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Enhancing Learning Outcomes in Science Subjects through Demonstration Method for Fifth Grade at Inpres Seringgu Elementary School

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Abstract. The teaching of science for fifth-grade students at Inpres Seringgu Elementary School, Merauke Regency is mostly teacher-centered, resulting in students' inadequate comprehension and retention of the subject matter. This study aims to enhance science learning outcomes regarding Earth and the universe through a demonstrative methodology. This research was executed in two iterative cycles concentrating on the primary element of the hydrological cycle. Comprehension of the water cycle idea markedly enhanced student learning outcomes, evidenced by a rise in group success from 43.33% in cycle I to 83.66% in cycle II. Comprehending the water cycle model can enhance student involvement in scientific teaching for fifth-grade pupils at Inpres Seringgu Elementary School, Merauke Regency during the 2023/2024 academic year. The utilization of the water cycle model in knowledge acquisition is more efficacious for comprehending the concept of water in scientific education. This may boost students' creativity in developing and presenting water cycle models, hence increasing participation during teacher explanations and encouraging active learning. The observational data clearly demonstrate that learning outcomes have enhanced between cycles I and II.

Keywords**:** Science, Learning Outcomes, Demonstrative methodology.

I. INTRODUCTION

Elementary school science education seeks to provide students with fundamental scientific information applicable to real-world contexts, while fostering educational values that contribute to character development. Science is a discipline inherently linked to nature. Its rationale is consistently associated with real occurrences (Thoma et al., 2023).

The study of science transcends mere memorization of concepts and principles; it seeks to cultivate scientific knowledge, abilities, attitudes, and aspirations in students, while promoting a profound understanding and reverence for the grandeur of God Almighty (Putra et al., 2024). The outcomes of science education are anticipated to manifest in students' capacities to comprehend scientific concepts and natural phenomena in their environment. Consequently, educators must provide an engaging and student-centered science curriculum to guarantee the attainment of learning objectives in the discipline (Jannah et al., 2023).

To enhance the quality of scientific instruction in elementary schools, it is imperative to design learning activities that offer children more pertinent educational experiences (Ávalos-Ramos & Vega-Ramírez, 2020; Hoeger et al., 2018). The approach under consideration is the demonstration method. The demonstrative method is a strategy endorsed in scientific teaching. The demonstrative technique addresses the deficiencies of instructional instruments and materials (Desot et al., 2022). The objective of the demonstration technique is to substantiate a notion via execution, observation, and experimentation. The demonstration technique enhances student involvement by showcasing the tool's functionality or the application of materials in conducting experiments. The merit of the demonstration approach resides in its promotion of individual exploration among students following the observation of teacher-provided examples, enabling them to cultivate their own ideas. Moreover, educators employ a direct learning paradigm that necessitates the exhibition of two competencies: declarative skills (subject knowledge) and procedural skills (task execution ability). Consequently, the caliber of science instruction in schools is anticipated to enhance and yield ideal outcomes for pupils. The instructional method under consideration is the demonstrative technique (Dapiha, 2019).

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Demonstration methods must not solely exhibit genuine scientific phenomena. (HB et al., 2023)stated that demonstration strategies that just show factual occurrences might confuse students and foster reluctance towards autonomous practice, resulting in the emergence of misunderstandings. The presentation method must delineate both authentic and fabricated events, incorporating instances from students' daily lives. Such presentations generate uncertainty among students at the onset of learning and pose obstacles in comprehending the veracity of the event. An inductive demonstration method introduces true and false occurrences from the outset of learning using examples drawn from everyday life.

The demonstration approach is frequently employed in science education as it enhances students' capacity to evaluate and develop hypotheses grounded in their prior knowledge (Reno Putra et al., 2024). Throughout the lecture, the instructor poses enquiries on the desired actions, the subsequent outcomes, and the rationale behind those outcomes. Inductive demonstrations promote student engagement and replies by prompting students to answer the teacher's questions. The teacher offers feedback to assist pupils in understanding the concepts and principles conveyed in the lecture. Teachers can assess students' comprehension of a concept by inductive demonstrations in the classroom (Dapiha, 2019).

Considering the circumstances, the problem can be articulated as follows: What is the effect of the demonstration method on enhancing the learning outcomes of the science curriculum regarding Earth and the universe for fifth-grade students at Inpres Seringgu Elementary School, Merauke Regency, during the 2023/2024 academic year? The aims of this study, derived from the problem formulation, are as follows: Assessing the enhancement of learning outcomes in science and the universe via the Demonstration Method for fifth-grade students at Inpres Seringgu Elementary School, Merauke Regency during the 2023/2024 academic year. The anticipated advantages of this study's outcomes encompass enhancing solidarity, promoting student engagement, cultivating cooperative dispositions, encouraging mutual support, and facilitating collaborative learning, all while honoring the diversity present in the educational setting and transforming passive learning into active participation. As a contribution to advancing active scientific education. This research aims to enhance diverse programs that concentrate on elevating the quality and outcomes of student learning in scientific fields, particularly those pertaining to Earth and the universe.

The expected improvements in the behavior of students are as follows:

1. Students acquire an extensive understanding of water, particularly its quality and advantages in daily life.
2. Students are given instructions to explain the water cycle via water cycle model media.

The application of the water cycle model in science education, as demonstrated in classroom activities, provides significant benefits in enhancing students' understanding of scientific concepts. This model not only helps students comprehend complex natural phenomena such as evaporation, condensation, and precipitation, but also enables them to connect theoretical knowledge with practical experiences through experiments or simulations. The results of applying this model are evident in the process evaluation, which shows active student engagement and improvement in their ability to analyze and interpret scientific data. Furthermore, the assessment of outcomes, which includes understanding of concepts, critical thinking skills, and practical abilities, offers a clear picture of the effectiveness of this approach in creating more meaningful learning experiences. Thus, the implementation of the water cycle model not only enriches students' scientific knowledge but also fosters curiosity and a scientific mindset that will be valuable for their future intellectual development (Yoslanda et al., 2022). As detailed in the following explanation, this method demonstrates how science learning can enhance both conceptual understanding and students' cognitive skills in problem-solving.

Cycle I

The implementation of science education focusing on the fundamental competency of "Describing the water cycle process and human activities that can influence it" for fifth grade at Inpres Seringgu Elementary School, Merauke

II. Methods

Research Subjects

The study was conducted at Inpres Seringgu Elementary School, Merauke Regency. The research period occurred in the middle of the second semester on the following date:

Cycle I : May 7, 2021

Cycle II : May 14, 2021

This study examines topics pertaining to the science subject of Class V, as well as student characteristics. Class V comprises 25 students, including 12 males and 13 females.

Observation

Student behavior was monitored in accordance with established norms. This study was designed to be implemented in two cycles within the same school, classroom, and teacher.

III. Findings And Discussion

Research Findings

This study employs a water cycle model to enhance comprehension of the water concept, as evidenced by the LKS results regarding the competency "Describing the water cycle process and human activities that can influence it," which remains deficient, particularly below the minimum competency standard SKM for science subjects for grade V at Inpres Seringgu Elementary School, set at 6.7. The water model is anticipated to enhance comprehension of the concept of water.

Discussion of Each Cycle

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Regency, occurred on May 7, 2021, during the 2020/2021 academic year. The table below displays science learning achievements as reporter names.

Table 1. Sequence and Identification of Reporter

Sequence	Group	Reporter
1	I	VOK
2	I	BDB
3	III	ANA
4	IV	IIC
5	V	FF
6	VI	AAH

Students autonomously select each group member to assume the roles of leader, writer, and reporter. Certain leaders assume the job of writer, others act as reporters, while some fulfil both duties concurrently.

Table 2. Task Allocation in Cycle 1

Group	Chairman	Writer	Reporter
I	VOP	AEA	VOP
II	SM	BDP	BDP
III	ANA	ANA	RU
IV	YM	HYP	IIC
V	FF	FF	WS
VI	IS	DF	AAH

The following are the results of observations of student activities.

Table 3. Results of Student Activity Observations in Cycle I

Learning Stages	Characteristics	Score				
		1	2	3	4	5
Before Reading	1. Pay attention to the objectives			V		
	2. Comprehension of the water concept that will be studied		V			
	3. Participation in group formation			V		
	4. Comprehension of the group assignments		V			
	5. Conducting learning interactions			V		
While Reading	1. Comprehension of the water concept			V		
	2. Participation in research accomplishment			V		
	3. Participation in tasks completion		V			
	4. Utilizing existing media			V		
After Reading	1. Preparing the report			V		
	2. Responding to other groups' reports			V		
	3. Responding to other groups		V			
	4. Mutual respect between individuals			V		
	5. Doing exercises		V			

According to the LKS Analysis, all groups have failed to comprehend the concept of water, despite articulating its utility in daily life. All groups can articulate the phenomenon of rain, except for group IV, which only indicates the indications that precede rainfall.

All groups effectively articulated the water cycle, but some groups derived conclusions from the LKS material book that were pertinent to their respective analyses.

Table 4. LKS Score for Each Group in Cycle I

Group	LKS Score
I	50
II	70
III	50

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IV	40
V	50
VI	70

Table 5. Distribution of Group LKS Scores in Cycle I

No	LKS Score	Frequency (f)	Percentage (%)	Total
1	40	1	16,67 %	40
2	50	3	50,00 %	150
3	70	2	33,33 %	70
Total		**6**	**100 %**	**260**
Average				**43,33**

The table indicates that students have not comprehensively grasped the method of enhancing Science Learning with the description of the water cycle. Consequently, it is essential to reiterate the cycle to enhance the outcomes of cycle I by employing the water cycle model medium.

Cycle II

Application of fundamental scientific learning competences to elucidate the water cycle process and the effects of human activities on it, employing the water cycle model in fifth grade at Inpres Seringgu Elementary School, Merauke Regency. Cycle II was executed on May 14, 2021. The student activities are delineated as follows.

Table 6. Results of Student Activity Observations in Cycle II

Learning Stages	Characteristics	Score				
		1	2	3	4	5
Before Reading	1. Pay attention to the objectives		V			
	2. Comprehension of the water concept that will be studied	V				
	3. Participation in group formation	V				
	4. Comprehension of the group assignments		V			
	5. Conducting learning interactions		V			
While Reading	1. Comprehension of the water concept	V				
	2. Participation in research accomplishment	V				
	3. Participation in tasks completion	V				
	4. Utilizing existing media	V				
After Reading	1. Preparing the report	V				
	2. Responding to other groups' reports		V			
	3. Responding to other groups		V			
	4. Mutual respect between individuals		V			
	5. Doing exercises	V				

The findings of the LKS study across all groups indicate that each group comprehends all concepts associated with water and its practical applications in daily life. The outcomes of each group's LKS are as follows.

Table 7. LKS Score for Each Group in Cycle II

Group	LKS Score
I	80
II	80
III	85
IV	90
V	90
VI	95

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Table 8. Distribution of Group LKS Scores in Cycle II

No	LKS Score	Frequency (f)	Percentage (%)	Total
1	80	2	33,33%	160
2	85	1	16,67%	85
3	90	2	33,33%	180
4	95	1	16,67%	95
Total		**6**	**100 %**	**520**
Average				**83,66**

The comprehension of the notion of water has been well grasped by students, as evidenced by the highly satisfactory results of the LKS in cycle II. Therefore, based on the field notes, it can be inferred that repeating the cycle is unnecessary. Moreover, the assessment of the LKS, observational data, interview outcomes, and field notes may yield diverse results as delineated below.

1. The outcomes of LKS learning demonstrate the requirements for success. Consequently, repetition is unnecessary.
2. Learning activities utilizing the water cycle model align with the predetermined plan. Consequently, repetition is unnecessary.

It can be concluded that the Action does not necessitate a repeat cycle Back. Consequently, the execution of the action has been finalized.

Discussion

Cycle I

The researchers determined that incorporating visual representations of the water cycle during the initial phase of their study did not significantly improve students' abilities to think critically and creatively about scientific topics. This conclusion is supported by the findings, which revealed that only a limited number of student groups, specifically 43.33%, demonstrated a thorough understanding of the water cycle. This percentage highlights the limited effectiveness of the visual aids in fostering deeper learning or stimulating innovative and analytical approaches to the subject matter. This is in line with the research findings from (Bafirman et al., 2023) which stated that additional methods or resources may be required to enhance critical and creative thinking skills in science education.

Cycle II

The findings from the second cycle of the learning improvement process reveal that the integration of three-dimensional media with a water cycle model significantly enhances both student engagement and educational outcomes. This innovative approach fosters the development of students' creative abilities while deepening their understanding of the water cycle (Alfie et al., 2023). The improvement in students' comprehension of scientific concepts, particularly among fifth-grade learners, is facilitated through the active involvement of educators who provide well-structured and engaging instructional materials. The effectiveness of this approach is evidenced by a substantial increase in learning outcomes, with performance levels rising from 43.33% in the first cycle to 83.66% in the second cycle. These results underscore the critical role of three-dimensional media, coupled with interactive water cycle models and strategies to boost student engagement, in positively influencing educational achievement and enhancing the overall learning experience.

IV. Conclusion

Following comprehensive conversations and analyses, together with the outcomes of two cycles of learning activities, the subsequent conclusions can be derived. Acquiring knowledge of the water cycle model significantly improves student learning outcomes, demonstrated by a rise in group accomplishment from 43.33% in cycle I to 83.66% in cycle II. Understanding the water cycle model can enhance engagement in science courses for fifth-grade students at Inpres Seringgu Elementary School, Merauke Regency during the 2020/2021 academic year. The utilization of the water cycle model in knowledge acquisition is more effective for comprehending the concept of water in scientific education, as it fosters students' creativity in constructing and exhibiting the water cycle model, thereby enhancing their engagement and motivation to study diligently. The study results indicated a significant improvement in student learning outcomes from cycle I to cycle II.

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