

Representation of Science Concepts in Local Folklore as a Source of Learning IPAS in Madrasah Ibtidaiyah

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Abstract: The purpose of this study is to see how local folktales and science concepts can be used as learning resources in Natural and Social Science lessons in Madrasah Ibtidaiyah (MI). In this study, qualitative methods and content analysis techniques were applied to relevant local folktales. The main data sources were folktales from various regions in Indonesia, which were selected based on their relevance to science concepts in the IPAS curriculum. Data collection was conducted through document analysis of folktales, interviews with IPAS teachers, and observations on how folktales are applied in classroom learning. Using a descriptive approach, the data collected was analyzed to find and categorize the science concepts contained in the folktales. In addition, it was assessed the possibility of folklore can be used as learning media. The results showed that local folktales have great potential as a source of IPAS education covering physics and chemistry concepts, as well as natural phenomena and animal and plant life. Students can gain a better understanding of science concepts through folktales, which are more contextualized and easy to understand. Thus, folktales can be incorporated into IPAS learning to improve students' understanding, enrich their learning experience, and raise awareness of the importance of environmental conservation. In addition, this study suggests the creation of folklore-based learning modules and teacher training programs to maximize this potential.

Keywords: IPAS, Learning Resources, Folklore

1. INTRODUCTION

Education in Indonesia faces great challenges in integrating science knowledge with local wisdom. Although the Merdeka Curriculum emphasizes the importance of connecting learning materials with the context of culture and the surrounding environment, in practice, many science lessons in Madrasah Ibtidaiyah (MI) have not fully considered the potential of local folklore as a learning resource. Data shows that most students in MI still struggle to understand abstract science concepts taught in class. One of the main reasons is the lack of context relevant to their lives and limitations in learning resources that are local and contextual.

Local folklore, passed down from generation to generation, contains many cultural values and knowledge that can be linked to scientific concepts. According to Kate, folklore not only contains moral values, but also empirical knowledge that can be explained through modern scientific approaches . For example, in folktales that tell the origin of natural phenomena, there are often explanations related to the laws of nature, ecosystems, or the interaction of living things, which are actually in line with the topics taught in Natural and Social Sciences (NSP) subjects. However, this potential has not been fully explored in the

context of science education in MI. This suggests that there is still a great opportunity to develop folklore-based learning that integrates science values .

One example of a folktale rich with science concepts is the "Legend of Lake Toba" from North Sumatra. The story tells the origin of Lake Toba, a large lake formed by a massive volcanic eruption. In this story, there are elements that can be related to geological phenomena, such as volcanic eruptions, caldera formation, and how these natural processes shape the surrounding landscape and ecosystems. These concepts are relevant to the topic of volcanic activity and the formation of the earth's surface taught in IPAS, especially in geography and earth science materials.

This fact is reinforced by several studies that show that learning materials containing local cultural elements can increase student interest and understanding. For example, research by Hermino revealed that students who learn science materials associated with folklore find it easier to remember the science concepts taught. They felt that the learning was more relevant to their daily lives, thus accelerating the understanding and application of knowledge. This is also reinforced by Humpherys's research which found that a folklore-based learning approach can increase student engagement in the learning process and foster curiosity about science .

However, the integration of folklore in IPAS learning is still limited. Some teachers in MI may not realize the potential of folklore in supporting the teaching of science concepts or find it difficult to connect stories with more technical science materials. As a result, most IPAS learning still relies on textbooks and teaching materials that are universal without paying attention to local wisdom that can make the learning process more dynamic and contextualized.

In addition, the folktale "Si Kancil dan Buaya", which comes from various regions in Indonesia, can link students to concepts in biology, especially about animal behavior and interactions between species in the ecosystem. In this story, Si Kancil shows his ingenuity to avoid danger from the crocodile. Although this story is better known for its moral message, there are many lessons about animal behavior, adaptation, and interactions between species that are relevant to IPAS materials at the primary level . By linking this story with biology concepts, students can better understand animal life and the importance of adaptation in maintaining survival.

Folklore-based learning can support the development of students' critical and analytical thinking skills . By linking science concepts in folklore, students not only learn scientific knowledge, but are also trained to understand and interpret information in the story with a scientific approach. This helps students develop a critical attitude in dealing with information, which is an important skill in 21st century education .

One of the main challenges in integrating folklore in IPAS learning is the need to adapt the stories to fit existing curriculum standards . Folktales that are rich with cultural and philosophical values often have a strong emotional impact, but do not always convey information that is directly related to science concepts. Therefore, this study aims to analyze how science concepts can be represented in local folktales and how they can be used as effective learning resources in teaching IPAS in MI.

The main objective of this study is to identify and analyze the representation of science concepts contained in local folktales. Furthermore, this research will explore how the stories can be adapted into relevant and interesting learning resources for students in MI. Thus, this research not only focuses on the potential of folklore as a learning medium, but also its application in science education to improve students' understanding of the concepts of IPAS.

Through this research, it is expected to find a learning model that combines local folklore with IPAS learning that is more contextual and fun. In this way, this research can make a significant contribution to enriching the learning process in Madrasah Ibtidaiyah, so that students not only acquire theoretical science knowledge, but are also able to connect it with cultural values and their daily lives.

Based on the above, researchers are interested in systematically studying one of the local folktales to be used as a learning resource that helps students imagine abstract concepts. Therefore, the researcher conducted this study with the title "Analysis of Representation of Science Concepts in Local Folklore as a Learning Resource for IPAS in Madrasah Ibtidaiyah."

2. RESEARCH METHODS

Research methodology refers to the approach used to discover, develop, and test the truth of knowledge through scientific methods. In general, research methodology is defined as a scientific way to obtain data with specific purposes and uses. In scientific research, methodology is very important because it serves as a systematic approach to ensure research activities can be carried out effectively and achieve optimal results .

Types of Research

This study used a qualitative approach with a descriptive-analytic research design. The focus of this research is on analyzing the content of local folktales selected based on

their relevance to topics taught in the learning of *Natural and Social Sciences* (IPAS) in *Madrasah Ibtidaiyah*. This approach allows the researcher to explore the science concepts contained in the folktales and examine how the stories can be utilized in an educational context

Data Source

The main data sources in this study were local folktales from various regions in Indonesia, which were selected based on their suitability to science concepts in the IPAS curriculum. The folktales selected should be relevant to topics such as natural phenomena, animal and plant life, and physics and chemistry concepts. In addition to folktales, secondary data were obtained from the IPAS curriculum used in *Madrasah Ibtidaiyah*, IPAS textbooks, and interviews with IPAS teachers.

Data Collection Technique

Some of the data collection techniques used in this study include :

- Document Study: Researchers collect and analyze folklore texts relevant to science themes, both in the form of written texts and oral recordings. The selected folktales will be analyzed to identify the representation of science concepts in them.
- b. Interviews: Interviews were conducted with IPAS teachers and local cultural experts to understand the relevance of folklore in the context of science learning. These interviews aimed to gain insight into how folklore can be applied in teaching and how teachers connect it to more theoretical IPAS materials.
- c. Observation: The researcher observed the application of folktales in teaching in *Madrasah Ibtidaiyah* classrooms to see how the stories were applied in the context of IPAS learning and how students responded to the learning method.

Data Analysis

Data obtained from document studies, interviews, and observations were analyzed using descriptive analysis and content analysis approaches. The analysis steps include:

- a. Identification of Science Concepts: Identifying science concepts found in folktales, such as natural phenomena, animal and plant life, and physics and chemistry concepts. This analysis aims to see how these concepts are represented in the stories and relate them to the topics in the IPAS curriculum.
- b. Science Theme Categorization: Categorizing science themes found in folktales based on IPAS subjects, such as physics, biology, geography, and social science. The selected folktales will be grouped according to topics relevant to IPAS learning.
- c. Analysis of Potential as a Learning Resource: Assessing the potential of folklore as a

learning medium by comparing its content with the IPAS material in the curriculum. Researchers will evaluate the extent to which folklore can clarify and deepen students' understanding of science concepts taught in the classroom.

Data validity

To ensure the validity and credibility of the data, this study used triangulation techniques, which involved collecting data from various sources (documents, interviews, observations) and cross-checking between data obtained from different sources.

With this methodology, it is hoped that this research can provide a comprehensive understanding of the potential of folklore as an effective learning resource to improve students' understanding of science concepts in IPAS learning in *Madrasah Ibtidaiyah*.3.

3. RESULTS AND DISCUSSION

Representation of Science Concepts in Local Folktales

This study found that local folktales have significant potential as learning resources for *Natural and Social Sciences* (NSP) subjects in *Madrasah Ibtidaiyah*. The representation of science concepts contained in folktales covers four main themes: natural phenomena, animal and plant life, physics concepts, and basic chemistry concepts. Each theme was analyzed to find the relationship between the storyline and the science concepts taught in the IPAS curriculum.

On the theme of natural phenomena, stories such as "The Legend of Mount Tangkuban Perahu" describe geological processes and volcanic activity that can be linked to the IPAS grade IV curriculum material on changes in the shape of the earth's surface due to volcanic activity. This story specifically illustrates how magma pressure and eruptions can form new landscapes. An interview with Mrs. Mala, a grade IV teacher at MI Walisongo Kranji 02, revealed that students more easily understand the hydrological cycle through this story compared to conventional methods. This is in line with Crompton's research, which showed a 20% increase in student understanding. Classroom observations showed that students were more enthusiastic and active in asking questions when folklore was used to explain the concepts of the hydrological cycle and volcanism .

On the theme of animal and plant life, stories such as "Si Kancil dan Buaya" and "Legenda Burung Cendrawasih" are relevant to the topic of ecosystems and food chains in grades IV and V. "Si Kancil dan Buaya" illustrates the adaptation of animal behavior to survive, while "Legenda Burung Cendrawasih" highlights the importance of maintaining the balance of the ecosystem and preserving endangered species. An interview with Mrs.

Nana, a grade V teacher at MI Walisongo Kranji 02, shows that students find it easier to understand the concept of adaptation through folktales compared to theoretical explanations. Bilqis, a fourth grade student, also stated that she was more interested in learning about animal adaptation through *"The Deer and the Crocodile"* compared to the usual textbook. Observations showed that students were more active in discussions and were able to relate the story to real life.

On the theme of physics concepts, stories such as "Malin Kundang" and "Batu Menangis" illustrate the principles of pressure, gravitational force, and changes in the form of substances. In the IPAS grade V curriculum, the material on changes in the form of substances can be explained through the story "Batu Menangis", which describes the transformation of tears into stone as an analogy of the process of changing from liquid to solid. Observations show that students are more focused and understand this concept better after hearing the story. Sania, a grade V student, stated that she remembered the concept of changing the form of objects more easily through the story "Batu Menangis". The study of Mira also supports this finding with an increase in student recall of up to 25%.

On the theme of basic chemistry concepts, the story "Mrapen Eternal Flame" describes a chemical reaction in the context of natural gas combustion. In the IPAS grade VI curriculum, this story can be used to explain how heat energy is generated from chemical reactions. Classroom observations show that students are more interested when chemistry material is explained through stories compared to conventional methods. An interview with Mr. Fahrudin, a grade VI teacher at MI Walisongo Kranji 02, confirmed that folktales help students understand abstract concepts such as chemical reactions and heat energy more easily. Nurwan's research also showed an increase in student understanding by 22%.

Responses from teachers and students to the application of folklore as an IPAS learning resource also showed a positive trend. Interviews with the three teachers revealed that folktales help convey abstract concepts to be more concrete and easily understood by students. However, they also expressed the need for additional training to make the integration of folklore in teaching more effective. On the student side, the interviews showed that they felt more enthusiastic and active in discussions when the IPAS material was delivered through folklore.

Overall, the results of the observations and interviews confirmed that folktales not only serve as a means of passing on cultural values, but also have significant potential as a learning resource for IPAS in *Madrasah Ibtidaiyah*. Folktales facilitate students' understanding of abstract science concepts by connecting them to a more concrete and familiar context. In addition, folktales also build students' awareness of the importance of protecting the environment and preserving nature. The main challenge in this application is the limited source of curriculum-relevant stories and the need to improve teacher competence through training and developing more systematic teaching modules.

Potential of Folklore as an IPAS Learning Resource

This study shows that local folklore has significant potential as a learning resource in the subject of *Natural and Social Sciences* (IPAS) in *Madrasah Ibtidaiyah*. This finding was obtained from in-depth analysis of data from classroom observations, interviews with teachers and students, and supported by the results of previous research. In general, the integration of folklore in IPAS learning successfully bridges the gap between abstract science concepts and students' concrete experiences, thereby increasing their engagement and understanding in learning science.

From the interviews with Ms. Mala and Ms. Nana, it is known that folklore has a strong appeal in delivering IPAS materials. Mrs. Mala explained that stories such as "*The Origin of Lake Toba*" are effectively used to explain the process of volcanism and the hydrological cycle, because the narrative of the story is easier for students to understand than direct explanation using a textbook. This is in line with Crompton's research which shows that a folklore-based approach can improve students' understanding of geological processes by up to 20% compared to the lecture method . On the other hand, Mrs. Nana used the story "*The Deer and the Crocodile*" to explain the concept of animal adaptation and relationships in the food chain. According to Ms. Nana, students more easily understand the role of species in the ecosystem when they see it through the animal characters in the story. Similar research by Zikri supports this finding, with the result of increasing students' understanding of ecosystems and animal adaptation by 25% .

The results of classroom observations reinforce the teachers' statements. In class IV B, students seemed more enthusiastic when listening to the story about the origin of Lake Toba, and the discussions that emerged showed a deeper understanding of how volcanic eruptions can form lakes. One student stated that the story made it easier for him to imagine the geological events described. A similar situation was seen in class V C, where students actively discussed the adaptation strategies of the deer and the role of crocodiles in the food chain. Observations also showed that the classroom atmosphere became more interactive, and students were more confident in asking questions after the storytelling session. Research by Kristidhika confirms that this approach can increase students' environmental awareness by up to 30%, because students are invited to understand the interactions

between living things and their environment in a more narrative and imaginative way .

In addition to geological phenomena and animal adaptations, physics and chemistry concepts can also be taught through folklore. Stories such as "*Batu Menangis*" describe the phenomenon of changing the form of objects, while "*Api Abadi Mrapen*" describes chemical reactions and heat energy. In the interview, Ms. Mala explained that students understand the concept of heat energy more quickly when it is explained through phenomena such as the Eternal Flame that continues to burn. This is in line with Nurwan's research findings, which stated that the folklore-based approach accelerated students' understanding of chemical reactions and heat energy by 22%. Classroom observations showed that students became more curious and actively asked questions about how the fire in Mrapen can continue to burn without going out, which shows the connection between stories and students' scientific curiosity.

However, this study also found some challenges in the application of folklore as an IPAS learning resource. Both Ms. Mala and Ms. Nana agreed that not all topics in the IPAS curriculum can be easily linked to existing folktales. More technical materials, such as the principles of electricity or magnetic force, still require a different approach. In addition, both teachers admitted that their skills in linking storylines with science concepts still need to be improved. This is in line with the findings of Damopolli et al., which showed that although folktales are effective in improving students' critical thinking skills by up to 30%, the success of their implementation depends heavily on the teacher's skills in telling stories and systematically linking them to the subject matter .

From the students' perspective, the interview results showed that they enjoyed the IPAS lesson more when it started with folklore compared to the usual lecture method. One student stated that the folktales made the IPAS material more interesting and easy to understand as the stories helped them to imagine the situations that occurred in the science concepts being taught. Another student added that they felt more confident when discussing the IPAS material after hearing interesting and relevant stories.

Overall, the results of this study confirm that folktales can serve as an effective bridge between science theory and students' concrete experiences in *Madrasah Ibtidaiyah*. Folktales not only play a role in delivering science concepts, but also in improving critical thinking skills, active participation in discussions, as well as students' awareness of the importance of protecting the environment. To maximize this potential, several strategic steps are needed, such as the development of folklore-based teaching modules, teacher training in scientific storytelling techniques, and more systematic documentation of folklore and adaptation to the IPAS curriculum.

4. CONCLUSION

This research reveals that local folktales have great potential as learning resources in *Natural and Social Science* education in *Madrasah Ibtidaiyah* (MI). The main findings show that science concepts, such as natural phenomena, animal and plant life, basic principles of physics, and simple chemistry, are implicitly contained in various folktales. For example, geological phenomena in the *Legend of Mount Tangkuban Perahu*, animal adaptation in *Si Kancil dan Buaya*, physics principles in *Batu Menangis*, and the concept of chemical energy in *Mrapen Eternal Flame*. This analysis shows that folklore can bridge abstract science concepts to be more concrete and easily understood through narratives that are familiar to students' daily lives. In addition, this approach has the potential to foster students' environmental awareness, culture, and critical thinking skills. Therefore, teacher training in effective storytelling techniques and the development of folklore-based teaching modules are needed to ensure optimal implementation in the classroom.

5. SUGGESTIONS AND RECOMMENDATIONS

As a suggestion for future research, the development of more systematic and structured folklore-based teaching materials can be the focus of future research. In addition, more in-depth research is needed regarding the effectiveness of culture-based learning models in improving students' critical thinking skills and science understanding. Future research is also expected to explore more folktales from various regions to enrich IPAS teaching materials in *Madrasah Ibtidaiyah*. Thus, the integration of folklore in learning IPAS not only strengthens students' understanding of science concepts, but also preserves local cultural heritage in the midst of modern educational advances.

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