
THE EFFECT OF PROBLEM BASED LEARNING MODEL ON JUNIOR HIGH SCHOOL STUDENTS' PROBLEM SOLVING ABILITY

Shofia Hanifa¹, Muhammad Afrilianto², Risma Amelia³

¹IKIP Siliwangi, Jl. Terusan Jend. Sudirman, Cimahi, Indonesia.

shofiahanifa@gmail.com

²IKIP Siliwangi, Jl. Terusan Jend. Sudirman, Cimahi, Indonesia.

muhammadafrilianto1@gmail.com

³IKIP Siliwangi, Jl. Terusan Jend. Sudirman, Cimahi, Indonesia.

rismaamelia@ikipsiliwangi.ac.id

ARTICLE INFO

Article history:

Received Aug 02, 2023

Revised Aug 03, 2023

Accepted Aug 08, 2023

Keywords:

Problem Solving Ability
Problem Based Learning
Model
Junior High School

ABSTRACT

Students have difficulty solving problem in question such as when solving word problems, asking questions, making steps to solve, and solving problems given. Problem solving skills are a very important part of mathematics curriculum. So the researchers conducted a study that aimed to determine the effect of problem based learning models on problem solving abilities in class VII set material. The development model used is an experimental research type using a quantitative approach. The research data was obtained through test instruments or scores from the problem solving instrument on set material. Data analysis of problem solving abilities was carried out using the t-test. The subjects of this study were 78 students. The sample was taken by simple random sampling, selected class VII D with a total 10 students as the experimental class and 10 from class VII E as the control class. The results of this study indicate that the problem based learning model has an effect on problem solving abilities. This can be seen based on the results of working on essay test question based on students problem solving abilities which get a tcount of 2.5776 while the table value is 2.0378. This means that the value of tcount is greater than t table, so in this case it means that H1 is accepted, meaning that there are differences in mathematical problem solving abilities between the experimental class and the control class. This shows that the problem based learning model has an influence on problem solving abilities.

Copyright © 2024 IKIP Siliwangi.

All rights reserved.

Corresponding Author:

Shofia Hanifa,
Department of Mathematics Education,
Institut Keguruan dan Ilmu Pendidikan Siliwangi,
Jl. Terusan Jend. Sudirman, Cimahi, Indonesia
Email: shofiahanifa@gmail.com

How to Cite:

Hanifa, S., Afrilianto, M., Amelia, R. (2024). The Effect of Problem Based Learning Model on Junior High School Students' Problem Solving Ability. *JIML*, 7(2), 136-144.

INTRODUCTION

Mathematics has an important role in all aspects of life, especially in improving human thinking skills Faoziyah (2022) As for problem solving skills, it is a necessity for students to face the real world and is the educational goal of Shofiyah (2018). Likewise what was conveyed by Hasratuddin (2010) that the formation of dignified attitudes can be obtained from good critical thinking skills. So, in the present time which is filled with life's problems

and challenges, this research activity exists to improve problem solving and critical thinking skills which are very much needed and developed. Thus, the education sector must immediately prepare the nation's next generation who think critically so that they are able to face various challenges and survive in a confident manner. This is in accordance with Wahab & Rosnawati (2021) which states that the ability to solve problems is basically the main goal of the educational process.

Suryadi et al Hikmawati et al., (2021) stated that in their survey on "Current situation on mathematics and science education in Bandung" sponsored by JICA, among other things, they found that solving mathematical problems is one of the mathematical activities that is considered important by both teachers and students. at all levels from elementary school to high school. However, it is still considered as the most difficult part of mathematics both for students to learn and for teachers to teach it. Solving mathematical problems is problem-based learning with real-life problems Darmayanti et al., (2019). According to Wena (2013) problem-based learning is designed to help students develop thinking skills, skills in solving everyday life problems, and intellectual skills.

According to Putri et al., (2019) problem solving is a process of overcoming the difficulties encountered to achieve the expected goals. Furthermore, Mardiah et al., (2020) argued that teaching problem solving skills to students is an activity carried out by a teacher to arouse students to accept and respond to questions posed and guide students to arrive at problem solving. There is a lot of material in learning mathematics that is related to problem solving in everyday life, one of which is set material, where the material studies the collection of objects that have been clearly defined. This set material is a branch of mathematics that very often occurs in social life so it needs to be shown to students the meaning of set material Wassahua (2016). But in reality in the field, based on the results of Wassahua (2016), student learning outcomes in set material are relatively low, according to Suyantana (2022), in the set material many students still have difficulty understanding the problems given. Several relevant studies have examined the ability to solve mathematical problems associated with other learning models, namely: Problem based learning and inquiry (Nadhifah & Aldila Afriansyah, 2016); Multi-representational discourse and reciprocal learning (Tristiyanti & Afriansyah, 2017); Creative problem solving and resource based learning (Sopian & Afriansyah, 2017); Learning trajectory (Kurniawati & Rizkianto, 2018); and Problem centered learning and problem based learning (Rinaldi & Afriansyah, 2019).

In the process of learning mathematics, it is necessary to prioritize problem solving abilities, because by facing problems students will be encouraged to think intensively and creatively in solving the problems they face. This is in line with Lester's opinion Mustamin Anggo (2011) that the main purpose of teaching problem solving in mathematics is not only to equip students with a set of skills or processes, but also to enable students to think about what they think. Thinking about what is thought in this case is related to students' awareness of their ability to develop various ways that might be taken in solving problems.

Based on the results of the researchers' observations, the teaching method of the mathematics teacher at one of the MTs in Bandung district at this time, learning activities were at a level that did not support the improvement of students' problem-solving abilities. In the learning process more emphasis on unproductive thinking, memorization, and only looking for answers, as a result, students' creativity and problem-solving abilities become slightly hampered. According to Paradina (2019) thought processes at a high stage, including creative thinking, are rarely trained so that learning like this can lead to a rigid and less extensive thinking process in understanding problems and their solutions. Basic creative talent is basically owned by everyone, because the tendency or drive to realize the potential is owned by everyone.

So in line with the problem above, one way to overcome this problem is to use problem-based learning methods on the questions given to students. Cinta et al., (2023) states that Problem Based Learning is a learning model that guides in solving problems with five steps, namely: First, orienting students to problems. Second, organizing students to learn. Third, guiding individual and group investigations. Fourth, developing and presenting the work. Fifth, analyze and evaluate the problem solving process. Furthermore, Silver Oktavia et al., (2015) suggests that problem-based learning is an active learning model that involves students as learning subjects who play a major role. Utilization of problem-solving-based description questions can encourage students to learn by solving steps better and according to instructions (Apriliawan et al., 2013), here the teacher also plays an important role in increasing student motivation in learning activities as said by Hanafy (2014) that the teacher must have a method in learning as a strategy that can facilitate students to know the knowledge given.

In addition to the use of problem-solving description questions, to help the learning objectives, namely increasing problem-solving skills and critical thinking, it is also necessary to pay attention to the presentation of problems in learning activities, to make students more interested so that they can stimulate them to be more active and creative (Reta, 2012). This happens because in learning students are directed to be able to solve problems with investigative and investigative methods. Giving problems to learning can train problem-solving skills, critical attitudes, how to work cooperatively in various situations or types of groups, also make learning activities more active (Schettino, 2016).

Based on the explanation above, researchers need real research and research on students to determine the effect of learning models on problem solving abilities and critical thinking.

METHOD

The research technique used by researchers is a type of quantitative research that is processed using statistical methods. The type of research used is experimental research. According to Nikmah et al., (2020) experimental research is a study that seeks to find the effect of certain variables on other variables under tightly controlled conditions.

The subjects of this study were 78 students. The sample was taken by simple random sampling, selected class VII D with a total of 10 students as the experimental class and 10 from class VII E as the control class.

In this study the data collection technique used is the test technique. The type of instrument is a description test which functions to see students' ability to solve problems. The test was then tested in the field to find the validity of the 4 test questions, all of these questions met valid criteria, the reliability test obtained a price value of $r_{11}=0.61$, meaning reliability $0.40 < r_{11} \leq 0.70$, including sufficient correlation, difficulty index test was obtained. 3 moderate category questions and 1 easy category item, and the discriminating power test obtained 3 moderate category questions and 1 good category item. The data were obtained through written problem solving tests, and the documentation obtained involved the majority of student data, photos of answer sheets for mathematical problem solving ability tests, facilities and infrastructure, photos of learning process activities and so on. Steps to draw conclusions from the final test data, then data analysis is carried out in the form of an average comparison.

The ability of students to solve mathematical problem solving between the experimental class and the control class is significant or not based on the results of the final test. The steps needed are to first test normality with the Lilliefors test and test the homogeneity of variance with the F-test. If both are met then proceed with testing the similarity of the two sample class averages with the t-test.

RESULTS AND DISCUSSIONS

Results

The results of this study are increasing problem-solving abilities using problem-based learning methods. Among them by conducting problem-based set test instrument questions, then researchers assessed student test results according to problem solving indicators. The math problem given in 2022/2023 will become a document to determine the quality of problem solving skills in class VII at one of the MTS in Bandung Regency for the 2022 – 2023 academic year.

Data on mathematical problem-solving abilities between experimental classes using problem-based learning models with approaches to control classes using conventional learning models

The final test results obtained are presented in the following table.

Table 1. Summary of Comparison of Class Mathematical Problem Solving Ability Scores

Data	Experiment Class	Control Class
Average	72.58	65.00
Deviation Raw	8.74	8.40
Variance	76.50	70.62

Based on table 1 it can be concluded that the mathematical problem solving abilities of students who use the problem based learning learning model with a different approach to those using conventional learning models when viewed from the variance and average values

Table 2. Summary of Experimental Class Normality Test and Control Class

Data	Experiment Class	Control Class
Subject	10	10
L ₀	0.1443	0.1929
L _{Table}	0.206	0.206
a = 0.05		

Based on table 2 it can be concluded that both sample classes are normally distributed.

Table 3. Summary of Experimental Class Homogeneity Test

Data	Experiment Class	Control Class
Variance	76.50	70.62
F _{Count}		1.082
F _{Table}		2.33
F_{Count} < F_{Table} (Homogen)		

Based on table 3 it can be concluded that the two samples have a homogeneous variance.

After the normality test and homogeneity test of variance of the two classes were carried out, the hypothesis was tested using the t-test analysis. This test is conducted to prove whether the hypothesis is accepted or not. The hypothesis in this study are as follows:

$$H_0: \mu_1 < \mu_2$$

$$H_1: \mu_1 > \mu_2$$

After analyzing the data, the tcount was 2.5776, while the ttable value was 2.0378. This means that the value of tcount is greater than ttable, so in this case it means that H0 is rejected and H1 is accepted, meaning that there are differences in mathematical problem solving abilities between the experimental class and the control class.

Discussions

This study resulted in the conclusion that the problem based learning method can affect students' problem solving abilities and critical thinking on set material. Based on the results of the research above, the author can put forward the discussion as follows: The link between problem-solving abilities and problem-based learning models, namely problem-based learning models, is a learning model that is carried out through group discussions so that students can express opinions to solve a problem and exchange information. This is in line with Alfansyur & Mariyani's research (2019) that appropriate and good learning activities will make it easier for students to achieve learning goals.

This is in accordance with what was stated by Wulandari & Surjono (2013) that problem based learning is giving problems related to everyday life to each group of students to find alternative solutions to these problems. The PBL learning model includes the following learning steps: The first step is the formation of groups (heterogeneous). In this step the teacher divides students into groups of 4-5 people. At the beginning of group formation, all learning objectives and group formation rules were conveyed to students. The rules for group activities are: (1) Group members must work together and support each other; (2) Each member of the group is aware of their respective responsibilities.

The second step, giving conflict (problem). At this step the teacher provides everyday phenomena (problems) related to what will be taught to students. In problem-based learning, learning is centered on the selected problem so that students not only learn concepts related to problems but also scientific methods for solving these problems. This is in line with Sujana's statement Abdurrozak (2016) which states that problem-based learning is a learning that presents various problems so that these problems can be used as springboards for conducting investigations and research. By giving problems to students will encourage student curiosity.

The third step, identify the problem. In this step, students choose the best ways to solve the problem. The teacher acts as a facilitator to direct the information needed to solve

problem, what to do, so that he can develop awareness about his thought process, plan a strategy to solve the problem, and monitor the success of the strategy.

The fourth step, problem solving. At this stage, the teacher encourages students to actively and independently collect data and information from various sources. The teacher asks questions for students to think about the problem and the variety of information needed to arrive at a defensible solution to the problem. Here students sort out, which information is needed and in accordance with the existing problems, and which information is not needed so that students can solve problems properly.

The fifth step, presenting the results. In the step of presenting the results in front of the class. This presentation may be accompanied by a written report. Of course, the presentation of these results is greatly influenced by the level of students' problem-solving abilities. One of the groups came to the front of the class to present their results, while the other groups paid attention and commented on the results obtained by the group presenting in front of the class. Each student in the group is active and free in expressing his opinion. The teacher's role here is to encourage students to be active in expressing their opinions.

The sixth step, evaluation. This step is intended to help students analyze and evaluate their own processes and the investigative and intellectual skills they use. During this phase the teacher asks students to reconstruct the thoughts and activities that have been carried out during the learning process.

In terms of the learning process, the problem-based learning model can involve students actively in learning, especially when organizing students to study, guiding investigations in groups, presenting their work or evaluating the results of problem solving. This is in accordance with what Wulandari & Surjono (2013) stated that problem based learning is progressive active learning centered on unstructured problems often carried out with a team approach that emphasizes skill development related to decision making, discussion and team leadership.

This can be seen when students work on student worksheets, students who don't understand enough ask their friends, while those who already understand explain it to their friends. When group representatives present their work in front of the class, each group has the opportunity to ask questions or correct their friends' answers. In this activity there is interaction between students and other students as well as the interaction of teachers and students.

In problem solving, usually a problem (problem) contains a situation that can encourage someone to solve it but does not immediately know how and also a question will become a problem if the question indicates a challenge that cannot be solved by a routine procedure that is already known. by students.

In the learning process in the classroom, the problem solving abilities of students who use the problem based learning learning model have a higher value than those who do not use the problem based learning learning model. This is because students in the experimental class who use the problem-based learning model are actively involved and can control the learning process, starting from the planning stage, choosing the right strategy according to the problem at hand, then correcting if there is an error.

In the learning process in the classroom that uses the conventional model, the teacher conveys more material, then writes the concepts of the material being taught on the blackboard, and students record what the teacher conveys. During learning activities, students look more passive, the teacher gives lectures, questions and answers, and assignments for students.

This is in line with Rasana's explanation Juliawan et al. (2021) which states that in the learning process that uses conventional models, teachers who are seen to be active in class, teachers give lectures, ask questions and give assignments to students which can result in mathematical problem solving abilities. low students because the learning process is less meaningful. This is in accordance with the explanation of Mawadah & Mulawarman (2021) that meaningfulness in learning mathematics is characterized by awareness of what is done, what is understood and what is not understood by students about facts, concepts, relations and mathematical procedures.

Based on the results of data analysis, it can be seen that there is a significant difference in the ability to solve mathematical problems between groups of students who are taught using the problem-based learning model and groups of students who are not taught using the application of the problem-based learning model. Furthermore, other research conducted by Juliawan et al. (2021) regarding the effect of problem-based learning models on solving math problems for class VII students. This research shows that there is a significant difference in the ability to solve mathematical problems between groups of students who are taught using the problem-based learning model and groups of students who are taught with conventional models.

This research shows that there is a significant difference in the ability to solve mathematical problems between groups of students who are taught using the problem-based learning model and groups of students who are taught with conventional models.

The difference in students' mathematical problem-solving abilities between the experimental class and the control class proves that learning mathematics uses

learning model problem based learning students' mathematical problems. The results of this study are in line with Krisna's research Ahmad & Ika (2010) which revealed that student achievement using the problem-based learning model is much better than without the help of problem-based learning model questions. This is because the problem-based learning model with a more approach provides opportunities for students to participate in learning activities.

Furthermore, in the application of the problem-based learning model, it can have a positive impact that arises during the implementation of learning activities in class. Through the use of problem based learning learning models, students will be aware of their own cognitive activities or anything related to their cognitive activities in solving problems and training students to think independently.

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that the problem-based learning method can influence students' problem-solving abilities and critical thinking. This shows that the problem based learning method is well used in the learning process.

Based on the results of the research that has been done, several suggestions can be put forward, namely first, students are expected to be more active in learning and practicing solving math problems. Second, as an alternative to the problem-based learning model, teachers can use it in learning mathematics to improve students' mathematical problem-solving abilities. Third, it is hoped that there will be further research to determine students' mathematical problem solving abilities at different schools and materials.

ACKNOWLEDGMENTS

The researcher is well aware that at that time the author of this article could not complete it without the help of various parties. Therefore, on this occasion the researcher is very grateful to the principal of MTs Al-Basyariyah, the mathematics teacher, all students of class VII. With its help researchers can complete research and write scientific papers article.

REFERENCES

- Abdurrozak, M. (2016). Aplikasi Pembelajaran Berbasis E-learning pada Pelajaran Agama Islam SMP IT Nur Hidayah Surakarta menggunakan Metode UML. *Report*, 1–21. [http://eprints.ums.ac.id/46143/4/Naskah Publikasi.pdf](http://eprints.ums.ac.id/46143/4/Naskah%20Publikasi.pdf)
- Ahmad, K., & Ika, L. (2010). Pengembangan Bahan Ajar Perkembangan Anak Usia Sd Sebagai Sarana Belajar Mandiri Mahasiswa Kasina Ahmad Ika Lestari. *Perspektif Ilmu Pendidikan*, 22(8), 183–193.
- Apriliawan, A., Gembong, S., & Sanusi, S. (2013). Analisis Kesalahan Penyelesaian Soal Uraian Matematika Siswa Mts Pada Pokok Bahasan Unsur-Unsur Lingkaran. *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, 1(2). <https://doi.org/10.25273/jipm.v1i2.480>
- Cinta, B., Rusman, A., Sumantri, M. S., & Zakiah, L. (2023). *Implementasi Model Pembelajaran Problem Based Learning untuk Meningkatkan Kemampuan Pemecahan Masalah pada Pembelajaran IPS Siswa Kelas V Sekolah Dasar*. 06(01), 6027–6035.
- Darmayanti, N. W. S., Sadia, W., Studi, P., Sains, P., Sarjana, P. P., & Ganesha, U. P. (2019).

- Pengaruh Model Collaborative Teamwork Learning Terhadap Keterampilan Proses Sains dan Pemahaman e-Journal Program Pascasarjana Universitas Pendidikan Ganesha. *E-Journal Program Pascasarjana Universitas Pendidikan Ganesha Program Studi Pendidikan Sains*, 3(2). https://ejournal-pasca.undiksha.ac.id/index.php/jurnal_ipa/article/view/553
- Faoziyah. (2022). Kemampuan Pemecahan Masalah Matematis Siswa melalui Pembelajaran Berbasis Pbl. *JUPE : Jurnal Pendidikan Mandala*, 7(2). <https://doi.org/10.58258/jupe.v7i2.3555>
- Hanafy, M. S. (2014). Konsep dan Pembelajaran. *Lentera Pendidikan*, 17(1), 66–79. http://103.55.216.55/index.php/lentera_pendidikan/article/viewFile/516/491
- Hasratuddin. (2010). Dosen pada Jurusan Matematika FMIPA UNIMED Medan. *Jurnal Pendidikan Matematika*, 4(2), 19–33. <https://doi.org/https://doi.org/10.22342/jpm.4.2.317>
- Hikmawati, H., Suastra, I. W., Suma, K., Sudiatmika, A. A. I. A. R., & Rohani, R. (2021). Effect of Problem-Based Learning Integrated Local Wisdom on Student Hots and Scientific Attitude. *Jurnal Penelitian Pendidikan IPA*, 7(SpecialIssue), 233–239. <https://doi.org/10.29303/jppipa.v7ispecialissue.1118>
- Juliawan, I. W., Bawa, P. W., & Qondias, D. (2021). Dampak Covid-19 Terhadap Implementasi Pembelajaran Daring Di Sekolah Dasar. *Jurnal Ilmiah Pendidikan Citra Bakti*, 8(2), 157–169. <https://doi.org/10.38048/jipcb.v8i2.342>
- Mardiah, M., Fauzan, A., Fitria, Y., Syarifuddin, H., F, F., & Desyandri, D. (2020). Pengaruh Pendekatan Realistic Mathematic Education terhadap Pemahaman Konsep dan Disposisi Matematis Siswa Sekolah Dasar. *Jurnal Basicedu*, 4(2), 513–521. <https://doi.org/10.31004/basicedu.v4i2.340>
- Mawadah, Z., & Mulawarman, M. (2021). Keefektifan Bimbingan Kelompok Dengan Teknik Permainan untuk Meningkatkan Perilaku Altruis Siswa. *Counsnesia Indonesian Journal Of Guidance and Counseling*, 2(1), 61–71. <https://doi.org/10.36728/cijgc.v2i1.1450>
- Mustamin Anggo. (2011). Pelibatan Metakognisi dalam Pemecahan Masalah Matematika. *Pelibatan Metakognisi dalam Pemecahan Masalah Matematika*, 01(April), 25–32. <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjR0q2gwfH7AhUMx3MBHaDHCqcQFnoECBYQAQ&url=https%3A%2F%2Fonline-journal.unja.ac.id%2Fedumatica%2Farticle%2Fdownload%2F188%2F6839%2F348&usg=AOvVaw1-EFAim0cReZBbRfxSNckB>
- Nadhifah, G., & Aldila Afriansyah, E. (2016). Peningkatan Kemampuan Pemecahan Masalah Matematis Siswa dengan Menerapkan Model Pembelajaran Problem Based Learning dan Inquiry. *Jurnal Pendidikan MatematikaSTKIP Garut*, 5(1), 4280.
- Nikmah, D. A. A., Setyawan, A., & Citrawati, T. (2020). Analisis Keterampilan Berbicara pada Pembelajaran Bahasa Indonesia Siswa Kelas IV SD Negeri Buluh 2. *Prosiding Nasional Pendidikan: LPPM IKIP PGRI Bojonegoro*, 618–625.
- Oktavia, A., Dan, A., & Saadi, P. (2015). Pengaruh Model Problem Based Learning (Pbl) Berbasis Aktivitas Metakognisi Terhadap Kemampuan Memecahkan Masalah Kelarutan dan Hasil Kali Kelarutan Pada Siswa Kelas Xi Sma Negeri 2 Banjarmasin. *Jurnal Inovasi Pendidikan Sains*, 6(2), 11–22.
- Paradina. (2019). Pengaruh Model Pembelajaran Problem Based Learning Terhadap Hasil

- Belajar Siswa Di Kelas X. *Jurnal Kumparan Fisika*, 2(3), 169–176. <https://doi.org/10.33369/jkf.2.3.169-176>
- Putri, R. S., Suryani, M., & Jufri, L. H. (2019). Pengaruh Penerapan Model Problem Based Learning terhadap Kemampuan Pemecahan Masalah Matematika Siswa. *Mosharafa: Jurnal Pendidikan Matematika*, 8(2), 331–340. <https://doi.org/10.31980/mosharafa.v8i2.471>
- Reta, K. I. (2012). Pengaruh Model Pembelajaran Berbasis Masalah Terhadap Keterampilan Berpikir Kritis Ditinjau Dari Gaya Kognitif Siswa. *Pengaruh Model Pembelajaran berbasis Masalah Terhadap Keterampilan Berpikir Kritis Ditinjau Dari Gaya Kognitif Siswa*, 2, 1–17. https://ejournal-pasca.undiksha.ac.id/index.php/jurnal_ipa/article/view/403
- Rinaldi, E., & Afriansyah, E. A. (2019). Perbandingan Kemampuan Pemecahan Masalah Matematis Siswa antara Problem Centered Learning dan Problem Based Learning. *NUMERICAL: Jurnal Matematika Dan Pendidikan Matematika*, 3(1), 9–18. <https://doi.org/10.25217/numerical.v3i1.326>
- Schettino, C. (2016). Framework for problem-based learning: Teaching mathematics with a relational problem-based pedagogy. *Interdisciplinary Journal of Problem-Based Learning*, 10(2). <https://doi.org/10.7771/1541-5015.1602>
- Shofiyah. (2018). Model Problem Based Learning (PBL) Dalam Melatih Scientific Reasoning Siswa , *Jurnal Penelitian Pendidikan Ipa*. 3(1), 33–38. <https://doi.org/10.26740/jppipa.v3n1.p33-38>
- Suyantana, I. N. (2022). Analisis Hasil Belajar Siswa Ditinjau dari Minat Belajar pada Materi Himpunan. *Linear : Jurnal Ilmu Pendidikan*, 6(1), 15–34. <https://doi.org/10.53090/jlinear.v6i1.288>
- Wahab, G., & Rosnawati. (2021). Teori-Teori Belajar Dan Pembelajaran. In *Paper Knowledge . Toward a Media History of Documents* (Vol. 3, Issue April). [http://repository.uindatokarama.ac.id/id/eprint/1405/1/TEORI-TEORI BELAJAR DAN PEMBELAJARAN.pdf](http://repository.uindatokarama.ac.id/id/eprint/1405/1/TEORI-TEORI%20BELAJAR%20DAN%20PEMBELAJARAN.pdf)
- Wassahua, S. (2016). Jurnal matematika dan pembelajarannya 2013. *Jurnal Matematika Dan Pembelajarannya*, 2(1), 84–104.
- Wena, M. (2013). Strategi Pembelajaran Inovatif Kontemporer. *Suatu Tinjauan Konseptual Operasional*, April, 262. <http://repository.uin-malang.ac.id/4643/>
- Wulandari, B., & Surjono, H. D. (2013). Pengaruh Problem-Based Learning terhadap Hasil Belajar ditinjau dari Motivasi Belajar PLC di SMK. *Jurnal Pendidikan Vokasi*, 3(2), 178–191. <https://doi.org/10.21831/jpv.v3i2.1600>