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Research Article

Effectiveness of Discovery Learning Model Assisted by Interactive Video to Improve Science Literacy of Elementary School Students

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ABSTRACT

The problem in this study is the low science learning outcomes of fourth grade elementary school students. This study aims to analyse and describe the effect of discovery learning model assisted by video media on science learning outcomes of fourth grade students of SD Negeri 2 Bulurejo. The method in this research is a pseudo-experiment with a non-equivalent control group design. The population of this study were all fourth grade students totalling 48 students. Determination of the sample of this study using purposive sampling technique, namely sampling with certain considerations. The sample consisted of class IVA as the control class and class IVB as the experimental class. Data collection techniques in this study used tests and non-tests in the form of observations to observe student activity. The data analysis used was simple linear regression test. The results of the study concluded that there was a significant effect of the discovery learning learning model assisted by video media on the science learning outcomes of fourth grade students of SD Negeri 2 Bulurejo in the 2021/2022 academic year.

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INTRODUCTION

The 21st century requires every individual to master science and technology literacy. Science literacy is a fundamental competency that enables students to understand the world, make decisions based on scientific considerations, and actively participate in modern society (OECD, 2018). The essence of science literacy is not limited to mastery of scientific facts, but includes the capacity to formulate questions, conduct investigations, and use evidence in the reasoning process (Harlen, 2018). The foundation for developing this capacity needs to be built from the primary education level, given that this phase is a critical period in the formation of scientific attitudes and thinking skills.

In Indonesia, the strengthening of science literacy is integrated into the implementation of the 2013 Curriculum, particularly through a thematic approach in primary schools. The Natural Sciences component in the curriculum structure is expected to serve as a vehicle for developing scientific process skills. The reality on the ground shows that this is not the case. National studies and international reports from the Programme for International Student Assessment (PISA) consistently place Indonesian students' science abilities below the international average (OECD, 2018). A similar condition was identified at SD Negeri 2 Bulurejo, where initial observations and analysis of daily test scores revealed that 75% of fourth-grade students did not meet the minimum passing criteria for science material. This situation is exacerbated by teaching practices that are still teacher-oriented, with a predominance of lecture and memorisation methods. As a result, students tend to be passive, experience a decline in interest, and struggle to apply scientific concepts to solve contextual problems.

The low level of student engagement and conceptual understanding requires intervention through the application of innovative learning models. The Discovery Learning model is a potential approach to overcome these problems Hendra et.al (2024). This model places students as active subjects who independently discover and construct knowledge through a process of investigation (Kemdikbud, 2013). Unlike direct learning, which involves the transmission of information, Discovery Learning trains higher-order cognitive skills in problem formulation, data collection, analysis, and conclusion. All of these abilities are key indicators of science literacy (Furtak et al., 2012). The syntax of the Discovery Learning model, which includes stimulation, problem statement, data collection, data processing, verification, and generalisation, is naturally aligned with the steps of scientific work.

The effectiveness of the Discovery Learning model in primary school classrooms relies on the support of media that can provide authentic and engaging stimulation. Interactive videos were chosen as a complementary medium because of their ability to visualise scientific phenomena that are abstract or difficult to observe directly. This ability supports the formation of accurate mental models in students (Mayer, 2017; Kholifah, et.al 2024). The integration of interactive videos and the Discovery Learning model creates a learning environment that enables students to explore, question, and discover concepts through experiences that are close to reality.

This combination is expected to enhance student engagement and conceptual understanding, ultimately contributing to the strengthening of science literacy. Several previous studies have examined the application of Discovery Learning, including those by Artawan (2020) and Setyowati (2021), which have demonstrated its effect on improving cognitive learning outcomes in science.

Research focusing on a more comprehensive aspect of science literacy—covering the competencies of explaining phenomena, evaluating investigations, and interpreting data—has not been widely conducted. The exploration of the role of interactive videos as catalysts in each phase of the Discovery Learning syntax for the development of these competencies is also still limited. This study aims to analyse the effectiveness of the interactive video-assisted Discovery Learning model in improving the science literacy of primary school students. The findings of this study are expected to provide practical contributions for educators in determining learning strategies that align with the

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demands of the 21st century, while also filling gaps in the existing research on basic science education.

METHOD

The type of research used in this study is a type of experimental research in the form of a quasi experimental design with a quantitative approach. The design used in this research is a non-equivalent control group design. This design involves two groups, namely the control group and the experimental group. The experimental class will be treated with a discovery learning model assisted by video media while the control class uses a conventional learning model or does not get treatment.

This research was conducted at SD Negeri 2 Bulurejo, Pringsewu Regency, Lampung. The population in this study were fourth grade students of SD Negeri 2 Bulurejo in the 2021/2022 academic year, totaling 48 students and divided into two classes, namely IVA class totaling 26 students and IVB class totaling 22 students The sampling technique in this study used a non-probability sampling technique in the form of purposive sampling. The class that gets the treatment (experimental class) is class IVB while the one that does not get treatment (control class) is class IVA. The thing that is considered in determining the class is that the learning outcomes of IVA class students are higher than those of class IVB.

The instruments used in this research are test and non-test instruments. The test instrument in this study is an objective test to measure cognitive aspects, while the non-test instrument is in the form of observation to observe the activities of students during learning by applying the discovery learning model assisted by video media.

In this study, the instrument test included validity, reliability, differentiation test, and difficulty test. After all the instruments were suitable for use, the researchers conducted research and analyzed the data using a simple linear regression test to test whether there was an effect of the application of the discovery learning learning model assisted by video media on the science learning outcomes of fourth grade students of SD Negeri 2 Bulurejo.

RESULT AND DISCUSSION

This research was conducted at SD Negeri 2 Bulurejo. In the experimental class and control class at the beginning of learning, researchers gave pretest questions to students before learning took place. After that in learning, researchers applied the discovery learning model assisted by video media in the experimental class, while the control class used a conventional learning model. The video media used is integrated with discovery learning. When learning activities take place, the observer observes the activities of students through observation sheets. The material taught was grade IV material on theme 8: the area where I live, subtheme 3: proud of the area where I live. At the end of the lesson the researcher gave posttest questions to students. Pretest and posttest given to students in the form of multiplechoice questions totaling 20 items. The following are the results of the pretest and posttest analysis in the control class.

Tabel 1. Description of Control Class Pretest and Posttest Values

Score	Number of Students	MCC	Completed	Not Completed	Lowest Score	Highest Score	Average
Pretest	26	70	6	20	35	85	56,73
Postest			10	16	40	85	63,08

*) Minimum Competency Criteria (MCC)

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Based on table 1, it can be seen that the pretest and posttest scores in the control class that was not given treatment using the discovery learning model assisted by video media showed that the posttest value had the lowest value of 40, and the highest value was 85 with an average value of 63.08.

Tabel 2. Description of Experimental Class Pretest and Posttest Values

Score	Number of Students	MCC	Completed	Not Completed	Lowest Score	Highest Score	Average
Pretest	22	70	4	18	30	80	54,10
Posttest			15	7	40	90	70,91

*) Minimum Competency Criteria (MCC)

Table 2, it can be seen that the pretest and posttest scores in the experimental class given treatment using the discovery learning model assisted by video media show that the posttest value has the lowest value of 40, and the highest value is 90 with an average value of 70.91.

The Learning Outcomes of experimental and control class students at the time of the posttest are categorized according to the category. After doing the calculations, a mean of 66.67 was obtained with a standard deviation of 13.74, so that based on the categorization criteria, the posttest learning outcomes of students in the experimental class and control class were obtained as follows.

Tabel 3. Analysis Results Categorization Criteria

Class	Number of Students	Categorization		
		Low	Medium	High
Eksperimen	22	2	16	4
Kontrol	26	7	16	3

Table 3, shows that out of 22 learners in the experimental class, 4 learners get a low category, 14 learners with a medium category, and 4 learners with a high category. While students in the control class, 4 students in the low category, 19 students in the medium category, and 3 students in the high category.

In the experimental class, students were observed in the application of the discovery learning model assisted by video media. Video media is displayed in front of the class, researchers ask students to pay attention to the video displayed to stimulate students and obtain information. During the learning process, students' activities were observed. The recapitulation of students' activities can be presented in the following table.

Table 4. Recapitulation of the Results of Student Activities with the Discovery Learning Learning Model Assisted by Video Media

No	Success Rate	Description	Frequency	%
1	≥80	Very active	3	13,64
2	60-79	active	13	59,09
3	50-59	simply	6	27,27
4	<50	Less	0	0,00
	Amount		22	100

Table 4, shows that the activity of students in the experimental class with the discovery learning learning model still needs to be improved, this is because the average percentage of student activity shows that there are 3 students in the very active category with a percentage of 13.64%, in the active category there are 13 students with a percentage of 59.09% and 6 students in the sufficient category with a percentage of 27.27%.

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Based on the results of data analysis that has been carried out with simple linear regression calculations, it can be concluded that there is a significant effect of the discovery learning learning model assisted by video media on the science learning outcomes of fourth grade students of SD Negeri 2 Bulurejo, Pringsewu Regency for the 2021/2022 school year. This study aims to analyze and describe the effect of the discovery learning learning model assisted by video media on the science learning outcomes of fourth grade students of SD Negeri 2 Bulurejo in the 2021/2022 academic year. The implementation of the research begins with conducting a pretest to determine the initial ability of students,

The discovery learning model is a learning model that directs students to obtain their own information or knowledge through direct experience and student involvement in learning. It means that educators can be facilitators who direct and involve students actively in learning. This is in accordance with what is revealed by (Kristin & Rahayu, 2016) that through the discovery learning model, students are invited to discover for themselves what they learn and then construct that knowledge by understanding its meaning, and the educator is only a facilitator.

The difference in student activity in the experimental and control classes occurred because learning with video media was able to make students interested, the discovery learning model also encouraged students to be more active in learning. This is in accordance with the opinion (Rahmayani, 2019) which states that the implementation of learning with a discovery learning model using video media can create a pleasant learning atmosphere. So that the use of the discovery learning model in learning can create an interactive, inspiring, and fun learning process. Whereas in the control class, students looked less enthusiastic, some were noisy or chatting with other students so that learning was not conducive. So that in the control class and also the experimental class both need to increase the activity of students.

the discovery learning model assisted by video media is relevant to cognitive learning theory which emphasises students' knowledge. It is in accordance with what is revealed by (Maskun & Rachmedita, 2018) cognitive learning theory emphasises more on thinking, memory and knowledge sourced from the environment, meaning that the more experience the better one's knowledge. The learning process provides opportunities for students to construct their knowledge and make learning more meaningful. The implementation of learning with video media is used in science learning subjects, namely force and motion material. The presentation of video media is given as a stimulus for students, which contains concepts and problems that must be found concepts. So that students are able to find the concept as a whole.

Video media is one of the right media to be applied in learning, it is in accordance with the development stage of grade IV elementary school students who are at the concrete operational stage at the age between 6-12 years. At this stage, the ability of students is still limited to concrete things, so that the thinking process of students will occur during direct activities. There are two theories that form the basis of the effectiveness of video media according to (Hadi, 2017), namely Edgar Dale's theory and Brunner's theory. Both theories emphasize that students will have a more meaningful learning experience if educators present a learning atmosphere that students can feel using all five senses. In other words, the more senses students use when learning, the easier the learning process will be absorbed by students. However, video media also has weaknesses, including if the video is taken incorrectly, it can make different interpretations, besides that the presentation of video media requires supporting materials such as projection equipment and laptops.

The results of this study indicate that there is a greater difference in posttest scores in the experimental class than the control class. Thus, it means that there is a difference in learning outcomes that are better by using the discovery learning model assisted by video media. So it can be concluded that there is an effect of using the discovery learning learning model assisted by video media on the science learning outcomes of fourth grade students of SD Negeri 2 Bulurejo in the 2021/2022 academic yearn does not leave the question unanswered.

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Another of important things about this section is do not rewrite the abstract; statements with "investigated" or "studied" are not conclusions; do not introduce new arguments, evidence, new ideas, or information unrelated to the topic; do not include evidence (quotations, statistics, etc.) that should be in the body of the paper.

Conclusions and Suggestions

Based on the results of the research and discussion, it can be concluded that there is a significant effect of applying the discovery learning learning model assisted by video media on the science learning outcomes of fourth grade students of SD Negeri 2 Bulurejo in the 2021/2022 academic year. Future researchers who will conduct research in the same field can apply the discovery learning learning model assisted by video media to other learning outcomes, as well as in other places that have not used the model.

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