 2022 Publication	<1 %
13	Febriani Sarwendah Asri Nugraheni. "Learning difficulties in microteaching class: A case study", AIP Publishing, 2019 Publication	<1 %

14	Usmeldi, Risda Amini. "The effect of integrated science learning based on local wisdom to increase the students competency", Journal of Physics: Conference Series, 2020 Publication	<1 %
15	Sri Hartini, Misbah, Helda, Dewi Dewantara. "The effectiveness of physics learning material based on South Kalimantan local wisdom", AIP Publishing, 2017 Publication	<1 %
16	www.e3s-conferences.org Internet Source	<1 %
17	www.scribd.com Internet Source	<1 %
18	Submitted to HTM (Haridus- ja Teadusministeerium) Student Paper	<1 %
19	jurnal.untad.ac.id Internet Source	<1 %
20	M Rizki, M Wati, M Misbah. "Electronic thermodynamics teaching materials based on authentic learning to practice students' problem-solving skills: Aspects of validity", Journal of Physics: Conference Series, 2021 Publication	<1 %

21	eprints.ulm.ac.id Internet Source	<1 %
22	jurnal.uns.ac.id Internet Source	<1 %
23	M Wati, M Misbah. "The content validity of the assessment instrument on the characters of wasaka in wetland environment physics learning", Journal of Physics: Conference Series, 2021 Publication	<1 %
24	Vivi E. R. Husin, Landiana Etni Laos, Heidy Wulandari. "Developing physics teaching material Newton's law based on local wisdom: Plait", AIP Publishing, 2022 Publication	<1 %
25	eprints.uny.ac.id Internet Source	<1 %
26	fisika.fmipa.unesa.ac.id Internet Source	<1 %
27	pubs.aip.org Internet Source	<1 %
28	Rudi Haryadi, Heni Pujiastuti. "Fun physics learning using augmented reality", AIP Publishing, 2022 Publication	<1 %
	idr.uin-antasari.ac.id	

29	Internet Source	<1%
30	H Yuliani, R Y Ulfah, E Agustina, A M Al-Huda, Z Qamariah. "Application of generative learning in physics learning", Journal of Physics: Conference Series, 2021 Publication	<1%
31	mojem.um.edu.my Internet Source	<1%
32	Submitted to Lambung Mangkurat University Student Paper	<1%
33	ejournal.iainbengkulu.ac.id Internet Source	<1%
34	ijere.iaescore.com Internet Source	<1%
35	iopscience.iop.org Internet Source	<1%
36	jurnal.umpwr.ac.id Internet Source	<1%
37	repository.uhamka.ac.id Internet Source	<1%
38	Putu Eka Suarmika, Ida Bagus Putu Arnyana, I Wayan Suastra, I Gede Margunayasa. "Reconstruction of disaster education: The role of indigenous disaster mitigation for	<1%

learning in Indonesian elementary schools", International Journal of Disaster Risk Reduction, 2022
Publication

39	F. Alatas, Norhasanah, T. Al Farizi, E. Hertanti. "Ethnoscience-based physics of Indonesian Betawi culture", AIP Publishing, 2023 Publication	<1 %
40	Utama Alan Deta, Binar Kurnia Prahani, Nadi Suprapto, Rahma Diani. "Research Trends of Physics Local Wisdom in Scopus Database in Ten Years (2013-2022): A Bibliometric Analysis", E3S Web of Conferences, 2024 Publication	<1 %

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	Off		