Jurnal Cakrawala Pendas
Vol. 9 No. 1, January 2023
DOI: http://dx.doi.org/10.31949/jcp.v9i1.3573

p-ISSN: 2442-7470
e-ISSN: 2579-4442

SCIENCE PROCESS SKILLS IN THE "NAWU HIPE" CUSTOM OF THE PEOPLE OF PALU'E ISLAND, SIKKA DISTRICT

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Abstract
The indigenous people of Palu'e Island, Sikka Regency, NTT Province, have used geothermal energy to meet their needs for drinking water and to cook certain types of food. Geothermal will produce steam, a form of energy conversion where heat energy from within the earth is used for cooking Hi'pe (Canavalia ensivormis). Therefore, this study aims to analyze science process skills in Nawu Hi'pe activities implemented in elementary school science learning. This research uses mixed or mixed method research that combines two research methods: quantitative and qualitative. The research was conducted at Edo Khatolik Elementary School with as many as 22 students and five people from Palu'e Island, Sikka Regency, as a community sample. The results showed that students' science process skills per indicator were forecasting/predicting at 2.7 (good), observing at 3.75 (very good), conducting experiments at 3.7 (good), concluding at 3.6 (good), and the last indicator is communicating at 3.65 (very good). The indicator with the lowest average is predicting at 2.7 (enough), and the highest is observing at 3.75 (very good). There was a difference in student learning outcomes between the pretest scores of 52.7273 and the posttest scores of 82.7273. The posttest value is much greater than the pretest value. Therefore, the science process skills of students taught through observing Nawu Hi'pe activities obtain higher learning outcomes after being given learning and included in the excellent category.
Keywords: *Analysis; Science Process Skills; Nawu Hi'pe*

Abstrak
Masyarakat asli Pulau Palu'e, Kabupaten Sikka, Provinsi NTT, telah memanfaatkan energi panas bumi untuk memenuhi kebutuhan air minum dan memasak jenis makanan tertentu. Panas bumi akan menghasilkan uap yang merupakan bentuk konversi energi dimana energi panas dari dalam bumi digunakan untuk memasak Hi'pe (Canavalia ensivormis). Oleh karena itu, penelitian ini bertujuan untuk melakukan analisis terhadap keterampilan proses sains pada kegiatan *Nawu Hi'pe* yang akan diimplementasikan pada pembelajaran IPA di SD. Penelitian ini menggunakan metode campuran atau *mixed method research* yang menggabungkan dua metode penelitian yaitu metode kuantitatif dan metode kualitatif. Penelitian dilakukan di Sekolah SD Khatolik Edo sebanyak 22 siswa dan 5 orang Masyarakat Pulau Palu'e, Kabupaten Sikka sebagai sampel masyarakt. Hasil penelitian menunjukkan bahwa keterampilan proses sains peserta didik per indikator yaitu meramal/memprediksi sebesar 2,7 (Baik), mengamati sebesar 3,75 (sangat baik), melakukan percobaan sebesar 3,7 (baik), menyimpulkan sebesar 3,6 (baik), dan indikator yang terahkir yaitu mengkomunikasikan sebesar 3,65 (sangat baik). Indikator yang memperoleh rata-rata rendah yaitu indikator memprediksi sebesar 2,7 (cukup) dan indikator yang paling tinggi yaitu mengamati sebesar 3,75 (sangat baik). Terjadi perbedaan hasil belajar siswa nilai pada *pretest* sebesar 52,7273 dan nilai *postest* sebesar 82,7273. Nilai posttest jauh lebih besar dari nilai pretest. Oleh karena itu, Keterampilan proses sains siswa yang dibelajarkan melalui observasi kegiatan *Nawu Hi'pe* secara langsung memperoleh memiliki hasil belajar lebih tinggi setelah diberikan pembelajaran dan termasuk kategori baik.
Kata Kunci: *Analisis; Keterampilan Proses Sains; Nawu Hi'pe*

Received	: 2022-10-28	Approved	: 2023-01-14
Reviesed	: 2023-01-09	Published	: 2023-01-31

Introduction

Science learning in elementary schools should be organized interestingly through coherent and varied reviews so student's absorption of the subject is maximized according to the expected learning outcomes index (Kumala, 2016) and (Portanata et al., 2017). A teacher's creative and participatory role in teaching science subjects is needed to support the process of transferring knowledge from teachers to students (Widodo, 2012). Experience shows that teachers have not applied the science process skills approach during the learning process. The learning process tends to only prioritize the development of intellectual aspects, with the teacher's handbook textbook being the primary learning source. Science learning in schools emphasizes cognitive knowledge products only (Kurnia & Wulandari, 2020). In fact, in everyday life, there are gaps encountered at this time. The teaching and learning system is monotonous, lacking variety, and less attractive, so students become bored and not interested in learning, and learning is more synonymous with reading.

This problem requires a science process skills approach (Acesta, 2014). Science process skills are one of the skills that train students' thinking skills and all the abilities needed to obtain, develop, and apply scientific concepts, principles, laws, and theories in the form of mental, physical, and social skills (Lusidawaty et al., 2020), (Sayekti & Kinasih, 2018) and (Yuliati, 2016). One form of community activity on Palu'e Island, Sikka, NTT, called Nawu Hi'pe, is implementing local community knowledge of science process skills, such as in science learning in elementary schools. The activity can carry out at any time, depending on weather conditions and the height of the waves. The location of the hole (poa) is located on the beach. Hi'pe harvested between March and May. Some are stored in a dry state, and some use immediately. After peeling to separate the skin and nuts, Hi'pe will then be stored in a basket made of palm leaves (in Palu'e language called kota or lepo), then Hi'pe will be brought down to the place where the cooking process will be carried out (Poa Ngerone). The Hi'pe cooking process is carried out in a poa (geothermal water hole) located on the shoreline, the Hi'pe cooking process is carried out within a period of 1 x 24 hours, and after the specified time is over, the Hi'pe is lifted from the poa (geothermal water hole) to be taken home and can be consumed. Besides being consumed, Hi'pe can also be sold to make money.

The specific purpose of this research is to analyze the form of science process skills in Nawu Hi'pe activities so that they can be used as a learning resource for students, especially at the basic education level. In addition, this research also increases public awareness of to use of alternative energy provided by the community (Murhaini & Achmadi, 2021) and (Suprayitno & Lokal, 2008). This research seeks to raise the value of the local wisdom of Nawu Hi'pe as a hereditary tradition of the Palu'e community and its implementation in science learning in elementary schools.

Research Methods

This research uses mixed-method research. This research method combines two research methods: quantitative and qualitative (Frederiksen, 2013). The study was conducted at Edo Catholic Elementary School in Palu'e Islands, Sikka Regency, in September 2022. The research on grade V students of SD KATOLIK Edo as many as 22 people.. Students who were interviewed were students who had high, medium, and low scores. The research procedure was carried out in three stages: preparation, implementation, and analysis. In the preparation stage, preparations were made by making lesson plans, and worksheets, modifying pretest-posttest questions, and making observation and interview formats. Furthermore, in the implementation, pretests and posttests were conducted on students treated with learning, the results of which

were revised and evaluated. The final stage is analysis, analysis, and preparation of research results.

Primary data in this study are student learning outcomes tests and observation results. The data was obtained from observations made by researchers of students in learning activities. The learning activities observed students' science process skills. In addition, to support the observation results, researchers also conducted interviews with students. Interviews were conducted to obtain information about science process skills, namely the Nawu Hi'pe activity, which is one of the traditional cultures of the Palue community. This activity is closely related to the forms of Ethnoscience and basic science process skills. Secondary data sources in previous studies whose study topics are associated with the analysis of science process skills.

The instrument in this research is a list of questions addressed to respondents who master and know well about the local wisdom of Nawu Hi'pe in Palue District. Respondents in this study were school elements in Palue Sub-district, namely principals, teachers, and students. Data collection techniques used are observation, documentation, and interviews. The analysis of the research is a normality test and hypothesis test. Data validity test using triangulation. Triangulation of this research data was used to check and test the reliability data. Triangulation aims to eliminate differences when collecting data taken from various ways. The triangulation used is the triangulation of sources and techniques, which means that researchers get data from different sources. The original is from observers and students. The techniques used are tests, observation, documentation, and interviews. Data from these sources and collection techniques were compared and analyzed by researchers to produce a conclusion.

Results and Discussion

In this study, researchers used several methods for data collection, namely the first observation method. In this study, the authors conducted observations or reviews of grade V elementary school students to determine the science process skills of students in Nawu Hi'pe activities. Researchers also use a test method that divides into two parts, namely the pretest, which is carried out before being given treatment or action, and the posttest, which is carried out after being given effort (Handika & Wangid, 2013) which aims to measure the ability of students in learning science process skills on the heat transfer material. In connection with the test, the questions given amounted to 10 multiple-choice questions. Each item scored 1 (if you answered correctly) and 0 (if you answered incorrectly), which had validated.

The question gives to all students who became the research sample of 22 people, namely class V students as the experimental class. The results of the analysis of the pretest and posttest answers of students from the research sample are attached. At the same time, the documentation method uses to find out the learning process in class and activities during the research. Researchers also used the interview method. Interviews were used in this study by asking structured questions using interview guidelines that were arranged systematically. Discussions in this study were conducted with fifth-grade students at SDK Edo, Palu'e. The students interviewed were students who had scores in the high, medium, and low categories.

Qualitative Results About Learning Using Nawu Hi'pe Activities

1. Observation result

Observations in this study include students' science process skills during the learning process and Nawu Hi'pe activities from the first to the second meeting with a heat transfer material.

Table 1. Observation Results of Science Process Skills of Learners

No.	Aspects	Meeting		Average	Category
		I	II		
1	Predict	1,9	1,6	2,7	Simply
2	Observe	2,5	2,8	3,75	Good
3	Conduct an experiment	2,5	2,4	3,7	Good
4	Conclude	2,4	2,4	3,6	Good
5	Communicating	2,4	2,5	3,65	Good

Table 1. The table shows the results of the observation assessment of the average percentage of students' science process skills during the Nawu Hi'pe activity. From the table, it obtained that the average science process skills of students per indicator are predicting/predicting by 2.7 (good), observing by 3.75 (very good), conducting experiments by 3.7 (good), concluding by 3.6 (good), and the last indicator is communicating by 3.65 (very good). From the table above, the indicator that obtained the lowest average was the prediction indicator of 2.7 (sufficient), and the highest aspect was observed at 3.75 (very good).

Table 2. Average Result of Pretest Posttest Score

Jumlah Siswa	Rata-Rata Nilai	
	pretest	*postest*
22	52,7273	82,7273

Table 2. shows the results of the pretest and posttest that have been done. The average value of the pretest was 52.7273, while the average value of the posttest was 82.7273. This shows that the posttest value is greater than the pretest, and there is a significant increase after the learning treatment using the direct observation method on science process skills in Nawu Hi'pe activities.

2. Interview Results

Interviews were conducted to determine the effectiveness of ethnoscience-based learning. The interviewees were students who obtained test scores that fell into the high, medium, and low categories.

a. The results of interviews with students who include in the high-score category are as follows:

Learner AM said, "I enjoy learning by observing the Nawu Hi'pe process directly because it helps me understand the material taught in class." DP learners also added that learning with the direct observation method made me more active and enthusiastic in learning activities". Based on the interviews with the two learners, it can conclude that: learning by using the direct observation method can increase students' interest and learning outcomes.

b. The results of interviews with students who are in the medium score category are as follows:

LT learners said, "I really like learning by directly observing Nawu Hi'pe activities because it can improve my memory and understanding of heat transfer material." In addition, MT learners said that "learning by directly observing makes me find many facts from the objects observed and be able to conduct experiments and conclude the results of these experiments." Based on the interview results, it can be concluded that: the science process skills approach helps students or facilitates students' understanding of the subject matter because students are directly involved with natural objects.

c. The results of interviews with students who are in the low score category are as follows:

SL learners said that "I find it difficult to learn by using the direct observation method of Nawu Hi'pe activities" besides that GT learners said that "I find it challenging to understand the material by using the direct observation method because so far, I have not been accustomed to doing learning activities to observe Nawu Hi'pe activities directly. Based on the results of the interviews of the two students, it can conclude that: students find it challenging to carry out learning activities using the direct observation method because, so far, students have rarely done learning with this method.

Science process skills can be interpreted as an insight into the development of intellectual, social, and physical skills that stem from fundamental abilities that are, in principle, already present in students (Rahayu & Angg, 2017). Process skills play an essential role in helping learners build scientific ideas. In this study, researchers used five aspects of science process skills (Susilawati & Sridana, 2015) among others:

a) Predict

The indicator of predicting the results of the first meeting has a suitable category, while the results of the second meeting have an appropriate type. In learning activities, students are directed to predict what will happen if the object of research is given treatment related to heat transfer. The learning atmosphere shows that students' knowledge is broad, not only referring to textbooks. In line with (Juhji, 2016) and (Sumiati et al., 2018) revealed that when students interact with the world scientifically, they will find aspects of science process skills independently. The test results on the predicting part found that there were students who obtained high scores and those who got low scores. Students who earned high scores showed that students were quite enthusiastic during the observation activities.

In contrast, students who obtained low scores did not participate in the activities properly. This is supported by the results of interviews with students who have high scores. In the results of interviews with students who got high scores, MR said, "I like learning by observing directly because this method makes me better understand the material taught." YS students said, "I have difficulty predicting indicators because while participating in learning activities at school, the method used tends to be the lecture method so that learning is more teacher-centered."

b) Observing

Observing indicators have increased significantly. The results of the second meeting show a very high category, while the results of the first meeting show an excellent type. The data indicate that learners can use as many of their sensory organs as possible to make an observation. Learners actively and enthusiastically collect the data needed to be interpreted and look for answers that have been created. In line with the research that has been done, it explains that an essential factor in improving science process skills and understanding of observations is that the higher the involvement of students in observations, the higher the achievement of understanding and science process skills of students. (Wahyudi & Supardi, 2013) and (Puspita et al., 2017).

Figure 1. a. demonstration of examples of plants commonly cooked using geothermal heat, b. discussion with the community regarding the use of geothermal heat, c. discussion on how to utilize geothermal heat for daily life, d. samples of Nawu Hipe plants used.

Almost all learners can use as many sensory organs as possible to observe objects in the field. This helps learners to maximize observation skills which are essential skills that everyone conducting scientific investigations must possess. Test results on keeping indicators learners get high and low scores. This can be seen in the observation results that some students take the activity seriously while some students follow the observation activities lazily. Some students are busy playing, and some students observe the action. This is supported by the results of interviews with MW students saying, "I am pleased to learn by observing because I can understand that what I have observed so far has something to do with natural science."

c) Conduct an experiment

The indicator of conducting experiments on the results of the first meeting has a suitable category, while the results of the second meeting have an excellent type. Some students are skilled in conducting experiments and can determine the tools and materials used in experiments. Still, most students, namely in the second meeting, have not been qualified to conduct investigations, namely in the work steps (Janah et al., 2018). define human knowledge about nature as obtained in a controlled manner. Besides being a product, namely human knowledge, science is also a process, namely how to get that knowledge.

Figure 2. a. Explanation and exposure of the benefits of geothermal for daily life to students in the classroom, b. discussion with the teacher about the importance of introducing natural potential to students.

The results of observations during activities show that most students have not focused on conducting experiments. Still, a small number of students have done experiments with full responsibility. The results of interviews with RS learners said that "the activity of doing this experiment is something that is rarely done in learning activities so far, so I feel this is a new thing and helps me in understanding the material being taught" YN learners also added that "I am pleased to do learning activities by doing this experiment because it can increase my knowledge about the surrounding environment related to learning materials at school."

d) Summarize

In learning activities, students are directed to be able to conclude the process of Nawu Hi'pe activities. Most learners could not fulfill the indicators of the concluding skill aspect, namely, in determining the objects observed and recorded. There was no average increase in the element of the summarizing hand from the first meeting to the second meeting. (Nuada & Harahap, 2015) Said that human efforts in understanding the universe through observations that are right on target, as well as using procedures and explained by reasoning, to get a conclusion.

The test results on the aspect of concluding most students get scores below the average. This can be seen in the observations that students still have difficulty completing something that happens. The factor that causes the indicator to conclude is still low compared to the others is that not all students express or end activities because students are not used to making reports or completing an action. The results of interviews raised by MR learners, "I still have difficulties and have not understood the indicators of concluding because so far I have not been accustomed to learning to complete an activity based on the results of observations.

e) Communicating

The average percentage value of the communication aspect is still low. Learners look less skilled in communication because learning is using the lecture method. Learning is still more teacher-centered. Students become less active in learning and communicating. Only a few students dare to ask and answer teacher questions, express ideas, convey facts, and discuss with other students. The test results on the communicating aspect show that some students get high

scores and some get low scores. This can be seen in the observation results that most students are less skilled in communicating due to the lack of confidence of students in speaking in front of the class. In the process of teaching and learning activities, the atmosphere in the classroom does not look conducive. This is supported by the results of interviews with MT learners who scored low said that "I find it difficult in this aspect of communicating because I lack confidence and am not used to speaking in front of the class." In contrast, YT learners said, "I like learning by using this observation method because it helps me understand the material."

Based on the description of the aspects of science process skills through tests, observations and interviews above, it can be concluded that the results of students' science process skills significantly affect their learning outcomes. Factors that influence students' successful use of the science process skills approach include students and the accuracy of the use of strategies. This happens because students are still not used to the learning process using the science process skills approach, so students are still confused and shy. To overcome the problem of aspects of the science process skills of students who score still below the average, namely by involving students actively in learning activities by providing stimulating questions that connect learning material with real-world situations, researchers also provide appreciation or rewards to students. Thus making students motivated to do their best, including being active in learning activities.

The implementation of the Nawu Hi'pe activity went smoothly and effectively. Learners practice themselves in conducting Nawu Hi'pe experiments with pretty simple tools and materials. Students experimented with the second meeting to implement the first experimental design. The direct learning experience obtained from Nawu Hi'pe activities makes students better understand heat transfer material. Science process skills are the ability of learners to apply the scientific method in understanding, developing, and discovering science. Science process skills are specific skills used by all scientists and can be applied to understand phenomena.

Figure 3. a. seeds from plants that cooked using geothermal heat, b. Examples of hot water used for cooking are c. cooking process by students on the beach, d. cooperation between students during the cooking process using geothermal heat.

Data analysis of the results of the observation sheet of the science process skills aspects of students has a relationship with learning outcomes. The results showed that the science process skills of students per indicator were predicting/predicting at 2.7 (good), observing at 3.75 (very good), conducting experiments at 3.7 (good), concluding at 3.6 (good), and the last indicator was communicating at 3.65 (very good). The indicator that obtained the lowest average was the predicted indicator of 2.7 (sufficient), and the highest indicator was observed at 3.75 (very good). There was a difference in student learning outcomes in the pretest value of 52.7273 and the posttest value of 82.7273. The posttest value is much greater than the pretest value. Therefore, the science process skills of students taught through direct observation of Nawu Hi'pe activities obtain higher learning outcomes after being given learning and are in a good category.

Conclusion

This study concludes that the science process skills of students taught through direct observation of Nawu Hi'pe activities obtain higher learning outcomes after being given learning and include in the good category, where the value of student learning outcomes in the pretest value is 52.7273, and the posttest value is 82.727.

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