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The Influence of Diorama Media on Student Learning Outcomes in Science Subjects in Elementary Schools

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Abstract

Although science learning in elementary schools has often relied on textbooks and simple visual media, abstract topics such as the water cycle remain difficult for students to understand. This study aims to determine the effect of water cycle diorama media on the learning outcomes of fifth-grade students at UPT SD Negeri 8 Pinrang. A quantitative approach was employed using a quasi-experimental design with a nonequivalent control group. Data were collected through learning outcome tests, observation, and documentation, and were analyzed using descriptive and inferential statistics. The findings indicate that the use of water cycle diorama media had a significant effect on students' learning outcomes. Students taught using diorama media achieved higher learning outcomes than those taught through conventional methods. The use of diorama media helped students understand the water cycle process in a more concrete, engaging, and meaningful way. These findings suggest that water cycle diorama media can serve as an alternative instructional medium for improving students' learning outcomes in elementary science education.

Keywords: Diorama Media; Learning Outcomes; Science Education; Water Cycle; Elementary School

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INTRODUCTION

Learning outcomes are a crucial indicator of the success of the learning process in elementary schools. In science lessons, students are expected to not only memorize concepts but also understand the natural processes that occur in everyday life. However, many students still struggle to grasp abstract material, particularly the water cycle. Elementary school students generally require concrete and visual learning experiences to more effectively grasp abstract concepts.Amalia et al. (2024)states that concrete or three-dimensional media helps students understand difficult concepts by providing a realistic representation of the form and operation of a system. Therefore, the use of appropriate learning media is essential to support meaningful learning experiences for elementary school students.Dendodi et al. (2025)explains that learning that involves concrete experiences can help students understand the material not only in theory, but also through direct application in real life.

The use of learning media in elementary schools is receiving increasing attention because media can increase student motivation, participation, and learning outcomes.Insanitaqwa et al., (2024)stated that in the independent curriculum, students become the center of attention in the learning process.Harefa & Hayati (2021)explains that learning is a process of interaction between teachers, students, and learning resources in a learning environment. Therefore, learning needs to be designed to be active, interactive, and provide meaningful learning experiences for students. Media serves as a tool that helps teachers convey learning material more clearly and engagingly.(Zahwa & Syafi'i, 2022). Further according toYuniastuti et al. (2021)states that learning media functions as an intermediary that helps teachers convey material so that it is easier for students to understand. Furthermore, media also provides meaningful learning experiences and helps students understand concepts that are difficult to observe directly.(Ningsih et al., 2024)However, many learning activities in elementary schools are still dominated by textbooks, lecture methods, and simple two-dimensional visual media. This situation results in teacher-centered and less interactive learning, particularly in science-based subjects like science and science.

Based on the results of initial observations and interviews conducted at the UPT SD Negeri 8 Pinrang, information was obtained that science learning is still dominated by the use of textbooks and simple visual media such as PowerPoint containing images that

are then explained verbally by the teacher. The use of concrete learning media that actively involve students has not been optimally utilized. As a result, students tend to have difficulty in understanding the water cycle material because the material contains abstract processes such as evaporation, condensation, precipitation, and infiltration. In addition, the average student learning outcomes are still below the Minimum Completion Criteria (KKM) set by the school, which is 75.

One alternative learning medium that can be used to address this problem is the diorama. A diorama is a three-dimensional visual medium that presents objects or events in miniature and concrete visualization.(Januaripin, 2023)In science learning, diorama media can help students observe and understand scientific processes more clearly because it presents learning materials visually and concretely.(Haryanti et al., 2025)The use of water cycle dioramas allows students to observe the stages of the water cycle sequentially and meaningfully, making learning more engaging and interactive.Safitri et al. (2024)stated that diorama media helps improve student learning outcomes because it is able to display learning objects in real terms so that the material is easier for students to understand.

Several previous studies have shown that diorama media has a positive influence on student learning outcomes.Khaeroni and Julia (2023)found that the use of diorama media can improve elementary school students' learning outcomes on the water cycle. LikewiseAprilia and Falah (2024)reported a significant difference between pretest and posttest scores after applying diorama media in science learning.Wahyuningtias (2024)also revealed that students who learn using diorama media get better learning outcomes than students who learn using conventional methods. Although previous studies have discussed the effectiveness of diorama media, research that specifically examines the influence of water cycle diorama media on the learning outcomes of fifth grade students in science subjects at UPT SD Negeri 8 Pinrang is still limited. In addition, previous studies generally only focus on the use of diorama media in science learning in general and have not studied much the application of diorama media in science learning in the context of the independent curriculum in elementary schools.

The novelty of this research lies in the application of concrete three-dimensional dioramas in science learning on the water cycle within the context of the independent curriculum at the elementary school level. This research focuses on how water cycle dioramas can improve students' cognitive learning outcomes through concrete and

contextual learning experiences. This research also strengthens the theory that concrete learning media helps elementary school students understand abstract concepts more effectively.

Based on the description, this study aims to determine the effect of water cycle diorama media on the learning outcomes of fifth grade students in the science subject at UPT SD Negeri 8 Pinrang.

METHODS

This study uses a quantitative research approach. Quantitative research is used to examine the relationships or influences between variables through the analysis of numerical data using statistical techniques. According toMustafa et al., (2022)Quantitative research is a systematic and structured research method that emphasizes objective measurement and statistical analysis. This approach is considered appropriate because this study aims to determine the effect of water cycle dioramas on student learning outcomes in science.

The research design used in this study was a quasi-experimental nonequivalent control group design. This design involved two groups: an experimental class and a control class. The experimental class was given treatment in the form of a water cycle diorama, while the control class was given treatment using conventional learning methods without the diorama.Susianti and Srifariayati (2024)states that in quantitative research, particularly in the field of education, variables are generally divided into independent variables and dependent variables. In this study, the water cycle diorama media acts as the independent variable, while student learning outcomes are the dependent variable. Pretests and posttests were given to both groups to determine differences in student learning outcomes before and after treatment. According toAnantasia & Rindrayani (2025)The nonequivalent control group design is appropriate for educational research because it allows researchers to compare learning outcomes between groups receiving different treatments. This design was chosen because it is considered appropriate for measuring the effects of treatments in real-life elementary school learning situations without altering pre-existing classroom conditions.

The population in this study was all fifth-grade students of UPT SD Negeri 8 Pinrang. The research sample was selected using a purposive sampling technique, taking into account the characteristics and conditions of the classes involved in the study.Lenaini

(2021)states that purposive sampling is a non-random sampling technique carried out by selecting research subjects based on specific characteristics deemed appropriate to the research needs, so that the selected sample is expected to be able to provide data relevant to the problem being studied. Research participants were divided into two groups, namely the experimental class and the control class. This technique was chosen because the researchers chose classes that had relatively similar academic characteristics and learning conditions.

Data was collected through tests, observations, and documentation. Learning outcome tests were used to measure students' cognitive achievement in the water cycle. The test instrument consisted of multiple-choice questions structured based on cognitive indicators, including remembering, understanding, applying, and analyzing.Sakahuni and Ramadhanti (2021)stated that the multiple-choice test format is effective in measuring student learning outcomes because it can objectively describe the level of concept mastery. Observation sheets were used to observe student participation and learning activities during the application of diorama media. Documentation techniques were used to collect supporting data related to the research process. Before use, the test instrument was first validated by an expert validator to ensure the suitability of the content, indicators, and cognitive level of the questions with the learning objectives. Based on the validation results, the instrument was then revised according to the validator's suggestions until it was declared suitable for use in research. Similar instruments have also been widely used in previous educational research examining learning media and student learning outcomes.

The data obtained in this study were analyzed using descriptive and inferential statistical analysis with the help of SPSS software. Descriptive statistics were used to describe student learning outcomes through average values, percentages, and score distributions. Inferential statistics were used to test the research hypothesis and determine whether or not there was a significant effect of the water cycle diorama media on student learning outcomes. The analysis included normality tests, homogeneity tests, and hypothesis tests using independent sample t-tests. Hypothesis testing was conducted at a significance level of 0.05. The use of inferential statistical analysis allowed researchers to determine differences in learning outcomes between the experimental class and the control class objectively and systematically.

RESULTS

Student Learning Outcomes

The research results were obtained through the application of water cycle diorama media in science learning for fifth-grade students at UPT SD Negeri 8 Pinrang. The study involved two groups: an experimental class and a control class. The experimental class was given treatment using the water cycle diorama media, while the control class used conventional learning without the diorama media.

Pretest results indicated that students' initial abilities in the class were still relatively low. After the treatment, posttest results showed an improvement in learning outcomes in both classes. However, the improvement in learning outcomes in the experimental class was higher than in the control class.



Figure 1.Water Cycle Diorama Media

The use of diorama media helps students understand the stages of the water cycle more concretely and systematically so that students can more easily understand the learning material.

Table 1.Student Pretest and Posttest Scores

Class	Pretest Average	Posttest Average
Experimental Class	45.90	84.36
Control Class	44.36	71.79

Based on Table 1, the average posttest score for students in the experimental class was higher than that of the control class. This indicates that the use of the water cycle diorama media has a positive influence on improving student learning outcomes in the water cycle material.

Research findings show that students who learn using water cycle dioramas achieve higher learning outcomes than those who learn using conventional methods. The use of three-dimensional media helps students visualize the stages of the water cycle more clearly and systematically.

Hypothesis Test Results

Before conducting the hypothesis test, prerequisite tests were first performed, namely the normality test and the homogeneity test. The results of the normality test indicated that the data from both groups were normally distributed, as the significance value was greater than 0.05. Furthermore, the results of the homogeneity test indicated that the variance of the data from both groups was homogeneous.

After meeting the prerequisite tests, hypothesis testing was conducted using an independent sample t-test with the help of SPSS software. The results of the hypothesis testing are presented in Table 2.

Table 2.Independent Sample t-test results.

Variables	Sig. (2-tailed)	Interpretation
Student Learning Outcomes	0,000	Significant

Based on Table 2, the significance value is less than 0.05, indicating a significant difference between student learning outcomes in the experimental and control classes. Therefore, the alternative hypothesis stating that the water cycle diorama media has a significant effect on student learning outcomes is accepted.

Improving Student Learning Outcomes

The improvement in student learning outcomes in the experimental class was influenced by active student engagement during the learning process using the water cycle diorama. Students were seen more actively observing the diorama, discussing the stages of the water cycle, and answering questions related to the learning material. The use of concrete and interactive learning media encouraged students to become more involved in the learning activities, thus helping them understand the material better.

Improvement in student learning outcomes can be explained using the following formula:

$$\text{N-Gain} = \frac{\text{Nilai } Posttest - \text{Nilai } Pretest}{\text{Nilai Maksimum} - \text{Nilai } Pretest}$$

The formula above is used to determine the increase in student learning outcomes after implementing the water cycle diorama media.

DISCUSSION

The results of the study showed that the application of water cycle dioramas significantly improved student learning outcomes in science. Students who learned using dioramas achieved higher posttest scores than those who learned using conventional methods. These findings demonstrate that concrete and visual learning media are effective in helping elementary school students understand abstract concepts like the water cycle.Putra and Suniasih (2021)stated that diorama media is very suitable for use with elementary school students because it is able to provide concrete learning experiences according to the concrete operational development stage of students.

The results of this study support previous research conducted by(Khaeroni and Julia (2023)who found that diorama media had a positive influence on elementary school students' science learning outcomes. Likewise,Aprilia and Falah (2024)stated that the use of dioramas improved students' understanding and learning achievement in science learning. This finding also aligns with the theory that elementary school students need concrete learning experiences to effectively understand abstract material.Maisarah et al., (2023)states that the use of concrete media provides a real learning experience because it allows students to observe, touch, and see learning objects directly, thus supporting the achievement of learning objectives.

The application of water cycle dioramas not only improves students' cognitive learning outcomes but also increases their participation and motivation during the learning process. Students become more active in observing, discussing, and understanding the stages of the water cycle because the learning material is presented visually and interactively.Nurlena et al., (2024)explains that direct learning experiences can improve students' understanding because students more easily remember the material learned through active involvement in learning.Harahap and Pradana (2024)emphasized that the use of dioramas can attract students' attention and make the learning process more varied,

preventing students from getting bored easily and allowing them to be more actively involved in the learning process. These findings suggest that innovative learning media can create a more meaningful and student-centered learning environment.Budiani et al., (2023)stated that diorama media can increase students' interest and enthusiasm for learning because it provides a more interesting and meaningful learning experience.

This research provides both theoretical and practical contributions to the field of elementary education, particularly science learning. Theoretically, this research reinforces the concept that concrete learning media can improve students' understanding of abstract science concepts.Evitasari and Aulia (2022) stated that dioramas are very suitable for use in science learning because they are not only interesting but also facilitate the explanation of a situation or phenomenon through three-dimensional visual displays that can help students understand the process in a concrete and more realistic way. Practically, this study provides recommendations for teachers to utilize innovative and interactive learning media such as dioramas in classroom learning activities.

Despite its positive contribution, this study has several limitations. It was conducted in only one school with a limited number of participants, which may affect the generalizability of the results. Furthermore, the study focused solely on cognitive learning outcomes and did not examine other aspects such as student attitudes or skills.(Ayu et al., 2022)stated that student learning outcomes encompass three domains: cognitive, affective, and psychomotor. Therefore, further research is recommended to involve a larger sample size and examine broader learning aspects using different learning media or research approaches.

CONCLUSION

This study aims to determine the effect of water cycle diorama media on the learning outcomes of fifth-grade students in science subjects at the UPT SD Negeri 8 Pinrang. The results showed that the application of water cycle diorama media significantly improved student learning outcomes compared to conventional learning methods. Students who learned using diorama media showed a better understanding of the stages of the water cycle because the learning material was presented in a concrete and visual manner.

This research contributes theoretically by strengthening the concept that concrete learning media are effective in helping elementary school students understand abstract

concepts. Practically, this research provides recommendations for teachers to utilize innovative and interactive learning media in the classroom to create more engaging and meaningful learning experiences.

Further research is recommended to involve a larger sample size and a broader scope to obtain more comprehensive results. Furthermore, further research could examine the effect of dioramas on other aspects of learning, such as students' motivation, creativity, and critical thinking skills.

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