Utilization of Environment-Based Science Learning Resources Around Sungai Pedada as Elementary Schools in the 3T Region of Indonesia

Rohana[1], Elsi Adelia Fitri[2]*, Yusni Arni[3]
[1]Bachelor mathematich Education, PGRI University of Palembang. 30116, Palembang, Indonesia
[2]Bachelor Science Education, PGRI University of Palembang. 30116, Palembang, Indonesia
[2]Bachelor Elementary School Teacher, PGRI University of Palembang. 30116, Palembang, Indonesia
e-mail: rohana@univpgri-palembang.ac.id, *elsiadelia18@univpgri-palembang.ac.id, yusniarniyusuf@gmail.com

Abstract: *The Pedada River is one of the 3T areas which is a coastal area located in South Sumatra Province. Its existence on the coast makes this area vulnerable to natural disasters such as tidal floods, and others. This study aims to analyze science learning resources as one of the 3T regions of Indonesia. This study uses a qualitative descriptive method. The data collection instruments used are questionnaires for students, interview guidelines for teachers, and analysis of teaching material documents. Based on the results of the needs analysis questionnaire, it shows that students are only facilitated by using the main textbook during classroom learning activities, the lack of use of learning media and other innovations in learning makes students not have great motivation in learning. Class-based learning activities are often constrained by natural conditions and road access from settlements to schools. The results of the interviews showed that teachers did not have the right experience in utilizing the surrounding environment as a potential for learning outside the classroom and still needed support in the provision of varied teaching materials. Thus, it can be concluded that learning resources at Sungai Pedada Elementary School are still very much needed and there is a need for training to improve teacher competence in developing teaching materials that are suitable for the student environment.*

Key Words: Science learning resources, Pedada River, Surrounding Environment, 3T Area.

Introduction

Education is one of the main pillars in the development of quality human resources. In Indonesia, the 3T (Frontier, Remote, and Disadvantaged) regions often face significant challenges in providing educational services that are on par with other regions. One of these areas is the Pedada River which is located in South Sumatra Province, including the Ogan Komering Ilir Regency area, which has an area of 19,023.47 km² and a population density of around 39 people per km². Sungai Pedada District, which has an area of 853.40 km², is the largest sub-district in Ogan Komering Ilir Regency and consists of 23 villages. The region has a coastal ecosystem dominated by waters that are directly connected to the sea, making it very vulnerable to changes in sea conditions that can affect the lives of people living along the river.

Sungai Pedada has 1 Elementary School (SD) and 1 Junior High School (SMP). One of the important aspects used in the learning process is teaching materials. Teaching materials. Teaching materials are an essential component used to convey subject matter to students. Good teaching materials must be relevant, easy to understand, and able to motivate students to learn more. In the context of 3T areas such as Sungai Pedada, the development of teaching materials that are in accordance with local conditions is very important. This is because contextual teaching materials can help students understand the material better through

experiences and environments they are familiar with in their daily lives (Kurnia, 2017; Nurdyansyah & Mutala'liah, 2015; Pangesti, Yulianti, & Sugianto, 2017).

One of the fields of education that is greatly affected by this condition is the learning of Natural Sciences (IPA). Science learning is expected to equip students with the knowledge and skills necessary to understand and interact with their environment. However, in Sungai Pedada, the limitations of teaching materials and monotonous teaching methods are the main obstacles. The available learning resources generally only come from the main textbooks, and the lack of use of innovative learning media causes students to lose interest and motivation in learning (Baier, 2020; Pacheco, 2020; Shahat, 2022). In addition, teachers lack adequate experience and training to utilize local potential as a contextual source of learning.

This study aims to identify and analyze the local potential in the Pedada River that can be used as an alternative learning source in science learning. This is one of the efforts that can be made to optimize the needs and overcome the obstacles faced in the learning process, as well as explore solutions that can be applied to improve the quality of education in this region. By integrating local potential into the science curriculum, especially science learning resources and utilizing local resources, it is hoped that learning can become more relevant and interesting for students, thereby increasing their motivation and understanding (Bates, 2020; Goldstein, 2015; Hamlen, 2018; Husband, 2014). In addition, this study emphasizes the importance of training for teachers in developing innovative teaching materials that are in accordance with the local context. Thus, it is expected to create a more dynamic and effective learning environment, which not only increases students' motivation but also strengthens their critical thinking and analytical skills.

The scope of this research includes an analysis of local needs and potentials in the Pedada River, as well as strategies for the development of innovative and contextual teaching materials. With this focus, the research is expected to make a significant contribution to improving the quality of education in the 3T area, especially in science learning at Sungai Pedada Elementary School, so that it can become a model for other 3T areas in an effort to improve the quality of education through the utilization of local potential.

Method

This study uses a qualitative descriptive method. In this study, students and teachers from elementary schools in Sungai Pedada were involved. The data collection instruments used are questionnaires for students, interview guidelines for teachers, and analysis of teaching material documents. The data analysis technique in this study uses a qualitative approach. The questionnaire data and interview results were analyzed qualitatively to see the actual condition of the science learning resources used in the Pedada River.

Results and Discussion

The learning process that has been implemented at SD N 1 Sungai Pedada, with its rich coastal ecosystem, offers great potential for environment-based learning, especially in science subjects. Based on the hassil of the needs analysis questionnaire, it shows that most (69%) students learn more about plant diversity as shown in the graph below:

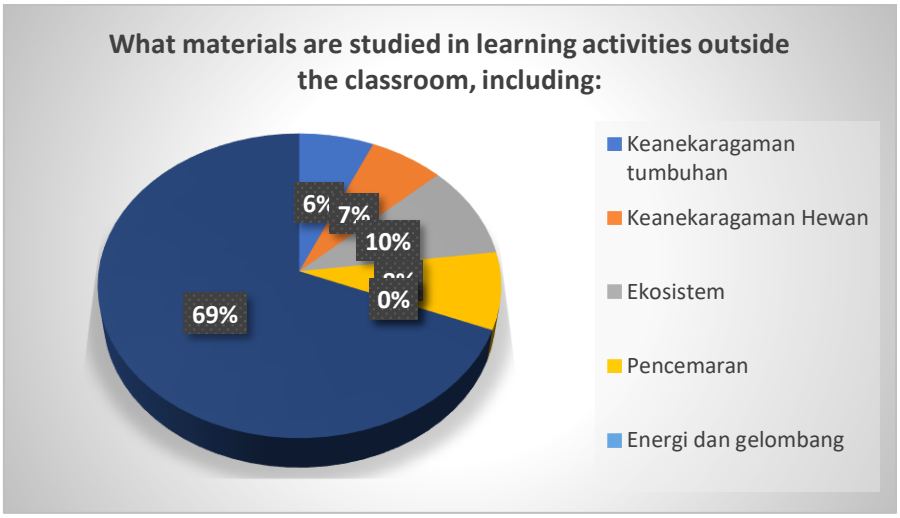

Figure 1. Meters of learning outside the classroom

Based on this, the Pedada River area has the potential of natural resources that can be used to teach students about ecosystems, biodiversity, energy, waves, life cycles of various species, and the most potential to be studied because it is in an area prone to disasters, namely the concept of natural disasters. For example, students can study natural processes such as tides, seawater intrusion. Environment-based learning allows students to relate the theories taught in the classroom with real-life experience in the field, which can enrich their understanding of scientific concepts. According to (Karyadi, Susanta, Winari, Ekaputri, & Enersi, 2018), learning that utilizes the surrounding natural environment can enrich students' learning capacity. With this approach, students have the opportunity to learn more deeply, as they can interact directly with real objects that can be observed and studied directly. This approach not only makes learning more relevant and engaging, but also encourages students to develop better observation and analysis skills. Thus, environment-based learning can provide a more holistic and contextual learning experience for students.

However, even though the existing natural potential is huge, the implementation of environment-based learning in Sungai Pedada still faces various challenges. Currently, the learning process in local schools is still very dependent on textbooks as the only source of learning. This is in accordance with the students' opinions in the graph below:

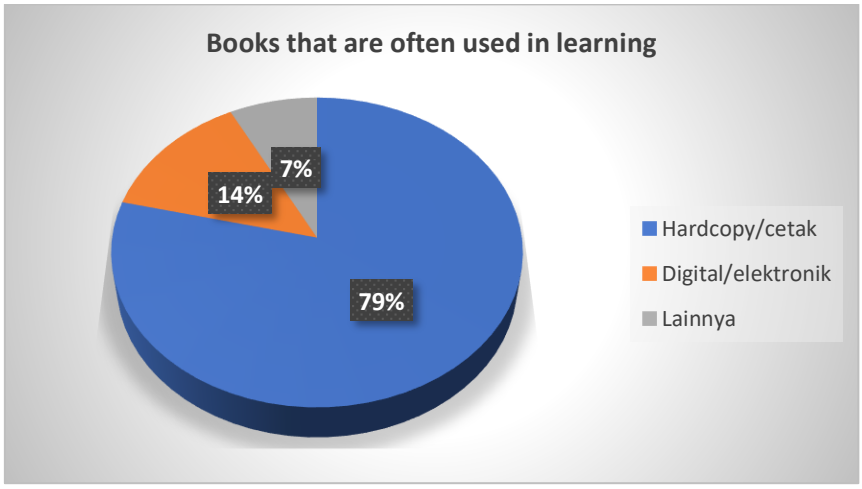

Figure 2. Books used in learning

Students' opinions regarding the learning resources used, namely 79% of students, revealed that they almost always rely on school books as the main reference in teaching and learning activities. Although textbooks have an important role as a guide for the material, the over-reliance on such learning resources limits the variety of ways students acquire knowledge and experience. Learning that only relies on textbooks tends to be monotonous and does not provide opportunities for students to learn in a more practical or contextual way, especially with the natural potential that exists around them. This is in line with the view (Kolb, 2014) which emphasizes the importance of learning through hands-on experience, where students can relate theory to real practice in their environment. Without diversity in the learning methods and media used, students may feel less motivated or do not fully understand the subject matter, because they cannot relate it to the real world around them. Therefore, there is an urgent need to introduce and integrate environment-based learning resources in the learning process in Sungai Pedada. In this way, students can be more active and creative in learning, as well as more connected to their surroundings. As suggested by (Pratama & Jumadi, 2023), the ethnoscience approach can be one of the effective ways to relate science learning to the local context, thereby increasing students' understanding and motivation.

The people of Sungai Pedada mostly live in stilt houses located along the river, which makes them highly dependent on the conditions of the surrounding waters. Transportation access in this area is also very limited. To get to school, students in Sungai Pedada rely on small boats (ketek) or speed boats as the main means of transportation. Given their proximity to the Java Sea and the South China Sea, travel to school is often hampered by bad weather factors, especially during high waves. On days with bad weather, many students are unable to attend school, due to the inability to sail safely. Often, the commute to school becomes very risky, given the lack of transportation and infrastructure facilities in this area. Such as an overturned boat or a damaged speed boat. This further worsens the already tough travel conditions, because there is no adequate safety guarantee.

Figure 3. Student access to school

In addition to weather constraints, access to electricity sources and the internet also often experience problems, where electricity is only on and can be used for 12 hours per day, as well as internet access which is affected by weather and electricity sources. Although the region has not been fully touched by adequate technology, some internet services are

available, but not all villages have good access to them. In the learning process in the classroom, students stated that 50% of students when learning using electronic or digital books experienced limited signal and network constraints. This can be seen in the image below:

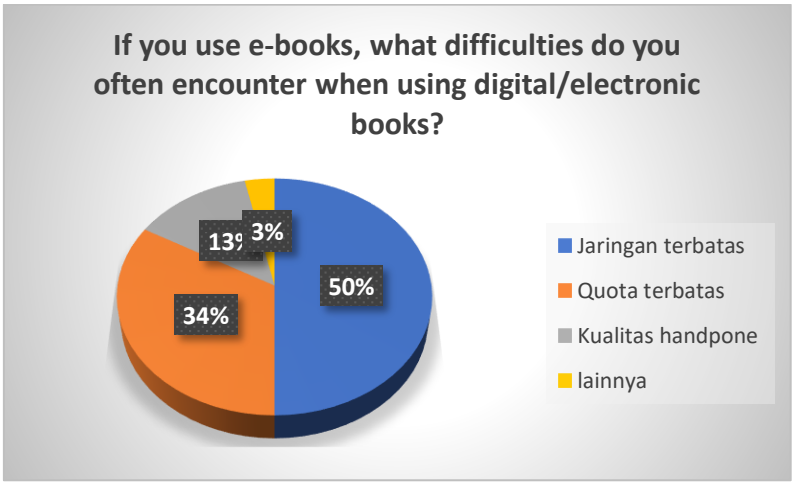

Figure 4. Limitations of using e-books

Internet signals that are often unstable are a major obstacle in utilizing technology for education and communication for teachers and students in the learning process. As a result, students often receive only theoretical knowledge without the opportunity to apply it in a more concrete context. According to (Hadijah, 2018), the use of interactive multimedia in learning can improve student understanding, but this is highly dependent on the availability of adequate infrastructure, including stable internet access.

To overcome these limitations, more varied learning resources are needed, such as technology-based learning media. One approach that can be used is to relate technology in learning according to the characteristics of the environment around students. The development of technology-based learning media that harnesses local potential can provide a more contextual and engaging learning experience for students (Qurrotaini, Sari, & Sundi, 2020) Thus, although infrastructure challenges still exist, the right integration of technology can help improve the quality of learning and student engagement. In accordance with the opinions of students explained in the graph below:

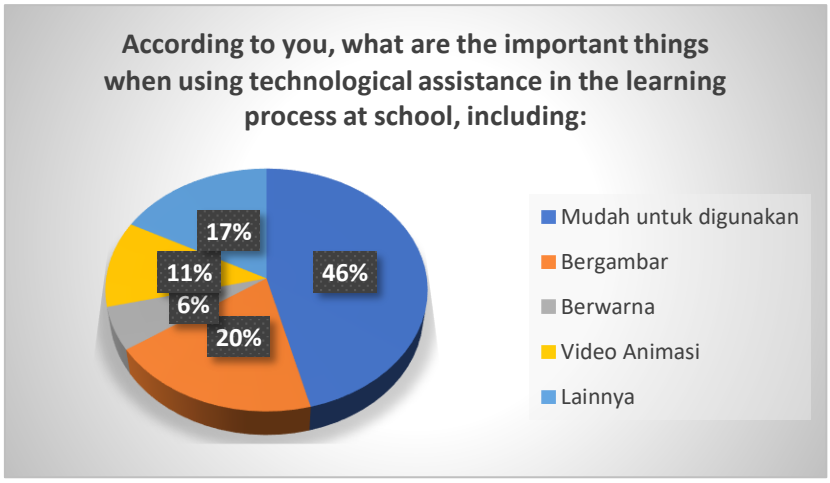

Figure 5. Technology needed in learning

Based on the picture above, 46% of students stated that they need technology-based learning resources that can make it easier for them to learn by being equipped with pictures and videos. Technology-based learning that utilizes the natural resources around the Pedada River, such as using applications to observe natural phenomena or interacting with digital-based subject matter, can be an effective alternative to improve the quality of education in this area. As expressed by (Romalee, Tsai, Hsu, Hsu, & Wang, 2023), the integration of augmented reality technology in education can provide a more interactive and immersive learning experience, allowing students to better understand concepts by seeing them in real contexts. Thus, the proper application of technology can help bridge the gap between theory and practice, as well as increase student motivation and engagement in the learning process.

In addition, to maximize the use of environment-based learning resources, it is very important to provide adequate training for teachers. Based on the results of the interview, it shows that teachers do not have the right experience in utilizing the surrounding environment as a potential for learning outside the classroom. This training should include an understanding of the natural potential that exists around them and how to relate it to the curriculum. According to (Saminan et al., 2024), effective education requires the integration of local knowledge and the ability to relate it to relevant learning materials. Teachers need to be trained to design learning activities that not only rely on theory, but also engage students in exploratory activities that allow them to learn directly from nature. This kind of training will help teachers to develop their competence in designing learning that is more creative, innovative, and relevant to the surrounding environmental conditions.

With training support for teachers, as well as improved infrastructure to support learning activities inside and outside the classroom, the use of environment-based learning resources in Sungai Pedada can be optimized. This will improve the quality of education in the 3T area, connect students with their surroundings, and enrich the learning experience they gain at school. Along with improving the quality of education, students will not only gain more in-depth knowledge, but also skills that will be useful in their daily lives.

Conclusion

Based on the results of the analysis, it can be concluded that learning resources at SD Sungai Pedada are still very much needed and there is a need for training to improve teacher competence in developing teaching materials that are suitable for the student's environment. In addition, classroom-based learning activities are often constrained by natural conditions and road access from settlements to schools. For further research, a more in-depth and extensive analysis is needed to cover all the needs of students and teachers according to the characteristics of students and the surrounding environment.

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