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THE EFFECT OF THE DISCUSSION METHOD OF VIDEO ANALYSIS OF PHYSICS LEARNING ON HIGH LEVEL THINKING SKILLS OF STUDENTS

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Abstract: Higher order thinking skills are one of the skills that used as provisions for students to face competition in the era of globalization. The purpose of this study was to determine the effect of the discussion method of analysis of physics learning videos on students' higher order thinking skills. The subjects of this study were all 5th semester students who took the Physics Curriculum Review lectures in the 2020/2021 academic year at a university in the city of Mataram, totaling 64 people. The research method was quantitative, with a post-test only group design. Higher order thinking skills data were obtained from the essay test given after the treatment. Data analysis to test the hypothesis using one-way ANOVA and calculations using SPSS 25. The results showed that the value of the F coefficient of 16,846 with a significance of 0.000 is much smaller than the alpha value of 0.05. There are differences in higher-order thinking skills between students who take conventional discussion learning, students who take video analysis discussion learning, and students who take problem-solving learning. The follow-up test with the Tukey Test shows that the difference between class 1 and class 2 has a significance of 0.000, the difference between class 1 and class 3 has a significance of 0.003, and the difference between class 2 and class 3 has a significance of 0.048. All comparisons had a significance value less than an alpha value of 0.05, so further tests for all pairs of sample classes were significant. The average score of students who took conventional discussion learning was 78.45, the average score of students who took part in the video analysis discussion learning was 85.20, and the average score of students who took problem solving learning was 82.36. Thus, the class of students who took part in the video analysis discussion learning physics learning had the highest average compared to the other 2 classes. The discussion method of analyzing physics learning videos can be used as an alternative learning method to develop students' higher order thinking skills.

Keywords: Discussions, videos, higher-order thinking.

INTRODUCTION

The demands of 21st century learning require students to use higher order thinking skills (HOTS) through problem solving and critical thinking, communication and collaboration, and creativity and innovation. To implement it, the teacher must first understand the HOTS concept because the main architecture in filling student intelligence is the teacher (Ivalina, 2020). In addition, the enactment of the Indonesian National Qualifications Framework (KKNI) requires the Bachelor's level to have graduate competencies including knowledge, skills and attitudes. This standard indirectly requires students to have higher-order thinking skills in solving problems (Ratu & Erfan, 2018).

The results of students' cognitive achievement on the reasoning aspect of HOTS are still low. Therefore, the teacher should direct students to think at a higher level in a lesson so that learning becomes much more meaningful. Learning by applying high-order thinking skills will make students not only able to remember and understand a concept, but students are also able to analyze, evaluate, and create a concept well, so it is very important for students to have higher order thinking skills (Liana et al., 2018).

The teaching and learning process cannot be separated from efforts to improve the quality of human resources. A good learning process is determined by good planning that also pays attention to the student's environment. After that the learning, evaluation, and observation process can be carried out well. In other words, if

the planning and teaching series is carried out properly, the learning process can be said to be successful and meet standards (Ita, 2018).

The learning process that is in accordance with the stage of student development will greatly assist in the development of higher order thinking skills. Some of the efforts that teachers can make in facilitating students to develop higher-order thinking skills are providing problems or non-routine problems that are problem solving and involving students actively in the learning process (Agustyaningrum, 2015). Critical thinking skills are very important to be trained during classroom learning, because students with good thinking skills have an impact on their ability to plan strategies and tactics for success in the 21st century (Affandy *et al.*, 2019).

Learning which is still dominated by the lecture method will make student activities limited to listening, taking notes, answering questions if the teacher asks questions, then the learning process clearly does not encourage students to think critically and creatively in their activities. Thus, learning that trains high-order thinking skills needs to be developed with the aim that students can acquire long-term memory and students can also build their own knowledge (Sumarli, 2018).

One of the learning methods in accordance with the problems mentioned above is the discussion method with the analysis of instructional videos. The discussion method can develop students' higher order thinking skills, facilitate students to be able to actively participate in the learning process so that students can construct their own knowledge of new information, and students are able to solve given problems. According to Senja & Nuryana (2016), the discussion method increases student activity, learning outcomes, and student skills. The same thing was also expressed by Fatimah (2019), the application of the discussion method can improve student learning outcomes and student activities. Hutahaean (2019) states that using the group discussion method can also increase student learning motivation. Ariani (2017) suggests that the use of media-assisted discussion methods (for example word cards or videos) can improve students' ability to identify. The purpose of this study was to determine the effect of the discussion method of analyzing the physics learning video on students' higher order thinking skills.

METHODS

This research method is quantitative, using a post-test only group design. The subjects in this study were all 5th semester students who took the Physics Curriculum Review lecture in the 2020/2021 Academic Year at a university in the city of Mataram, totaling 64 students.

Higher Order Thinking Skills (HOTS) data were obtained through essay tests (descriptions) given to students after treatment. HOTS referred to in this study is the cognitive learning outcomes of students at levels C4, C5, and C6. The data analysis used in testing the research hypothesis was one-way ANAVA with calculations using the SPSS 25 application.

FINDINGS AND DISCUSSION

Findings

Based on Table 1, the average score of students who took conventional discussion learning was 78.45, the average score of students who took part in video analysis discussion learning was 85.20, and the average score of students who took problem solving learning was 82.36. Thus, students who take video analysis discussion learning are superior to students who take conventional discussion learning and problem-solving learning.

The results of the Levene test in Table 2 show the F coefficient of 0.827 with a significance of 0.442. The significance value is much greater than the specified alpha value, namely 0.05. That is, there is no difference in the variance between groups being compared. So, the variance homogeneity which is the one-way ANOVA requirement has been fulfilled.

The results in Table 3 get an F coefficient of 16,846 with a significance of 0.000. This significance value is much smaller than the alpha value set at 0.05, so that the F value is said to be significant. This means that there are significant differences in high-order thinking skills between students who take conventional discussion learning, students who take video analysis discussion learning, and students who take problem-solving learning. Because there are significant differences in high-order thinking skills between the three groups, it is necessary to carry out further tests using the Tukey Test.

10 The follow-up test with the Tukey Test shows that the difference between class 1 (conventional discussion learning) and class 2 (video analysis discussion learning) has a significance of 0.000, the difference between class 1 (conventional discussion learning) and class 3 (problem solving learning) has a significance of 0.003, and the difference class 2 (learning video analysis discussion) and class 3 (learning problem solving) has a significance of

0.048. All comparisons had a significance value less than an alpha value of 0.05, so further tests for all pairs of sample classes were significant. Based on the average value in Table 1, it can be concluded that students who take part in video analysis discussion learning (class 2) have higher order thinking skills than students who are in the other two classes (class 1 and class 3).

Table 1. Descriptive Statistics

Dependent Variable: BerpikirTingkatTinggi			
Kelas	Mean	Std. Deviation	N
1	78.45	4.251	22
2	85.20	3.533	20
3	82.36	3.513	22
Total	81.91	4.645	64

Descriptions of the average value of students for class 1 (conventional discussion learning), class 2 (video analysis discussion learning), and class 3 (problem-solving learning) can be seen in table 1.

Table 2. Homogeneity Test

Levene's Test of Equality of Error Variances ^{a,b}					
		Levene Statistic	df1	df2	Sig.
BerpikirTingkatTinggi	Based on Mean	.827	2	61	.442
	Based on Median	.752	2	61	.476
	Based on Median and with adjusted df	.752	2	58.670	.476
	Based on trimmed mean	.766	2	61	.469
15 Tests the null hypothesis that the error variance of the dependent variable is equal across groups.					
a Dependent variable: BerpikirTingkatTinggi					
14 b Design: Intercept + A					

The results of the variance homogeneity test can be seen in Table 2 as follows.

Table 3. Summary of ANAVA

9 Tests of Between-Subjects Effects					
Dependent Variable: BerpikirTingkatTinggi					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	483.692a	2	241.846	16.846	.000
Intercept	429.531.873	1	429.531.873	29.919.018	.000
A	483.692	2	241.846	16.846	.000
Error	875.745	61	14.356		

Total	430.712.000	64		
Corrected Total	1.359.438	63		
a R Squared = .356 (Adjusted R Squared = .335)				

One-way ANOVA summary table with Test of Between-Subjects Effects can be seen in Table 3.

Table 4. Advanced Test Results

Multiple Comparisons						
Dependent Variable: BerpikirTingkatTinggi						
Tukey HSD						
(I) Kelas	(J) Kelas	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	-6.75*	1.171	.000	-9.56	-3.93
	3	-3.91*	1.142	.003	-6.65	-1.16
2	1	6.75*	1.171	.000	0,18958333	09.56
	3	2.84*	1.171	.048	.02	0,253472 22
3	1	3.91*	1.142	.003	01.16	0,295138 89
	2	-2.84*	1.171	.048	-5.65	-.02
Based on observed means.						
The error term is Mean Square(Error) = 14.356.						
* The mean difference is significant at the						

The results of further tests can be seen in Table 4.

Discussion

Students' thinking skills can be classified into two major groups, namely (1) Lower Order Thinking Skills (LOTS), and (2) Higher Order Thinking Skills (HOTS). LOTS are the first three aspects of Bloom's taxonomy: remember, understand and apply. Meanwhile HOTS is the last three aspects of analyzing, evaluating, and creating. In other words, HOTS is the highest in Bloom's taxonomy of cognitive domains. There are 9 strategies to effectively improve students' higher order thinking skills, namely; (1) Incorporating HOTS in general subjects, (2) Implementing a group-based learning approach, (3) Implementing the "Thinking" learning model and "Thinking" learning tools, (4) Preparing answer models, (5) Planning learning that can be 'managed', (6) Controlling the "thinking environment" - not too open or too free, (7) Preparing for assessments, (8) Emphasizing moral development and character building, and

(9) Emphasizing student reflection (Gradini, 2019). In other words, high-order thinking skills are abilities that include three aspects, namely analysis, evaluation and creation, namely the ability to think at the cognitive level C4-C6 (Anazalia et al, 2020).

The application of the discussion method with video learning analysis is one of the metacognitive problem solving strategies that are in accordance with the constructivist paradigm to improve students' higher order thinking skills. Students are stimulated to develop the ability to think critically, logically, reflectively, metacognitively, and think creatively. Through the problem-solving process, students find it easier to explore ideas related to essential concepts, deepen the concept so that the ideas that emerge can be developed. This is because metacognitive knowledge guides students to develop a learning environment and choose the right strategy, students become more confident and become independent learners, realizing that

they can meet intellectual needs, find a lot of information, and realize that when they face problems they will try to find way out. Thus the application of these strategies is able to develop students' higher order thinking skills and increase student activity in class learning (Almasitoh & Nugrahaningsih, 2021).

The application of the discussion method with the analysis of physics learning videos requires the role of the teacher / lecturer in directing student activities so that learning objectives can be achieved as expected. According to Syafruddin (2017), this discussion method is a teaching method that can solve problems that can be solved collectively by exchanging ideas with mutual consensus between group members and discussion participants. The discussion method is a way of presenting lessons, in which students are faced with a problem, which can be a statement or a problematic question to be discussed and solved together. However, there are problems when the discussion method is applied to learning in the field of study, among which some students consider it trivial and seem less interested in studying the field of study, so that it has an impact on the results obtained by students. Teachers carry out learning using the group discussion method by dividing groups by paying attention to the level of intelligence of students so that there is no accumulation of students who have intelligence above the average of other students, determine group leaders, provide material to be discussed in each group, the teacher provides conclusions from the results of the discussion, and giving grades to students at the end of the discussion (Syafruddin, 2017).

The application of the discussion method with the analysis of physics learning videos in the physics curriculum review course must pay attention to several things. Juniati (2017) explains things that need to be considered in the application of the discussion method. Teachers should pay more attention to the Learning Implementation Plan that will be given to students. Teachers should arrange learning programs that are tailored to student learning materials and provide evaluations both classical and individual evaluations. Teachers should provide more opportunities for students in solving learning problems, this will indirectly open students' thinking patterns. Thus, according to the opinion of Miasari (2018) that the application of the small group discussion method in the implementation of the learning process can improve learning achievement.

Learning by applying the discussion method can not only be done with the help of video learning analysis, but also with the help of other media such as student worksheets. Prabawanti (2015) states that the media-assisted discussion method (video and student worksheets) can increase student activeness, teacher performance, and students' cognitive abilities in solving problems.

The use of the discussion method can not only improve students' higher order thinking skills. Supriyati (2020) found that the application of the discussion method was very effective in learning speaking skills for students. The use of the discussion method can improve students' ability to speak in class, improve student learning outcomes, and increase teacher involvement in the learning process (Susanti, 2015). The effects of learning using group discussion methods are very diverse, such as increasing performance, increasing social interaction, increasing activity, and increasing emotional intelligence (Haq, 2019). The application of the discussion method can dig deeper into students' understanding of a learning topic being studied that can attract students' attention so that it can motivate them in the learning process (Aswat, 2019).

CONCLUSION

The application of the discussion method of analyzing physics learning videos affects students' higher order thinking skills in the Physics Curriculum Study course. The mean score of students who took part in video analysis discussion learning was 85.20, the highest compared to the mean score of students who took conventional discussion learning at 78.45 and problem solving learning at 82.36.

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