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Child-friendly Schools: Implementation of Ethnoscience-based Science Learning

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Abstract. This research aims to explore and analyze the implementation of ethnoscience-based Natural and Social Sciences (IPAS) learning in child-friendly schools. An ethnoscience approach that integrates local knowledge, and wisdom aims to create a learning environment that is relevant, inclusive, and supports students' holistic development. The research method used is a descriptive qualitative approach. The subjects of this research were teachers and students at an elementary school at SDN 01 Jatibarang Mijen, Semarang City which implemented the child-friendly school concept. Data was collected through observations, interviews and document analysis. Observations were carried out to see the learning process in the classroom, while in-depth interviews with teachers and students aimed to understand their perceptions and experiences of ethnoscience-based science and science learning. Document analysis includes curriculum, learning implementation plans (RPP), and teaching materials. The results of the research show that the implementation of ethnoscience-based science and science learning in child-friendly schools succeeded in creating a fun, inclusive and interactive learning atmosphere resulting in an increase in understanding of science and science concepts and appreciation for local culture. In conclusion, ethnoscience-based science and science learning in child-friendly schools is not only effective in improving the quality of learning, but also in building a learning environment that respects children's rights and local culture. The recommendation from this research is the further development of teacher training programs and the provision of learning resources that support the implementation of ethnoscience in child- friendly schools to achieve inclusive and meaningful education.

Keywords: child friendly schools, ethnoscience, local wisdom, science and social learning

INTRODUCTION

Learning to be the spearhead in educational practice is expected to prioritize the implementation process. Learning science in elementary schools is not optimal because learning only focuses on theory and does not involve the environment as a learning resource. The implementation of the learning process has not involved science process skills in science learning in elementary schools. Environment-based learning activities make students active in the learning process (Sarwi et al., 2021)

Educational institutions are a place to shape and develop the character of the nation which is evaluated based on limitations and improved by updating the curriculum in accordance with the level of development of the times to fulfill success in producing intellectual, broad-minded and character generations for all groups. Through the ethnoscience approach given to students from an early age as an effort to optimize contextualized integrated learning and strengthen the environment as a learning resource. The purpose of learning is to facilitate students to reach their full potential (Wahyuningtyas, 2020). By using learning resources, techniques, media is an integral part of the learning process. Ethnoscience is meaningful learning that allows students to learn while doing or *"learning by doing"* (Alvonco (2014)). Learning by doing allows students to connect the learning material learned with the context of everyday life. By applying ethnoscience-based learning, it makes learning more meaningful in accordance with the objectives of the 2013 curriculum.

The concept of child-friendly schools is defined as a program to realize safe, clean, healthy, caring, and cultured conditions, which are able to guarantee the fulfillment of child rights and protection from violence, discrimination, and other treatment, as long as children are in the education unit, and support child participation especially in planning, policies, learning and supervision. Child-friendly schools are not building a new school, but conditioning a school to be comfortable for children, and ensuring that the school fulfills the rights of children and protects it, because the school becomes the second home for children, after their own home. (Kementerian Pemberdayaan Perempuan dan Perlindungan Anak, 2015)

The Role of Teachers in Child Friendly Schools According to Janguza, Dofo Mahmud (2012) in researchers (Abdullahi & Ph, 2017) is Making a conducive class for all students, has student health defects, ensures good -border classrooms, positive class sentences, class rules in

respecting behavior, regular presence checking, able to overcome problems that arise, ensuring adhesion that is centered on children through teaching and learning, assessing students' entry behavior, using formtive assessment, considering chilen's learning needs, providing adequate textbooks and teaching aids, utilizing open questions and docnetic processes and learning progress, able to identify student widths in learning.

IPAS is an integrated study program designed to help students become more capable of critical and analytical thinking. The purpose of learning using the IPAS approach is to enhance skills and offer experiences. Learning in science and social studies is integrated into IPAS under the autonomous curriculum. In the autonomous curriculum, IPAS aims to foster curiosity, interest, and active engagement alongside the potential to advance knowledge and abilities. In fact, since the science content goes hand in hand with experiences connected to daily life.

day, there is a strong interest in learning science, learning will feel more fun, and students achieve the desired learning outcomes, science is actually seen by elementary school students as a fun and simple subject (Hasanah et al., 2024)

Based on the explanation above, further research is needed related to ethnoscience-based IPAS learning to improve the thinking skills of elementary school students. Combining IPAS learning material with the environmental wisdom of the region makes IPAS learning more meaningful not only academically but also character and environment.

The purpose of this study was to determine how science education is implemented in child-friendly schools. By implementing Ethnoscience learning, it is expected that students can learn based on the wealth of the environment around SDN Jatibarang 01 Semarang city. One of the cultural cultures or sources of income for local residents is the cultivation of cassava plants which are used as a livelihood. By implementing Ethnoscience-based science learning, it is expected that the local area will become a source of learning for students. One of them is by learning how to process cassava scientifically so that it can have a selling value so that it can help improve the learning process and creativity for students in utilizing the learning environment.

METHODS

This research was conducted on July 5, 2024 at SDN 01 Jatibarang, Semarang City. The results of this study were obtained from two data sources, namely primary data sources obtained from interviews and observations and secondary data sources obtained from documentation, journals, previous research, and books. Data in the study were collected through interviews, observations, and documentation. Interview activities were carried out to obtain in-depth information from the principal, grade V teachers, and three grade V students related to the focus of the study. Observations were carried out to find out directly about how the implementation of Ethoscientific-based Science learning in grade V was carried out. Meanwhile, documentation in this study was obtained from teaching modules, products produced by students, teaching materials, and other supporting documents. To check the validity of data, technical and source triangulation was carried out. Technical triangulation is checking and combining data obtained from observations, interviews, and documentation. Meanwhile, source triangulation is checking and combining information obtained from interviews with several informants.

Then the data was analyzed using the Miles and Huberman analysis technique (Abdussamad & Sik, 2021) through three stages, namely data reduction, data presentation, and drawing conclusions. Data reduction is carried out by sorting, centralizing, and simplifying a set of data that has been obtained at SD 01 Jatibarang according to the focus of the research. Then based on the results of the reduction, the data is presented in the form of a description with a clear flow related to the planning, implementation, factors, and solutions for Ethnoscience-based Science learning at SD 01 Jatibarang, Mijen, Semarang City. Then based on the description that has been presented, a conclusion is drawn. The data was analyzed with analysis model, carried out interactively until the data is saturated (Nofitasari et al., 2023). The steps in data analysis include reducing data, presenting data, and drawing conclusions/verification (Rusilowati et al., 2024)

This research design is a qualitative descriptive research design. Qualitative research emphasizes more on descriptive explanation of an event, on the formation of a substantive theory based on empirical data in the field, this theory will be flexible to changes in the results of observations in the field. In qualitative research, researchers must be present directly in the field with the aim of obtaining accurate data. This descriptive research design will be used by researchers to obtain as

complete information as possible about the implementation of ethnoscience in science learning at SDN 01 Jatibarang. The subjects in this research are principals, teachers and students, while the object of this research is ethnoscience in science learning. Interview, observation, and documentation methods are data collection techniques used by researchers. Data validation uses triangulation of sources and techniques. While the data analysis technique is by collecting, reducing, presenting, and drawing conclusions from the data.

RESULTS AND DISCUSSION

In this study, there were 3 resource persons consisting of the principal, high class teachers and students. Researchers used a number of methods to obtain supporting data. The results showed that in the implementation of ethnoscience-based IPAS learning is applied through 3 processes, namely planning, implementation, and evaluation.

Ethoscince-based IPAS lesson planning

Ethnoscience-based science learning planning at SDN 01 Jatibarang is only applied to certain materials that can be integrated with the ethnoscience approach, for example regarding the use of nature for the survival of human life, local production of local areas, local food, and cultural heritage. This school is included in a child-friendly school where the school expects learning that is very friendly and favored by children, the learning process and the media used do not harm students and apply the 2013 curriculum.

SDN 01 Jatibarang always strives to develop educational services for all students including students with special needs, SDN 01 Jatibarang has a school brand "Colored and Cultured" Colored is shown by the colorful side of the building in every corner which indicates that there will always be interesting and new things that we must develop then for the cultured one is shown by the attitude of all school colors to always have the nature of Andap Ashor, mutual respect and respect for others both in the school environment and outside the school environment. The learning planning stage of SDN 01 Jatibarang is designed by making a "*weekly plan*" The *weekly plan is* prepared by each class teacher to plan what activities the children will do in learning for one week. This planning aims to make every activity that children will do run smoothly. It is hoped that the *weekly plan* will assist teachers in preparing models or media that will be used by students to make learning more interactive. Teachers are fundamental to designing the learning process, one of which is activities that can improve the quality of human resources through seminars or workshops, it is hoped that they will also be able to focus on children with special needs (ABK).

The science learning program model in this school is not much different from IPAS learning in elementary schools in general, but the science program in this elementary school still has differences, namely in environmental learning. With this learning program, students are able to protect and preserve the environment. In accordance with the Brand SDN 01 Jatibarang to become a colorful and cultured school, the teacher implements it in IPAS learning. Natural and social science learning. In connection with this learning plan, students are invited to approach where the learning resources are through the surrounding environment.

One of the implementations that will be carried out in Ethoscience-based IPAS learning planning is by making weekly plans or monthly plans in the stages of the learning process. In accordance with the results of research conducted by (Alfianita et al., 2021) explained that ethnoscience-based science learning planning at SD Alam Surya Mentari is only applied to certain materials that can be integrated with the ethnoscience approach, for example regarding the use of nature for the survival of human life, local production of local areas, local food, and cultural heritage. There are three curricula applied in this school, namely the official curriculum, muhammadiyah, and nature. The national curriculum is the same curriculum as that applied by schools, namely the Education Unit Level Curriculum and Curriculum 2013. The Muhammadiyah curriculum characterizes the school's Muhammadiyah curriculum.

Based on these references, the planning stage becomes a very important stage in making schools that have character or characteristics. At SDN 01, the Education Unit Level Curriculum is applied to grades 1 and 4, while the 2013 Curriculum is applied to grades 2, 3, 5, and 6. in the planning stage class in the implementation of Ethoscience-based IPAS learning has an impact on the preparation and what steps will be taken in learning. As done by the class teacher at SDN 01 Jatibarang that in the first week the teacher teaches students to recognize the environment around their school and what local wisdom is around the school so that it can be used as a learning resource, in the second week the teacher takes students to one of the closest locations for cassava cultivation owned

by residents around the school with the aim that students see firsthand the cultivation process, In the third week, students are invited to one of the houses of residents who produce processed cassava into food and in the fourth week students are asked to write down their learning outcomes and confirm their learning outcomes either individually or in groups in front of the class. By doing Ethnoscience learning, students are expected to grow into students who are able to face challenges in everyday life.

From the observation, it shows that teachers have been able to explore students' initial conceptions well with the material presented, namely contextual learning. They are motivated and unconsciously have applied the ethnoscience approach in every lesson, especially the IPAS subject matter because basically this school is a school that prioritizes learning to lead to the potential of the surrounding environment and environmental education. However, in the planning, teachers have not planned explicitly and planned in implementing ethnoscience-based IPAS learning. They unconsciously or intentionally bring up the value of local wisdom in IPAS learning which is applied contextually through outdoor activities/visits, observations of making tape, ice, and batik as well as thematic learning. The result of Ethnoscience-based IPAS learning is that it can provide direct experience to students in learning so as to increase curiosity, self-confidence and critical thinking skills in learning.

Thematic lessons. Based on the results of research at SD N 01 Jatibarang obtained, ethnoscience- based IPAS learning planning is not yet consciously planned or the planning is unconsciously carried out by the teacher. However, every week, teachers make *weekly plans* and the main media used in the learning process are natural media and the surrounding environment. *Weekly plan* in IPAS learning reviews the learning planning that students will do, as seen in the IPAS learning worksheet for class V theme Indahnya Kebersamaan which discusses learning by displaying several cultures, namely the characteristics of tribal customs and the natural appearance of Indonesia regarding regional musical instruments associated with IPAS learning, namely understanding single substances and mixed substances and their relationship with students' ability to create a work. This is in accordance with the opinion of Kartono and Bujang (2010) in research (Agustian & Salsabila, 2021) which states that science education can be developed based on the uniqueness and excellence of a region, including local (traditional) culture and technology. Learning that implements local cultural traditions can lead students to love their region and nation. Learners can explore knowledge directly from local cultural practitioners.

Implementation of Ethnoscience-based IPAS Learning

Implementation of IPAS Learning at SDN 01 Jatibarang is contextual, because it takes into account the age of students who are at the age of concrete learning. Ethnoscience learning is applied by linking the material with local culture then ethnoscience is associated with relevant topics in other words ethnoscience-based IPAS learning is only applied to certain materials that can be linked to the ethnoscience approach. This is in line with the results of research by Nurkhalisa and Ummayah (2015) in (Nihayatul Fadlilah et al., 2024) ithat *The learning process is not only done in the classroom but the students can also learn from the environment and society*. So ethnoscience-based science learning is learning with culture / habits in the area / environment. The ethnoscience approach in IPAS learning can be done by integrating learning materials with the environment. Based on findings in the field, the application of ethnoscience-based IPAS learning at SDN 01 Jatibarang is through Tape Making, batik, visiting the Ice Factory, and also observing the natural environment.

Tape Making

Tape is one of the traditional foods where the manufacture involves a scientific process in the form of frementation. Tape is a cooked food made from the basic ingredients of cassava, cassava is a crop that can be obtained by parents around their neighborhood, either in the garden or yard, almost most residents in the village of jatibarang mijen semarang city have these tubers. Making tape involves cassava tubers as a substrate and tape yeast (Saccharomyces cerevisiae) which is spread on the tubers that have been peeled off the skin. Basically, tape is a cooked food after going through a steaming or boiling process. There are two manufacturing techniques that produce regular tape, which is wet and soft; and dry tape, which is more legit and can be hung without deteriorating. Dried tape is popular in the northern Priangan area (Purwakarta and Subang), and is known as a typical souvenir from this area (known as hanging piyem, because it is traded by

hanging.) While in Semarang city there are several places selling the tape such as ADA supermarkets, Superindo and nearby Indomaret as marketing of MSME products in the local area.

Tape making is one of the places that students go to in learning, the result is that students get to know the fermentation process that occurs in tape from the basic ingredients of cassava. Starting from the process of planting cassava, the process of picking cassava, the boiling process, and the process of giving yeast and the length of fermentation until it becomes tape that is ready to be served. In accordance with research conducted by (Puspasari et al., 2019) explained that ethnoscience studies are a new innovation in learning, especially in learning at the elementary school level. Ethnoscience has the same characteristics as modern science which is obtained through certain steps or methods that can be proven empirically. This ethnoscience learning can bridge students in the learning process by combining student culture with scientific culture in schools well so that it can be concluded that the tape-making process includes the Ethnoscience-based IPAS learning process.

Batik

Batik is a local wisdom that has become one of the characteristics of Indonesia in the eyes of the international community. Ethnosanically batik activities are the result of the implementation of IPAS learning about Single Substances and mixed substances with local content activities to produce a work. In the process of making batik there are science process skills, namely physical changes, when the wax melts due to heating. Then when scratching the canting onto the cloth there is a change in the form of objects from liquid to solid. Batik motifs are formed with liquid wax using a tool called canting. The liquid wax will freeze after being scratched on the cloth due to the influence of temperature. Furthermore, in the color dyeing stage, a convection heat transfer process occurs, water and dye are heated to boiling on the stove.

The process of draining the dyed fabric and letting it rest so that the color can soak maximally in the fabric fibers results in Capillarity, the dye soaks into the fabric. The process of boiling the cloth in boiling water at 100 degrees Celsius to remove the wax / glue that sticks to the cloth to bring out the motifs that have been designed, there is a change in form from solid to liquid, namely wax from solid to liquid due to changes in temperature. Finally, the process of washing the batik cloth with clean water to remove the remnants of wax that are still attached. Then, the drying process allows the loss of moisture content in the fabric due to the evaporation process. In the process of making batik, there are several science process skills seen above and there are cultural values through the history of batik in Indonesia, the process of making batik, and the identity of batik as a cultural heritage through Unesco.

In the process of making batik, students are introduced to what chemicals will be used in the process of coloring batik cloth. Among them are students knowing the process of mixing chemicals, how to make motifs in batik and how to dye and dye until the drying process is carried out in one place in batik cloth making entrepreneurs, by making observations students become aware of the materials used to make cloth and steps, that way making students think more critically. The results of this study are supported by research (Alfianita et al., 2021) Explaining that in the process of making batik there are science process skills, namely physical changes, when the wax melts because it is heated. Then when scratching the canting onto the cloth there is a change in the form of objects from liquid to solid. So it can be concluded that there is an ethnoscience process in it. And in my research, it is the same that in addition to melting wax into malam, there is also a mixing of chemical drugs to form new colors that will be applied to make colors on the mori cloth that has been prepared. The result of this research is that students understand the process of making batik with the ethoscience stage from the materials that have been provided.

Visiting the Ice Factory

Around the school there is an ice factory so it can be used as a learning object. What we can learn is how to do business by learning outside the classroom, students can understand the process of making ice related to science content. Ice cubes are pieces of ice (frozen water) that are usually used for cold drinks. Ice cubes sometimes refer to crushed ice because it takes longer to melt. The ice is usually used for ice drinking mixes. This is a scientific process of energy transfer (memberku). The value of local wisdom is seen in environmentally oriented learning (Contextual) by visiting a new ice making factory in the neighborhood around the school.

By visiting the ice factory, students learn about the process of making ballok ice which is very simple and in science the process is called the

process of freezing water so that it can be distributed to stalls in need. This research is supported by research conducted by (Puspasari et al., 2019) explained that the ice factory that stands in the student's school environment is used as a learning topic. The result of learning is that students can learn ethnoscience through changes in substances in ice so that the process of making ice in the factory is one of the Ethnoscience-based science learning processes. The result is that students can know the process of freezing substances that occur in making ice blocks.

Observe the environment around the school

The school environment has a large area of land so that a plant yard is made, it is used by the teacher as a place for students to learn, including observing the growth process that occurs in plants, so that students can make observations. The plants present are ornamental plants, ornamental plants are used as a vehicle for students to foster a spirit of controversy.

By observing the environment, it makes students more appreciative of what is around them, does not destroy it and now chooses to take care of it, this research is supported by research conducted (Saputri & Desstya, 2023) explaining that the process One of the learning approaches based on local wisdom is an approach that utilizes the environmental potential that exists where students live, live, and grow up. During the learning process, students are actively involved in activities such as discussions, group work, and research. The result is to make students have a more meaningful experience in the learning process directly.

Thematic Learning

Learning carried out in the daily learning process is differentiated learning. Many teachers do not understand differentiated learning when in essence the teacher has provided learning according to student needs. In thematic learning, teachers are required to link one content with another, including combining science content with culture, IPAS learning which is a combination of science and social studies learning and then combined with culture in the local environment. As has been done in class V when the research took place the teacher made research on the material of single substances and mixed substances in connection with the art of batik in social studies subjects on the material of Indonesian diversity.

This research is supported by research conducted by (Aza Nuralita, 2020) explaining that in implementing ethnoscience-based thematic learning it is necessary to pay attention to the selection of learning resources. some effective learning resources are used in science learning, including the surrounding environment, literature, audio visual, and the internet. By utilizing various learning resources, it is hoped that the results will provide holistic learning to students in dealing with everyday life by thinking critically and creatively, so we can understand that Ethnoscience-based IPAS learning is very beneficial for students in everyday life. According to research conducted by (Kelana et al., 2021) that ethnoscience as a learning resource in elementary schools because it provides direct experience in the learning process.

Evaluation of Ethnoscience-based IPAS Learning Implementation

The efforts made by SD N 01 Jatibarang in achieving learning objectives are to conduct routine evaluations in a structured period of time as a place for educators to pour out all complaints, shortcomings, needs and appeals so as to improve the quality of learning at school. Education should have Education Standards that include 4 competencies; pedagogic, professional, social, and personality (Fahmi, 2021) With the existence of qualified teacher abilities, learning will run more effectively and efficiently.

The ethnoscience-based IPAS learning assessment process uses authentic assessment to measure IPAS learning outcomes, namely knowledge or cognitive assessment, attitude or affective assessment, and psychomotor or skill assessment. All three can be obtained from the learning process and exams thi is Cognitive Assessment is In this assessment measures the mastery of the material by students, the research stage includes a written test, oral test, assignment, next Affective Assessment is In affective or attitudinal assessment, it is seen from the attitude of students during the learning process. This attitude assessment consists of spiritual or social attitudes that are used to shape student character and Affective Assessment is In affective or attitudinal assessment, it is seen from the attitude of students during the learning process. This attitude assessment consists of spiritual or social attitudes that are used to shape student character, anda last Psychomotor Assessment it is psychomotor assessment, the aspects assessed

from students are performance, projects, and student skills.

Based on research conducted by (Yulistina Nur DS et al., 2022) explained that learning evaluation is the final stage in the learning process that takes place in every lesson. The form of evaluation includes cognitive, affective, and psychomotor aspects. Similarly, in science learning, evaluation is also carried out in the form of cognitive tests in the form of oral tests, written tests in the form of multiple choice, objective descriptions, short answers, and so on. Evaluation of affective forms in learning is related to student attitudes in the learning process, for example student activeness, disciplined attitudes, and good cooperation. As for the evaluation of psychomotor forms, for example in practicum activities or work tests based on the assessment rubric prepared by the teacher which is adjusted to the 2013 curriculum evaluation standards.

Based on the facts described above, one of the important findings of this literature study is the synthesis of various types of local culture integrated learning facilities in Indonesia. These science learning facilities range from strategies, approaches, models, methods, learning tools, syllabus, lesson plans and various types of learning media. All of them function to help learners master the aspects of attitude, product and science process skills. For educators at primary, secondary and tertiary levels, these findings can make it easier to choose the most appropriate learning facilities according to their respective considerations. This is very important in order to improve the development index in a sustainable manner (Syazali & Umar, 2022)

The result is the application of ethnoscience at SDN 01 Jatibarang Semarang city is a step that can be discussed, evaluated and implemented in science learning in elementary school. Because with the application of ethnoscience-based science learning, students will more easily understand the material that departs from the daily lives of students and cultures that exist in the city of Semarang.

Supporting and inhibiting factors

Supporting factors for the implementation of ethnoscience-based science learning at SDN 01 Jatibarang Mijen Semarang City are strategically located schools, namely in the Mijen sub-district of Semarang city, adequate facilities and infrastructure, administration and supportive walimurid support, have different backgrounds, schools implement child-friendly education so as to support education for all.

While the inhibiting factors in learning are if there are students who are less able to catch up, we as teachers have to pay additional attention to these students and guide them so that they are not left behind for the next stage of learning and to overcome other students who feel badmood, we should provide ice breakers, matches to increase student curiosity about the learning process that students are doing.

CONCLUSION

The purpose of this study was to determine how the implementation of ethnoscience-based IPAS learning at SDN 01 Jatibarang, mijen city Semarang. In the discussion, it has been explained the steps and how the learning process occurs and the result is that students can follow the learning well, this is evidenced by how students are able to follow the learning process, experiences and discussions carried out during the learning process. Ethnoscience-based IPAS learning is also one of the active and creative learning in accordance with the curriculum we use, namely the independent curriculum. By implementation learning with media around our environment, it helps students to think critically and realize that learning resources are not only in books but the environment and surrounding culture are learning resources that can be implemented in learning and daily life.

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