RESEARCH ARTICLE

Sasirangan cloth as a learning resource for biology subjects in high school lessons in South Kalimantan

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Abstract: Issues in learning, particularly the utilization of learning resources, have not been maximized to facilitate teachers in guiding students to learn certain concepts related to the surrounding environment. This study aims to analyze the motives and colors of *Sasirangan* as a source of biology learning in high schools and the knowledge of high school biology teachers in Banjarmasin regarding the existence of *Sasirangan*. This survey research involved 40 *sasirangan* craftsmen from 20 *sasirangan* production houses and 38 high school biology teachers in Banjarmasin, South Kalimantan. The instruments used were interview sheets and questionnaires. Data analysis was descriptive using percentage techniques. The results of expert validation indicated that the interview sheets and questionnaires were suitable, with scores of 89.63 and 92.5. *sasirangan* has great potential to become a source of biology learning, both in terms of motives and natural colors used by craftsmen. However, high school biology teachers in Banjarmasin have not fully utilized and conveyed it as a biology learning resource. While in other statements, teachers stated that they understood and explained that the existence of *Sasirangan* is very important to be conveyed in biology learning. Some teachers were able to provide information on biology concepts related to the existence of *Sasirangan*.

Keywords: Biology learning resources; local-based learning; *Sasirangan*

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Introduction

Changing times have encouraged teachers to continue to develop their professional competence in providing the best experience for students (Bhattacharjee & Deb, 2016; Droessiger & Vdovinskiene, 2020). This situation will work well if teachers are sensitive to changing times, social, cultural, and technological developments (Baumert et al., 2013; Chin & Mageswary, 2013). According to several researchers, curriculum development and learning tools are also components that determine teacher competence (Adegboye et al., 2017; Carpenter et al., 2019), apart from other components such as student-teacher relationships and their interactions (Goldman et al., 2014; Hill et al., 2020). The global development of the world of education also demands high professionalism of teachers as educators, who understand the material and can manage and relate it to everyday life (Carpenter et al., 2019; Ferguson-Patrick, 2018; Maimun & Hakim, 2021). A researcher stated that teaching is an art and therefore the competence of teachers who orchestrate learning activities is essential to continue to develop (Barnett & Francis, 2023; Heath & Tynan, 2023).

One effort to improve teacher competency through the learning process can be facilitated by empowering local culture as a learning resource (Carlina & Djukri, 2018; Sukri et al., 2018). Indonesia is known as a maritime country with high cultural diversity. The different characteristics in each region are a potential that can be used as a learning resources in the knowledge transfer process (Leasa et al., 2021; Susilastri & Rustaman, 2015). This has also developed into the local wisdom of the local community in empowering natural potential (Parmin et al., 2015; Ramdani, 2018). This local wisdom can be part of the support

provided to educational units to ensure that students do not lose cultural values, historical roots, and have an insight and knowledge about social culture and their environment. Furthermore, this situation emphasizes that education and learning cannot be separated from culture because of their important role in creating civilization (Udiyana & Arnyana, 2022). In the current era of globalization, the discourse on local wisdom is receiving serious attention. Advances in science and technology due to globalization tend to weaken the social order and moral values of society which originate from the neglect of local wisdom (Jumriani & Prasetyo, 2017).

A professional teacher must be able to explore students' thinking abilities, creativity, and good attitudes through the learning process. Therefore, teachers need to design innovative learning by optimizing learning resources in the environment so that students can utilize the knowledge gained, one of which is how to protect the environment (Kencana et al., 2020; Weng et al., 2022). The potential of nature or the environment is one of the aspects needed in developing students' caring attitude so that it has an impact on the existence of human behavior (Arent et al., 2020; Masturoh & Ridlo, 2020; Pane & Patriana, 2016; Sukri et al., 2018). It is believed that instilling an attitude of caring for the environment will create positive behavior and reduce negative impacts on the environment (Asrial et al., 2021; Palupi & Sawitri, 2018; Sukri et al., 2020). This is an effort to maintain and develop local potential and wisdom into superior, competitive products. The South Kalimantan government is trying to encourage the exploration of various local potentials so that local wisdom becomes superior. Based on these circumstances, knowledge, attitudes, and skills are needed to develop local wisdom.

The role of the curriculum is fundamental capital in fostering innovation and creativity in developing local wisdom to support development in South Kalimantan. Abidinsyah et al (2019) and Sasmita et al (2023) stated that learning with local wisdom which is synonymous with authentic learning experiences determines students' success in 21st-century skills. For example, critical and creative thinking skills can be stimulated by solving problems in the surrounding environment. On the other hand, science/biology learning essentially requires learning resources that come from nature, the various potentials of which can be explored as knowledge and skills through wise use by the community (Anjarwati, 2019). Biology learning is closely related to the cultural potential of local communities as a means of learning about themselves and their natural surroundings (Ilhami et al., 2018; Ramdiah et al., 2020). Based on this description, teachers play an important role in developing students' abilities to meet the demands of the times. However, the challenge for teachers cannot be denied, namely how to teach in line with current developments in biology. Apart from that, currently, several learning problems, especially the application of learning models and learning resources, are not optimal, making it easier for teachers to guide students to learn certain concepts related to the environment around students. On the other hand, the condition of the surrounding community shows that knowledge and the level of public awareness are starting to fade.

The typical Banjar tribe cloth passed down from generation to generation is known as sasirangan cloth and is one of the leading industrial products in South Kalimantan. Sasirangan industrial activities provide employment opportunities for the community and support South Kalimantan's economy (Jumriani et al., 2021). Saddam et al (2016) stated that national development must be balanced with efforts to improve overall human quality. Economic progress goes hand in hand with educational progress which is the basis for sustainable development in a region. Sasirangan as a superior product is an important part of various community activities in South Kalimantan, including students' and civil servant uniforms. However, the impact on the level of public awareness of local culture is not yet known.

Sasirangan motifs resemble plants and animals, even buildings that have meaning and value according to the uniqueness of South Kalimantan. However, it is not yet known how to classify plant and animal species based on biological studies, so it has a positive impact on biology. This research also explores information on biology teachers' knowledge in carrying out learning so far. This requires in-depth study and a correct understanding of how the concepts taught so far have an impact on students' thinking abilities, especially the existence of sasirangan as biology learning material in high school. Based on this idea, this research aims to analyze the motifs and dyes of sasirangan as a source of biology learning in high school and to analyze the knowledge of high school biology teachers in Banjarmasin about the existence of sasirangan.

Method

This survey research focuses on the motifs and natural dyes used in making sasirangan cloth, as well as biology teachers' knowledge about the existence of sasirangan. The research subjects consisted of 40 sasirangan craftsmen from 20 production houses and 38 high school biology teachers in Banjarmasin. The instruments were divided into two parts i.e. interview and questionnaire. As many as 19 interview items were used to gather information regarding the existence of sasirangan regarding the motifs and dyes used. Furthermore, there are 12 items questionnaire was used to explore biology teachers' knowledge about the existence of sasirangan as a biology learning resource.

To begin with data collection instruments, the interview sheets and questionnaires were validated by two

assessment experts and one education expert. Based on Arikunto (2013) validity criteria, expert validation results show that the interview sheet is suitable for use with a validation score of 89.63, while the teacher knowledge questionnaire has a validation score of 92.5. These tools were then distributed to sasirangan craftsmen and high school biology teachers throughout Banjarmasin. Moreover, the data was analyzed using descriptive statistics with percentages. This analysis aims to describe the data obtained from questionnaires filled out by biology teachers and sasirangan craftsmen in Banjarmasin (Table 1).

Table 1. Kind of questions in questionnaire

No	Questions
1	Do you plan your lessons using learning resources from the surrounding environment?
2	Do the learning resources used support the achievement of the expected learning objectives?
3	Do the learning resources you currently have suffice for teaching in schools?
4	In the last two years, has Sasirangan ever been used as a learning resource?
5	Do you know about *sasirangan*?
6	Do you know about the type of fabric used to make the typical fabrics of South Kalimantan?
7	Do you know about the dyes used to make the typical fabrics of South Kalimantan?
8	Do you know about the natural dyes used to make the typical fabrics of South Kalimantan?
9	Do you know about the synthetic dyes used to make the typical fabrics of South Kalimantan?
10	Do you know about the motifs and meanings used in the making of the typical fabrics of South Kalimantan?
11	In your opinion, is it necessary to provide information to students about typical fabrics from South Kalimantan?
12	On which concept or topic do you provide information about typical fabrics from South Kalimantan? (write down several topics)

Results and Discussion

Based on the data collected, sasirangan production houses in Banjarmasin use many motifs resembling plants and animals as well as objects and even buildings typical of South Kalimantan. This motif painting follows traditional motifs that have been recognized in Intellectual Property Rights by the Ministry of Law and Human Rights. The craftsmen also make sasirangan cloth with modern motifs and adapt it to customers' orders. Another important thing depicted in the sasirangan cloth is the meaning/value contained in the painting which is used as a guide to life for the people of South Kalimantan.

The traditional sasirangan motifs are very varied, such as *haruan teeth, sliced pudak, kambang kacang, spinach king, kakang kaombakan, kulat karikit, sinapur coral waves, bahambur star, jaruju leaves, and kambang sakaki, hiris gagatas, tampuk mangosteen, sarigading, salak, dayang descend, scales tanggiling, kambang tanjung, naga balimbur, jajumputan* (Alkaff et al., 2019; Almas, 2018; Ekawati et al., 2019; Kholis, 2016; Permatasari et al., 2023; Wijaya et al., 2015). Whereas, based on findings regarding natural dyes, it was discovered that only three production houses produced sasirangan cloth with natural dyes. The following are natural dyes that have been used by craftsmen (Table 2).

Table 2. Types of plants and colors used in sasirangan

No	Plant		Part of plant	Color produced
	Local	Scientific		
1	Indigofera	*Indigofera zollingeriana*	Stem; twig	Blue
2	Mahogany	*Swietenia mahagoni*	Fruit	Yellowish brown
3	Avocado	*Persea americana*	Fruit	Green or brownish green
4	Jackfruit	*Artocarpus heterophyllus*	Fruit	Yellow
5	Rambutan	*Nephelium lappaceum*	Rind	Brown
6	Shallot	*Allium cepa*	Skin	brown
7	Turmeric	*Curcuma longa*	Rhizome; stem	Yellow.
8	Noni	*Morinda citrifolia*	Root	Reddish-brown
9	Chilli	*Capsicum frutescens*	Fruit	Red
10	Rainbow tree	*Dracaena angustifolia*	Leaf	Green
11	Marian plum	*Bouea macroplylla*	Seed	Purple

The use of natural coloring gives a more natural impression to the sasirangan motif. The natural dyes used in sasirangan make sasirangan more attractive and distinctive because it has natural colors and is environmentally friendly (Hartiningsih, 2020; Nintasari & Amaliyah, 2016). Natural dyes produce a variety of beautiful and distinctive colors, which are difficult to imitate by synthetic dyes. Most natural dyes are taken from plants which are dyes that are easily degraded. Every plant can be a source of natural dyes

because they contain natural pigments. The potential source of natural dyes is determined by the intensity of the color produced and depends on the type of dye present in the plant (Andriana, 2019; Nintasari & Amaliyah, 2016).
Based on the data findings regarding the existence of *sasirangan* based on interviews with *sasirangan* craftsmen, information about teachers' knowledge is also obtained, which simultaneously describes the implementation of biology teaching in Banjarmasin high schools in utilizing *sasirangan* as a learning resource. Here are the analysis results obtained:

1. Do you plan your lessons using learning resources from the surrounding environment?

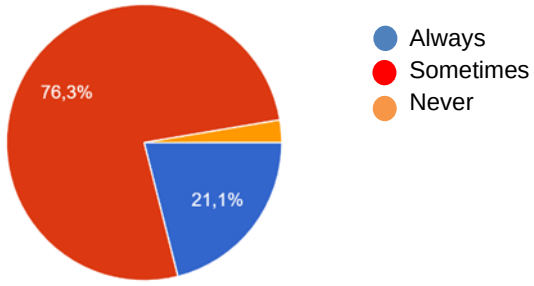

Figure 1. Teachers' responses regarding the preparation of biology lesson plans

The research results show that almost all biology teachers have designed learning by utilizing the surrounding environment as a learning resource (Figure 1). However, the majority of teachers only develop it not all the time. As many as 21.1% of teachers always use learning resources from the surrounding environment, while the rest (76.3%) only occasionally.

2. Do the learning resources used support the achievement of the expected learning objectives?

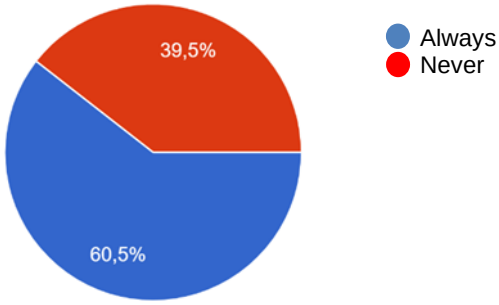

Figure 2. Teachers' responses regarding learning resources and achievement of learning objectives

Interestingly, only some teachers (60.5%) stated that they always use learning resources as part of achieving learning goals (Figure 2). This is quite different from the first question. This means that some other teachers consider that the learning resources used are not used to achieve learning objectives

3. Do the learning resources you currently have suffice for teaching in schools?

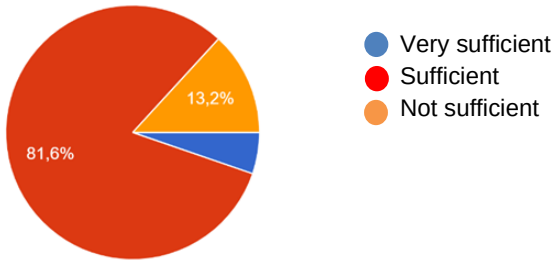

Figure 3. Teachers' responses regarding the existence of learning resources in schools

On the other hand, the majority of teachers stated that the surrounding environment was sufficient to be used as a learning resource (81.6%) while 13.2% stated that the learning resources provided at school were inadequate (Figure 3).

4. In the last two years, has Sasirangan ever been used as a learning resource?

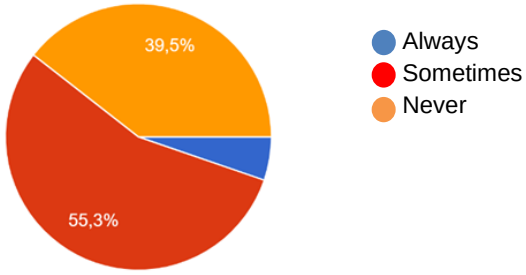

Figure 4. *Sasirangan* as a biology learning resource for the last two years

In the next question (Figure 4), biology teachers stated that in the last two years, 55.3% sometimes used sasirangan as a learning resource in biology lessons, while 39.5% stated that they have never used it even though the existence of sasirangan has been acknowledged.

5. Do you know about sasirangan?

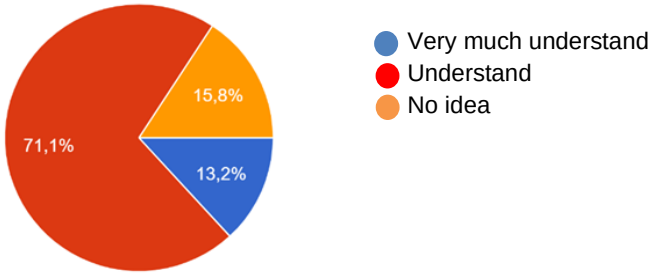

Figure 5. Teachers' knowledge about the existence of *sasirangan*

In the following statement, biology teachers stated that 71.1% knew about the sasirangan. However, in the last two years, it has not been maximally utilized as a learning resource in biology teaching (Figure 5).

6. Do you know about the type of fabric used to make the typical fabrics of South Kalimantan?

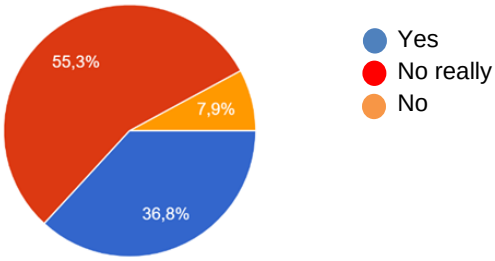

Figure 6. Teachers' knowledge about the types of fabrics used in making *sasirangan*

Based on Figure 6, teachers stated that 36.8% are familiar with the types of *sasirangan* fabrics, while others stated that they are not familiar with the types of *sasirangan* fabrics.

7. Do you know about the dyes used to make typical South Kalimantan cloth?

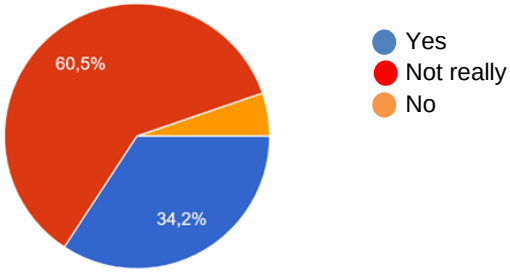

Figure 7. Teachers' knowledge about the dyes of *sasirangan* fabrics

In the following statement as presented in Figure 7, as many as 34.2% of biology teachers stated that they are aware of the dye materials used to make *sasirangan*, while 60.5% stated that they are not aware

of them.

8. Do you know about the natural dyes used to make the typical fabrics of South Kalimantan?

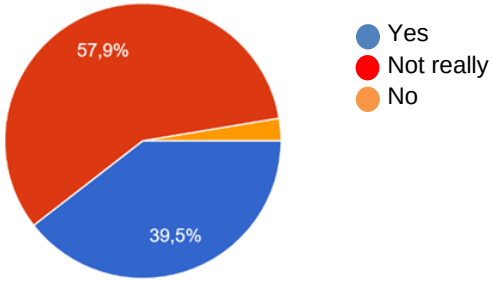

Figure 8. Teachers' knowledge about natural dyes used in *sasirangan* fabrics

Figure 8 shows teachers' knowledge of natural dyes used to color *sasirangan* fabric motifs. Only 39.6% of teachers stated that they are aware of natural dyes used to color *sasirangan*. Meanwhile, 57.9% of teachers does not know.

9. Do you know about the synthetic dyes used to make the typical fabrics of South Kalimantan?

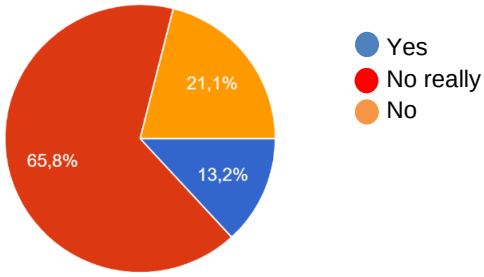

Figure 9. Teachers' knowledge about synthetic dyes used in *sasirangan* fabrics

In Figure 9, only 13.2% of teachers are aware of the existence of synthetic dyes used to color *sasirangan* fabrics. Others stated that they have less knowledge or are not aware of synthetic dyes.

10. Do you know about the motifs and meanings used in the making of the typical fabrics of South Kalimantan?

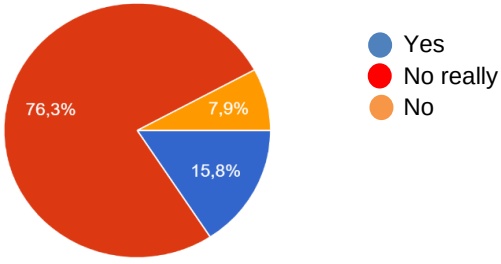

Figure 10. Teachers' knowledge about the motifs and meanings of *sasirangan* fabrics

Sasirangan paintings produce designs/motifs that have values that depict the life of South Kalimantan society. In this statement, teachers stated that only 15.8% are aware that *sasirangan* motifs have meanings/values, while 76.3% stated they have less knowledge and 7.9% do not know (Figure 10).

11. In your opinion, is it necessary to provide information to students about typical fabrics from South Kalimantan?

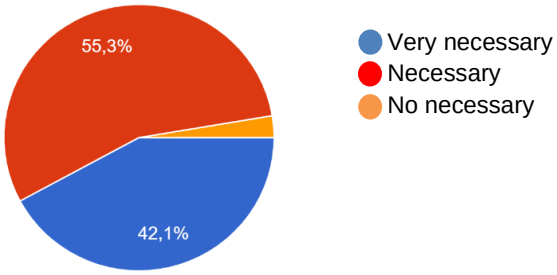

Figure 11. Teachers' responses regarding the need to inform about the existence of *sasirangan* as a typical fabric of South Kalimantan

Furthermore, in the implementation of biology teaching, teachers stated that 42.1% strongly need the existence of *Sasirangan* to be conveyed to students, and 55.3% stated it is necessary (Figure 11).

12. On which concept or topic do you provide information about typical fabrics from South Kalimantan?

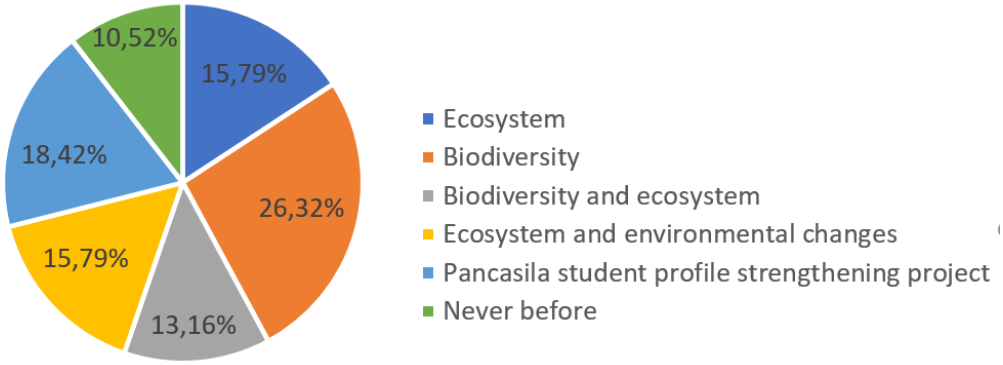

Figure 12. Teachers' responses regarding the concepts or biology topics that inform about the existence of *Sasirangan* fabrics

The research results in Figure 12 show that sasirangan has been presented on several biological topics, namely the ecosystem concept (15.79%) and the concept of biodiversity (26.32%). Furthermore, several teachers also stated that they could convey both concepts in an integrated manner, including the concept of biodiversity and ecosystems (13.16%) and the concept of ecosystems and environmental change (15.79%). Apart from that, the existence of sasirangan was also implemented in the strengthening the character of Pancasila by 18.42%. However, some teachers stated that they had never known about the existence of sasirangan in biology learning as much as 10.52%.

The findings of this study provided very meaningful information to be used in biology learning. Data found from interviews can be a source of learning for students at all levels of education. Based on the results of the interviews, it was found that the traditional *sasirangan* designs have been maintained until now. The designs themselves are more like plants. However, in this study, animal motifs, objects and traditional South Kalimantan houses were also identified as described by the *sasirangan* craftsmen. These designs can be a source for learning biology, especially in explaining the morphology of plants or animals (Almas, 2018; Permatasari et al., 2021).

Apart from these motifs, the information conveyed through interviews related to natural dyes is also a source for learning biology. Natural dyes come from parts of plants that contain dyes and are used by craftsmen in dyeing *sasirangan*. Based on these findings, *sasirangan* can be an appropriate and effective learning resource, especially for students in the South Kalimantan environment. It is because *sasirangan* is a superior product from South Kalimantan that reveals many biological concepts and is very close to students' daily experiences (Çimer, 2012; Kundariati et al., 2022). According to Hadisaputra et al (2019); Ihsan et al (2019); and Sasmita et al (2023), learning sources can come from various data, people, or the surrounding environment, which supports the learning process and will have an impact on the success of the learning process. Furthermore, it was also explained that learning resources have an effective function if used optimally. Fleischner et al (2017) and Kundariati et al (2020) stated that the use of learning resources in the learning process helps students understand and makes it easier for teachers

to transfer biological concepts. This is an advantage in utilizing the environment during learning because students obtain information through direct experience of daily events, so they get real and more communicative information (Fleischner et al., 2017; Pllana, 2019).

Based on this description, *sasirangan* has great potential to become a source for learning biology. However, from the data found through questionnaires filled out by high school biology teachers in Banjarmasin, many have not utilized it optimally. Meanwhile, in other statements, the teachers stated that they understood the existence of *sasirangan*. And another statement explains that it is very necessary for the existence of *sasirangan* to be conveyed in biology learning. However, the data findings also show that most teachers have not conveyed and utilized biological concepts from the point of view of the existence of *sasirangan*. This is thought to be because teachers still tend not to know about the motifs, natural dyes, and meaning contained in *sasirangan*, which can be used as a learning resource. However, in the next statement, teachers can provide information that the existence of *sasirangan* can be provided when teachers present material on the concepts of biodiversity, ecosystem balance, waste management, and environmental change.

It is feared that this condition will affect student learning outcomes in biology. Ferguson-Patrick, (2018); Looney et al (2018); Mahini et al (2012); and Ramdiah et al (2019) argue that teachers have a very important role in determining the quantity and quality of the teaching they carry out. Teachers must think and plan carefully to increase learning opportunities for their students and improve the quality of teaching and reflection (Benade, 2015; Lamb, 2017). This situation is very important and urgent considering that teachers' understanding of aspects related to students' thinking skills will influence the quality of learning, which aims to empower these thinking skills (Hashim et al., 2015).

Conclusion

Based on these findings, sasirangan has great potential to become a source of biological learning. Sasirangan has various motifs and uses natural colors in its manufacture. This is expected to have an impact on students' knowledge understanding and concern for local wisdom. Furthermore, the results of this research also state that there is great potential for teachers to use sasirangan as a learning resource in delivering material about the concepts of biodiversity, ecosystem balance, waste management, and environmental change.

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Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Author Contributions

S. Ramdiah: Conceptualization, formal analysis, original draft writing, data analysis, methodology, review, data curation. **R. Mayasari:** Writing, review, editing, visualization, data analysis. **A. Abidinsyah:** Data curation, review.

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