



Analysis of Science Learning Barriers in Elementary Schools

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Abstract. This research examines the obstacles in learning science in elementary schools and seeks appropriate solutions to overcome these problems. The research method applied in this research is literature review. Despite its importance in the curriculum, science learning is faced with challenges such as the complexity of the material that is difficult to present according to the level of student understanding, a curriculum that is sometimes unclear, conventional teaching methods that are less interactive, and limited resources and training for teachers. In addition, the use of foreign vocabulary can also confuse students and reduce their interest. In order to overcome these obstacles, this study proposes the implementation of a diverse learning model, focusing on the Round Robin Brainstorming model which offers a cooperative approach. This model encourages students' interaction and collaboration in groups, allowing them to share ideas and thoughts related to science materials. The results show that the implementation of this model can overcome problems in science learning, increase student engagement and reduce barriers related to understanding foreign vocabulary. In addition, this study emphasizes the importance of developing teachers' skills in designing innovative and interactive learning. Regular professional training and the use of educational technology can help teachers expand their learning methods. By overcoming these barriers, science learning in primary schools can become more effective, varied and satisfying, and help students understand science concepts better.

Keywords: Learning Barriers, Science Learning, Elementary School.

1. INTRODUCTION

Natural science education (IPA) is an important component of the education curriculum in elementary schools (Agustina, 2018). The main goal of science education is to develop students' understanding of the natural phenomena around them, build scientific thinking skills, and form insights into how the physical world works (Laius, 2015). However, in its implementation, science learning in primary schools is often faced with various difficulties, both in terms of curriculum, teaching methods, and internal and external factors that affect the learning process.

One of the main challenges in learning science in elementary school is how to present complex material in a simple way to suit the level of understanding of students who are still in the developmental stage. Students at this age have a concrete way of thinking and are not yet fully abstract, so they need the right approach to explain scientific concepts in a way that they understand. In addition, science teaching should

also be able to consider the various learning styles that students have, such as visual, auditory and kinesthetic.

In addition, there are also constraints in terms of curriculum. The science education curriculum in primary schools often undergoes changes or adjustments, which can result in unclear scope and learning objectives. This can disrupt the smoothness of the teaching and learning process. In addition, the emphasis on material mastery and exam preparation can often neglect aspects of developing critical thinking skills and scientific exploration.

External factors such as the lack of resources, limited equipment and facilities that support science learning, and the lack of training for teachers in teaching science also contribute to the difficulties of learning in primary schools. These limitations can hinder teachers' efforts to create a learning environment that is interactive, interesting and relevant to students' daily lives.

In this context, research on science learning difficulties in primary schools is important to identify the problems faced by students and teachers in teaching and learning science. With a deeper understanding of these barriers, strategic measures can be designed to improve the effectiveness of science learning in primary schools. This research can help develop more innovative learning approaches, involving the use of technology, project-based approaches, and integration with other subjects to increase students' interest and understanding of natural science.

2. RESEACH METHODS

This research uses the literature review method, to analyze how obstacles occur in the implementation of science learning at the elementary school level and find the right solution in overcoming these obstacles. Literature review is a collection of theories from various sources that are used as references in conducting research activities or writing scientific papers. In this case the thoughts can come from various media such as journals, papers, articles, news and newspapers.

According to (Snyder, 2019) Literature review is all reading material that may have been read and analyzed, either published or as a private collection. The literature review analysis method was chosen because it allows researchers to collect and synthesize information from various literature sources relevant to the research topic.

The first step in this method is the collection of literature related to science learning in elementary schools. The literature includes scientific journals, textbooks, research articles and valid online sources. Literature collection was conducted through academic databases and digital libraries to ensure relevance to the research topic.

Once the literature was collected, the researcher conducted a systematic review to identify trends, approaches and findings that have emerged in the relevant literature. This process involved critical reading and analysis of each piece of literature to identify conceptual frameworks that could be used in analyzing science learning in primary schools.

Next, we organized the findings from the literature into relevant categories, such as science teaching methods, evaluation strategies, inhibiting factors and proposed solutions. The researcher also compared and synthesized findings from various

literature sources to identify common patterns, differences and contradictions in the existing literature.

In the final step, the researcher presents the results of his analysis in the form of a narrative synthesis that outlines the main findings from the reviewed literature. The results of this analysis are then used to support the discussion of challenges and opportunities in science learning in primary schools. The implications of this research can also be used as a basis for formulating recommendations and guidelines for the development of more effective science learning methods at the primary school level.

Thus, through the literature review analysis method, this research seeks to provide deep insights into science learning in elementary schools based on knowledge that has been accumulated in relevant literature.

3. RESULT AND DISCUSSION

A. Barriers to Science Learning in Elementary School

Learning barriers are one of the events that cause a situation that hinders the application during the learning process (Suyedi, 2019). This research shows that one of the main obstacles in learning science in the classroom is the lack of application of diverse learning models for students. Teachers who have not utilized teaching models and media that make students bored and lack enthusiasm in learning in class (Simbolon, 2022).

From the data analysis that has been conducted, it was found that most teachers tend to use conventional learning approaches that focus on lectures, without providing interactive and practical learning experiences to students. The lecture method is a method that is often used by every teacher, teachers usually do not feel satisfied when in the learning management process they do not lecture (Baylor University).

In learning science in primary schools, various learning models offer unique approaches to facilitate students' understanding of scientific concepts (The Science Teacher). However, along with their advantages, these models are also faced with various obstacles that can affect their effectiveness when applied to learners.

One of the barriers that can arise is the sophistication of the curriculum and conventional evaluation can also be an obstacle. Innovative learning models may not always align with conventional ways of assessing student progress (Tibahary, 2018). Traditional evaluation systems can limit teachers' space to implement more creative learning models.

Another obstacle that needs to be considered is more intensive preparation of materials. no less important is the ability to manage the class. Some learning models that involve group or collaborative work can lead to complex classroom dynamics. The teacher's ability to manage student interaction and maintain discipline remains a key factor in the success of these models. In the implementation of collaborative group methods sometimes there is one learner who is too powerful and stands out in the learning potential of the group, and this is not very good because it will provide obstacles in the learning process for other group members to develop (Cooper, 2008).

Another barrier relates to access to resources. Learning models that require advanced technology or specific practical tools may not always be accessible to all schools (Brooking). These resource limitations may hinder the implementation of more interactive learning models.

Another barrier that should not be overlooked is the link with students' learning styles. Not all learning models are suitable for students' diverse learning preferences. Choosing a model that suits students' needs becomes a challenge in an effort to improve their understanding (Teach.com).

In the face of these barriers, schools and teachers need to take steps to overcome obstacles and adapt learning models to the context and needs of students. By understanding these barriers, science learning approaches at the primary school level can be more effective, satisfying, and able to provide encouragement and opportunities for all learners to develop in the learning process.

The application of learning models that are not diverse can have a negative impact on students' understanding of science concepts (Primayana, 2019). The application of learning models that are not varied will make the implementation of learning activities monotonous for students and this will certainly greatly affect students' learning motivation and learning outcomes. Learning that is not varied makes students bored and will affect student learning outcomes (Ozerk, 2020).

The application of various learning models has a significant impact on the learning process. When learning approaches tend to be limited to one type of model or only rely on lectures as the main method, the learning process tends to be monotonous and less appealing to students (Pupitarini, 2019). Classroom activities that are too uniform and less challenging can dampen students' interest in being actively involved in the teaching-learning process.

The importance of variety in learning models is also related to student motivation. When learning lacks variety and challenge, students tend to lose their motivation to learn (Hasan, 2019). As a result, their enthusiasm for learning decreases and the quality of classroom participation decreases. Therefore, it is important for educators to create a learning environment that stimulates students' interest and motivation through diverse and engaging approaches.

Variations in learning models also have a direct impact on students' understanding of science concepts. By utilizing various methods such as group discussions, practical experiments, simulations or practice-based projects, students have the opportunity to approach concepts from different points of view (Ornek, 2008). This helps them build a deeper and more applicable understanding, as they can see how the concepts interact in various real-life situations.

Furthermore, the application of diverse learning models can also improve overall student learning outcomes. With a variety of methods used, students have the opportunity to develop broader cognitive skills, and are able to apply their knowledge in various contexts. This helps them not only understand science concepts theoretically, but also master their application in everyday life situations (Hasanah, 2020).

In addition, variations in learning models can also respond to diverse learning styles among students. In every class, there are students with different learning

preferences, such as visual, auditory or kinesthetic. By integrating various learning models, teachers can meet these diverse needs and optimize the learning potential of each student.

Therefore, Ozerk (2020) underlines the importance of variation in learning models in the context of science learning. This provides a foundation for creating a dynamic, motivating and effective learning environment that improves students' understanding and learning outcomes in natural science.

Research conducted by (Costa, 2021) highlighted issues related to the use of foreign vocabulary in natural science learning and its impact on students. In this study, it was found that the main problem that arises is that there is a lot of foreign vocabulary that is difficult for students to understand. Science learning materials often contain scientific terms derived from foreign languages, which may not be familiar to students.

This phenomenon has a significant impact on the learning process. Foreign vocabulary that is difficult for students to understand can cause confusion in understanding scientific concepts (Cambridge). When students encounter many terms that they do not recognize or understand the meaning of, they may find it difficult to relate the concepts to real experiences or prior knowledge. This can hinder the learning process and reduce students' level of understanding of the learning material.

In addition, the abundance of foreign vocabulary also has the potential to reduce students' interest in learning science. The frustration of not being able to understand these terms can cause students to feel less confident and less motivated to take part in science lessons (San Diego State University). This decreased interest can have a negative impact on students' participation in class and ultimately affect their learning outcomes.

Therefore, the findings in this study confirm that the use of foreign vocabulary in science learning can indeed be a significant barrier. It is important for educators to consider the language used in delivering learning materials. If necessary, educators can explain unfamiliar terms in a simpler way or provide a context that is easier for students to understand. Thus, students will more easily relate science concepts to their experiences and build better understanding.

B. Problem Solution

In addition, the abundance of foreign vocabulary also has the potential to reduce students' interest in learning science. The frustration of not being able to understand these terms can cause students to feel less confident and less motivated to take part in science lessons (San Diego State University). This decreased interest can have a negative impact on students' participation in class and ultimately affect their learning outcomes. To overcome this obstacle, teachers must be able to develop skills in designing and implementing diverse learning models. Regular training and professional development can help teachers expand their repertoire of learning methods. In addition, the integration of educational technology can also increase the variety of learning by utilizing digital resources such as simulations, learning videos and interactive platforms.

By continually honing their innovative lesson design skills, teachers will become

more effective facilitators of learning, linking complex concepts to real-world experiences. Well-planned training will equip them with the necessary tools to navigate changes in learning approaches and better respond to the individual needs of students (Raising Children).

In addition, the integration of technology in learning provides the potential to transform the classroom into a more dynamic and interactive environment. By utilizing learning videos, for example, teachers can bring hard-to-access experts or locations into the classroom, enriching students' learning experience (TechSmith). Meanwhile, interactive platforms and simulations allow students to interact directly with abstract concepts, building a deeper and more sustainable understanding (Campos, 2020).

Overall, continued efforts in professional development and integration of educational technology will open the door to more varied and rich learning experiences for students (Hanover Research). As such, teachers will serve as agents of change in the world of education, shaping a generation ready to face global complexity with deep understanding and relevant skills.

Students need to carry out a series of activities to increase their knowledge, so they must practice more and build their science process skills (Rahma, 2020).

By applying a varied learning model will be able to improve by applying a more interactive, collaborative, and exploration-based learning approach, students have a greater chance of achieving a deep and applicable understanding of science material.

One of the cooperative learning models that is more interactive and able to make all students encouraged to develop in the learning process is certainly an appropriate solution for teachers to apply in learning. The Round Robin Brainstorming type cooperative learning model can be a solution to the obstacles of science learning.

C. Round Robin Brainstorming Cooperative Learning Model

The Round Robin Brainstorming learning model is a group learning approach that encourages interaction and collaboration between learners (Jenelle Cox). In this model, students work in small groups to share ideas, thoughts or solutions related to a particular topic or problem. The name "Round Robin" refers to the rotating process where each group member contributes in turn.

The Round Robin Brainstorming process usually goes like this:

- a. **Topic Selection:** The teacher selects a learning topic that is relevant to the material to be taught.
- b. **Group Formation:** Students are divided into small groups, usually 4-6 members in each group.
- c. **Individual Thinking:** Each group member is given time to reflect and record initial ideas related to the given topic.
- d. **Rotating Alternately:** The rotating process begins. Each group member in turn shares one of their ideas or thoughts. This process continues until every group member has contributed.
- e. **Discussion and Development of Ideas:** Once the round has ended, the group

has the opportunity to discuss and develop the ideas that have been given.

- f. Summary and Presentation: Groups can summarize the results of their discussion and present it to the whole class.

This model aims to develop creative thinking, collaboration, communication, and problem-solving skills. By actively participating in discussions and listening to their friends' ideas, students can broaden their understanding of the topic being studied (Minds tool). In addition, this model also helps in reducing fear or discomfort in speaking in front of a group.

The results showed that the application of cooperative learning model type Round Robin Brainstorming is effective in overcoming the obstacles of science learning in elementary school (Session lab). Students are more active in participating in group discussions, sharing ideas, and solving problems together. Students' involvement in the learning process increases, seen from the increase in motivation, creativity, and ability to work in groups.

Round Robin Brainstorming is an interactive and beneficial learning method for students as it allows them to learn from each other and feel more involved in the learning process (Sriphradith, 2019).

The application of Round Robin Brainstorming learning model in science learning helps to overcome the barriers that may be experienced by students. This model encourages students to think creatively and actively participate in the learning process (mind manager). Students' involvement in sharing ideas and thoughts improves their understanding of difficult science concepts.

In addition, the use of foreign vocabulary in an interactive context makes students more familiar with the use of foreign languages. The group activity in the Round Robin

Brainstorming model allows students to discuss and clarify the meaning of vocabulary together, making it easier to understand and use.

The results of this study indicate that the Round Robin Brainstorming learning model has the potential to be an effective solution in overcoming science learning barriers and improving student interaction and comprehension of foreign vocabulary. However, it is important to note that the context and characteristics of students and teaching can also affect the effectiveness of this model.

4. CONCLUSION

The conclusion from the results and discussion that have been presented is that the barriers to learning Science in primary schools have a negative impact on students' understanding of Science concepts. One of the main obstacles is the lack of application of diverse and interactive learning models. The application of learning models that are monotonous and limited to lectures can make students feel bored and less motivated, so their learning outcomes are also affected. All these barriers can affect the effectiveness of science learning and reduce the quality of students' understanding and learning outcomes.

Solutions to overcome these barriers involve developing teachers' skills in designing and implementing diverse learning models. Regular professional training

and the integration of educational technology can help teachers expand their repertoire of learning methods. Cooperative learning models such as Round Robin Brainstorming can also be an effective solution, as they encourage interaction, collaboration and deep understanding of the material.

The importance of variety in learning models not only impacts on students' learning motivation, but also on their understanding of science concepts. Diverse learning models help students build deeper and more applicable understanding and develop broader cognitive skills. The use of foreign vocabulary in learning also needs to be considered, prioritizing students' understanding and presenting the terms in a simpler and more contextual way.

Overall, overcoming barriers in science learning requires a holistic approach. Teachers need to develop skills, integrate technology and choose learning models that suit students' characteristics. By doing this, science learning in primary schools can become more effective, varied and satisfying, helping students understand science concepts better.

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