International Journal of Contextual Science Education
e-ISSN. 3046-8876
Vol. 2, No. 3, September 2024
pp. 77-81

The effect of Problem-Based Learning Model with Video-Assisted Communication Skills and Creativity of Students in High School Physics

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Accepted: August 17th2024, Approved: September 10th 2024, Published: September 30th 2024

Abstract— This research seeks to examine how physics students at SMA Negeri 8 Mataram may improve their communication and creative abilities via the use of problem-based learning models with video support. That which isUsing a non-equivalent control group design, the research adopts a pseudo-experiment approach. The 159 participants in this research are from five different classes in Class X MIA SMA Negeri 8 Mataram during the 2023–2024 school year. We selected Class X MIA 4 (32 students) as our experimental group and Class X MIA 5 (31 students) as our control group using the purposive selection method. A video- assisted problem-based learning model was used by the experimental group for therapy, while a conventional model was employed by the control group. The data processing findings revealed that the control group had strong communication skills (69.70), but the experimental group had an average of 78.52. The control group averaged 76.84 on the creativity test, but the experimental group averaged 83.52. It has Results from the hypothesis test showed that a video-assisted problem-based learning model had a significant effect on both communication (t_{count} = 0.00) and creativity (t_{count} = 0.02) abilities, with a significance value of 0.00 for each variable, when we used a MANOVA test to evaluate the data. Thus, it is safe to say that the physics students at SMA Negeri 8 Mataram really benefit from the video-assisted problem-based learning approach when it comes to improving their communication and creative abilities.

Keywords— Communication Skills, Creativity, Problem-based learning.
How to Cite— Rahmawati, N. E., Sutrio, Rokhmat, J., & Gunawan. (2024). The effect of Problem-Based Learning Model with Video-Assisted Communication Skills and Creativity of Students in High School Physics. *International Journal of Contextual Science Education*, 2(3), 77-81. https://doi.org/10.29303/ijcse.v2i3.668

1. Introduction

As physics continues to expand, researchers identify and improve its learning issues, including students' inadequate comprehension of the subject matter (Aziz et al., 2015). Traditional teaching approaches that emphasize the teacher as the main source of knowledge can also hinder the development of communication skills and student creativity (Basilaia et al., 2020). Teachers often exert too much control over physics lessons by isolating themselves from student participation. Here, pupils take it easier from the instructor, which means they don't get the context of the mathematical equations they employ to study physics (Ismiazizah *et al.*, 2017).

Teachers at SMA Negeri 8 Mataram have used effective learning models in their lessons and classroom activities, according to observations, such as the discovery learning model, starting with discussions, assignments, question and answer interactions between students, and occasionally involving them in practicum. However, there are some teachers have not fully incorporated the thought of developing communication skills and creativity of students as a learning goal. As a result, students' communication and creativity skills have not been specially trained. On the other hand, students also seem to be less focused during the learning process in the classroom. They prefer to be physically present and just follow the learning without actively participating or trying to use creativity in solving the problems given by the teacher. Many students still see physics as a challenging, dull, and abstract topic, which is the fundamental reason. As a consequence, pupils lose interest and become less curious. The physics learning process also does not utilize diverse teaching materials. This is not in line with the principles of the 2013 curriculum which should involve diverse learning approaches and models and utilize learning resources other than teachers as additional learning resources.

Problem-based learning is the learning model that seeks to enhance students' skills and aligns with the curriculum of 2013. Students develop their analytical, communicative, and collaborative abilities via problem-based learning, which encourages them to create their own learning context-relevant issues and work together to find solutions (Fatimah, 20Nurhayati et al. (2019) assert

that the use of problem-based learning model teaching materials encourages students to actively participate in groups, enabling them to explore the concepts or physical materials under study to enhance their knowledge. dge. By using this learning model, teachers can have a more effective alternative to deliver material to students.

In the modern era, technological advancements have opened up new effective opportunities in education, including the use of video media. Videos can visualize complex physics concepts with easier and intriguing explanations. The use of video can awaken communication skills, including the ability to convey ideas and ideas related to problem solving. It includes the ability to express solutions in writing and participate in discussions that can enrich learning activities in the classroom. Communication skills in physics learning activities play an important role in facilitating a deeper understanding of abstract and difficult-to- understand physical concepts (Nurhayati, 2019). Therefore, in the context of education, it is necessary to apply more innovative learning media to stimulate students' creativity so that they can maximize their full potential (Hasibuan et al., 2022).

Under the heading "the effect of a video-assisted problem-based learning model on the communication skills and creativity of students in high school physics materials," an experimental study has been suggested that is based on the above description. With a focus on SMA Negeri 8 Mataram, this research seeks to examine the potential effects of video-assisted problem-based learning models on the communication abilities and creativity of high school physics students.

2. Method

During the second semester of the 2023/2024 academic year, we carried out this investigation at SMA Negeri 8 Mataram.A non-equivalent control group was used in the study's quasi-experiment design. There are three factors assessed in this research. There are three types of variables: free, bound, and control. An approach to learning that is problem-based is the Free Variable. Bound factors include physics students' ability to communicate and their level of inventiveness. Control variables encompass factors such as teachers, learning time, learning materials, learning objectives, test instruments, and the methods used to assess both the experimental and control classes.

The 159 participants, distributed over 5 classrooms, are all from Class X at MIA SMA Negeri 8 Mataram. Using a purposive sampling approach, this study's samples consisted of students from Class X MIA 4 and Class X MIA 5, with the former serving as the experimental group and the latter as the control group.

Data assessment of communication skills and creativity of students in this study were obtained using rubric assessment of communication skills and creativity test consisting of 5 questions description. Creativity skills test Instrument is tested first before use. The validity, reliability, complexity, and problem discriminating power tests are all part of the package. More investigation Prerequisite tests, including those for homogeneity and normalcy, were run on the data before analysis could begin. Next, we ran a test to see whether our hypothesis held. Using IBM SPSS 21 software, this research tested hypotheses using a MANOVA test.

3. Result and Discussion

The study's evaluation rubric value and a comparison of the two classes' pre- and post-test scores show that students' communication and creative abilities increased. The average scores for the experimental and control groups on the communication skills evaluation rubric are 79 and 70, respectively. On average, the experimental group scored 26 on the creative skills pretest and the control group scored 23, while on average, the experimental group scored 83 and the control group scored 77 on the creativity skills posttest. The findings of the creative skills pretest and posttest, as well as the outcomes of the communication skills evaluation rubric, are shown in Tables 1 and 2 for the control and experimental courses, respectively.

Tabel 1. Recapitulation Of The Results Of The Communication Skills Assessment Rubric

	Experiment	**Control**
Number Of Students	32	31
Top Rated	92	87
Lowest Value	60	58
Criteria	79	70
Criteria	Good	Cood

Tabel 2. Recapitulation of Pretest and Posttest communication skills

	Pretes		*Postte*	
	Experimen	Control	Experimen	Control
Number Of Students	32	31	32	31
Top Rated	40	38	98	92
Lowest Value	12	10	70	62
Criteria	26	23	83	77
Criteria	Low	Low	High	High

Students in the control group had an average pretest score of 23 in creative skills while those in the experimental group had an average score of 79 in communication skills, according to Table 2 and Table 1, respectively. Both groups may have missed out on impulse and momentum material, which would explain the low pretest value of students' creative abilities. After the session, students in the control group scored 77 on the creativity exam, while those in the experimental group scored 83. Based on Table 1, the findings of the communication evaluation rubric are shown in Figure 1.

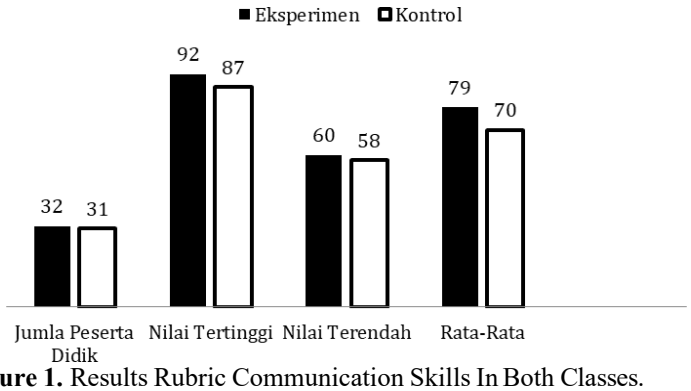

Figure 1. Results Rubric Communication Skills In Both Classes.

The findings show that both the experimental and control groups' communication abilities improve. It hasWe arrived at this mean by comparing the two groups' performance on a communication assessment administered over the course of three sessions; students in the control group scored 70 and those in the experimental group scored 79. So, it's safe to say that students' learning is much improved when they use a video-based problem-based learning paradigm as opposed to the control group that uses the old-fashioned way.Based on Table 2, Figure 2 shows the outcomes of the creative skills pretest and posttest.

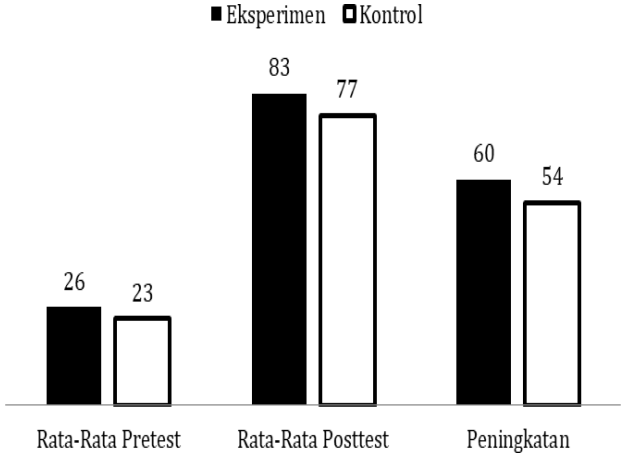

Figure 2. Pretest and Posttest Results of Creativity Skills in Both Classes

The findings show that both the control and experimental groups' early creative abilities are valued more highly. The control group had a growth of 54 percent, but the experimental group saw a 60 percent rise. Results on post-tests show a statistically significant improvement when compared to the control group's use of traditional models when employing a problem- based learning approach with video support. It is important to test the hypothesis in order to see whether there is an improvement in communication skills and creativity. Nevertheless, in the past, tests for data uniformity and normalcy were required.

The homogeneity prerequisite test aims to ensure that both classes have the same cognitive level. The result Fhitung data value of communication skills with a value of 1.54. Using a table with a value of 1.81, determine the pre- and post-test scores for creative skills, which are 1.31 and 1.20, respectively. When compared with Ftable, then this result shows Fcount less than Ftable. The Data is said to be homogeneous if the count is less than the table, so it can be seen that both classes are homogeneous.

To make sure the data follows a normal distribution, a normality precondition test is run. The Chi-square test method was used to carry out the examination. For the experimental group, the xhitung2 value of the communication skills data was 3.87, whereas for the control group, it was 10.27. The experimental class's Xhitung2 pretest score was 9.90, whereas the control class's score was 5.28. The findings of the Xtabel2 posttest for creative abilities showed that the experimental group scored 10.81 and the control group 9.31. Because Xhitung2 is smaller than Xtabel2, which indicates that the data follows a normal distribution, we may conclude that both groups follow this pattern.

The results of the data homogeneity and normalcy tests indicated that the two groups followed a normal distribution. Thus, with the help of IBM SPSS 21 software, we may go on with the hypothesis test by using the MANOVA test. The purpose of the MANOVA test is to evaluate the impact of problem-based learning models on both creativity and communication abilities simultaneously. There are two prerequisites for the MANOVA test: the box test and the Levene test. Both of these tests need to be suitable for a MANOVA to be conducted. Among the posttest data included for the hypothesis test is an evaluation of creative and communicative abilities based on a data rubric. Since both the box test and Levene's test provide significance values higher than 0.05, we may proceed with the MANOVA test. Students' communicative and creative abilities are impacted by problem-based learning models, according to MANOVA test findings with a significance value below 0.05. When it comes to impulse and momentum content in particular, research has shown that problem-based learning models improve students' communication abilities. These findings corroborate those of Wulandari et al. (2018), who demonstrated that problem-based learning approaches

have the potential to enhance students' communication abilities. According to the average values, the experimental group exhibited more creative abilities than the control group. In line with these findings is Risnani's (2016) study that shows how problem-based learning methods may increase students' creativity.

4. Conclusion

Students' ability to express themselves in physics class at SMA Negeri 8 Mataram is impacted by the video-assisted issue-based learning paradigm, according to the problem statement, study findings, and debate. A similar influence was also seen on students' creativity skills when video-assisted PBL models were applied in physics learning. In addition, the video-assisted PBL model showed a simultaneous positive impact on students' communication skills and creativity in physics in high school. This is reflected in the increase in the average value of students, where experimental classes that use video-assisted problem-based learning models show higher average values compared to control classes that use conventional learning models.

Acknowledgment

The author would like to extend his heartfelt appreciation to supervisor 1, supervisor 2, examiners, and everyone else who has helped, supported, or advised in any way to ensure the successful completion of this study.

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