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Students' Mathematical Problem Solving Ability in View of Learning Motivation Through the MURDER Learning Model Assisted by Animation Videos

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Abstract

This research was carried out with the aim of analyzing the effectiveness of the MURDER learning model assisted by animated videos on students' mathematical problem solving abilities and describing mathematical problem solving abilities in terms of student learning motivation through the MURDER learning model assisted by animated videos. This research employed a mixed-method research approach with a sequential explanatory design model. The study population consisted of students from all Class VIII of SMP Negeri 6 Semarang for the academic year 2022/2023, comprising eight classes. The research sample was class VIII G, with 32 students, and class VIII F, with 32 students. The results of this research indicate that the MURDER learning model assisted by animated videos is effective for mathematical problem solving abilities. In addition, a description of students' mathematical problem solving abilities was obtained in terms of learning motivation. Students with high learning motivation meet all indicators of mathematical problem solving abilities. Students with moderate learning motivation tend to be able to meet the indicators of mathematical problem solving ability. Students with low learning motivation tend to be unable to meet indicators of mathematical problem solving ability.

1. Introduction

Human resource development can be supported through mathematics learning (Anggraini et al., 2021). Mathematics has benefits in everyday life and is useful as a support for the successful development of other sciences or advances in science and technology (Santoso, 2017). In addition, mathematics is one of the sciences that is taught at every level of education, even in universities, mathematics is still taught, so mathematics must be taught from an early age (Utami et al., 2020). But mathematics is often considered a subject that is very frightening for most students so that it affects students' learning outcomes in mathematics (Alfian et al., 2020). MZ & Muhandaz (2019) explained that in mathematics learning, many students' mathematics learning achievement is found to be low. MZ & Muhandaz (2019) further explained that this might be due to students' lack of interest in learning mathematics, not enthusiasm for learning it and fear of learning mathematics. In line with this, Nurfitriyanti (2016) argues that to overcome students' disinterest and students' fear of mathematics, creativity is needed in learning because mathematics must be taught in an interesting way and linked to real life and using a variety of learning models so that the learning atmosphere takes place in fun. The learning process that leads to a pleasant learning atmosphere is expected to be more effective in achieving the goals of learning mathematics (Siregar et al., 2017).

The purpose of learning mathematics is to develop an ability to solve mathematical problems and communicate, by connecting an idea between mathematics or with other sciences (Hildani & Safitri, 2021). The ability to solve students' mathematical problems is one of the objectives of learning

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mathematics at school and is a basic ability that students must have (Permendikbud, 2016); (Fitria, 2018). Problem solving is not a generic skill, but is a human activity that combines previously acquired concepts and rules. The ability to solve mathematical problems is an ability that involves high-level thinking processes and is essential for students to have in the 21st century (Elita et al., 2019). Mathematical problem solving ability has several indicators, problem solving indicators according to NCTM (2000) are identifying elements that are known, what is asked, and sufficient information needed, formulating problems and making mathematical models appropriately, implementing strategies in solving similar or new problems , and explain the results according to the original problem.

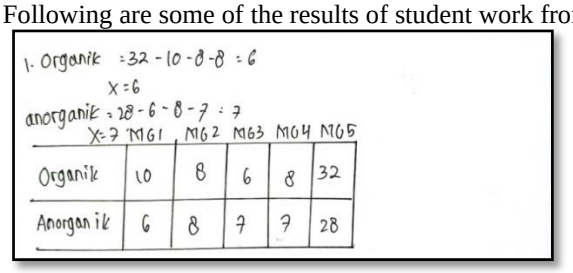
Mathematical problems that are solved using mathematical problem solving generally have quite high difficulty and are usually presented in the form of story problems where students are then required to understand the problem by changing the problem into mathematical form and then solving it based on what is known in the problem (Gabriella & Imami, 2021). One of the materials that requires students' mathematical problem solving abilities is Statistics material, where in this material the questions presented are in the form of story problems and are usually related to daily life such as finding the average weight, student grades and so on. The results of research conducted by Latifah & Afriansyah (2021) show that students' mathematical problem solving abilities in Statistics material still have a low percentage because students still experience difficulties with several indicators. Some of these difficulties are at the transformation stage where students experience difficulty in changing questions into mathematical sentences so that students cannot solve the problem correctly.

In an initial test of mathematical problem solving abilities, 32 students in class VIII G of SMP Negeri 6 Semarang were given 1 question of mathematical problem solving ability on data presentation.

> Tika has collected waste production data at her home for one month. Tika has also separated the organic and inorganic waste. The waste data obtained for the first week is 10 kg organic and 6 kg inorganic, for the second week is 8 kg organic and 8 kg inorganic, for the third week is x kg organic and 7 kg inorganic, and for the fourth week is 8 kg organic and y kg inorganic. The total waste collected during the one-month period is 32 kg organic and 28 kg inorganic. What are the values of x and y? Present the data in table format!

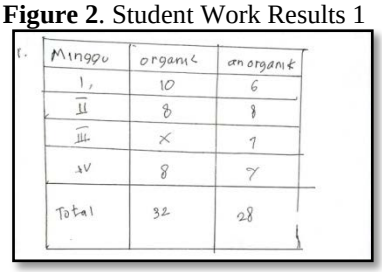
Figure 1. Initial test questions for mathematical problem solving abilities

Following are some of the results of student work from word problems in Figure 1.


1. Organik : 32 - 10 - 8 - 8 : 6
X : 6
anorganik : 28 - 6 - 8 - 7 : 7
X : 7

	M G1	M G2	M G3	M G4	M G5
Organik	10	8	6	8	32
Anorganik	6	8	7	7	28

Figure 2. Student Work Results 1


c.

Minggu	organic	anorganik
I	10	6
II	8	8
III	x	7
IV	8	y
Total	32	28

Figure 3. Student Work Results 2

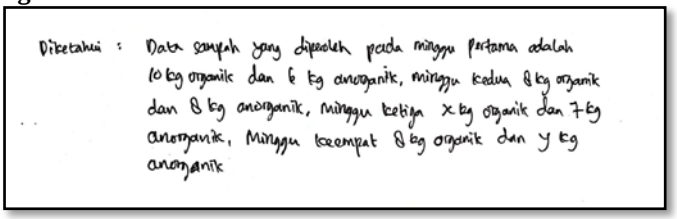

Diketahui : Data sampah yang diperoleh pada minggu pertama adalah 10 kg organik dan 6 kg anorganik, minggu kedua 8 kg organik dan 8 kg anorganik, minggu ketiga x kg organik dan 7 kg anorganik, Minggu keempat 8 kg organik dan y kg anorganik

Figure 4. Student Work Results 3

After making observations, the results of the students' work on the questions were obtained in accordance with the indicators of mathematical problem solving ability. As many as 40.625% of students answered correctly and 59.375% of students answered incorrectly, the average student score obtained was 65.16, and as many as 24 students got a score below 74 (minimum mastery learning criteria). Figure 2 and Figure 3 show that students do not write down the elements they know, what they ask and the information they need. This shows that students do not meet the indicators of mathematical problem solving ability. Figure 3 shows that students can present data in tabular form, but do not know how to find x and y, because students do not formulate the problem first so they cannot solve the problem correctly. In Figure 4, students can write down the information contained in the problem but cannot solve the problem presented. Apart from that, the three students did not write conclusions from the solution results obtained. So, students have not been able to fulfill all indicators of mathematical problem solving ability.

Based on the results of interviews conducted with mathematics teachers at SMP Negeri 6 Semarang, the ability to solve mathematical problems at SMP Negeri 6 Semarang is still not optimal, because teachers rarely direct students to mathematical problem solving abilities, sometimes directed but not at every subject matter, so in solving a problem students have difficulty identifying questions, writing down what is known and asked about the problem, determining the solutions used, and writing back the results obtained. The inability of students to solve problem solving problems is caused by several factors, including the low motivation and enthusiasm for student learning and the application of boring learning, so students are not enthusiastic in working on problems because they are already lazy when looking at math problems. Low learning motivation is one of the factors that causes students' low ability to solve mathematical problems (Ulya, 2016).

Learning motivation has an influence on students' mathematical problem solving abilities, if learning motivation is high then problem solving abilities are also high and vice versa (Wulandari et al., 2018). Motivation is an encouragement or driving force that exists within students as a spirit to study hard and achieve their desired desires, namely good achievements (Mulyani et al., 2021). Uno (2014) states that indicators of learning motivation consist of several things, namely the desire to succeed, encouragement of the need to learn, hope for the future, appreciation for learning, interesting learning and a conducive learning situation. Problem solving abilities and low learning motivation can be caused by the teacher's lack of precision in choosing a learning model. This problem certainly requires innovation in learning as a solution to develop students' mathematical problem solving abilities and motivation to learn, especially in statistics material. Based on research by Raztiani & Permana (2019), the use of interactive learning models can have a learning influence on students and can increase enthusiasm for learning and encourage students' learning motivation to be interested in the subject. The research results of Utami et al. (2017) showed that there was an effect of the learning model on students' mathematical problem solving abilities. So, it can be concluded that the right learning model is very important in developing students' mathematical problem solving abilities and learning motivation. Syaripudin (2018) in his research proved that there was an increase in students' mathematical problem solving abilities who used the MURDER learning model (Mood, Understand, Recall, Digest, Expand, Review).

The MURDER learning model is a learning model introduced by Dansereau (Dansereau et al., 1979). The MURDER learning model (Mood, Understand, Recall, Digest, Expand, Review) is a learning model that can build student learning motivation and provide optimal opportunities for students to study independently, interpret material, and understand it in depth in discussion activities. The steps of the MURDER learning model are Mood, which means a mood that can create a positive learning atmosphere, one of which is through motivation. Understand means a step in students' understanding of the material to be studied. Recall means repeating the material studied in their own language. Digest means going back again. on topics that are not yet understood, then studied again and find errors in understanding the material or solving problems, Expand means developing information where students respond to the results of other groups' discussions and seek answers to questions from other groups by discussing, and Review is reviewing the material studied (Susanti , 2020); (Muhd. et al., 2017); (Widyanti, 2018). This learning model should be equipped with appropriate learning media so that it supports in improving students' mathematical problem solving abilities and increases student learning motivation.

Mathematics learning media is used because it can provide more concrete concepts so that students can understand its use in everyday life (Mukhni et al., 2020). One of the learning media that can be used is animated video media. Animated video is one of the learning media that can be used properly which is packaged with material that is equipped with text and still images and can be supplemented with animation so that it gives an interesting impression to students and students' interest in learning becomes better (Pradana et al., 2021). From the results of research conducted by Farida et al. (2022) shows that the use of animated video learning media in data presentation material is effective when used online or

offline because besides that students can better understand the material well it can also reduce student boredom while studying. From this information, it can be concluded that when students do not feel bored in learning, it is hoped that student learning motivation will be better. Presentation of data is also one of the materials in statistics so it is hoped that if the understanding of the material can be well received then students' mathematical problem solving abilities can also improve well.

Related to the problems above, This research was carried out with the aim of analyzing the effectiveness of the MURDER learning model assisted by animated videos on students' mathematical problem solving abilities and describing mathematical problem solving abilities in terms of student learning motivation through the MURDER learning model assisted by animated videos.

2. Methods

The research method used in this study was a mixed method. Mixed methods research is a problemcentered approach that involved collecting both quantitative and qualitative data in a single project to achieve a more comprehensive understanding of the phenomenon under investigation (Leavy, 2017). According to Sugiyono (2021), mixed methods research is a research method that combined quantitative and qualitative methods to be used together in a research activity, thereby obtaining more comprehensive, valid, reliable, and objective data.

The research design employed in this study was a sequential explanatory design, also known as asequence of evidence. The explanatory sequential design was a research design where quantitativemethods were employed first, followed by qualitative methods to explain the quantitative findings (Leavy, 2017). This design involved collecting quantitative data initially and then collecting qualitativedata (Creswell, 2016). This research design was chosen because it began with quantitative research and subsequently incorporated qualitative research to test hypotheses.

The quantitative method used in this study utilized a quasi-experimental design in the form of a posttestonly design with nonequivalent groups. This design was selected as it included a control group but lackedcomplete control over external variables that may have influenced the experiment's implementation (Sugiyono, 2021). The posttest-only design with nonequivalent groups was a research design that only measured the post-treatment outcomes with unequal groups (Hastjarjo, 2019). The study consisted of two groups: the experimental group, which received the MURDER learning model treatment assisted by animated videos, and the control group, which received expository learning treatment. After thetreatment, both groups underwent a posttest. An illustration of the research design, posttest-only design with nonequivalent groups, is presented below.

Table 1. Quantitative Research Design

Group	Treatment	*Posttest*
Experiment	X	P_1
Control	Y	P_2

Keterangan:

X : MURDER learning model assisted by animated videos

Y : expository learning model

P_1 : posttest results of students' mathematical problem solving abilities in the experimental group

P_2 : posttest results of mathematical problem solving abilities of control group students

The location of this research is SMP Negeri 6 Semarang which is located at Jl. Patimura No. 9, Kebonagung, East Semarang Subdistrict, Semarang City, Central Java 50123. The population in this study was all class VIII of SMP Negeri 26 Semarang. Sampling was carried out using a simple random sampling technique. The sample in this study was taken by selecting two classes as an experimental group and a control group. There are two variables in this research, namely the dependent variable and the independent variable. The dependent variable in this study is the ability to solve mathematical problems and the independent variable is learning with the animated video-assisted MURDER learning model.

3. Results & Discussions

The research was carried out on May 12 2023 until May 31 2023 at SMP Negeri 6 Semarang located at Jl. Patimura No. 9, Kebonagung, East Semarang District, Semarang City. This research used two classes, namely a class with a MURDER learning model assisted by animated videos and a class with an expository learning model.

3.1. Result

3.1.1 Quantitative Data Analysis

3.1.1.1 Classical Completeness Test

Classical completeness test testing was carried out to test classical mastery, namely whether students' mathematical problem solving abilities with the video-assisted MURDER learning model achieve classical mastery with a percentage of 75%. The hypothesis formulation used is as follows.

$H_0: \pi \leq 0.75$ (the proportion of students who complete learning through the MURDER learning model assisted by animated videos is less than or equal to 75%)

$H_1: \pi > 0.75$ (the proportion of students who complete learning through the MURDER learning model assisted by animated videos is more than 75%)

The test criterion is to reject H_0 if $z_{calculated} \geq z_{table}$. Because the data is normally distributed, the arithmetic statistics used are $z = \frac{\frac{x}{n} - \pi_0}{\sqrt{\frac{\pi_0(1-\pi_0)}{n}}}$.

In this research, we used $\alpha = 0.05$, $\pi_0 = 0.75$ and z_{table} obtained from the standard normal list with probability $(0.5 - \alpha)$. The results of the classical completeness test can be seen in Table 2.

Table 2. Classical Completeness Test

n	32
x	29
π_0	0.75
$z_{calculated}$	2.08
z_{table}	1.64
H_0	Rejected

Based on the criteria for the right-sided proportion test, it is obtained $z_{calculated} \geq z_{table}$, so that H_0 rejected, which means that the proportion of students who have completed learning through the MURDER learning model assisted by animated videos is more than 75% or achieved classical completeness.

3.1.1.2 Hypothesis Test 2

This hypothesis test was carried out to test whether the proportion of mathematical problem solving abilities in the class with the MURDER learning model assisted by video animation is more than the proportion of mathematical problem solving abilities in the class with the expository learning model. Because the data is normally distributed and homogeneous, the statistical test used is the similarity test of two proportions (right side) with the following hypothesis.

$H_0: \pi_1 \leq \pi_2$ (the proportion of students who complete the class with the video-assisted MURDER learning model is less than or equal to the proportion of students who complete the class with the expository learning model)

$H_1: \pi_1 > \pi_2$ (the proportion of students who completed the class with the MURDER learning model assisted by animated videos was more than the proportion of students who completed the class with the expository learning model)

This test criterion is reject H_0 if $z_{calculated} \geq z_{0.5-\alpha}$. Value $z_{0.5-\alpha}$ obtained from a standard normal list with probabilities $(0.5 - \alpha)$ and significant level 0.05. The formulation used is $z = \frac{\left(\frac{x_1}{n_1}\right) - \left(\frac{x_2}{n_2}\right)}{\sqrt{pq\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$, with $p = \frac{x_1 + x_2}{n_1 + n_2}$ and $q = 1 - p$. The results of the equality test of these two proportions can be seen in Table 3.

Table 3. Hypothesis Test 2.

$z_{calculated}$	2.19
α	0.05
z_{table}	1.64
Conclusion	$z_{calculated} > z_{0.5-\alpha}$

Based on Table 3, obtained $z_{calculated} > z_{table}$, so that H_0 rejected, which means that the proportion of students who complete the class with the MURDER learning model assisted by video animation is more than the proportion of students who complete the class with the expository learning model.

3.1.1.3 Hypothesis Test 3

Hypothesis 3 testing was carried out with the aim of testing whether the average mathematical problem solving ability of class students using the MURDER learning model assisted by video animation is more than the average mathematical problem solving ability of class students using the expository learning model. The data that has been obtained is normally distributed and homogeneous, so a t-test statistic is performed with the following hypothesis.

$H_0: \mu_1 \leq \mu_2$ (the average test results for students' mathematical problem solving abilities in the class with the video-assisted MURDER learning model are less than or equal to the average test results for students' mathematical problem solving abilities in the class with the expository learning model)

$H_1: \mu_1 > \mu_2$ (the average test results of students' mathematical problem solving abilities in the class with the video-assisted MURDER learning model are more than the average test results for students' mathematical problem solving abilities in the class with the expository learning model)

These testing criteria are with values $\alpha = 5\%$ is if $t_{calculated} \geq t_{table}$, so H_0 rejected and H_1 accepted. Value t_{table} obtained from the distribution list $t_{1-\alpha,dk}$ with $dk = n_1 + n_2 - 2$. The formulation used is $t = \frac{\bar{x}_1 - \bar{x}_2}{s\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}}$ with $s^2 = \frac{(n_1-1)s_1^2+(n_2-1)s_2^2}{n_1+n_2-2}$. The results of this t-test can be seen in Table 4.

Table 4. Hypothesis Test 3

$t_{calculated}$	1.71
α	0.05
t_{table}	1.67
Conclusion	$t_{calculated} \geq t_{table}$

Based on Table 4, it is obtained $t_{calculated} > t_{table}$, so that H_0 rejected, which means that the average test result of students' mathematical problem solving ability in the class with the MURDER learning model assisted by animated videos is more than the average test result of students' mathematical problem solving ability in the class with the expository learning model.

3.1.2 Qualitative Data Analysis

Qualitative data analysis in this research is data from tests and interviews on mathematical problem solving abilities. Based on the results of the student learning motivation questionnaire in the MURDER learning model class assisted by video animation, namely class VIII G, it was found that the level of student learning motivation was different. Of the 32 students in the class with the video-assisted MURDER learning model, 6 students were selected as research subjects, namely 2 students from the high learning motivation (HLM) category, 2 students from the moderate learning motivation (MLM) category, and 2 students from the low learning motivation (LLM) category. A summary of problem solving abilities for each subject is shown in the following table.

Table 5. Summary of Mathematical Problem Solving Ability of Subjects HLM-01

Indicator	Question Number					Description
	1	2	3	4	5	
Students can identify the elements that are known, what is asked and the adequacy of the information needed.	√	√	√	√	√	Subjects are able to identify the elements that are known, what is being asked and the adequacy of the information needed.
Students can formulate problems and construct mathematical models appropriately.	√	√	√	√	√	Subjects are able to formulate problems and construct mathematical models correctly.
Students can apply strategies in solving similar or new problems.	√	√	√	√	√	Subjects are able to implement strategies in solving similar or new problems.
Students can explain the results according to the original problem.	√	√	√	√	√	The subject is able to explain the results according to the original problem.

Table 6. Summary of Mathematical Problem Solving Ability of Subjects HLM-02

Indicator	Question Number					Description
	1	2	3	4	5	
Students can identify the elements that are known, what is asked and the adequacy of the information needed.	√	√	√	√	√	Subjects are able to identify the elements that are known, what is being asked and the adequacy of the information needed.
Students can formulate problems and construct mathematical models appropriately.	√	√	√	√	√	Subjects are able to formulate problems and construct mathematical models correctly.
Students can apply strategies in solving similar or new problems.	√	√	√	√	√	Subjects are able to implement strategies in solving similar or new problems.
Students can explain the results according to the original problem.	√	√	√	√	√	The subject is able to explain the results according to the original problem.

Table 7. Summary of Mathematical Problem Solving Ability of Subjects MLM-01

Indicator	Question Number					Description
	1	2	3	4	5	
Students can identify the elements that are known, what is asked and the adequacy of the information needed.	√	√	√	√	√	Subjects are able to identify the elements that are known, what is being asked and the adequacy of the information needed.
Students can formulate problems and construct mathematical models appropriately.	-	√	√	√	√	Subjects tend to be able to formulate problems and construct mathematical models appropriately.
Students can apply strategies in solving similar or new problems.	-	√	√	√	-	Subjects tend to be able to implement strategies in solving similar or new problems.
Students can explain the results according to the original problem.	√	√	√	-	√	Subjects tend to be able to explain the results according to the original problem.

Table 8. Summary of Mathematical Problem Solving Ability of Subjects MLM-02

Indicator	Question Number					Description
	1	2	3	4	5	
Students can identify the elements that are known, what is asked and the adequacy of the information needed.	√	√	√	√	√	Subjects are able to identify the elements that are known, what is being asked and the adequacy of the information needed.
Students can formulate problems and construct mathematical models appropriately.	√	-	√	√	√	Subjects tend to be able to formulate problems and construct mathematical models appropriately.
Students can apply strategies in solving similar or new problems.	√	-	√	√	√	Subjects tend to be able to implement strategies in solving similar or new problems.
Students can explain the results according to the original problem.	-	√	-	√	√	Subjects tend to be able to explain the results according to the original problem.

Table 9. Summary of Mathematical Problem Solving Ability of Subjects LLM-01

Indicator	Question Number					Description
	1	2	3	4	5	
Students can identify the elements that are known, what is asked and the adequacy of the information needed.	-	√	-	-	-	Subjects tend to be unable to identify the elements that are known, what is being asked and the adequacy of the information required.
Students can formulate problems and construct mathematical models appropriately.	-	-	-	-	-	Subjects are unable to formulate problems and construct mathematical models correctly.
Students can apply strategies in solving similar or new problems.	-	-	-	-	-	Subjects are unable to apply strategies in solving similar or new problems.
Students can explain the results according to the original problem.	-	√	√	-	-	Subjects tend to be unable to explain the results according to the original problem.

Table 10. Summary of Mathematical Problem Solving Ability of Subjects LLM-02

Indicator	Question Number					Description
	1	2	3	4	5	
Students can identify the elements that are known, what is asked and the adequacy of the information needed.	√	√	√	√	-	Subjects tend to be able to identify the elements that are known, what is being asked and the adequacy of the information needed.
Students can formulate problems and construct mathematical models appropriately.	-	-	√	-	-	Subjects tend to be unable to formulate problems and construct mathematical models correctly.
Students can apply strategies in solving similar or new problems.	-	-	-	-	-	Subjects are unable to apply strategies in solving similar or new problems.
Students can explain the results according to the original problem.	-	-	-	-	-	Subjects were unable to explain the results according to the original problem.

3.2. Discussion

3.2.1 Quantitative Discussion

The results of the research analysis in the class with the video-assisted MURDER learning model show that the value of students' mathematical problem-solving ability has achieved classical learning mastery and 29 students out of 32 students who have completed it, meaning that the percentage of student learning completeness is 90.625%. Students who are given the animated video-assisted MURDER learning model are more skilled at solving problems, this is because in the animated video-assisted MURDER learning model students are required to be active in solving questions given by the teacher, students are used to understanding the problem first then writing down the information important in a problem, so that students can determine the right strategy in solving a problem. So, it can be said that the MURDER learning model is effective on students' mathematical problem solving abilities.

The MURDER learning model assisted by animated videos makes students more active because students play a more full role in the learning process. Students who are given the MURDER learning model assisted by animated videos have better mathematical problem solving abilities. In accordance with Syaripudin's (2018) research which states that the MURDER learning model can improve mathematical problem solving abilities. The MURDER learning model is learning where the teacher presents information related to learning to arouse students' curiosity, then students are emphasized to reorganize

the information received, then understand it and communicate orally and in writing (Mayangsari et al., 2018). Learning also uses Student Worksheets which are done together in groups and presented with problems related to daily life so that students are enthusiastic in solving problems. Students actively seek information together with their groups to solve new problems and refer to indicators of mathematical problem solving abilities. This is in line with research by Astuti & Sari (2017) which revealed that learning carried out in groups using student worksheets makes students more comfortable asking questions to their group friends and makes students more active and motivated to take part in the learning process. The learning process is carried out using the help of animated videos that have been prepared by the teacher, so that students are interested in participating in learning and understanding the material and make students enthusiastic about solving problems. Apart from that, the use of animated videos is one of the uses of technology in mathematics learning. This is in line with research by Mashuri & Budiyono (2020) which states that one of the advantages of animated videos is increasing students' enthusiasm for learning mathematics through an attractive display and research by Harsela et al. (2022) who revealed that learning media in the form of animated videos can improve students' mathematical problem solving abilities.

3.2.2 Qualitative Discussion

Based on the analysis of students' mathematical problem solving abilities in the categories of high, moderate, and low learning motivation, it can be concluded that the different student learning motivations lead to differences in students' mathematical problem solving abilities. This is in accordance with research by Wulandari et al. (2018) which states that learning motivation has an influence on mathematical problem solving abilities, where differences in learning motivation can create different students' mathematical problem solving abilities, if learning motivation is high then the higher mathematical problem solving abilities and vice versa.

3.2.2.1 Students' Mathematical Problem Solving Ability Based on High Learning Motivation

Subjects with high learning motivation when interviewed were able to answer questions confidently because they were sure of the answers so they could answer all questions well. Based on the results of the analysis of subjects with high learning motivation that has been done, it can be concluded that subjects with high learning motivation are able to identify the elements that are known, what is asked, and the adequacy of the information needed, are able to formulate problems and create mathematical models correctly, are able to apply strategies in solving similar or new problems, and being able to explain the results according to the original problem. This is in line with Ulya's research (2016) which revealed that students with high learning motivation have good problem solving abilities which can be seen from each problem solving indicator that can be solved.

Based on research results, students with high learning motivation are able to work on questions on their own, are willing to think and try even though the questions they encounter are difficult for the student. Students in the high learning motivation category during the learning process are very active in discussion activities in solving problems and are able to guide friends who have difficulty solving problems and actively ask questions when they don't understand the material being studied, because these students are willing to try to get maximum grades. This is in line with research (Kamaluddin, 2017) which states that students with high learning motivation will create an active learning atmosphere, be enthusiastic about paying attention to each lesson, actively ask and answer questions, and feel like they are in the process of learning and research. Sukmawati & Yenni (2020) which states that in solving mathematical problems, students who have high motivation will be able to solve them well, because by having a strong desire to do something to be more successful, students are motivated to obtain maximum work results.

3.2.2.2 Students' Mathematical Problem Solving Ability Based on Moderate Learning Motivation

Based on the results of the analysis of subjects with moderate learning motivation that has been carried out, it can be concluded that subjects with the moderate learning motivation category are able to identify the elements that are known, what is being asked, and the adequacy of the information required, tend to be able to formulate problems and create mathematical models correctly, tend to be able to apply strategies in solving similar or new problems, and tend to be able to explain the results in accordance with the original problem. Students with moderate learning motivation sometimes forget the formulas and strategies that must be used to solve problems, so that when solving problems students become hampered. This is in line with research by Agsya et al. (2019) which revealed that students with moderate learning

motivation have relatively moderate mathematical problem solving abilities and errors usually occur when students apply strategies that have been formulated to find the right answer.

Based on the results of the study, students with moderate learning motivation tended to be able to work on the questions, but sometimes doubted the answers they had obtained and students were often in a hurry in working on the questions so that they were not optimal. During the interviews it can be seen that students with learning motivation said they were in a hurry in working on the questions and looked doubtful when answering even though the answers were correct. At the time of learning when they did not understand the meaning of the questions, students wanted to ask the teacher and said they understood the problem after it was explained, but when given a new problem, students looked confused to do it. This is in line with research by Prabowo et al. (2020) which revealed that students with moderate learning motivation when working on questions seemed more rushed and sometimes confused about the problems faced which resulted in less optimal work being completed.

3.2.2.3 Students' Mathematical Problem Solving Ability Based on Low Learning Motivation

Based on the results of the analysis of subjects with low learning motivation that has been carried out, it can be concluded that subjects with low learning motivation tend to be unable to identify the elements that are known, what is asked and the adequacy of the information needed, are unable to formulate problems and make mathematical models correctly, do not able to apply strategies in solving similar or new problems, and unable to explain the results according to the original problem. In line with research by Agsya et al. (2019) which shows that students with low learning motivation are unable to choose the strategy used in solving problems and do not know the right strategy for the problem at hand resulting in students not being able to solve problems properly.

Based on the results of the study, students with low learning motivation were less able to solve problems, even when students received questions they were lazy to work on them and only expected instant answers. Students seemed not interested in working on the questions after reading the questions that were distributed and just waiting for answers from other friends while playing with objects around them and sometimes even playing pranks on their friends. Students tend to give up easily when they cannot solve a problem, it can be seen that during interviews many questions cannot be answered and more often the answers "don't know", "forget", "can't" and do not show enthusiasm in answering questions. During the learning process, students also occasionally appear to be sleeping and during discussions students do not dare to express opinions. This is in accordance with research (Prabowo et al., 2020) which revealed that students with low learning motivation did not have the enthusiasm to learn, just wanted to be lazy and seemed to be more busy playing than studying.

4. Conclusion

Based on the results of research on mathematical problem solving abilities in terms of student learning motivation through the MURDER learning model assisted by animated videos, it was concluded that the MURDER learning model assisted by animated videos was effective on mathematical problem solving abilities. This is shown by the results (1) the proportion of students who completed learning through the MURDER learning model assisted by animated videos was more than 75%, (2) the proportion of students who completed the class with the MURDER learning model assisted by animated videos was more than the proportion of students who completed the class with expository learning model, (3) the average test result of students' mathematical problem solving ability in the class with the MURDER learning model assisted by animated videos is more than the average test result of students' mathematical problem solving ability in the class with the expository learning model and each level of learning motivation has different mathematical literacy abilities, namely: (1) students' mathematical problem solving abilities through the MURDER learning model assisted by animated videos from subjects with high learning motivation, able to identify elements that are known, what is being asked, and the adequacy of the information needed, able to formulate problems and create models mathematics correctly, able to apply strategies in solving similar or new problems, and able to explain the results according to the original problem (2) students' mathematical problem solving abilities through the MURDER learning model assisted by animated videos from the subject of moderate learning motivation, able to identify known elements, asked and the adequacy of the information required, tend to be able to formulate problems and create mathematical models correctly, tend to be able to apply strategies in solving similar or new problems, and tend to be able to explain the results according to the original problem, (3) students' mathematical problem solving abilities through models MURDER learning assisted by animated videos from low learning motivation

subjects tends to be unable to identify known elements, what is being asked and the adequacy of the information needed, unable to formulate problems and create mathematical models correctly, unable to apply strategies in solving similar or new problems, and unable to explain the results according to the original problem.

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