



Application of Learning Media to Improve Understanding of Food Chain in Elementary School Students

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Abstract

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This study aims to describe the application of contextual learning media in improving students' understanding of the concept of the food chain at SDN 184 Pekanbaru. The study used a descriptive qualitative approach with direct observation of 41 fifth grade students. Data were collected through observation and documentation. The results of the study indicate that the use of concrete media, such as food chain dioramas, can clarify the relationship between living things in the ecosystem, increase motivation, and active participation of students. The application of this media is also able to build students' ecological awareness of the conditions of the surrounding environment. This study is expected to contribute to the development of more effective learning media and in accordance with the characteristics of student development.

Keywords: Concrete media, contextual learning, food chain, problem-based learning, qualitative.

1. Introduction

The learning process in the classroom plays an important role in the success of the education system, because even though the curriculum has been designed with a new concept, without learning that uses an innovative mindset, educational outcomes will not be optimal and may only be limited to administrative changes without having a real impact on learning practices (Setiasih Hernika et al., 2021). According to (Salman et al., 2022) in the learning process, there are several interconnected components, namely: (1) teachers, (2) students, (3) learning materials, (4) learning methods, (5) learning media, and (6) learning evaluation. Each of these components is related to each other and plays an important role in the success of teaching and learning activities. Natural Science (IPA) Education at the Elementary School level plays an important role in shaping students' scientific thinking, caring attitudes towards the environment, and exploratory skills from an early age. Natural Science (IPA) is the result of human thought obtained through the study of various natural objects and events. This study is carried out through a series of experiments that follow the steps of the scientific method (Sihotang & Amelia, 2024). Natural Science (IPA) is one of the subjects that plays an important role for elementary school students, because through science learning, students can understand various natural phenomena that occur in their environment (Janah et al., 2024). Modern science education places great emphasis on teaching students how to actively participate in the learning process through exploration (Made Anggraeni et al., 2023). The recommended science learning model to support a learner-centered approach is to provide opportunities for students to learn through the process of discovery, not just passively receiving information (Sajidan et al., 2022). Through science learning, students are invited to understand the natural phenomena that occur around them and develop the ability to connect scientific concepts with real life. One of the main materials in science learning is the concept of ecosystems, which includes the relationships between living things in an environment.



Among the concepts in the ecosystem, the food chain is one of the important materials that students must master. This concept explains the process of eating and being eaten between living things and describes the role of each organism as a producer, consumer, and decomposer in

maintaining environmental balance. A good understanding of the food chain not only enriches students' cognitive aspects but also forms a concern for environmental preservation.

However, learning the concept of the food chain in elementary schools often faces various challenges. Many students have difficulty understanding this material because of its abstract nature and lack of connection to real contexts. Initial observations conducted at SDN 184 Pekanbaru showed that most students had not been able to identify the role of living things in the food chain correctly. This is exacerbated by the dominance of the lecture method in learning and the minimal use of concrete media that can help visualize concepts. This condition shows that the low use of concrete media and exploratory activities in science learning are the main factors in students' weak understanding of the concept of ecosystems (Fardiana et al., 2023). In the realm of education, understanding the role of the learning environment is very important because it has a major influence on learning motivation. The learning environment also has a positive and meaningful effect on encouraging learning enthusiasm. In other words, the presence of a supportive learning environment can simultaneously increase student motivation significantly (Rahman et al., 2024). According to Piaget's cognitive development theory, students aged 7–11 years are at the concrete operational stage, which means they will find it easier to understand scientific concepts through direct experience and real objects (Suari, 2023). Therefore, visual and manipulative learning media are very important to support students' thinking processes in understanding the concept of the food chain as a whole.

Concrete media such as three-dimensional models, interactive images, and dioramas have been shown to significantly improve students' understanding. Cahyani stated that diorama media provides a more contextual, interesting learning experience, and is able to strengthen student involvement in learning. The use of media that is relevant to everyday life can also foster students' learning motivation and ecological awareness of their surroundings (Cahyani, 2023). Learning media acts as an interactive bridge that helps teachers transfer knowledge, spark students' imagination, and build their focus and enthusiasm during the learning process (Fardiana et al., 2023). A diorama is a three-dimensional representation of a scene in a small size that aims to depict or display an event or situation, whether historical or not (Nabila & Sutyanti, 2020). Research shows that dioramas can meet various learning styles and special needs of students (Sintaran et al., 2024).

Apart from learning media, the learning approaches and models used by teachers also play an important role. A learning model is a conceptual framework that details systematic steps in organizing learning experiences, with the aim of achieving the expected competencies of students (Mu;arif et al., 2023). One of the innovative learning models that suits the characteristics of elementary school students is Problem Based Learning. This model trains students to develop 21st century skills or 4C, namely the ability to think creatively, think critically and solve problems, communicate effectively, and work together in groups (Rakhmawati, 2021). The Problem Based Learning (PBL) model, for example, encourages students to think critically, solve real problems, and learn collaboratively. Suari said that PBL can increase students' active participation and understanding of scientific concepts because it involves them in the process of investigation and discussion (Suari, 2023). Problem Based Learning (PBL) places problems at the heart of the learning process, with an active approach designed to help students hone critical and collaborative thinking skills in problem solving. (Suradika et al., 2023). The combination of PBL and the use of concrete media is believed to be able to create more meaningful and contextual science learning.

Problem-based learning is a learning model that utilizes problems as a starting point to gain new knowledge and connects it to relevant activities in real life (Farikhatin et al., 2024). In this model, students are encouraged to learn something through a systematic process of solving real problems in order to build their own understanding (Partika Dwi et al., 2022). The Problem Based Learning (PBL)



model supported by diorama media can increase the effectiveness and efficiency in learning the food chain, so that students are able to achieve complete learning outcomes (Malinda et al., 2024). The selection of learning approaches and methods needs to be aligned with the learning objectives and characteristics of the material to be studied (SISWOYO et al., 2022).

In the local context of SDN 184 Pekanbaru, the application of this approach is very relevant. A learning strategy is needed that is able to overcome the low understanding of students regarding the concept of the food chain, while also fostering awareness of environmental issues such as forest fires that often occur in the area.

Based on this background, this study aims to describe the application of contextually developed learning media in improving students' understanding of the concept of the food chain. This study focuses on the extent to which the media is able to build students' understanding of the interrelationships between living things in an ecosystem and foster ecological awareness through an active and interactive learning approach.

2. Method

This study uses a descriptive qualitative approach that aims to describe in depth the application of learning media in improving students' understanding of the concept of the food chain. This approach was chosen because it is able to describe learning phenomena naturally in the context of the classroom, with the main focus on the process, not on the results in the form of numbers. The study was conducted at SDN 184 Pekanbaru, in the even semester of the 2024/2025 academic year, with 41 subjects of grade V students. All students were actively involved in the learning process and became the main source of research data.

Data collection was conducted through direct observation of student activities during the learning process. Researchers were directly involved in the classroom to observe student involvement, responses to learning media, and the dynamics of group discussions that occurred. To strengthen the results of observations, data were supported by documentation in the form of photos of activities, student work results in Student Worksheets (LKPD), and field notes made during the process.

The collected data were analyzed descriptively by following the analysis flow of the Miles and Huberman model, namely data reduction, data presentation, and drawing conclusions. Data reduction was carried out by sorting information that was relevant to the focus of the research, then presented in narrative form to illustrate the relationship between the use of learning media and students' understanding of the food chain concept. Drawing conclusions was done by observing the patterns of student involvement and responses that emerged during learning.

With this approach, the research is expected to be able to provide a complete picture of how the designed learning media can build students' conceptual understanding more meaningfully, especially on the food chain material, as well as increase their active participation in the learning process.

3. Results and Discussion

Learning with the Problem-Based Learning approach is implemented through five stages of structured and interconnected syntax. Each syntax is applied by referring to the contextual situation and needs of elementary school students, especially in understanding the food chain material. All activities are designed so that students are actively involved from the beginning to the end of learning.

The first stage, namely orientation to the problem, is carried out by presenting a real problem that is close to students' lives, namely a case of forest fires that disrupt the ecosystem. The teacher delivers a short narrative about changes in the ecosystem due to forest encroachment and shows two diorama models: one depicting a balanced forest ecosystem, and the other depicting conditions after damage occurs. This visualization immediately attracts students' attention and makes them curious about what happens if one living thing is lost from the food chain. Students' interest in the problem becomes a strong starting point for fostering learning motivation.



In the second stage, which is organizing students to learn, the teacher divides students into heterogeneous groups of 4 to 5 people. Each group is given a worksheet that has been designed to guide the steps of the investigation. The teacher explains the task and learning objectives briefly, then gives the groups the freedom to plan how they work. The division of roles in groups such as recorders, presenters, and painters is done independently by students, and the teacher plays a more active role as a facilitator who monitors and provides direction as needed. The learning atmosphere becomes active, with students discussing, asking group members, and observing the diorama in turns.

The third stage is to guide individual and group investigations. Students begin to explore the LKPD by observing the contents of the diorama in detail, recording the living things they see, and arranging the order of the food chain based on the results of their observations. They also use textbooks to determine the role of each organism observed. Group discussions become a space for students to exchange understanding, correct conceptual errors, and strengthen arguments. The teacher goes around from one group to another to provide guidance with trigger questions such as "What happens if the grass in the forest burns out?" or "Why are snakes called top consumers?". These questions encourage students to think critically and logically.

Next, in the fourth stage, namely developing and presenting the results of the work, students are asked to draw conclusions from the results of their investigations. Some groups choose to draw food chain diagrams on cardboard, while other groups write their descriptions in the form of simple stories. Students then present their findings in front of the class. In the presentation, students explain the flow of the food chain that they have compiled based on the diorama and provide examples of disturbances that might occur if one component of the ecosystem is disturbed. Enthusiasm seems to increase, even students who were initially passive began to dare to ask questions to other groups. At this stage, students feel that the learning process is more interesting and challenging because they have the opportunity to express their opinions freely in various classroom situations (Qondias et al., 2022).

The final stage is analyzing and evaluating the problem-solving process. The teacher facilitates joint reflection by asking open-ended questions such as "What lessons did you learn from today's activity?" and "What are the things that are still confusing to you about the food chain?". Students write a short reflection in the LKPD, and the teacher reviews the results of group work and individual participation during the activity. Assessment is not only focused on the final answer, but also on the thinking process, activeness, and cooperation between students. The teacher provides personal feedback and provides reinforcement to groups that have worked well.

The evaluation results obtained from 41 students after they participated in science learning on food chain material using Problem-Based Learning (PBL)-based LKPD showed quite encouraging achievements. Based on the data collected, as many as 32 students or around 78.05% were declared to have completed with a score above or equal to the Minimum Completion Criteria (KKM), while 9 students or 21.95% had not reached the completion limit. The highest score achieved by students was 100, while the lowest score was recorded at 40. The average score obtained from all students was 75.12. This shows that in general the students' learning outcomes have met the graduation standards, and learning designed with a PBL approach and supported by concrete media in the form of dioramas is able to provide meaningful and effective learning experiences. The distribution of the evaluation results can be summarized as follows:

Table 1 results of student understanding

Value Category	Value Range	Number of Students	Percentage (%)
Very good	≥ 90	16 students	39.02%
Good	75–89	8 students	19.51%



Enough	60–74	8 students	19.51%
Not enough	< 60	9 students	21.95%
Amount	-	41 students	100%

The table above shows that most students are in the satisfactory category. Students who are in the very good category (≥ 90) number 16 students or around 39.02%. They generally have high absorption of the material, are able to understand the contents of the LKPD thoroughly, are active in group discussions, and are able to compile logical and systematic explanations about the flow of energy and the role of living things in the food chain. In addition, students in the good and sufficient categories each number 8 students (19.51%). They generally have understood the basic concepts but still have difficulty in analytical aspects, such as explaining the impact of food chain disruptions on ecosystem stability or describing changes in energy flow under certain conditions.

Meanwhile, students in the less category as many as 9 people (21.95%) indicate that there are still students who need further attention and guidance. Students in this category seem less able to understand the instructions in the LKPD, are not active in group work, and tend to be passive when discussing. Based on observations, some of them looked confused when they had to explain the meaning of the diorama image or when asked to arrange the relationships between living things. This indicates the need for additional reinforcement from teachers in the form of individual guidance, more explicit visual enrichment, and repetition of material with a simpler and more familiar approach.

The analysis of the data processing results also shows that the Problem-Based Learning approach has a positive impact on student involvement in the learning process. This can be seen from the increasing participation of students in group work, the increasing quality of questions asked by students, and their ability to convey findings or solutions based on problems given in the LKPD. This process actually forms critical, collaborative, and reflective thinking skills, which are part of the 21st century competencies that are intended to be built in the modern learning process.

As a concrete example, students in the very good category are able to easily explain the roles of producers, consumers, and decomposers, and are able to analyze the impact if one of these components is disturbed. They can even relate the contents of the LKPD to real events that occur in the surrounding environment, such as forest fires and their impact on the survival of animals and plants. On the other hand, students in the less than good category still experience obstacles in relating abstract concepts to visual representations of dioramas. Even so, their involvement still needs to be facilitated so that the learning process is not only enjoyed by students who are ready, but also inclusive of students with diverse learning abilities.

Thus, the quantitative data that has been processed strengthens the finding that the implementation of PBL-based LKPD developed in this study has quite good effectiveness. However, this result also reflects that there needs to be a further strategy that supports students with greater learning needs, so that all students can achieve the expected competencies evenly.

4. Conclusion

The application of concrete media in the form of dioramas supported by Student Worksheets (LKPD) based on Problem-Based Learning (PBL) has proven effective in improving understanding of the food chain concept in grade V students of SDN 184 Pekanbaru. Most students showed an increase in learning outcomes, with 78.05% achieving scores above the Minimum Completion Criteria (KKM). Contextual learning media can facilitate students' concrete thinking processes, increase active participation, and foster ecological awareness. The implementation of the PBL model also encourages critical, collaborative, and reflective thinking skills. However, there are still a number of students who need further assistance. Therefore, it is important for teachers to adapt inclusive learning strategies so that all students can achieve competencies evenly.



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