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Application Of Video-Assisted Problem Based Learning Models To Improve Student Learning Outcomes On Virus Material

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Abstrac

Learning in the era of globalization directs teachers to use learning models that are adapted to existing technological media. Based on the data obtained, there is still a learning process that has not maximized the use of technological media as a tool, so students have difficulty understanding biology material which results in a lack of activity and student learning outcomes in class. The aim of this research is to determine the difference in improving student learning outcomes between the control class and the experimental class in implementing the video-assisted Problem Based Learning model on virus material. The research method used was Quasi-Experiment with a non-randomized control group type, pretest-posttest only design. The research subjects consisted of odd semester students. The research was carried out at two different Madrasah Aliyah in Aceh Besar, where Madrasah Aliyah A consisted of 61 students and Madrasah Aliyah B consisted of 60 students. The test given is a multiple choice test with 35 questions with 5 alternative answer choices. The research results showed that the average N-gain for the experimental class was 62.31 in the medium category, while the control class was 42.95, indicating the medium category. Even though it is included in the medium category, the average N-gain value for the experimental class is higher than the control class. Based on the average posttest score, the experimental class obtained a score of 73.34, higher than the control class which was only 60.59. The difference in mean posttest scores between the experimental class and the control class shows an increase in learning outcomes.

Keywords ; problem based learning model, videos, learning outcomes, virus material

INTRODUCTION

Learning in the era of globalization directs teachers to use learning models that are adapted to existing technological media. Based on the data obtained, there is still a learning process that has not maximized the use of technological media as a tool, so students have difficulty understanding biology material which results in a lack of activity and student learning outcomes in class. One technology that can be used is learning videos, so that students do not

have to imagine abstract biological material. The use of video media can help teachers prepare learning so that students are actively involved and learning objectives can be achieved well. One of the difficulties with biology material is that students have to understand concepts and imagine abstract things, such as when studying viruses (Simon, 2017).

By using video media, learning is more effective, teachers can create a more active and enthusiastic learning atmosphere because students not only read the material provided, but can also watch videos while explaining the material presented so that they can increase students' understanding to improve student learning outcomes (Mengga, 2021). Apart from that, the advantage of using video media is that the message conveyed is easy to understand and retained in memory so that it will have a real effect on improving student learning outcomes (Pradilasari, 2019). One of the biological materials that requires video media is the characteristics, replication and role of viruses. On the other hand, students often make mistakes when differentiating between viruses and bacteria, including when they have to classify names with the diseases they cause (Baram, 2010).

Learning outcomes are an indicator of the success of a learning program, providing a clear picture of what can be achieved by participating in a learning program, learning activities and assessment schemes must be perfectly designed to identify the success of the learning process (Mahajan, 2017). Learning outcomes are students' self-assessment of the knowledge they gain to try to be skilled and able to understand the concepts taught in class. Learning outcomes are the level of success that can be achieved by students based on the experience gained after evaluation in the form of tests that cause changes which include remember, understand, apply, analyze, evaluate, create, apart from that, it is also seen with practical assessments (Young, 2003).

Research that has been conducted previously by using learning video media is more effective, teachers can create a more active and enthusiastic learning atmosphere because students not only read the material provided, but can also watch videos while explaining the material presented so that it can increase students' understanding of increasing student motivation and learning outcomes.

Based on the description of these problems, it is very necessary to apply a video-assisted Problem Based Learning learning model on virus material that is able to overcome these problems, therefore research needs to be carried out so that it is hoped that it will be able to answer the question whether the application of the video-assisted Problem Based Learning model can improve learning outcomes. and students' learning motivation on virus material.

METHOD

The approach used in this research is a quantitative approach. The method applied is Quasi-Experiment with a non-randomized control group type, pretest-posttest only design. The research subjects consisted of odd semester students. The research was carried out at two different Madrasah Aliyah in Aceh Besar, consisting of Madrasah Aliyah A consists of 61 students and Madrasah Aliyah B consists of 60 students. The sample was determined using a purposive sampling technique. The test given is a multiple choice test with 35 questions with 5 alternative answer choices. The learning outcome indicators used pay attention to cognitive levels based on Bloom's Taxonomy. Learning was carried out in 3 meetings, the first meeting

was given a pretest for 45 minutes and continued with learning using video media using the problem based learning model for 2x45 minutes, the second meeting continued with learning for 3x45 minutes, and the third meeting continued with learning for 2x45 minutes and a posttest was given for 45 minutes. Before use, the instrument will be tested validity, reliability, distinguishability and level of difficulty of the questions. Once the data is obtained it will be analyzed using normality, homogeneity, t-test and n-gain tests.

RESULT AND DISCUSSION

Student learning outcomes in this research include pretest and posttest. To see the difference in pretest and posttest scores for the control class and experimental class using the N-Gain test. The difference in the mean pretest, posttest and N-gain of control class and experimental class students can be seen in Table 1 below:

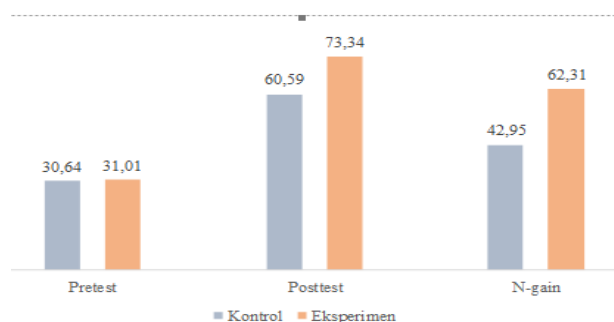
Table 1. Improvement in Learning Outcomes of Control Class Students

Class	Value	N	Average	Std. Deviation
Control	Pretest	61	30,64	10,21
	Posttest	61	60,59	10,85
	N-Gain	61	42,95	14,54
Experiment	Pretest	60	31,01	10,25
	Posttest	60	73,34	9,09
	N-Gain	60	62,31	10,54

Source: Results Of Research Data Processing in 2024

Based on Table 1, the average N-Gain for the control class is 42.95 in the medium category. The average N-gain value for the experimental class was 62.31, indicating the medium category. Even though it is included in the medium category, the average N-gain value for the experimental class is higher than the average N-gain value for the control class. The difference in the average pretest, posttest and N-Gain of control class and experimental class students can be seen in Figure 1 below:

Figure 1. Average pretest, posttest and N-Gain scores for the Control class and Experimental class



Source: Results Of Research Data Processing in 2024

Based on Figure 4.1, it shows that the overall mean pretest scores of control class and experimental class students do not show a significant difference. This also shows that students'

initial ability to master virus material before implementing the video-assisted Problem Based Learning model has the same level of ability between the experimental class and the control class.

The increase in the average posttest score and N-gain for the experimental class reached 73.34 and 62.31, more than the control class which only amounted to 60.59 and 42.95. The difference in the average N-gain between the experimental class and the control class shows an increase in learning outcomes in the experimental class and the control class. Both classes experienced an increase in learning outcomes before and after treatment by implementing the video-assisted Problem Based Learning model. Furthermore, to see the difference in the increase in learning outcomes in the experimental class and the control class, you can see the average difference test using the independent sample t-test which is shown in Table 2.

Table 2
Tests for Normality, Homogeneity, and Independence t-test of Student Learning Outcome Data

Value	N	Average	Normality Test*)	Homogeneity Test**)	t-test***)
Kontrol	61	60,59	0,056	1,015	(0,000)
Eksperimen	60	73,34	0,167		

Source: Results Of Research Data Processing in 2024

Based on Table 2, it shows the average value of N-gain after the normality test was carried out for the control class and experimental class, it was found that the data was distributed normally and homogeneously. The results of data analysis show that the learning outcomes between the control and experimental classes show significant/significant differences, namely at the sig level of $0.01 < 0.05$. which means the hypothesis is accepted. From these results it can be concluded that the application of video-assisted problem based learning has an influence on student learning outcomes.

From the research results, there are differences in the average learning outcomes of students between the control class and the experimental class. Overall, the mean pretest scores of students in the control class and experimental class still did not show a significant difference. The results of this pretest show that the initial ability of control class and experimental class students in mastering virus material still has the same level of ability before the treatment. After students received treatment by implementing the video-assisted Problem Based Learning model in the experimental class, there was an increase in understanding which could be seen from the posttest scores. The average posttest score for the control class learning outcomes was 60.59 and the experimental class was 73.34. Based on the average obtained in the control class and experimental class, it can be seen that the posttest score for the experimental class is higher than the control class. This shows an increase in understanding of the material after going through the learning process. The increase in learning outcomes is the result of students being directly involved in problem solving activities using the Problem Based Learning learning model with

the help of videos so that they can build their own knowledge and the learning experienced by students is more meaningful. Learning will feel more meaningful if students experience and are directly involved with what they are learning, not just knowing the material (Aqib, 2013).

Student learning outcomes reflect the extent to which they have mastered the knowledge, skills and attitudes targeted in the learning process. Learning outcomes are a measure of student achievement or achievement after going through a learning period. Achievement of student learning outcomes has several important aspects to evaluate, such as knowledge, skills and attitudes. Students' understanding of virus material can be seen from the increase in learning outcomes between the control class and the experimental class which can be seen from the average N-gain with an average score of 42.95 obtained in the control class and 62.31 in the experimental class. Through the video-assisted Problem Based Learning learning model, it can help students to practice thinking and problem-solving skills so that students can develop the ability to solve problems and the learning goals that are expected to be achieved optimally (Suryadi, 2022).

The application of the video-assisted Problem Based Learning learning model has had a positive impact on improving students' learning outcomes in mastering viral material. Using videos in learning activities can make it easier for students to understand virus material compared to learning that only uses textbooks. The Problem-Based Learning (PBL) model or problem-based learning is a learning approach that focuses on applying knowledge in solving real problems. PBL encourages students to actively identify, analyze and solve complex problems that are relevant to real life contexts.

Problem-Based Learning (PBL) is a learning approach that offers a number of advantages that have a positive impact on students. One of the main advantages of PBL is increasing students' understanding of concepts. In PBL, students are not only given theoretical explanations, but are also faced with real problems that are relevant to their lives (Suryadi, 2022). In this way, students can relate the concepts they learn to everyday situations, thereby increasing their understanding in a more in-depth and contextual way. Apart from that, PBL can also develop students' critical thinking and problem solving skills. In PBL, students are invited to think analytically, evaluate relevant information, and produce innovative solutions. In this process, they learn to see problems from various perspectives and develop problem-solving skills that they can apply in real life (Wulandari, 2013). PBL also encourages collaboration and cooperation between students. In PBL, students work in small groups to analyze and solve problems. They share information, discuss, and support each other in developing solutions. This builds students' cooperation and communication skills, as well as improving their ability to work in teams.

Apart from that, Problem Based Learning provides space for students to develop their creativity. In PBL, students are given the freedom to look for innovative solutions and implement them in the context of a given problem. PBL can help students develop creativity, creative thinking skills and the ability to adapt to complex and diverse situations. Apart from being based on the Problem Based Learning model, there is also the influence of learning video assistance. Learning videos are media used in the learning process that use audiovisual elements (Wabula, 2020). Through learning videos, students can access information and learning materials in an attractive visual form. Learning videos can be recordings of teachers giving explanations, demonstrations, or simulations, or they can also be animations or specially designed multimedia presentations.

Learning videos have a number of advantages that make them an effective learning tool. First, learning videos present learning content in an attractive visual form. Images,

graphics, animations and videos can enrich students' learning experiences by providing clear illustrations and engaging visuals. This can help students understand complex and abstract concepts better (Hanif, 2020). Based on this, it can be concluded that the use of video-assisted problem based learning models can improve student learning outcomes on viral material. The results of the research show that there is a difference in the increase in student learning outcomes between the control class and the experimental class on virus material at MAN 1 and MAN 3 Aceh Besar.

CONCLUSION

Based on the results of research regarding the effect of implementing video-assisted problem based learning on learning outcomes, it can be concluded that:

1. There is a significant difference in the increase in student learning outcomes between the control class and the experimental class after implementing the video-assisted Problem Based Learning learning model on virus material at MAN 1 Aceh Besar and MAN 3 Aceh Besar.
2. The average posttest learning result score for the control class was 60.59 and the experimental class was 73.34. Based on the average obtained in the control class and experimental class, it can be seen that the posttest score for the experimental class is higher than the control class.
3. The increase in the average posttest score and N-gain for the experimental class reached 73.34 and 62.31, more than the control class which only amounted to 60.59 and 42.95.

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