



Utilization of Marine Ecosystem Food Chain Diorama Media in Elementary School Science Learning

¹⁾ Lativa Qurrotaini ²⁾ Sila Dwi Kinanti, ³⁾ Sindy Kinanty Jelita, ⁴⁾ Shafa Zahara

¹⁾ Pendidikan Guru Sekolah Dasar, Universitas Muhammadiyah Jakarta, qurrota22@yahoo.com

¹⁾ Pendidikan Guru Sekolah Dasar, Universitas Muhammadiyah Jakarta, siladwikinanti@gmail.com

²⁾ Pendidikan Guru Sekolah Dasar, Universitas Muhammadiyah Jakarta, sindikinantijelita@gmail.com

³⁾ Pendidikan Guru Sekolah Dasar, Universitas Muhammadiyah Jakarta, shafaazaharaa@gmail.com

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ABSTRACT

The use of diorama media for marine ecosystem food chains in science learning is a support in achieving the success of learning objectives. This study was conducted to determine the function of dioramas in science learning. Kemmis and Mc Taggart's class-action research-based literature study model became this research method. The target subjects of this study involved 28 students in grade IV of SD Negeri Cireundeu 02 in the 2022/2023 school year. Many literatures have proven the effectiveness of diorama media in improving students' understanding of science concepts in various material families. The effectiveness of the use of diorama media is also proven after being applied in teaching the food chain of marine ecosystems in elementary school science, although it still has several weaknesses. Despite the weaknesses possessed, in terms of helping the development of students' understanding of science concepts is very helpful significantly, This can be seen from the student learning outcomes from meeting I as many as 78.57% (22 students) have achieved learning completion, and meeting II as many as 89.29% (25 students) who were declared successful. The results of this study certainly contribute effectively in eliminating student learning passivity and encouraging improvement in learning outcomes.

Informasi Artikel

Kata Kunci:

Media Diorama;
Rantai Makanan;
Ekosistem Laut;
Ilmu
Pengetahuan
Alam;
Sekolah Dasar

ABSTRAK

Penggunaan media diorama rantai makanan ekosistem laut pada pembelajaran IPA merupakan salah satu faktor pendukung dalam mencapai keberhasilan tujuan pembelajaran. Penelitian ini dilakukan untuk mengetahui fungsi dan tujuan media diorama yang diterapkan pada pembelajaran IPA Sekolah Dasar. Metode penelitian yang digunakan adalah Penelitian Tindakan Kelas (PTK) dengan model Kemmis dan Mc Taggart dan dikomparasikan dengan studi literatur. Sasaran subjek penelitian ini melibatkan 28 siswa di kelas IV SD Negeri Cireundeu 02 pada tahun ajaran 2022/2023. Banyak literatur yang telah membuktikan keefektifan media diorama dalam meningkatkan pemahaman konsep sains IPA siswa dalam berbagai rumpun materi. Keefektifan penggunaan media diorama ini juga terbukti setelah diterapkan dalam pengajaran rantai makanan ekosistem laut IPA sekolah dasar, meski tetap memiliki beberapa kelemahan. Terlepas dari kelemahan yang dimiliki, namun dalam hal membantu pengembangan pemahaman konsep sains siswa sangat membantu

secara signifikan, Hal ini terlihat dari hasil belajar siswa dari pertemuan I sebanyak 78,57% (22 siswa) telah mencapai ketuntasan belajar, dan pertemuan II sebanyak 89,29% (25 siswa) yang dinyatakan berhasil. Hasil penelitian ini tentu berkontribusi efektif dalam menghilangkan kepasifan belajar siswa dan mendorong peningkatan hasil belajarnya.

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✉ **Corresponding Author:** (1) Lativa Qurrotaini, (2) Pendidikan Guru Sekolah Dasar, (3) Universitas Muhammadiyah Jakarta, (4) Indonesia, (5) Email: qurrota22@yahoo.com

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INTRODUCTION

Natural Science learning will always be relevant in developing students' science thinking concepts, from developing simple thinking skills to thinking on a more complex scale (Marasabesy et al., 2023). The development of this concept of science thinking in elementary schools, makes teachers the most important party in developing students' science thinking potential, so that they are born as learners who can compete in the midst of the rapid influence of technological modernization developments (Liu et al., 2023; Shin et al., 2022).

Science learning essentially involves aspects of products, processes, attitudes, and technology (BK & Hamna, 2023). Therefore, the science learning method should be done through scientific inquiry. In order for science learning to be carried out by scientific inquiry, it is necessary to support learning media that can be implemented by teachers in teaching science concepts that are so complex to students (Sidyawati et al., 2021), interestingly, it can develop students' science talents (Mack et al., 2021) and student creativity (Vuk, 2023) including his science social skills (Hamna & BK, 2023; Lavasani et al., 2011).

The complexity of science material in elementary schools requires the realization of active participation of students in learning. A teacher must be able to determine precisely the teaching strategy that activates students and makes it easier for them to understand a concept of the science material they are learning, both in determining teaching methods and in determining media that are considered relevant to the concepts taught (Kirik & Markic, 2012) for the development of natural competence in science (Niklas & Schneider, 2017). Of the various alternative strategies and the use of media that can be used in

teaching science concepts, in the end the teacher is a determinant of student learning success.

Every teacher certainly expects his learning to be successful which is measured by the success of students in understanding the material they teach. However, it seems that the hope of realizing this learning success seems difficult to achieve in teaching science concepts at SD Negeri Cireundeu 02 in the 2022/2023 school year. The main obstacle behind students' passivity in understanding science concepts is that they have not received concrete media that can stimulate students' thinking and understanding of the material taught. The impact of passivity in learning has implications for the achievement of student science learning outcomes. In the findings of the study documenting student learning outcomes of 28 students, the dominance of students' lack of science learning achievement, especially in ecosystem materials and food chains in the sea, was classically experienced by 24 students (85.71%), although 4 students (14.29%) had achieved good results. This achievement is based on the minimum required learning completeness limit of 75.

As in teaching the concept of ecosystem material and food chains in the sea which is an important part of science learning in elementary schools, it is not appropriate if the teaching emphasizes rote reinforcement and touches less on strengthening visualization by observing concrete examples by relying on the use of diorama media. To help students understand this concept better, the development of science dioramas can be an effective and interesting tool. Through the diorama, students will be able to see in real time how the interaction between various organisms in the marine ecosystem, including in the food series that occurs in it (Melinda & Ariyani, 2024).

According to (Humaira & Ninawati, 2023), A diorama is a type of model that takes the form of a miniature three-dimensional scene, used to represent an actual scene. In general, it is said by (Eldelena et al., 2022) dioramas consist of objects or objects placed in a stage with a painting background that is adapted to its presentation.

There are many studies that have proven the effectiveness of diorama media in student learning, such as improving students' cognitive learning outcomes of ecosystem materials (Aris & Hanifah, 2021), there is a significant influence on students' science learning outcomes (Astriana et al., 2023; Jannah et al., 2023), students' creative thinking skills (Dayana et al., 2021), improve students' science cognitive learning outcomes (Aris & Afina, 2022), improve understanding of science material (Laili et al., 2023), and also the results of research that prove the increasing understanding of student science material about the importance of healthy food for the body (Samosir et al., 2022). Referring to this previous research, it is known that it is still limited which specifically examines the effectiveness of diorama media for marine ecosystem food chain material as the focus of its research. With a review of the limitations of the problem, then further studied in this study. Therefore, the purpose of this study is to further explore the effectiveness of diorama media on marine ecosystem food chain material.

The importance of the purpose of this research on the development of science diorama media for learning food chain ecosystems in the sea is basically to increase students' understanding of the concept in a fun and interactive way. Dioramas can also help students visualize how food chains in the ocean work, as well as understand the importance of maintaining the balance of marine ecosystems.

Through learning science dioramas, students are expected to develop observation, analysis, and problem-solving skills in understanding marine ecosystems and their food chains (Kustadiyono, 2020; Putri et al., 2023). Thus, the development of science dioramas becomes one of the effective and fun tools in helping students understand complex science concepts, such as food chain ecosystems in the ocean.

The main indicators in the development of diorama media include all elements that allow the delivery of messages or subject matter, with the aim of stimulating the attention, interests, thoughts, and feelings of learners in the learning process, to achieve learning objectives. The impact of its use can contribute effectively in helping students get closer to the learning object at hand. One important thing behind the use of diorama media is that it is easy to use even though making it requires teacher creativity in making it look attractive to students' learning. Because the manufacture is so easy, so this diorama media is considered contributive in helping teachers in teaching without having to rely on technological devices that are not cheap.

METHOD

The research method used is Classroom Action Research with the Kemmis and Mc Taggart models and is compared with literature studies using library data collection, reading and recording, and managing research reading library information.

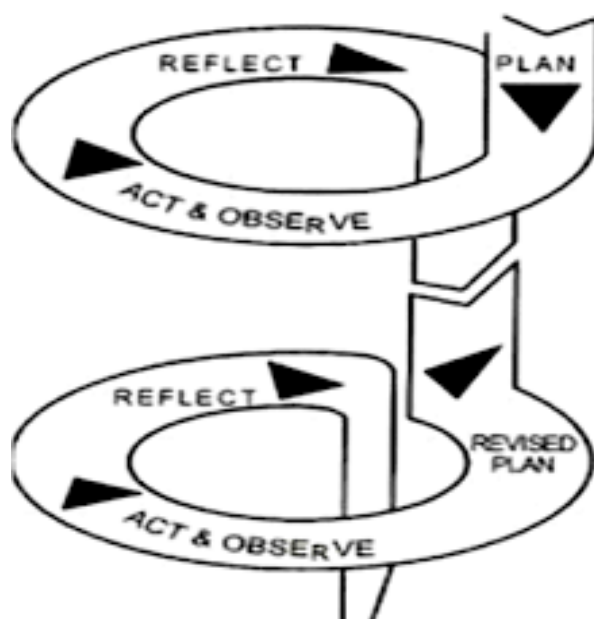


Figure 1. Kemmis and Mc. Taggart's Version of Classroom Action Research Pipeline Design (Salleh & Aiman, 2015)

The target subjects of this study involved 28 students in grade IV of SD Negeri Cireundeu 02 in the 2022/2023 school year. This research was carried out in two meetings for ecosystem material and food chains in the sea. There are four instruments used in this study, namely media expert validation instruments, expert validation instruments and media practitioner validation instruments.

The validity test criteria are based on percentage scores after the media instrument is tested by validators with percentage conditions: (1) 0%-20% (Very Invalid), (2) 21%-40% (Invalid), (3) 41%-60% (Less Valid), (4) 61%-80% (Valid), and (5) 81%-100% (Very Valid). If the percentage of test results is below 61%, it means that the media instrument is not suitable for use. In order to be used in learning, it needs to be tested many times until it is valued at least valid. Testing its validity refers to the elements of ease of use, practical, and relevant to the material combined. The results of the use of validated diorama media instruments are then analyzed by relying on literature studies in analyzing the effectiveness of diorama media for the development of students' science concepts.

RESULTS AND DISCUSSION

A. Result

1. Diorama Media Planning and Evaluation

The diorama media used in this study as an alternative representation of three-dimensional mini media designed to illustrate the visualization of abstract reinforcement of matter becomes more concrete (Syahid et al., 2022). This diorama is made similar to real conditions to create a real impression in understanding students of material concepts, especially those whose tendency to think concepts are still at the concrete operational level (Ningtias et al., 2023).

Learning media dioramas of marine ecosystem food chains use materials obtained easily. Materials in making media are Styrofoam, print images, skewers, glue and scissors. There is also the identity of this learning media as follows:

1. Form: Concrete learning media
2. Title: Diorama of the food chain of marine ecosystems
3. Goal: high-grade learners

How to make diorama media for marine ecosystem food chains, namely:

1. Cut out the printed image.
2. Then cut the styrofoam into two halves.
3. After that, stick the picture on the skewers.
4. Arrange the pictures of the food chain according to their order.
5. Paste the background of the ecosystem image on Styrofoam and then combine the two Styrofoam.

There is also a general display of the media is as follows:



Figure 1. Results of Marine Ecosystem Food Chain Diorama Media

Here are some suggestions for creating interesting dioramas about the food chain of marine ecosystems:

1. Choose a bright color palette to attract students' attention in the diorama we have made, we chose light blue as a picture of the state of the sea.
2. Add small detail elements to enhance the realism of the diorama. The diorama we created uses images of coral reefs, starfish, and plants that live in the sea as the background of the diorama to give the impression of sea realism.
3. Be sure to use materials that are safe for students when making them. The diorama we make uses Styrofoam as the basic material so it is safe for students.
4. Choose pictures of animals on the food chain that catch students' attention. In the diorama we made we chose images of plankton, small fish, dolphins, sharks and bacteria in the form of cartoon images.

The design of diorama media in teaching the concept of ecosystems and food chains in the sea is based on the results of the validity of media design to be appropriate in its use, including the relevance of its use to teaching materials. The results of media validity have been assessed as feasible by expert validators and practitioner validators.

Table 1. Recapitulation of Diorama Media Assessment

No.	Validator	Substance of Assessment			Average Percentage	Criterion Credentials
		Feasibility	Practical	Relevance		
1	Media Member Validator	85%	84%	87%	85,67%	Very Worth It
2	Media Practitioner Validator	89%	85%	85%	86,33%	Very Worth It
Average Percentage of Assessment Items		87%	84,5%	86%	86%	Very Worth It

2. The Effectiveness of Using Diodrama Media in Science Learning

The description of the effectiveness of the use of diorama media is measured by the success of teachers in functioning the use of these media and the acceptance of student learning after the media is adapted in their learning activities. The implementation of learning is carried out twice by referring to the flow of the classroom action research cycle. The results of observations on teacher and student activities are then tabulated in tables to facilitate meaning related to the effectiveness of media used in supporting ecosystem learning and eating chains in the sea.

Table 2. Effectiveness of Diodrama Media from Teacher Activities

Meeting	Effectiveness				Percentage	Criterion
	Informative	Logism	Guidance	Involvement		
1	76%	80%	77%	82%	78,75%	Effective
2	83%	86%	94%	92%	88,75%	Very Effective
Percentage per scoring item	79,5%	83%	85,5%	87%	83,75%	Very Effective

Table 3. Effectiveness of Diodrama Media from Student Activities

Meeting	Effectiveness				Percentage	Criterion
	Acceptance	Understanding	Mastery	Adaptations		
1	79%	77%	77%	75%	77%	Effective
2	82%	87%	83%	88%	85%	Very Effective
Percentage per scoring item	80,5%	82%	80%	81,5%	81%	Very Effective

Testing the effectiveness of diorama media in teaching science concepts, especially in teaching ecosystem and food chain materials in the sea, for teacher activities is observed with four aspects of assessment including aspects of observation, logic, guidance, and engagement. While testing the effectiveness of student activities is measured from four aspects including aspects of acceptance, understanding, mastery, and adaptation.

B. Discussion

Testing the effectiveness of the use of diorama media from teacher activities is measured from four aspects, including: (1) delivery of information whose learning objectives are associated with the use of diorama media (informative) with a percentage of effectiveness of 79.5%, (2) logic in the delivery of media functions so that it is easy for students to understand with a percentage of 83%, (3) guiding and accompanying students when using diorama media with a percentage of 85.5%, and (4) involving students actively in every Learning that utilizes the use of diorama media with a percentage of 87%. The measurement results of the four aspects of media effectiveness testing from meeting I were assessed with an effective assessment with a percentage of 78.75% and increased in meeting II with a percentage of 88.75% (very effective). The use of diorama media is very beneficial if it meets the pedagogic elements of learning, such as facilitating the dissemination of information, fostering thinking skills, and helping children learn (Peart & Kool, 1988).

The results of testing the effectiveness of media use from the aspect of teacher activity turned out to be relevant to the results of testing the effectiveness of diorama media seen from student activities, which were measured based on four assessment categories, such as: (1) student acceptance of the use of diorama media (acceptance aspect) with a percentage of 80.5%, (2) students' understanding of science concepts changed when using diorama media (comprehension aspect) with a percentage of 82%, (3) there was an increase in student learning outcomes after learning ecosystem material and food chains in the sea by functioning diorama media (mastery aspects) with a percentage of 80%, and (4) adapting students' thinking concepts in understanding the conrhythmization of the concepts of the material they learned using diorama media (adaptation aspects) with a percentage of 81.5%. The results of measuring student activity in learning using diorama media from meeting I were tested effective with a percentage of 77% and increased in the second meeting with a percentage of 85% with a very effective category. Good teaching media, in fact, provoke children's interest in learning, give birth to curiosity, and children love to learn (Eisenberg, 2013). And this arises in the learning of students who use diorama media (Insley, 2008; Ishikawa, 2022).

Table 4. Student Learning Completeness

Classroom Action Research Cycles	Number of Students		Fitness Criteria Classical	Upgrade Difference (Gain Effectiveness)
	> Criterion Standard Minimum	< Criterion Standard Minimum		
Meeting I	22	6	Succeed	10,72%
Success Percentage	78,57%	21,43%		
Meeting II	25	3	Succeed	
Success Percentage	89,29%	10,71%		

According to the gain, the effectiveness of student learning outcomes from meeting I to meeting II experienced a significant increase with an increase difference of 10.72%. The meaning of this increase difference indicates that in science learning it would be effective to use media as a support for strengthening material information explained by the teacher and one of the alternative media that can be used is diorama media which can help contextualize students' understanding of the material being studied.

Although the use of diorama media is effective in improving student science learning outcomes for ecosystem and marine food chain materials, there are still some weaknesses in its use, such as not all diorama media are right for all science materials so it is necessary to know their relevance so that then the media needs to be tested for feasibility by expert validators and media practitioner validators. The next weakness of adapting visual media presentations is still very limited to accommodate all concepts of natural science material in elementary school curriculum content (Mutch-Jones et al., 2022). But behind its weaknesses, it is very effective in encouraging student learning enthusiasm because in the presentation of media visualizations that are designed as

attractive and according to student characters, it certainly invites students' interest in learning (Hafsah et al., 2023).

According to Prabowo & Wulandari (2017), The use of three-dimensional diorama media, as an artificial object, aims to involve several aspects, including overcoming the difficulty of understanding objects that are too large, allowing the study of historical objects from the past that cannot be physically reached, providing alternatives for objects that are easily accessible but lack adequate information, facilitating the understanding of abstract constructions, and showing the processes of broad objects. The advantages of using diorama media according to Putra & Suniasih (2021) are:

1. The material of manufacture is economical and easy to find.
2. Can be used repeatedly.
3. Able to represent the true form of the state.
4. Allows visualization of the inside of an object that is difficult to see in real life.

Learning that makes students build their learning experience and make them think critically, concretely and scientifically either using tools in teaching or using adaptive teaching strategies, indicates that it is very useful for learning to be applied in further student learning. It further said Johnson & Keane (2023) and Jones et al. (2022), Learning that builds critical thinking literacy will help prepare students to face the next learning challenge by capitalizing on previous learning experiences. This is interesting to make students more complex in thinking (Nuralan et al., 2022; Rubenstein et al., 2022; Utamajaya et al., 2020) and build the academic ability performance of outstanding students (Candia et al., 2022).

CONCLUSIONS

The use of learning media products in the form of dioramas of marine ecosystem food chains shows effective results in developing students' science concepts. This media, made of Styrofoam is designed by displaying images of marine ecosystems. This is done to facilitate students' understanding of the concept of ecosystems and marine food chains and provide concrete and interactive learning experiences for students. The advantages of the first diorama media are that the tools and materials used are quite affordable, the media can be used repeatedly, the media can describe the food chain as the original. It is recommended in making diorama media to be relevant to the concept of science material taught and should not be too crowded, but clear in its purpose so as to invite student attraction to learning.

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