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Training to Develop Science Process Skills of Students of SMA 6 Padang Pelawi, Seluma Regency Through Physics Ethnoscience Learning

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Abstract

This community service project focuses on enhancing students' Science Process Skills (SPS) through the implementation of ethnoscience-based physics learning. The activity was conducted on August 1, 2024, at SMA Negeri 6 Padang Pelawi, Seluma Regency. The method of implementation included presentations, discussions, and hands-on practice with students. After applying the ethnoscience-based learning concept, there was a noticeable improvement in students' science process skills, both in observation and experimentation. Additionally, the effectiveness of the Discovery Learning and Problem-Based Learning (PBL) models was evident in improving students' science process skills through collaboration and problem-solving. Ethnoscience-based learning not only enhanced science process skills but also deepened students' appreciation of local culture. Through ethnoscience learning training at SMA Negeri 6 Padang Pelawi, Seluma Regency, it is hoped that the learning process can leverage local cultural diversity. This approach not only develops students' scientific skills but also strengthens the connection between physics concepts and local wisdom. This culturally-based learning provides relevant context, deepens students' understanding, and makes the learning process more meaningful.

A. Introduction

Science process skills are a teaching method that emphasizes how the subject matter is taught and learned (Asy'ari & Fitriani, 2017). Learning skills cannot be separated from learning concepts. Both are continuous lines that are always related. Learning concepts emphasizes the appreciation of concepts while process skills emphasize the acquisition and understanding of facts and principles (Masril et al., 2018). Learning process skills is impossible if there is no material or material being studied. On the other hand, learning concepts will not occur if there are no process skills in each student who learns. These realities are included in developing science process skills (SPS) and scientific attitudes in students (Khoiri, 2021).

Local wisdom is a form of human behavior and its relationship with the surrounding environment which is formed naturally and is based on customs and ancestral advice (Pesurnay, 2018). In general, local wisdom emerges through a long process of internalization and is passed down from generation to generation as a result of interaction between humans and their environment (Uge et al., 2019). The process of value evolution that took place quite a long time resulted in the formation of a value system that was crystallized in the form of local customary law, beliefs and culture (Wulansari & Admoko, 2021).

Ethnoscience is a combination of the words "ethnos" which comes from Greek, meaning nation, and "scientia" from Latin which means knowledge (Khusniati et al., 2023). In general, ethnoscience refers to

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the knowledge possessed by a community or nation, which studies the knowledge system and cultural mindset of a particular society, and highlights the uniqueness of the nation's knowledge. The scope of ethnoscience includes science, agriculture, ecology, medicine, and flora and fauna (Harefa, 2017). Ethnoscience is an activity of transforming between original science which consists of all knowledge about the facts of society which originate from hereditary beliefs and still contain myths (Dewi et al., 2022). The birth of ethnoscience cannot be separated from knowledge that was discovered through trial and error and the lack of ability to translate the findings into scientific knowledge. This is because the starting point of ethnoscience is at the local to regional level as a form of knowledge resulting from trial and error (Novitasari et al., 2017; Regina & Wijayaningputri, 2022).

SMA Negeri 6 Padang Pelawi is one of the schools in Seluma district, where there is a lot of cultural diversity and natural phenomena that occur. Seeing this, the implementation of ethnoscience-based physics learning can be carried out to optimize the learning process through natural and cultural phenomena that exist there.

B. Methods

Training to develop the science process skills of students of SMA 6 Padang Pelawi, Seluma Regency through physics ethnoscience learning was conducted on August 1, 2024 and was implemented in the form of material presentations, discussions, and practices.

First, the presentation of this material aims to introduce the basic concepts of physics and ethnoscience, and how the two are related in the context of local culture. The presentation of the material delivered is related to relevant physics concepts, such as Newton's laws, fluid mechanics, or thermodynamics, which are related to traditional knowledge or local phenomena. Examples of the use of physics concepts in traditional tools or natural phenomena around SMA Negeri 6 Padang Pelawi are explained in detail.

Second, Discussion is conducted to develop students' critical thinking and scientific communication skills. After the presentation, students are divided into groups to discuss how the physics concepts learned apply to local phenomena they are familiar with. Students can also share their experiences or knowledge from family members related to the application of physics in traditional technology.

Third, Practice is carried out **to** provide students with hands-on experiences to apply science process skills, such as observation, experimentation, and data analysis. Students conduct simple experiments related to ethnoscience, testing the principles of force on traditional tools such as seesaws, or measuring the speed of water flow in local irrigation systems. Experiments are conducted in groups, with a focus on science process skills such as designing experiments, making observations, and drawing conclusions.

C. Results and Discussion

The training began with the provision of material on ethnoscience-based learning to teachers and students at SMA Negeri 6 Padang Pelawi which was then discussed together. Based on the results of discussions with the teachers there, it turned out that learning still uses conventional methods, namely from books or teaching materials made by teachers which are then explained in front of the class. In addition, there is practice for physics lessons in the laboratory but using limited laboratory equipment. This limitation is a problem in carrying out the teaching process.

According to some teachers, ethnoscience-based learning may have been done indirectly, such as using surrounding objects as materials for physics practical work. Socialization is carried out by explaining one of the applications of ethnoscience activities.

Involving these local cultural values increases students' interest and motivation in learning physics at school. Ethnoscience-based learning has proven effective in deepening students' understanding of physics concepts, while making learning more meaningful by linking it to local phenomena. Students' enthusiasm for physics increases because one application of the application of physics can be seen. This is supported by the many students who ask questions. The increase in students' enthusiasm for physics is supported by several factors, namely increasing science process skills, Integration of Ethnoscience in Physics Learning, Use of Simple Teaching Aids Based on Local Culture.

Science Process Skills (SPS) Improvement

After the implementation of the ethnoscience learning concept, students' science process skills increased in several aspects, namely: 1) Observation and Experimentation: Students became more skilled in conducting observations and experiments using simple tools based on local wisdom. This observation seems to be in line with research Elvanisi et al. (2018), which states that students' science process skills can be improved through hands-on learning. 2) Hypothesis Proposing and Inferring: Students demonstrate better abilities in proposing hypotheses and drawing conclusions from experiments. They are able to relate theories to phenomena encountered in everyday life in the local environment, such as the use of Bernoulli's law in traditional house roof construction. 3) Data Interpretation: Students become more adept at interpreting experimental data. They are able to compare their results with the physics theories they have learned, in accordance with findings from Rahma et al. (2023) which emphasizes the importance of simple teaching aids in improving students' data interpretation skills.

Integration of Ethnoscience in Physics Learning

The ethnoscience approach used in this service strengthens the connection between physics theory and local practices. Students are invited to see physics as a science that is inseparable from their culture and daily life. This is in accordance with the results of the study Panjaitan et al. (2023), which emphasizes that ethnoscience-based learning not only improves science process skills, but also deepens students' appreciation of local culture. In the context of Seluma, students learn to apply Newton's laws and Archimedes' laws by observing how traditional tools such as boats and fishing nets work. With this approach, physics is no longer seen as an abstract science, but as part of everyday life that is tied to culture. Ethnoscience provides a more relevant context for students, so they are more motivated to learn, according to the findings Prahani et al. (2023) regarding the use of physics concepts in local wisdom as an effective learning resource.

Use of Simple Teaching Aids Based on Local Culture

Simple teaching aids based on local materials and technology are very helpful in strengthening students' understanding of physics concepts. As explained by Rahma et al. (2023), teaching aids made from simple materials, such as wood, bamboo, and stone, can improve students' scientific process skills. For example, in this service, students use traditional equipment to learn concepts such as torque, momentum, and center of mass. The use of these tools not only makes physics concepts easier to understand, but also improves students' experimental skills, because they are directly involved in measurements and observations. This supports research Rahma et al. (2023) about the importance of simple teaching aids in training students' KPS.

Thus, the results of this community service show that the integration of ethnoscience in physics learning at SMA 6 Padang Pelawi has succeeded in significantly improving students' science process skills. This program also proves that physics learning that is relevant to students' daily lives can motivate them to study harder and foster a sense of attachment to local culture.

Figure 1. Documentation of Activity

D. Conclusion

Overall, the community service program at SMA 6 Padang Pelawi shows that the implementation of ethnoscience-based learning is effective in improving students' science process skills. This approach not

only develops students' scientific skills but also strengthens the connection between physics concepts and local wisdom. This culture-based learning provides a relevant context, deepens students' understanding, and makes the learning process more meaningful.

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