THE EFFECT OF ANIMATION AND SIMULATION ASSISTED DISCOVERY LEARNING MODEL ON STUDENTS' SCIENCE LEARNING OUTCOMES

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Article Info

Abstract :
This study aims to determine the effect of the discovery learning model assisted by animation media on the learning outcomes of class eight students of St Gabriel Ndona Catholic Middle School for the 2022/2023 academic year. This type of research is a pre-experimental design (One Shoot Case Study) with a quantitative approach. Data collection techniques are in the form of objective tests. The population in this study were students of class eight, St. Gabriel Ndona's Catholic First Middle School. The study sample consisted of 32 students obtained from the saturated sampling technique. According to the analysis using the SPSS-V24 application, the results showed that the discovery learning model affected the science learning outcomes of class eight students of SMPK St Gabriel Ndona. This is shown by the results of data analysis for science learning outcomes with sig. 0.05, the confidence level is 95%, and the value of t count = 5.838, so the sig value is obtained. $0.00 < 0.05$ so that H_0 is rejected and H_1 is accepted. The profile of students' thinking abilities in the cognitive domain shows good results, where 80% of students have good thinking skills that influence student learning outcomes. The study had various obstacles, including the lack of learning facilities such as computers, so learning was done in groups.

Keywords: Animation and Simulation; Discovery Learning; Science Learning Outcomes

INTRODUCTION

In the world of education, there are learning problems that contribute to the low quality of education, one of which is a methodological problem, namely *problems* related to learning efforts or processes concerning the problem of the quality of delivery of material, the quality of interaction between teachers and students, the quality of empowering facilities and elements in learning (Yuberti, 2020; Mayu, 2021). Methodological problems will greatly affect the success of the learning process because the teacher must really master learning and teaching according to the learning methodology that has been designed so that it meets the methodological aspects of education (Ilyas & Syahid, 2018; Jufri & Srimadona, 2022; Suhara et al, 2022). The aspect that is highly emphasized here is the learning model (Hosnan, 2020). Teachers must know exactly when and how to use learning models (Kurniasih, 2019;

Ramadhanti & Simamora, 2023), and have the ability to choose and use appropriate learning models (Asyafah, 2019; Suhara et al, 2022).

Natural Science is a group of sciences, having special characteristics of studying factual natural phenomena, either in the form of facts or events and their causal relationships (Widiasih & Sulistyowati, 2022; Husna & Adriani, 2023). Therefore many students find it difficult to understand the concept of science because there is a science learning process that cannot be observed directly (Dewi & Ibrahim, 2019), this is increasingly difficult because many schools have inadequate learning facilities such as physics or science laboratories (Mahendra & Laksana, 2017; Romiyati et al, 2023).

Learning that is still centered on the teacher results in activeness in the classroom where students do not have a culture of independent learning so that students tend to listen, pay attention and are dictated by the way of learning by the teacher, this makes students feel bored with learning in class (Semaranatha et al., 2016). The lack of involvement of students in learning can affect student learning outcomes, this can be proven when learning in class most students are just silent and do not pay attention to teacher explanations such as being sleepy, daydreaming, and chatting with friends (Hidayati, 2018). Another problem that is obtained is that many students feel that learning science at school is very difficult, especially in Physics material where students need calculations and concepts that must be understood.

Discovery learning is a learning model that requires students to study independently, find and be able to apply knowledge in everyday life with the teacher's job as a facilitator in learning (Dehong et al., 2020) . *Discovery Learning* is able to develop creative thinking skills (Tumurun et al., 2016). This is because the *discovery learning model* has stages that are able to train students to think creatively, according to Sinambela, (2017) the steps for implementing *discovery learning* are: first, Second *Stimulation, Problem Statement* (Problem Identification) Third, Fourth *Data Collection* Data *Processing* Fifth *Verification* Sixth *Generalization*. By taking into account the above conditions, innovation in Science Physics learning is very necessary. One of the efforts made by the teacher to achieve learning objectives and improve student learning outcomes is to use a variety of learning models. One of them is by using the *discovery learning learning model.* This learning model directs students to find something to learn so that students are actively involved in the learning process (Trianawati et al., 2019).

Students' thinking skills also play a role in improving learning outcomes at school (Firdaus et al., 2019) . The ability to think will be able to be achieved by someone who has good cognitive abilities so that innovations in learning will be able to increase student innovation in thinking so that student achievement at school will be good so that it can improve learning outcomes at school (Hamdani et al., 2019). Based on the results of interviews with science subject teachers at St Gabriel Ndona Catholic Middle School, it was found that low student learning outcomes on simple plane test scores where the completeness level was only 25% of the Minimum Completeness Criteria 75 score. This low learning outcome is used as a strong indicator so that there is the influence of the discovery learning *model* on students' science learning outcomes. This is supported by research (Wahyuni et al., 2020) which found that there was an effect of the *discovery learning model* on the physics learning outcomes of class X students at Madrasah Aliyah Riung.

To optimize student learning outcomes through the *discovery learning learning model*, stimulating media are still needed which make students play an active role in the learning process, one of which is using computer-assisted learning media in this case through animation and learning simulations using the *Macromedia Flash application* (Saputra & Sari, 2018). This is also supported by research (Sukiyasa & Sukoco, 2017) which states that animated media can improve student learning outcomes in automotive electrical system material.

RESEARCH METHOD

This research is an experimental research with a *Pre-Experimental design (One Shoot, Case Study)*, which is an experimental study in which a group is given treatment and then the results are observed (Arikunto, 2017). This research will be conducted in August 2022 at St Gabriel Ndona Catholic Middle School hool for the 2022/2023 academic year in an odd semester. The population in this study were all class VIII students of St Gabriel Ndona Catholic Middle School, totaling 32 students. The sampling technique uses a saturated sampling technique where *all* populations are used in research (Ambita, 2020).

At the beginning of the study, an analysis of the items made by the author was carried out, where the instrument in this study was student learning outcomes questions prepared as many as 33 numbers in the form of multiple choice questions for class IX students. The results of the Validity and Reliability Tests showed that there were 20 valid question items with the Reliability of the questions being 0.959 with the *product moment value* being n = 14 which was 0.532 where 0.959 > 0.532 so the questions were declared *Reliable* and then used for *the post-test. Post-test* results of class eight students will be analyzed using the *SPSS V-24 application.*

Data analysis was carried out by testing the hypothesis of *one sample t-test* using *SPSS V-24 software*. Before testing the hypothesis, it was first tested for normality using *Shapiro-Wilk* (Budiono, 2020). Furthermore, the questions are calculated according to the level of thinking ability, namely Low Order Thinking Skill (LOTS), namely at the C1 level Remembering, C2 Understanding, C3 Applying and Higher Order Thinking Skill (HOTS) namely at level C4 Analyzing to find out students' thinking abilities that influence learning outcomes students (Ibda Fatima, 2018).

RESULTS AND DISCUSSION

From the learning outcomes obtained from the results of *the post-test* in the sample class . The description of the data in the sample class can be seen in Table 1. The average value (*mean)* is 83.63. With the lowest value (*minimum)* is 70.00 and the highest value (*maximum)* is 100. The median or middle value shows 85.00 where half of the sample scores above 85.00 (Arikunto, 2017) .

Table 1. Descriptive Data

Descriptive Statistics			
Dependent Variable: Post-test			
ClassSample	Means	Highest	Lowest	N
Means	83,63	100	70	32

Based on Figure 1, it is found that the presentation of students' thinking skills at St Gabriel Ndona Catholic Middle School is in the range of above 80% with details of students who are able to solve low level thinking questions (LOTS) having a presentation of 85.21% of the total number of students, and those who are able to do questions at the higher level thinking level (HOTS) have a presentation of 83.6% of the total number of students (Muchith, 2021) .
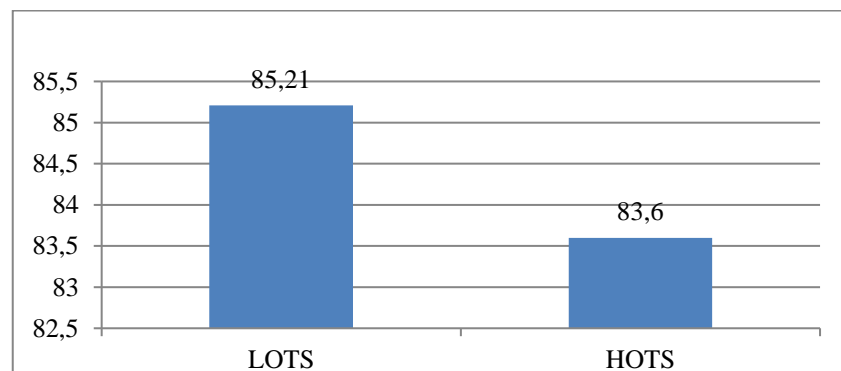

Figure 1. Graph of students' thinking ability

The results of the residual normality test for the research data are shown in table 2. The normality test was not carried out on each variable but on the residual value (regression analysis). This value is shown in the *Shapiro-Wilk* test obtained a significant value of learning outcomes 0.185 > 0.05, so it can be concluded that the data on learning outcomes is normally distributed (Sugiyono, 2019).

Table 2. Descriptive Data

Descriptive Statistics
Dependent Variable : Post-test

Residual for posttest	Shapiro-Wilk statistics	Df	Sig.
	.954	32	.185

After the data were normally distributed, the hypothesis was tested using the one sample t-test as shown in table 3. A significant level value of 0.000 was obtained and a t-test = 5.838 with df = 31 at a significant level α = 0.05. So that from the table obtained sig . *(2-tailed)* 0.000 < 0.05 then H_0 is rejected and H_1 is accepted, so that the data from the t-test results can be concluded that there is an influence of the *discovery learning model* assisted by animation and simulation media on student learning outcomes in class VIII motion and style material St Gabriel Ndona Catholic Middle School for the 2022/2023 school year (Ridwan, 2018) .

Table 3. The results of the one sample t-test hypothesis test

Descriptive Statistics			
Test Value = 75			
Science Learning Outcomes	T	Df	Sig.	Mean Differences
	.954	31	.000	8,625

This research was conducted to determine the effect of the *discovery learning model* assisted by animation and simulation media on student learning outcomes in class VIII St Gabriel Ndona Catholic Middle School. This is evidenced by data analysis, the *post-test score* showed an average value of 84.00, while the test score for the previous material, namely simple machines, was 61.34. This shows that the *post-test value* in learning using *the discovery learning model* can make an excellent contribution and the completeness level reaches 90.6% so that the *discovery learning learning model* assisted by animation and simulation media can improve student learning outcomes (Purwanto, 2019; Karlina & Asma, 2022; Mulyati et al, 2023). Prior to testing the hypothesis of student learning outcomes, a normality test was carried out (Waspada, 2022) so on the data was processed using the t-test, so that a *sig value was obtained. 2 tailed = 0.000 <0.05 so it can be concluded that there is an influence of the discovery learning* model on science learning outcomes in the material of motion and style at St Gabriel Ndona Catholic Middle School.

According to Rusman (2012), learning outcomes are a number of experiences gained by students which cover the cognitive, affective, and psychomotor domains. In research, learning outcomes are assessed in the cognitive domain which includes C1-C4, namely: remembering (C1), understanding (C2), applying (C3), and analyzing (C4). Learning outcomes are the ultimate goal of carrying out learning activities in schools. The achievement of learning objectives is an end result of influence in the learning process and the achievement of learning objectives based on the curriculum can be seen in improving learning outcomes (Millah & Wildani, 2022). Based on the research above, students' thinking skills in the cognitive domain are still in the good category, seen from the presentation of completeness reaching above 80% where this affects the improvement of student learning outcomes at school.

From the research above, it shows that there is an influence of the *discovery learning model* assisted by animation and simulation media. This can be seen in the increased student learning outcomes and students' thinking skills in the cognitive domain which are well above 80% and the completeness level reaches 90.6%. The obstacle faced by researchers is the lack of computer facilities so that in learning students are divided into groups. In terms of previous research Wahyuni et al, (2020) with the title the effect of *the discovery learning* model on student physics learning outcomes. Shows the influence of the *discovery model* on student learning outcomes at Madrasah Aliyah Muhammadiyah Riung.

CONCLUSION

Discovery learning method assisted by animation and simulation media can affect student learning outcomes in the material of motion and style for class VIII SMPK St Gabriel Ndona for the 2022/2023 academic year which has achieved a Minimum Completeness Standard score of 75. This can be seen from the sig. (*2-tailed) < 0.05* ie 0.000 < 0.05.

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