

The Effectiveness of the Video Assistant Problem Based Learning Model to Improve Mathematics Problem Solving Ability and Student Independence in MTs Al Jamiyatul Washliyah Tanjung Morawa Academic Year 2021/2022

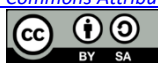
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Abstract: This study aims to: (1) To find out the video-assisted Problem Based Learning model in improving mathematical problem solving abilities in class VII MTs students. Al-Jamiyatul Washliyah Tanjung Morawa. (2) To find out the effectiveness of the video-assisted Problem Based Learning model in increasing learning independence in class VII MTs students. Al-Jamiyatul Washliyah Tanjung Morawa. This research uses mixed methods (Mixed Methods). This research was conducted in MTs School. Al-Jamiyatul Washliyah Tanjung Morawa with 30 students. The instruments used in this research are mathematical problem solving ability tests, learning independence questionnaires and interviews. The results of this study indicate that: (1) Video-assisted Problem Based Learning model is effective in improving students' mathematical problem solving abilities. (2) Video-assisted Problem Based Learning Model is effective in increasing students' mathematical learning independence

Keywords: Effectiveness, Problem Based Learning, Learning Videos, Mathematical Problem Solving Ability, Mathematical Learning Independence

I. INTRODUCTION

According to Suherman (Krisna & Marlinda, 2020) Mathematics is one of the fields of study that is very important for students as well as for the development of other scientific fields and is the main tool for providing a way of thinking, namely composing clear, precise, thorough, and law-abiding thoughts. Mathematics needs to be studied because of its very large contribution to life. The contribution of Mathematics in life can be viewed from three things, namely from the development needs of children, society and the world of work (Nasir, 2016). Mathematics is a subject that requires mastery of initial concepts that students must know in order to be able to relate to new concepts. Delivering mathematical concepts must be done with the right strategy so that learning does not become passive so that the objectives of learning can be achieved. The lack of strategies or learning methods applied by teachers in the teaching and learning process makes it difficult for students to develop problem-solving abilities they face.

Problem solving ability is one of the mathematical skills that must be possessed by students. Sundayana (Sulistiyani et al., 2020) argues that problem solving is a process or way for students to solve mathematical problems using the concepts they already have. (Lestari et al., 2019). However, in reality the problem solving ability in Indonesia is still low. Based on the results of international assessments TIMSS and PISA. The latest PISA 2018 data shows that Indonesia is ranked 74th out of 79 countries with a score of 371. A reflection of the TIMSS and PISA results is Indonesia's lack of training in solving questions with the same characteristics as those on TIMSS and PISA.

In addition to the facts above, the results of the researcher's interview with the mathematics teacher of class VII MTs. Al-Jamiyatul Washliyah Tanjung Morawa shows a fact that is not much different. Class VII students are less able to solve non-routine problems, lack of students' ability to identify problems given by the teacher related to contextual problems.

Furthermore, the researchers made initial observations by giving math problems on the Social Arithmetic material. From all students' answers, the researcher found the difficulties experienced by students in the problem solving abilities of VII grade students of MTs. Al-Jamiyatul Washliyah Tanjung Morawa, totaling 30 students, obtained the percentage of students' mathematical problem solving abilities on social arithmetic material as shown in table 1 below:

Table 1. KPMM Tes Test Observation Percentage

No	Indicator	Percentage
1	Understanding the Problem	36.67%
2	Planning Troubleshooting	53.3%
3	Carrying out Troubleshooting	26.67%
4	Check again	66.67%

Source: Student Observation Test

Thus it can be said that students have not been able to solve problems properly because they have not been able to pass the four problem solving steps correctly.

Another factor that also affects students' mathematical problem solving abilities is learning independence. Harris (Saputra, 2017) defines learning independence as a process of careful design and self-monitoring of cognitive and affective processes in completing an academic task. From the results of observations made by researchers on students, it shows that many students are still lacking in the aspect of learning independence.

This is caused by the learning model that is applied is less effective to improve problem solving ability and independent learning of students. The mathematics learning model applied by the teacher in MTs. Al Jamiyatul Washliyah Tj. Morawa is currently still unable to improve students' ability to solve problems correctly. Learning activities that take place in the classroom are still teacher-centered by applying a less varied and monotonous learning model.

In the learning process, the participation and activeness of students in participating in the learning process is not optimal. Regarding the lack of optimal problem solving ability and student learning independence, the thing that can be done to overcome the low mathematical problem solving ability and lack of student learning independence is to choose and apply a learning model that is able to stimulate increased mathematical problem solving abilities and student learning independence in learning mathematics. From the existing learning models, one of the models that can improve mathematical problem solving skills and student learning independence is the Problem Based Learning model. Problem-based learning models are seen as relevant to present a real atmosphere in the mathematics learning process, according to Shofiyah (Krisna & Marlinda, 2020) Problem Based Learning is a learning model that organizes learning around questions and problems, through the submission of authentic and meaningful real-life situations, which encourage students to conduct investigations and inquiries, by avoiding simple answers, and allowing for various solutions to these situations.

Activeness and independence of students must appear in every learning process, it is necessary to have learning media as a supporter of the learning process. One of the media that teachers can use to attract students' attention to think independently is by using video. Video is a very effective medium to help the learning process, whether for mass, individual, or group learning. According to Munadi (Setiana et al., 2019) explained that audio-visual media is media that involves the senses of hearing and sight at the same time in one process. The nature of messages that can be channeled through the media can be in the form of verbal and non-verbal messages that sound like audio media. Video can be used in learning programs, because it can provide unexpected experiences for students.

This is reinforced by the results of research Kurniyawati et al, (2019) stated that Problem Based Learning can be used as an alternative for teachers to improve problem solving skills and student learning independence, especially in learning mathematics. Furthermore, the results of research by Fitri, et al (2021) stated that the video-assisted problem-based learning model was very effective in improving students' mathematical concept understanding skills compared to conventional learning.

Regarding the explanation, the authors are interested in conducting an effectiveness research with the title "The Effectiveness of Video-Assisted Problem Based Learning Models to Improve Mathematical Problem Solving Ability and Independent Learning of MTs Students. Al Jam'iyatul Washliyah Tanjung Morawa". This research aims to find out the video-assisted Problem Based Learning model in improving mathematical problem solving skills and learning independence in class VII MTs students. Al-Jamiyatul Washliyah Tanjung Morawa.

II. METHODS

The type of research used is research using mixed methods (Mixed Methods). Mixed research methods or commonly referred to as mixed methods, is a research method that combines qualitative and quantitative methods in one study. Researchers used research methods with explanatory design models. Explanatory research design is a mixed method research design which consists of two phases, namely research design which begins with data collection and analysis. This first phase is followed by a quantitative data collection and analysis section. The second phase, the qualitative research phase is designed according to the relationship or quantitative results in the first phase.

The design used in this study is a Single Group Pretest-Posttest Design (One Group Pretest-Posttest Design). Single group means that the testing in this study is carried out only in one class. Pretest-Posttest serves to measure the success

of research, so that the magnitude of the effectiveness of the use of video-assisted problem-based learning models can be known with certainty.

The sample in this study were students of class VII-1 MTs. Al-Jamiyatul Washliyah Tanjung Morawa, totaling 30 students. This research was conducted in MTs School. Al-Jamiyatul Washliyah Tanjung Morawa. The time of the research was carried out in the even semester in April-May of the 2021/2022 Academic Year.

III. RESULTS AND DISCUSSION

This study was to determine the effectiveness of video-assisted Problem Based Learning model learning tools in improving students' mathematical problem solving abilities and independent learning. In addition to knowing the effectiveness of video-assisted Problem Based Learning model learning tools, the learning tools used must be valid, practical and effective.

1. Learning Tool Validation Results

The results of the RPP validation by the validator showed that the total average of each aspect of the learning device was 4.53 and was in the interval $4 \leq V_a < 5$. So according to the validity criteria, the learning tools developed are valid. The results of the LKPD validation that the total average value obtained is 4.53, is in the interval $4 \leq V_a < 5$ which means that it is appropriate to use the "valid" category. Furthermore, the results of the validation of the learning video obtained an average total of 4.63 located at intervals which means that it is appropriate to use the "valid" category. $4 \leq V_a < 5$

2. Practicality of learning tools with Video-assisted Problem Based Learning models

The practicality of learning tools with the Video-assisted Problem Based Learning model consists of two assessments, namely expert assessment and assessment of the implementation of learning devices using learning tools with Video-assisted Problem Based Learning models. Based on the results of expert and practitioner assessments of the practicality of learning tools in this study, it can be seen that experts and practitioners state that learning tools with Video-assisted Problem Based Learning models can be used with little or no revision. So, according to the practicality criteria, the learning device with the Video-assisted Problem Based Learning model meets the practical criteria according to the expert.

Furthermore, the results of the observer's observations in observing the implementation of learning during the learning process using learning tools with the Video-assisted Problem Based Learning model are presented in the following table:

Table 2. Results of Observation of Learning Implementation

Ke . meeting	I	II	III
Average	4.25	4,375	4,625
K	85	87.5	92.5
Total Average	88.33		

If you pay attention, there is a fairly large difference between the implementation of learning at meeting 1, meeting 2 and meeting 3. However, in general, learning tools with the Video-assisted Problem Based Learning model have a learning implementation level of $k = 88.33$ (good criteria). Thus, the learning device with the video-assisted Problem Based Learning model has met the practical criteria empirically.

3. The effectiveness of learning tools with video-assisted problem based learning models.

According to the previous discussion, the criteria for effectiveness in this research are:

a. Classical learning completeness

The learning process of the video-assisted problem based learning model is carried out in class VII MTs. Al Jamiyatul Washliyah Tanjung Morawa with 30 students. In this study, student learning outcomes are viewed from the ability of students to solve mathematical problems after learning using learning tools with a video-assisted problem based learning model. The results showed that there were 26 students (86.7%) who completed and as many as 5 students (16.67%) did not complete. It was concluded that classical completeness was achieved, students who completed learning had reached 85%.

b. Achievement of Learning Objectives

The achievement of learning objectives in terms of each indicator of students' mathematical problem solving abilities, for student achievement on each indicator can be seen in the following table:

Table 3 KPMM Increase Percentage

Indicator	Achievement (Pretest)	Achievement (Posttest)	Results Enhancement
Understanding the Problem	93.33%	56.67%	36.66%
Planning a solution	83.33%	46.67%	36.66%
Solve the problem	76.67%	33.33%	43.34%
Check Back	66.67%	16.67%	50%

Based on the table above, the results of the students' mathematical problem solving ability tests after learning (posttest), there was an increase in each indicator with problem solving abilities before learning (pretest).

Furthermore, the achievement of learning objectives when viewed from each indicator of students' mathematical learning independence is presented in the following table:

Table 4 Improving students' mathematical learning independence

Indicator	Achievement (pretest)	Achievement (posttest)	Improved Results
Have a sense of responsibility towards yourself	54.02%	90.42%	36.4%
Behave on your own initiative	54.83%	89.17%	34.34%
Have confidence	54.17%	83.33%	29.16%
Behave discipline	52.5%	80.56%	28.06%
Have strong self control	50.42%	78.95%	28.53%

Based on the table above, it is found that there is an increase in each indicator of students' mathematical learning independence before learning (pretest) and after learning (posttest).

To strengthen the results of the above students' mathematical problem solving abilities, data triangulation was carried out, namely observations and interviews related to students' mathematical problem solving abilities. The results of observations during learning with the Video-assisted Problem Based Learning model when viewed from mathematical problem solving abilities are that during the learning process students actively listen to the explanations given by the teacher, students also give positive responses when the teacher asks about social arithmetic material to start learning.

For the stage of understanding the problem students can understand well the problems given on the mathematical problem solving ability test sheet. Students can write clearly what is known and asked on the given test. Furthermore, for the stage of planning a solution, students begin to get confused about what the problem-solving plan means. Students look confused and ask questions with their own group mates. This happens because students are not accustomed to writing problem-solving plans in working on problems.

For the stage of carrying out problem solving, students can do mathematical problem solving in accordance with the mathematical problem solving plan that has been previously written. For the re-examination stage, students do not experience difficulties when drawing conclusions.

Furthermore, interviews were conducted with 3 research subjects to strengthen the test results and observations during the research.

Based on the results of the interview, it was found that the three subjects said that no one had difficulty at the stage of understanding mathematical problems. For indicators of carrying out the plan students are able to run it well, because students do not have so much difficulty when doing the calculation process. The last indicator is to re-examine the answers and draw conclusions, in this section the subject does not experience difficulties because if you get the results of solving the problem, then you just have to make the conclusion.

From the explanation above, both quantitatively and qualitatively, it can be concluded that learning with the video-assisted problem based learning model is effective in improving students' mathematical problem solving abilities and mathematical learning independence.

c. Student Response

The student response questionnaire has a positive response and a negative response. Positive responses are indicated by feelings such as, happy, new, interested, clear, interested and making it easier to learn mathematics.

Based on the results of the student response questionnaire analysis, it was found that the average analysis results for each aspect of student responses were as follows: (1) Students expressed satisfaction with the components of the learning device with the Video-assisted Problem Based Learning model as much as 90%. (2) Students stated that the components and learning activities were still new as much as 91.11%. (3) Students expressed interest in participating in mathematics learning on other materials such as learning that was carried out as much as 93.3%. (4) Students stated that the LKPD language, the tests and questionnaires used could be understood as much as 88.33%. (5) Students expressed interest in the appearance of LKPD as much as 93.3%. (6) Students stated that it was easier and more motivated to learn mathematics as much as 86.67%.

Based on the results above, it was found that the average presentation of the total positive responses of students was 90.46%. So that it is obtained that the average percentage of the total positive response of students is greater than 80%. So it can be concluded that the student's response to the components and learning activities is positive.

Based on the results of the research described above, it was found that the video-assisted problem-based learning method was effective in improving students' mathematical problem solving abilities and student learning independence.

The results of this study were strengthened by research by Wulandari, (2021) which shows that using the video-based problem based learning (PBL) learning model is effective because it is successful in improving students' problem solving abilities.

Haqiqi, (2021) stated that there was an increase in every indicator of mathematical problem solving ability. Meanwhile, the results of testing the difference between the two averages show that the video-assisted problem based learning model in live worksheets is effective on students' mathematical problem solving abilities.

Setiana et al, (2019) stated that the Problem Based Learning (Pbl) model assisted by video media was able to improve the mastery of learning outcomes in mathematics subjects. This can be proven by the acquisition of students' mathematics learning outcomes after being given action in each cycle. The success in improving students' mathematics learning outcomes can be seen from before the action was taken, namely in the pre-cycle only 9 students or 43% completed, in the first cycle increased to 15 students or 71% who completed learning mathematics and in the second cycle increased again to 21 students who completed learn math or 100%.

IV. CONCLUSION

Learning with the video-assisted Problem based learning model is effective for improving students' mathematical problem solving abilities and mathematical learning independence both quantitatively and qualitatively. Because there is an increase based on the results of the pretest and posttest tests of mathematical problem solving abilities and student learning independence. The results of the interviews also showed that the video-assisted problem-based learning model made students not bored studying because there were videos that were shown and students felt happy because they could have group discussions.

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