Pengaruh Model Problem Based Learning Menggunakan LKPD Kontekstual terhadap Kemampuan Pemecahan Masalah Matematika Siswa SMP

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Abstrak

Kemampuan pemecahan masalah matematika perlu dimiliki siswa untuk dapat menyelesaikan persoalan matematika yang kompleks. Kemampuan pemecahan masalah matematika terdiri dari pemahaman, perencanaan, penyelesaian, dan pemeriksaan Kembali. Kemampuan-kemampuan ini dapat dilatih melalui penerapan model pembelajaran yang tepat. Salah satu model yang dapat digunakan adalah model *problem based learning.* Penelitian ini bertujuan untuk mengetahui pengaruh model pembelajaran *problem based learning* menggunakan LKPD kontekstual terhadap kemampuan pemecahan masalah matematika siswa SMP. Jenis penelitian yang dilakukan adalah penelitian eksperimen semu dengan desain penelitian *One Grup Pretest-Posttest Design.* Populasi dalam penelitian ini adalah seluruh peserta didik kelas VII SMP Negeri 12 Lebong tahun pelajaran 2021/2022. Sampel dalam penelitian ini adalah peserta didik kelas VIIA yang berjumlah 23 siswa sebagai kelas eksperimen yang diambil dengan teknik *sampling* purposif. Instrumen yang digunakan pada penelitian ini adalah lembar tes kemampuan pemecahan masalah yang berbentuk soal uraian. Analisis data menggunakan statistika deskriptif dan inferensial. Hasil penelitian menunjukkan bahwa terdapat perbedaan kemampuan pemecahan matematika siswa sebelum dan sesudah pembelajaran. Berdasarkan hasil penelitian, dapat disimpulkan bahwa terdapat pengaruh yang signifikan pada model *pembelajaran problem based learning* terhadap kemampuan pemecahan masalah matematika pada siswa kelas VII SMP Negeri 12 Lebong.

Kata Kunci: eksperimen semu, kemampuan pemecahan masalah, problem based learning

The Effect of Problem Based Learning Models Using Contextual Worksheets on Middle School Students' Mathematical Problem Solving Ability

Abstract

Students need to have mathematical problem solving abilities to be able to solve complex mathematical problems. Mathematical problem solving abilities consist of understanding, planning, solving, and reviewing. These abilities can be trained through the application of appropriate learning models. One model that can be used is the problem based learning model. This study aims to determine the effect of the problem based learning model using contextual student worksheet on the mathematical problem solving ability of the junior high school students. This type of research is a quasi-experimental research with a research design of One Group Pretest-Posttest Design. The population in this study were all seventh grade students of SMP Negeri 12 Lebong in the 2021/2022 academic year. The sample in this study were class VIIA students, totaling 23 students as an experimental class taken by purposive sampling technique. The instrument used in this study was a problem-solving ability test sheet in the form of description questions. Data analysis using descriptive and inferential statistics. The results showed that there were differences in students' math solving abilities before and after learning. Based on the research results, it can be concluded that there is a significant influence on the Problem Based Learning model on mathematical problem solving in class VII students of SMP Negeri 12 Lebong.

Keywords: problem based learning; problem solving ability; quasi experiment

INTRODUCTION

Mathematics is a branch of science that has an important role in human life, and is the basis for other sciences (Septiyani et al., 2017). Therefore, mathematics is one of the subjects that must be studied by students from elementary school to university level, in order to equip students with several competencies in education and can be used to solve problems in everyday life. Many people think that mathematics is a subject that is very difficult for students to master, such as material related to everyday life (Malini et al., 2020). One of the problems related to everyday life is in social arithmetic material.

Social arithmetic is one of the mathematics lessons whose material is related to everyday life. For example, financial calculations include studying material related to buying and selling, profit or loss, discounts, single interest, taxes, and everything related to trade. Social arithmetic is very close to everyday life, such as discounts, profits, profits, losses, gross, net, selling prices, buying prices and so on (Sari et al., 2018). This material is material that is quite difficult for junior high school students, because the questions presented are usually in the form of word problems and it is difficult for students to understand the intent and translate word problems into mathematical form (Isnawati & Rosyana, 2021). This can be seen from the problem solving ability of students in solving questions on social arithmetic material which is still low (Sumartini, 2016).

The low problem-solving ability is evidenced from the initial ability test by giving one question to class VIII students of SMPN 12 Lebong. It can be seen from the aspect that is assessed that the level of problem-solving ability in these students is low, with a total of 19 students, 59.64% unable to understand given problems, 64.91% could not plan problem solving, 52.63% could not solve the problem according to plan, and 75.43% could not re-check the answers obtained. The low problem-solving ability of students is due to not being used to solving problems that require aspects of understanding, planning, solving, and re-examining. Students are used to working on problems just by imitating them, without understanding the intent of the questions given. So that the method of solving given is not precise and structured, because they are not used to it and are only fixated on the example questions given by the teacher. So problem solving is very important because problem solving is a means of learning mathematical ideas and math skills (Susanto, Susanta, et al., 2020). Therefore problem solving ability is considered important.

In line with the importance of problem-solving skills in mathematics lessons, educators have some difficulty in choosing the right learning model, because there are many learning models that can be used in mathematics. So that it causes educators to be confused about choosing the right model to be applied in the mathematics learning process. Therefore, researchers will use a learning model that can make students think actively and play an active role during the learning process. One of the learning models that influence the ability to solve mathematical problems is learning using the Problem Based Learning model.

The Problem-Based Learning (PBL) Learning Model is a collection of learning activities that emphasize problem-solving skills. Students in PBL are given the task of developing their ability to acquire new knowledge, solve problems in a variety of mathematical contexts, and use a variety of strategies to reflect on the mathematical problem solving process (Simamora et al., 2017). Problem Based Learning (PBL) is a learning model that orients students to real problems at the beginning of learning so that it stimulates students to construct knowledge through group discussion activities to solve contextual problems presented (Jailani et al., 2018). The characteristics of PBL are: 1) starting with a problem, 2) problems related to the real world, 3) problem-oriented learning, 4) giving confidence to students in the learning process, 5) in groups, 6) students are asked to demonstrate what they have learned (Ngalimun, 2014). Problem Based Learning can also support student activity in learning, one of which is mathematics, this learning is based on the principle that problems can be used as a starting point to gain new knowledge (Susanto, Rusdi, et al., 2020).

The problems presented in this study are expected to influence students from the model used in understanding the given concept (Yusri, 2018). The importance of looking at the effect of the Problem Based Learning model on students' mathematical problem solving abilities is to find out whether the model can be applied in schools or not. In line with the results of the study (Tanti et al., 2020) there is

an effect after applying the Problem Based Learning model to students' mathematical problem solving abilities. Evidenced by the application of the Problem Based Learning model, students better understand problems, plan problems, solve problems according to plan, and check again or interpret solutions. This research is different from previous researches. This study uses contextual student worksheets (LKPD), namely worksheets that are developed according to the stages of the problem based learning model and use contextual problems in everyday life.

Based on the description above, it encourages researchers to examine whether there is an effect of the Problem Based Learning model using contextual student worksheets (LKPD) on students' problem solving abilities. Based Learning model. This study aims to determine the effect of the problem based learning model using contextual student worksheet on the mathematical problem solving ability of the junior high school students.

METHOD

This research is an experimental research with quasi-experimental. The focus of the research is the effect of the problem-based learning model using contextual student worksheet (LKPD) on students' mathematical problem-solving abilities. The design used in the one group pretest-posttest design, namely research conducted on one research sample, namely the experimental group before being given treatment and after being given treatment. The population in this study were all class VII students of SMPN 12 Lebong for the 2021/2022 academic year, consisting of 3 classes. In this study, researchers used purposive sampling. purposive sampling is a sampling technique with certain considerations. The research sample was determined based on the results of the odd semester final exams. The sample used was class VII A which consisted of 23 students, with details of 12 female students and 11 male students. The time for conducting the research is in May-June 2022.

The data collection technique used in this study was to provide an initial ability test (pretest) and a final ability test (posttest). The test instrument used is 7 Problem Solving Ability (PSA) questions in the form of description questions which contain four PSA indicators. The following is the student PSA test scoring rubric.

Table 1. Scoring Indicators of Problem Solving Ability

Num.		Rated Aspect of Reaction to Problems/Problems	Score
1	Understand the problem	Students do not write down what is known or what is asked in the problem	0
		Students write down what is known or asked in the question correctly	1
		Students write down what is known and asked in full and correctly based on the questions on the question sheet correctly	2
2	Plan solution of problem	Students do not write down any plans to solve the problems in the questions	0
		Students make plans that are correct but incomplete	1
		Students make the correct plan according to the procedure and lead to the correct solution	2
3	Carry out the plan of problem solution	Students do not solve the problems that have been prepared	0
		Students solve problems incorrectly	1
		Students carry out the correct completion procedure but miscalculate	2
		Students solve problems correctly and use the correct procedures.	3
4	Conclude	Students do not write conclusions or do not answer what is asked of the problem	0
		Students write conclusions or answer what is asked appropriately	1

Source: modification of (Anggraeni & Kadarisma, 2020)

Next, the researcher analyzed the results of the PSA tests that had been done by the students. This is done to determine the percentage of achievement indicators of problem solving abilities that have been achieved by students. The formula used is as follows:

$$Final\ Score = \frac{Total\ of\ Obtained\ Score}{Maximum\ Score} x100 \quad ...... (1)$$

After obtaining the final score of students' mathematical problem solving ability, the scores are grouped based on the following categories:

Table 2. Problem Solving Ability Category

Range of Final Score (FS)	Level of Problem Solving Ability
$90 \leq FS \leq 100$	Very High
$80 \leq FS \leq 89$	High
$65 \leq FS \leq 79$	Fairly High
$55 \leq FS \leq 64$	Low
$0 \leq FS \leq 54$	Very Low

Source : (Sagita et al., 2018)

Data analysis techniques use descriptive and inferential statistics. The hypothesis is as follows:

$H_0 : \mu_1 = \mu_2$, There is no significant positive effect on the problem-based learning model on the ability to solve mathematical problems in class VII students of SMP Negeri 12 Lebong.

$H_1 : \mu_1 > \mu_2$, there is a significant influence on the problem-based learning model on the ability to solve mathematical problems in class VII students of SMP Negeri 12 Lebong.

Information:

μ_1: The average value after receiving treatment (posttest) with the Problem Based Learning model.

μ_2: Average value before getting treatment (pretest)

RESULTS

This research was conducted by applying the problem-based learning model by focusing on improving students' mathematical problem-solving abilities. The research was conducted in 8 meetings including 2 meetings with pretest-posttest and 6 meetings with learning using the problem-based learning model. Before the pretest-posttest was used for the research sample class, the questions were logically validated and tested on the class that had studied the material. After testing it on students. The test results (empirical validity, reliability, differential power, and item difficulty level) analyzed by the researchers showed that 8 questions were made and 7 questions that could be used as pretest and posttest questions. Whereas 1 question has poor discriminating power, meaning that the question cannot distinguish answers between students in the class. So to avoid retesting the revised questions, there are only 7 questions that can be used.

After logical validation and test questions, the researcher then conducted a pretest to the research sample class to find out the student's initial ability test before being given treatment in the form of a problem-based learning model. Furthermore, after being given the treatment students were asked to take a final ability test (posttest). The recapitulation of student KPM test results after being given the pretest and posttest is as follows.

Table 3. Result of Pretest-Posttest

Descriptive	Total of Students	Mean Score
Pretest	23	33,78
Posttest	23	69,00

Based on table 3 it can be seen that the average value of the posttest is higher than the pretest. This means that learning using the problem based learning model has increased in social arithmetic material. After the results of the posttest and pretest were obtained, the results were carried out by analyzing the prerequisite tests, namely the normality and homogeneity tests to determine the hypothesis test to be used. The normality test was carried out to find out whether the distribution of data is normally distributed or not (Lestari & Yudhanegara, 2015). The normality test is carried out using the Shapiro Wilk test, the formula is as follows:

$$T_3 = \frac{1}{D}\left[\sum_{i=1}^{n} ai(X_{n-i+1} - X_1)\right]^2 \text{ with } D = \sum_{i=1}^{n}(x_i - \bar{x})^2$$

Source : (Cahyono, 2015)

With a_i is coefficient of Shapiro wilk, X_{n-i+1} is Number at n-i+1, X is number at i, and $\bar{X}$ is mean. From the calculations that have been carried out using SPSS software and manual calculations, the normality test results are obtained as follows:

Tabel 4. Uji Normalitas Data

	Shapiro-Wilk		
	Sig	Real Level	Information
Pretest	0,808	0,05	Normal Distributed Data
Posttest	0,431	0,05	Normal Distributed Data

Based on the results obtained in table 4, the pretest and posttest results in the research class have a sig. > significant level (α) = 0.05, then H_0 is accepted so that the pretest and posttest data are normally distributed. Homogeneity test is carried out using Fisher's test, the formula is as follows:

$$F= \frac{Largest\ Variance}{Smallest\ Variance} \quad …… (2)$$

(Lestari & Yudhanegara, 2015)

From the calculations that have been carried out using SPSS software and manual calculations, the homogeneity test results are obtained as follows:

Table 5. Result of *Fisher* Test

F_{count}	F_{table}	Information
1,93	2,047	Accepted H_0

Based on table 5, it can be seen that the value of F_{count} = 1,93 and the value of F_{table} = 2,047 so based on the test criteria if $F_{count} < F_{table}$ then H_0 is accepted. So, it can be concluded that the pretest learning outcomes data and posttest learning outcomes are homogeneous.

After the posttest data is known to be normally distributed and homogeneous, the pretest-posttest data is tested for the hypothesis to find out whether there is a significant effect of the problem based learning learning model on the ability to solve mathematical problems in class VII students of SMP Negeri 12 Lebong. The hypothesis test used in this study was the t-test (paired sample t-test) to determine the difference in the mean of two paired samples. The following is the t-test formula used:

$$t_{count} = \frac{\bar{X}_D}{\sqrt{\frac{\sum d^2}{N(N-1)}}} \quad …… (3)$$

(Lestari & Yudhanegara, 2015)

With $\bar{X}_D$, namely the average of the differences in data pairs, d, namely $D - \bar{X}_D$, N, which is a lot of data. From the calculations that have been done using SPSS software and manual calculations, the following results are obtained from the hypothesis test.

Table 6. Result of t Test of Pretest and Posttest

t_{count}	t_{table}	Information
14,3	2,07	Rejected H_0

Based on table 6, with the calculations using Microsoft Excel above, it can be seen that the t_{count} value = 14,3 and t_{table} value = 2,07. Because t_{count} = 14.3> t_{table} = 2.07 then H_0 is rejected and H_1 is accepted.

As for the recapitulation of the achievement of mathematical problem solving abilities of research class students as follows:

Table 7. Percentage of Achievement of Problem Solving Ability indicators

Indicator	*Pretest*			*Posttest*		
	Σ Test Item Score	Percentage	Info.	Σ Test Item Score	Percentage	Info.
Understand the Problem	261	81%	High	258	80%	High
Plan Solution Problem	165	51%	Low	219	68%	Fairly High
Carry out the Plan	82	17%	Very Low	366	76%	Fairly High
Conclude	38	24%	Very Low	131	81%	High
Mean		43%	Very Low		76%	Fairly High

Based on table 7, it can be seen from the average that there is an increase before being given and after being given treatment of the math problem solving abilities of junior high school students on social arithmetic material.

DISCUSSION

Based on the research results, it was found that learning with the Problem Based Learning model using contextual student worksheets (LKPD) for problem solving abilities was better than learning before being given treatment in the form of a Problem Based Learning model. This is supported by the hypothesis test, namely the t-test using the SPSS for windows software, the value is sig(2-tailed) = 0.000 <α = 0.05, thenH_0 rejected and H_1 is accepted, which means that the t-test calculation shows that there is a significant influence significant in the problem based learning model on the ability to solve mathematical problems in class VII students of SMP Negeri 12 Lebong. This is in line with previous research, where in this study it was found that by using the Problem Based Learning model students' understanding of problem solving was better than direct learning (Tanti, et al., 2020). The PBL model has a significant effect on the ability to solve mathematical problems (Monica et al., 2019). This is because the Problem Based Learning model consists of several syntaxes that really support the steps in problem solving, as follows:

The first step is to orient students to the problem. In this step, students are given the problems that exist in the LKPD in groups, students are asked to observe the problems that exist in the LKPD. Through the activity of observing the problem given, it can generate curiosity to investigate the problem given. The process of observing which is carried out in groups can optimize thinking skills, students can hone, test and develop their thinking skills in solving problems (Rusman, 2016). So that in this step can get students involved in problem solving activities and students can understand the problems that exist in LKPD. Therefore, students can understand the purpose of the problem. So that students can collect and understand the information in the problems given. The purpose of this step is so that students can understand the problems given before working on the questions properly.

The second step is to organize students to learn. Where in this step students work in groups/groups with their peers in completing information related to problem solving on problem orientation. Furthermore, students collect the information obtained and answer the questions in the LKPD, such as what is asked and what is known. This stage of organizing students to learn supports steps in problem solving, namely understanding the problem. By polya namely understanding the problem. In the LKPD, it can be seen from the answers the students were able to collect what information was known and asked.

In the third step, namely guiding individual and group investigations. In this step, students are asked to choose the best ways to solve problems. The teacher acts as a facilitator to direct the information needed to solve the problem, what must be done to solve the problem. At this step students are asked to plan what steps must be completed to solve the problem, then students are asked

to solve the problem. This activity supports steps in problem solving, namely Devising a plan and Carrying out the plan.

In the fourth step, namely developing and presenting their work, at this stage students are asked to complete their LKPD and present the results of their discussions in front of the class. In this case, you can hone your speaking skills and answer questions in public. Furthermore, in the fifth step, namely analyzing and evaluating the solving process, at this stage students are asked for their answers and write down the conclusions they have worked on. This activity supports steps in problem solving, namely looking back (looking back at the solutions obtained).

As for the description of the implementation of student activities with the Problem Based Learning model. The first step is to orient students to the problem. At this stage the teacher explains the steps for working on the LKPD and students are asked to listen to the teacher's explanation of the steps explained by the teacher. Next, the teacher poses problems in the LKPD. Then students were asked to listen to the teacher's explanation of the problems raised by the teacher in the LKPD, so the first stage had been carried out.

In the second stage, namely organizing students to study, at this stage students are asked to understand problem 1 and problem 2 in the LKPD and collect information that is known and asked each group to discuss problem 1. Then the teacher gives students the opportunity to ask about things that are not understood from the problems given. And then students are directed to fill in the parts that are known and asked on the LKPD.

In the third stage, namely guiding individual and group investigations. At this stage, before solving problem 1, students are given problem 2 to find the concept. Students are asked to solve problem 2 in the LKPD according to the information that has been obtained from the previous activity, then continue solving problem 1 in solving problem one there are several steps, namely students are asked to plan what activities are carried out to solve the problems in the LKPD, Students are asked to solve problems based on the plans that have been made.

In the fourth stage, namely developing and presenting their work, at this stage students prepare the results of their discussions on the sheets provided in the LKPD and students present the results of their discussions in front of the class. Furthermore, the last stage or stage 5 is to analyze and evaluate the process of solving student problems. Students are asked to re-examine the answers that have been made and make conclusions from the answers that have been answered, write down the conclusions that have been found in solving problem 1, problem 2 and the problem at the reflection stage. In the learning process from stage 1 to stage 5, it has been explained from meeting 1 to meeting 6.

The results of this study are in line with research entitled "The Effect of Problem Based learning model LKPD assisted on student's problem solving ability in Senior High School" (Wahyuni et al., 2018). The results of this study indicate that based on the indicators obtained that students taught by problem based learning models have higher problem solving abilities than students taught by conventional learning. Another study by (Saragih et al., 2022) entitled "The Effect of The LKPD-Based PBL Model on Mathematical Problem Solving Abilities of Seventh Grade Students of SMP N 1 Kisaran", also showed that the results of the mathematical problem solving abilities of students who followed the problem based learning model that assisted by LKPD were higher than those of students who followed conventional learning models. Those means that the problem based learning model using LKPD has an effect on the ability to solve mathematical problems.

CONCLUSION

Based on the results and discussion, it can be concluded as follows that there is an effect of the Problem Based Learning model using contextual student worksheet (LKPD) on the mathematical problem solving abilities of junior high school students on social arithmetic material.

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BIBLIOGRAPHY

Anggraeni, R., & Kadarisma, G. (2020). Analisis Kemampuan Pemecahan Masalah Matematik Siswa SMP Kelas VII pada Materi Himpunan. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *4*(2), 1072–1082. https://doi.org/https://doi.org/10.31004/cendekia.v4i2.334

Cahyono, T. (2015). *Statistik Uji Normalitas*. Yayasan Sanitarian Banyumas (Yasamas).

Isnawati, & Rosyana, T. (2021). Analisis Kesalahan Siswa dalam Menyelesaikan Soal Aritmatika Sosial. *Jurnal Pendidikan Matematika*, *4*(3), 675–682. https://doi.org/10.22460/jpmi.v4i3.675-682

Jailani, Sugiman, Retnawati, H., Bukhori, Apino, E., Djidu, H., & Arifin, Z. (2018). *Desain Pembelajaran Matematika Untuk Melatih Higher Order Thinking Skills* (H. Retnawati, Ed.). UNY PRESS.

Lestari, K. E., & Yudhanegara, M. R. (2015). *Penelitian Pendidikan Matematika*. PT Refika Aditama.

Malini, R., Hanifah, & Agustinsa, R. (2020). Pengaruh Strategi REACT Terhadap Kemampuan Pemahaman Konsep Matematis Peserta Didik Kelas VIII SMP. *Jurnal Penelitian Pembelajaran Matematika Sekolah (JP2MS)*, *4*(3), 363–373. https://doi.org/https://doi.org/10.33369/jp2ms.4.3.363-373

Monica, H., Kesumawati, N., & Septiati, E. (2019). Pengaruh Model Problem Based Learning Terhadap Kemampuan Pemecahan Masalah Matematis dan Keyakinan Matematis Siswa. *MaPan : Jurnal Matematika Dan Pembelajaran*, *7*(1), 155–166. https://doi.org/10.25139/smj.v8i1.2537

Ngalimun. (2014). *Strategi dan Model Pembelajaran*. Aswaja Pressindo.

Rusman. (2016). *Model-Model Pembelajaran : Mengembangkan Profesionalisme Guru*. PT RajaGrafindo Persada.

Sagita, I., Medriari, R., & Purwanto, A. (2018). Penerapan Creative Problem Solving Model untuk Meningkatkan Kemampuan Pemecahan Masalah Fisika Siswa Kelas XI MIA 4 MAN 2 Kota Bengkulu. *Jurnal Kumparan Fisika*, *1*(3), 2–6. https://doi.org/https://doi.org/10.33369/jkf.1.3.1-6

Saragih, E. M., Astuti, D., Silaen, N. E., Ray, S. A., & Sartika, M. (2022). Pengaruh Model Problem Based Learning (Pbl) Berbantuan Lkpd Terhadap Kemampuan Pemecahan Masalah Matematis Siswa Kelas Vii Smp N 1 Kisaran. *Prosiding Seminar Nasional Multidisiplin Ilmu Universitas Asahan Ke-5*, 141–149.

Sari, A. M., Susanti, N., & Rahayu, C. (2018). Analisis Kesalahan Siswa Dalam Menyelesaikan Soal Cerita Pada Materi Aritmatika Sosial. *JP3M Jurnal Penelitian*

Pendidikan Dan Pengajaran Matematika, *4*(2), 61–68. https://doi.org/10.33369/jp2ms.4.3.455-463

Septiyani, D. Y., Yensy, N. A., & Maizora, S. (2017). Pengaruh Penerapan Pendekatan Pembelajaran Scientific Terhadap Hasil Belajar Matematika Siswa Di Kelas Viii. *Jurnal Penelitian Pembelajaran Matematika Sekolah (JP2MS)*, *1*(2), 127–136. https://doi.org/https://doi.org/10.33369/jp2ms.1.2.127-136

Simamora, R. E., Rotua Sidabutar, D., & Surya, E. (2017). Improving Learning Activity and Students' Problem Solving Skill through Problem Based Learning (PBL) in Junior High School. *International Journal of Sciences: Basic and Applied Research (IJSBAR) International Journal of Sciences: Basic and Applied Research*, *33*(2), 321–331. http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Sumartini, T. S. (2016). Peningkatan Kemampuan Pemecahan Masalah Matematis Siswa melalui Pembelajaran Berbasis Masalah. *Jurnal Mosharafa*, *5*(2), 148–158. https://doi.org/10.31980/mosharafa.v5i2.270

Susanto, E., Rusdi, & Susanta, A. (2020). Peningkatan Kepercayaan Diri Mahasiswa Dalam Pembelajaranstatistika Dasar Melalui Problem Based-Learning Increase. *Jurnal The Original of Mathematics*, *4*(2), 179–184.

Susanto, E., Susanta, A., & Rusdi. (2020). Efektivitas Project Based Learning Terhadap Kemampuan Pemecahan Masalah Dan Berpikir Kritis Mahasiswa. *Jurnal THEOREMS (The Original Research of Mathematics)*, *5*(1), 61–68.

Tanti, Rahim, U., & Samparadja, H. (2020). Pengaruh Model Problem Based Learning Terhadap Kemampuan Pemecahan Masalah Matematis Siswa Kelas VII Smp Negeri 14 Kendari. *Jurnal Penelitian Pendidikan Matematika*, *8*(2), 169–182. https://doi.org/10.36709/jppm.v8i2.13659

Wahyuni, P., Astuti, D., & Ijuddin, R. (2018). Pengaruh Model Pembelajaran Berbasis Masalah Berbantuan Lkpd Terhadap Kemampuan Pemecahan Masalah Siswa Di SMA. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa*, *7*(9), 1–9.

Yusri, A. Y. (2018). Pengaruh Model Pembelajaran Problem Based Learning Terhadap Kemampuan Pemecahan Masalah Matematika Siswa Kelas VII di SMP Negeri Pangkajene. *Jurnal Musharafa*, *7*(1), 51–62. https://doi.org/10.31980/mosharafa.v7i1.341