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INTERACTIVE MULTIMEDIA APPLICATION TO INCREASE INTEREST AND LEARNING OUTCOME OF 4TH GRADE STUDENTS OF SDN PALERAN 05 IN MATERIAL OF PROPERTIES OF LIGHT

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Abstract

This research aims to improve the learning practices in order to increase student interest and learning outcomes through the application of interactive multimedia in the material of the properties of light. This research is a Classroom Action Research (CAR) using a two-cycle design according to Arikunto et al. The subjects of this research are the 4th grade students of SDN Paleran 05 in the academic year 2021/2022, of 9 students. Each cycle consists of four stages, namely planning, implementation, observation, and reflection. The percentage of students' learning interest obtained from the pre-cycle questionnaire results was 53.91% (sufficient) increased to 74.58% (high) in the first cycle and 74.72% (high) in the second cycle. Meanwhile, from the observations, the pre-cycle 58.33% (sufficient) increased to 81.11% (very high) in the first cycle, then it became 86.54% (very high) in the second cycle. The data of learning outcomes find out by written test and then analyzed using N-Gain. The results showed that students' learning outcomes increased in the first cycle by 0.48 and the second cycle by 0.31, so it can be concluded that interactive multimedia can increase students' interest and learning outcomes.

Keywords: Science; Interest; Learning Outcomes

A. Introduction

Basic education plays an important role in the subsequent educational process in an effort to achieve instructional goals. Science learning at the elementary school level is used to develop students' ability to recognize their environment in everyday life. Science learning is a discovery, not only the acquisition of knowledge in the form of concepts, facts, and principles. Most students still think that learning science is not easy for elementary school to high school students (Aliyyah *et al.,* 2021).

Learning is a change in student behavior through active practice and experience (Sulfemi and Minati, 2018). Learning that occurs now, especially in science learning is still dominated by the use of conventional techniques, the lack of teachers' variety in teaching, and the lack of use of the learning media (Sudana and Wesnawa, 2017). Slameto (2003:57) states that, interest has a significant effect on learning outcomes, if there is a discrepancy between the lessons and interests, students cannot learn optimally. Interest is a persistent tendency to observe and remember certain activities (Djamarah dalam Karina *et al.*, 2017). According to Safari in Herlambang (2021), 4 indicators of student interest in learning are happy feeling, student involvement, interest, and attention.

Media comes from the Latin "*medius*" which means middle, intermediary, or introduction. (Arsyad, 2019:3). Learning media is an aid to the teaching and learning process (Ali dan Lumintuarso, 2017). The role of the media is very important as an aid for teachers to provide teaching materials that cause curiosity, attention, and pleasure. Multimedia is a combination of media that integrates elements of text, images, audio, graphics, and video together (Nuraini dan Supriadi, 2018). Interactive multimedia is a display that has interactivity with its users in informing a message. According to Rohmani (2019), designing interactive and interesting learning using media can be used as a way to make students interested.

Sudjana (2009) defines learning outcomes as behavior-changing in cognitive, affective, and psychomotor aspects. In Indonesia, Bloom's

Taxonomy terms include the cognitive domain associated with thinking skills, the affective domain associated with attitudes, and the psychomotor domain associated with motor skills (Parwati, 2019:24-25). In general, the factors that influence learning outcomes are divided into internal factors and external factors.

Based on the pre-cycle results, it is known that during the science learning process the teacher still has a tendency to use the lecture method. Learning interest is obtained from the results of questionnaires and observations of 4th grade students' learning activities. The results of student learning interest questionnaire were 53.91% and observations were 58.33% which is categorized as quite low. The analysis of science learning outcomes through the pretest obtained an average of 44.17. It was recorded that from the total number of students who took the test, only 12.5% achieved completeness.

Based on the problems that occur, the obtained solution is the application of interactive multimedia in the class actions. Media and teaching methods are the two main elements that underlie the learning process (Kustandi dan Darmawan, 2020:15). Teachers should manage the learning media well in the implementation of science learning because the accuracy of media selection will determine the success of the learning process. According to Munir (2012:132-133), interactive multimedia in learning has advantages, including more interactive and innovative learning, teachers are forced to be more creative and innovative to achieve breakthroughs, and can combine text, images, audio, music, animation, or video in order to achieve the learning objectives. SOne of the animation software commonly used to produce professional designs is Macromedia Flash 8. Macromedia Flash-based learning media can facilitate teachers as facilitators in delivering material (Bekti *et al.,* 2021).

The research by Aprilia et al. (2019) concluded that the application of interactive multimedia can increase the learning interest of elementary school students. Saputra (2018) mentioned that the Islamic Religious Education (PAI) learning process using interactive multimedia made the student learning outcomes increase. In line with

Harsiwi and Arini (2020) interactive learning media improves student learning outcomes, it is shown by the improvement in post-test scores. In addition, there are some differences from this research which lie in the materials, classes, interactive multimedia used, and the schools used for the research. Therefore, the purpose of this research was to determine the increase of interest and learning outcomes of 4th grade students in the material properties of light through interactive multimedia.

B. Research Methodology

The research conducted is Classroom Action Research (CAR). CAR is a reflective systematic study, carried out by educators, and conducted to improve learning practices. (Subyantoro, 2020:13). This research aims to increase student interest and learning outcomes through the application of interactive multimedia in science subjects, especially the material of properties of light. The subjects in this research were 4th grade students at SDN Paleran 05 Jember of the academic year 2021/2022 which consisted of 9 students. The research design is described by four stages, namely the planning stage, action stage, observation stage, and reflection stage, which are presented in two cycles according to Arikunto et al. (2015:42) can be seen in Figure 1.

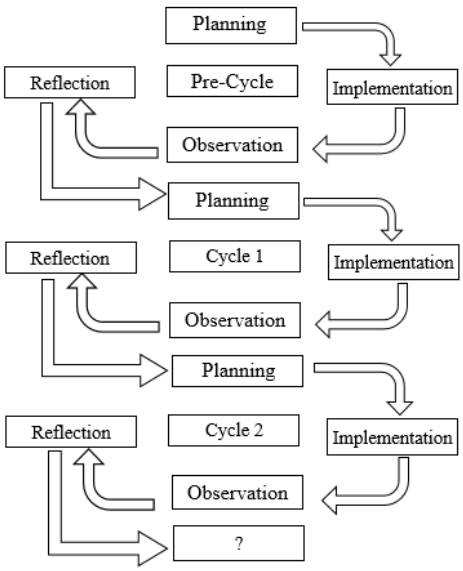

Figure 1. The Cycle of CAR

The data obtained were collected through interviews, observation, written tests, questionnaires, and documentation. Documentation is used to obtain relevant information directly from the research site (Andriana *et al.*, 2017). To interpret the research results, then it continued with data analysis which includes student interests and learning outcomes. The obtained learning

interest data is quantitative data that comes from the assessment aspect using a checklist in accordance with the assessment criteria. To obtain the percentage of students learning interests, use this formula (Sugiyono, 2013:95):

$$N = \frac{K}{Nk} x100\%$$

Modification of learning interest criteria according to Arikunto & Jabar (2010:35) is shown in Table 1 below.

Table 1
The Criteria of students' learning interest

No	Value	Criteria of Interest
1	80%≤ N ≤100%	Very High
2	60%≤ N <80%	High
3	40%≤ N <60%	Sufficient
4	20%≤ N <40%	Low
5	0%≤ N <20%	Very Low

The data collection technique of the learning outcomes uses a test at the end of the cycle. Calculating the final score of student learning outcomes after learning using the interactive multimedia is measured by N-gain $\langle g \rangle$ as follows:

$$\langle g \rangle = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}}$$

With the interpreted effectiveness criteria of N-gain according to Hake (1998) listed in Table 2.

Table 2
The Criteria to Improve Student Learning Outcomes

N-gain Score	Criteria
$0{,}70 \leq \langle g \rangle$	High
$0{,}30 \leq \langle g \rangle$ <0,70	Moderate
$0{,}00 \leq \langle g \rangle$ <0,30	Low

The percentage of classical completeness is determined from the acquisition of student scores after the application of interactive multimedia learning in teaching and learning activities using the formula according to the Ministry of National Education (in Hobri, 2007:167) as follows.

$$E = \frac{n}{N} x\ 100\%$$

C. Result and Discussion

This research was conducted from November 19, 2021, to December 4, 2021. The data were obtained during teaching and learning activities in 4th grade SD Negeri Paleran 05 on the properties of light using interactive

multimedia. The learning process consists of 4 meetings (8 hours of lessons), namely cycle I (2 meetings) and cycle II (2 meetings). Each cycle consists of four main activities, namely planning, implementation, observation, and reflection. Before applying interactive multimedia to students, a pre-cycle was conducted to find students' interests and early learning outcomes. The results of this pre-cycle are used as a reference to the next cycle implementation.

Interest improvement is determined by the results of the observation assisted by observers during the learning process and the results of the questionnaire filled out by students. The use of various media and methods has not been optimized by the teacher, so the interest in the pre-cycle is quite low. Learning is still dominated by the lecture method so students easily feel bored. The observed students learning interests aspects include feelings of pleasure, involvement, interest, and attention. To facilitate data analysis, tabulation of the obtained data by the computer. The average learning interest obtained from the questionnaire results was 53.91%. The average result of learning interest was then interpreted through categorization techniques and classified as quite low. Meanwhile, the learning interest based on observation has an average of 58.33% which was quite low. This shows that students easily felt bored and less enthusiastic during the science learning process. The use of conventional methods makes students feel bored, sleepy, passive, and often complain as if the time is running long.

In cycle I, actions were given with the application of interactive multimedia to overcome existing problems. Based on the data obtained in cycle I, the questionnaire obtains an average learning interest of 74.58% which is classified in the high category. Meanwhile, the learning interest based on observation obtains an average of 81.11% which is classified as very high. From the average results of cycle I, the students' learning interest is better than in the pre-cycle. This shows that students are enthusiastic about learning using interactive multimedia. Students who were initially passive began to be active at the second meeting, students began to be brave to

volunteer to come forward and actively start asking questions. The improvement of students' learning interests shows good results but is not optimal yet. Therefore, in cycle II, improvements were made, which obtained an average learning interest of 74.72% from the questionnaire results which were classified in the high category. Meanwhile, the learning interest based on observation has an average of 86.54% which is classified as very high. The average results obtained improvement in students' learning interest when compared to cycle I which was indicated by students being very enthusiastic about learning using interactive multimedia. The analysis of learning interest improvement from the results of observations and questionnaires is shown in Figure 2 below.

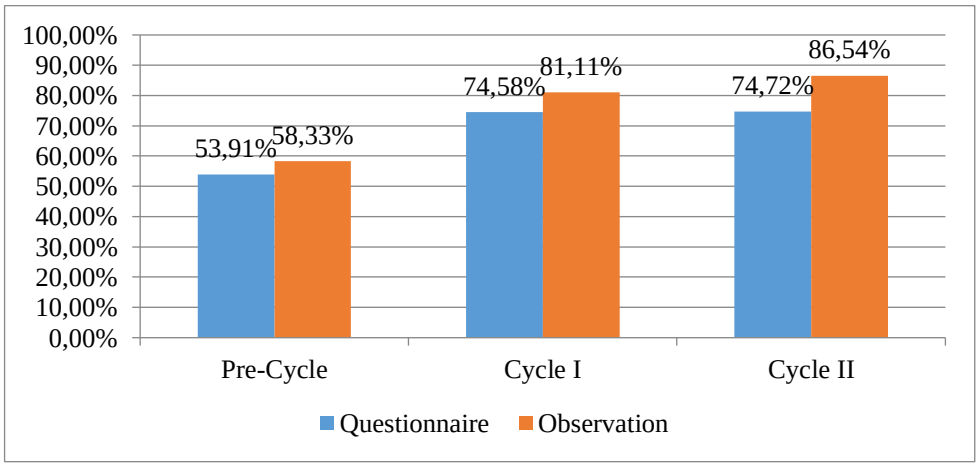

Figure 2. The Percentage Diagram of Improvement in Student Learning Interest

As shown in Figure 2, it can be seen that there is an increase in the percentage of students' learning interests from pre-cycle, first cycle, and second cycle. The results of the overall questionnaire analysis showed an increase in the percentage of learning interest by 20.67% from the pre-cycle to the first cycle, and from the first cycle to the second cycle increased by 0.14%. While the overall results of observations showed an increase in the percentage of students' learning interests from the pre-cycle to the first cycle of 22.78%, and from the first cycle to the second cycle increased by 5.43%. The occurrence of this improvement indicates the achievement

of indicators of success. The results of this research are supported by previous research conducted by Aprilia, et al. (2019), that the application of interactive multimedia can increase students' interest in learning. Students look interested, enthusiastic, and happy in the learning because students are directly involved in the application of interactive multimedia.

Student learning outcomes are one of the important factors to find out the students' mastery of the taught material. Based on the written test results that was conducted at the end of each cycle, obtained the data from the student learning outcomes of pre-cycle, cycle I, and cycle II. The success of applicating interactive multimedia can be assessed based on the improvement of student learning outcomes and students' classical mastery. Based on the average student learning outcomes in the pre-cycle, cycle I, and cycle II, the N-gain score is obtained in the table 3 below.

Table 3
The Student Learning Outcomes Improvement of Cycle I and Cycle II

	Learning Outcomes	Average	*N-gain* $\langle g \rangle$	Criteria
Cycle I	*Pretest*	44,17	0,48	Moderate
	Posttest	71,11		
Cycle II	*Pretest*	71,11	0,31	Moderate
	Posttest	80,00		

In cycle I, obtained an average improvement in learning outcomes if compared to the pre-cycle. This is obtained from the written test scores in the pre-cycle as the pretest and the written test scores in the first cycle as the posttest. Based on table 3, the average score of the pretest was 44.17 and the average score of the post-test was 71.11. After being analyzed using the effectiveness of N-gain, a score of 0.48 is obtained, which included in the moderate criteria.

In cycle II obtained an average improvement in learning outcomes if compared to cycle I. This is obtained from the average pretest score of 71.11 and the average post-test score of 80 with N-gain effectiveness of 0.31, which is calculated into the moderate criteria. This shows that the application of interactive multimedia has been able to improve student learning outcomes in cycle I and cycle II. In addition, the success of learning is also seen in the percentage of students' classical

completeness which shows the score of ≥ 70%. The summary of the classical completeness of each cycle is presented in table 4 below.

Table 4
Comparison of the Percentage of Success in Student Learning Outcomes

No	Criteria	Pre-cycle		Cycle 1		Cycle II	
		Total	Percentages (%)	Total	Percentages (%)	Total	Percentages (%)
1	Completed	1	12,50	5	55,56	7	77,78
2	Uncompleted	7	87,50	4	44,44	2	22,22

As shown in table 4, it can be seen that there is an increase in the students' classical mastery percentage in each cycle. Classical completeness in the pre-cycle to the cycle I increased from 12.50% to 55.56% with an increase of 43.06%. Cycle I has been able to obtain a quite significant improvement in learning outcomes but has not fulfilled the indicators of student classical mastery achievement, so the cycle needs to be continued. The actions in cycle I were continued to cycle II, with some improvements based on the reflections in cycle I. The students' classical completeness of cycle I to cycle II increased from 55.56% to 77.78%, with an increase of 22.22%. The classical completeness improvement in cycle II shows that the success indicator has been achieved, namely classical completeness ≥ 70%, so the cycle can be stopped.

The results of this research are in line with previous research by Sumiadi & Asma'iyah (2019) which showed an improvement in science learning outcomes in the application of interactive multimedia with PowerPoint media in the 4th grade of MI Maraqitta'limat. Likewise, the research conducted by Bachtiar (2020) says that the application of multimedia-assisted scientific learning on flat-shaped materials can make the learning outcomes increase quite significantly.

D. Conclusion

Based on the discussion, it is concluded that the application of interactive multimedia learning in science subjects can improve the interest and learning outcomes of 4th grade students at SDN Paleran 05. In the pre-cycle, the percentage of student learning interest obtained from the

calculation of the questionnaire was 53.91% (sufficient) increased to 74.58% (high) in the first cycle, and then in the second cycle, it became 74.72% (high). While the learning interest obtained from observations in the pre-cycle to the first cycle was 58.33% (sufficient) increased to 81.11% (very high), then increased in the second cycle to 86.54% (very high). The improved learning outcomes are seen based on the score of N-gain and classical completeness. In the pre-cycle, the average student learning outcomes of 44.17 increased to 71.11 in the first cycle with an N-gain effectiveness analysis of 0.48 which was included in the moderate criteria. The average student learning outcomes from cycle I to cycle II have increased from 71.11 to 80 with an N-gain effectiveness analysis of 0.31 which is included in the moderate criteria.

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