



Inquiry Learning with Polya Problem Solving to Improve Student Learning Outcomes and Engagement

¹Farid Gunadi, ²Luthfiyati Nurafifah*, ³Khofifah Khofifah, ⁴Asep Maolana Akbar

^{1,2,3}Universitas Wiralodra, Indonesia

⁴SMAN 1 Indramayu

*Corresponding Author E-mail: luthfiyati.nurafifah@unwir.ac.id

Abstract

This study aims to determine whether students' engagement with trigonometry material may be increased through inquiry learning by solving Polya problems. The classroom action research approach is used in this study. 36 pupils from class X, MIPA 7, SMA 1, Indramayu, served as the subjects for this study. In this study, only two cycles are allowed. The findings from cycle I revealed that not all group members could effectively communicate with one another when trying to solve a problem. Another issue with the teacher is that he has not been able to manage his time well, which results in his spending a lot of time explaining the content. As a result, learning's primary objective—which requires pupils to be more engaged and solve their own problems—is not adequately achieved. However, it appears that the specified performance indicators have been met based on the findings of teacher and student observations made during the second cycle of action.

Keywords:

Learning Outcomes, Polya Theory, Problem Solving, Student' Engagement, Trigonometry

INTRODUCTION

According to Mello and Less (2013), active learning is an approach that especially promotes student engagement and activity in the classroom. Finding a problem will be simpler for students who are strong learners because passive learners don't participate in discussions and have trouble coming up with solutions. According to MacDonald and Frank (2016), active learning may be preferable since it enables students to select the best examples based on their most recent hypotheses and past experiences.

Learning outcomes are written descriptions of the goals that students hope to accomplish after completing their studies (Mahajan and Singh 2017). According to Gunadi, Jannah, and Taufan (2021) learning outcomes are the degree of mastery attained by students in taking the learning process and producing experiences in accordance with learning objectives. Students can excel in their coursework in addition to forming strong partnerships. As a result, teachers must employ learning models to modify the level of student needs. The inquiry learning model is one of the ways that proper learning models can be used to enhance comprehension and how students approach difficulties during the learning process.

Learning that uses Inquiry is a learning method in groups of people who collaborate to engage in discussions in solving a problem (Yildirim and Seferoglu 2021). Actively asking questions regarding each topic discussed, students have the same opportunity to answer the questions asked so that the teacher does not always have to answer these questions (Sanita and Anugraheni 2020). The teacher is only a facilitator who supervises and guides students when in class and students must be able to solve problems given by the teacher. Students' ability to solve mathematical problems is not only based on thinking systematically but also confidence in students in facing all obstacles (Bidhayanti 2019). To work around this issue use the Polya troubleshooting steps.

Polya stated that problems in mathematics are grouped together into two types, namely (1) problems to find or questions to find and (2) problems to prove or questions to prove. Searching for problems is to find, determine or obtain some unknown values in the problem and meet certain conditions. While the problem of proof is a procedure to determine whether a statement is true or not. There are four steps to solving a math problem: (1) mastering the problem, (2) making a plan, (3) implementing the plan, and (4) reviewing the answer (Inganah et al. 2023), steps (1) and (2) can be used as a problem to find and also steps (3) and (4) used as a problem to prove. Polya's theory

emphasizes problem-solving activities in learning. In this study students were also given active opportunities in their learning with inquiry learning. The purpose of this research was to determine the increase in student learning outcomes in trigonometry material using the Inquiry learning model with problem solving according to Polya theory, and to determine the increase in student activity in trigonometry material using the Inquiry learning model with problem solving according to Polya theory. This learning model requires students to be more active in learning, which is consistent with Lee's opinion (Lee, 2017) that learning with polya theory can increase activity. Using the inquiry learning model with problem solving according to Polya theory is expected to increase student activity in learning and also trigonometry learning outcomes. This concurs with C. Y. Lee and Chen's assertion (Lee and Chen, 2015) that the Polya theory can help students perform better so that learning outcomes improve. Students are directed gradually as they study and solve difficulties. Furthermore, to achieve this goal, an evaluation is carried out not only from the students but also the way the teacher applies his learning.

METHOD

This study uses the Classroom Action Research method. In this research it was carried out to provide direct improvements to problems that occurred in one of the classes at SMAN 1 Indramayu and besides that to find new solutions to the problems encountered. In addition to assertions from local teachers that students' ability to solve trigonometry problems was still weak, the researchers' decision to focus on this class was based on observations that revealed a lack of student engagement in learning trigonometry. In this way, it is hoped that there will be an increase in the activity and learning outcomes of trigonometry with the application of the Inquiry learning model. Implementation of research that will be carried out using two cycles in stages. Before carrying out the cycle the researcher carried out the pre-cycle stage by making initial observations in class, the initial observations were carried out by interviewing class teachers about the problems that existed in the class. Furthermore, the implementation of the cycle begins with the planning stage where at this stage the researcher prepares learning instruments which are then validated logically with two observers. The next stage is implementation, at this stage the researcher carries out classroom learning by applying the learning instruments that have been made. The next stage is observation, where there are two observers who evaluate learning using closed and open instruments. Then the reflection stage where the observer sits together with the teaching teacher, to discuss deficiencies and alternative solutions that will be used as preparation for the next cycle. The following is a list of the implementation of Cycles I and II.

Table 1. Classroom Action Research Procedures Cycle I

Stages	Implementation Procedure
Planning	<ol style="list-style-type: none"> a. Reviewing the lesson plans prepared for cycle 1. b. Prepare materials and student worksheets.
Implementation	<ol style="list-style-type: none"> a. Teacher prepares class b. The teacher asks students' news, motivation to students and directs students to fill in the attendance list. c. The teacher conveys the learning objectives d. Teacher Provides learning materials in class. e. The teacher presented trigonometry material. f. The teacher invites students to ask questions about trigonometry material that they do not understand. g. The teacher ends the lesson and motivates students to keep studying hard. h. The teacher held a learning achievement test in cycle I.
Observation	<ol style="list-style-type: none"> a. Observer observes the course of learning in class. b. In each observation the teacher notes the problems that arise from the beginning of the lesson to the end of the lesson. c. Observer provides an assessment for each indicator of the activity of each process of learning activities.
Reflection	<ol style="list-style-type: none"> a. The teacher discusses the results of the analysis of activity based on indicators and analyzes the results of the evaluation of each individual student.

Stages	Implementation Procedure
	b. The teacher makes an action improvement or revision design based on the results of the analysis of the achievement of these indicators. c. Collaboratively between teachers and observers analyze observations. d. The teacher makes reflections and temporary conclusions on the implementation of cycle 1

Table 2. Classroom Action Research Procedures Cycle II

Stages	Implementation Procedure
Planning	a. Reviewing the learning plan prepared for cycle II by revising it according to the results of cycle I's reflection. b. The emphasis on planning here is on solving problems found in cycle I. c. Prepare teaching materials and completed student worksheets.
Implementation	a. Teacher prepares class. b. The teacher directs students to fill in the attendance list. c. The teacher provides learning material by explaining the solution to the Polya step problem. d. Students are made into groups and the teacher gives group assignments that are completed with Polya steps. e. The teacher invites students to present the results of group work. f. Teacher gives <i>Reward</i> and <i>Punishment</i> for each group. g. The teacher provides the right solution and concludes learning. h. The teacher held a test of learning outcomes in cycle II.
Observation	a. The observer observes every activity carried out by students from the problems that arise at the beginning of the lesson to the end of the lesson. b. The teacher observes the course of all activities carried out by students and compares the results with the implementation of cycle II. c. The teacher observes the results of the evaluation of each student regarding the ability to master the material that was previously presented.
Reflection	a. In collaboration between teachers and observers, analyzing the results of observations then making reflections and making temporary conclusions about the implementation of cycle II. b. Discuss the results of the analysis in cycle II both on the indicators of activity and on the results of the evaluation.

FINDINGS AND DISCUSSION

Findings

Formative test results given in each cycle are used to obtain the results of class action assessments and observation sheets to measure student's engagement during learning. The formative test aims to determine the increase in student learning outcomes in Trigonometry. Observation results are also used as a basis for reflection to improve learning in the classroom. The results of learning and student activity are presented below.

Table 3 Learning Outcomes and Student Activeness

Information	Student Test Scores in Each Cycle	
	I	II
Average Score of Mathematics Learning Outcomes	73.5	84.4
Percentage of Student's Engagement	88.89%	94.44%

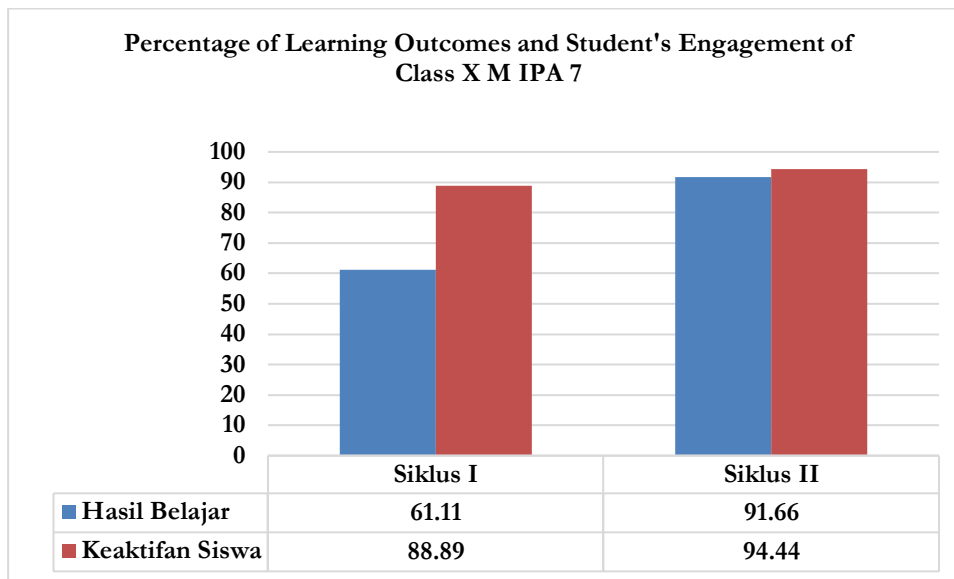


Figure 1. Percentage of Learning Outcomes and Student's Engagement

In observing and concluding the results of learning activities, researchers were assisted by two observers. In this study the observer's duty was to correct and provide feedback or input from the side of teacher and student activities. The following is an explanation of the diary activities for each cycle

Cycle I

1) Implementation Stage

Learning in cycle I was conducted in class on Friday, January 20 2023 at 08.30-09.50. In the learning cycle I refers to the lesson plans that have been prepared previously with indicators of solving problems in trigonometry material with trigonometry comparison sub-material about angles. At the beginning of learning the researcher explained apperception, learning objectives, learning steps in applying the *inquiry learning model* with problem solving theory according to Polya which will be used during the learning process.

In the core activity the teacher explains trigonometry material in the trigonometry comparison sub-material about angles and gives students the opportunity to ask questions about the material explained by the teacher. Then the teacher asks about students' understanding of the material presented. After that, students were formed into several groups to apply the *inquiry learning model*. Students are required to solve problems given by the teacher to be discussed with their group mates and the teacher guides students/groups who are having difficulties. Then the results of the discussion are presented in front of the class and provide opportunities for other groups to ask questions or provide rebuttals to the answers presented by the group presenting.

A post test was carried out at the end of the lesson to find out how much students understood the problems discussed with their groups. The post test is then collected and presented as an instrument for measuring student learning outcomes. Following are the results of teacher observations during the first cycle of learning which are presented in tables 4 , 5 , and 6 .

Table 4 . Teacher Activities During Learning in Cycle I (Observer I)

No	Observed activity	No	Not enough	Enough	Good
1.	The teacher gives an apperception about the material to be taught.			√	
2.	The teacher conveys the goals and things that students will learn in learning.				√
3.	The teacher divides students into several groups to discuss the problems they will work on.				√
4.	The teacher gives problems to students in the form of questions related to everyday life			√	

No	Observed activity	No	Not enough	Enough	Good
5.	The teacher observes and gives students the opportunity to ask questions during the group discussion process.			√	
6.	The teacher monitors the work of each group.				√
7.	The teacher guides students/groups who have difficulty.				√
8.	The teacher gives the opportunity to several students to present the results of group discussions.				√
9.	The teacher asks the opinion of the results of the discussion from other groups.			√	
10.	The teacher draws learning conclusions from the learning carried out.				√
11.	The teacher asks again things that students have not understood.			√	
12.	The teacher informs the upcoming material.				√

Table 5 . Teacher Activities During Learning in Cycle I (Observer II)

No	Observed Activity	No	Not enough	Enough	Good	Very good
1.	The teacher gives an apperception about the material to be taught.				√	
2.	The teacher conveys the goals and things that students will learn in learning.				√	
3.	The teacher divides students into several groups to discuss the problems they will work on.					√
4.	The teacher gives problems to students in the form of questions related to everyday life				√	
5.	The teacher observes and gives students the opportunity to ask questions during the group discussion process.				√	
6.	The teacher monitors the work of each group.				√	
7.	The teacher guides students/groups who have difficulty.				√	
8.	The teacher gives the opportunity to several students to present the results of group discussions.				√	
9.	The teacher asks the opinion of the results of the discussion from other groups.				√	
10.	The teacher draws learning conclusions from the learning carried out.				√	
11.	The teacher asks again things that students have not understood.				√	
12.	The teacher informs the upcoming material.				√	

At the implementation stage it can be seen from the observations assessed by the observer, the teacher's activities in cycle I did not achieve good results, this was because the teacher did not convey the material clearly and concisely because she was lacking in managing time and solving the problem was not appropriate. The problems found by the observer in cycle I were obtained:

Table 6 . Observation Results of Cycle I Observer I and II

No	Observers I	No	Observers II
1	Reduce questions that trigger simultaneous answers	1	Drawing a right triangle must be complete
2	Variants of questions should be reproduced	2	Checking the attendance list is less effective
		3	The problem is that it is used less

No	Observers I	No	Observers II
		4	Initial materials have not been submitted
		5	Awards / rewards have not been maximized
		6	Incomplete attention to student work

From the results of observations of students in cycle I, the actions of the instrument of activity in general have reached the active category (A), namely the average of 36 students who took part in learning in cycle I, who were declared inactive as many as 4 students and as many as active 32 students or 88.89% because the target of 75% activity so in cycle I reached the active category (good engagement).

2) Reflection Stage

After the data is obtained from the observations at the cycle I level, the problems that become obstacles in learning need to be reflected with the help of observers for further action. From the results of the reflections carried out by researchers and observers, the efforts that must be corrected in the actions in cycle II are as follows which are presented in table 7.

Table 7 . Reflection Results of Cycle 1 Observer 1 and 2

No	Observers I	No	Observers II
1	Problem Reduce questions that lead to simultaneous answers. Solution Give students the opportunity to answer by raising their hands.	1	Problem Incomplete drawing of a right triangle Solution Complete with the sign of the right angles and angles
2	Problem Slight variant Solution There are lots of discussion questions	2	Problem Checking the attendance list is not effective Solution Check the attendance list by looking for identities that are not present
		3	Problem The problem is that it is used less Solution Present the problem from the material side and problems
		4	Problem Initial materials have not been submitted Solution Convey complete material at the end and at the beginning
		5	M problem Awards / rewards have not been maximized Solution Give rewards or punishments for those who are not active
		6	Problem Incomplete/maximum paying attention to student completion Solution The unit is incomplete and the student's speech has not been delivered.

Cycle II

1) Implementation Stage

Learning in the second cycle was carried out in class on Tuesday, 31 January 2023 at 07.00-07.50. In this second cycle of learning, refers to the lesson plans that have been previously prepared with indicators of solving problems in trigonometry material with sub-matter of sine rule. At the

beginning of learning the researcher explained apperception, learning objectives, learning steps in applying the *inquiry learning model* with problem solving theory according to Polya which will be used during the learning process.

In the core activity the teacher explains trigonometry material in the trigonometry comparison sub-material about angles and gives students the opportunity to ask questions about the material explained by the teacher. Then the teacher asks about students' understanding of the material presented. After that, students were formed into several groups to apply the *inquiry learning model*. Students are required to solve problems given by the teacher to be discussed with their group mates and the teacher guides students/groups who are having difficulties. Then the results of the discussion are presented in front of the class and provide opportunities for other groups to ask questions or provide rebuttals to the answers presented by the group presenting.

A post test was carried out at the end of the lesson to find out how much students understood the problems discussed with their groups. The post test is then collected and presented as an instrument for measuring student learning outcomes. Following are the results of teacher observations during the second cycle of learning which are presented in tables 8, 9, and 10.

Table 8 . Teacher Activities During Learning in Cycle II (Observer I)

No	Observed Activity	No	Not enough	Enough	Good	Very good
1.	The teacher gives an apperception about the material to be taught.					√
2.	The teacher conveys the goals and things that students will learn in learning.					√
3.	The teacher divides students into several groups to discuss the problems they will work on.				√	
4.	The teacher gives problems to students in the form of questions related to everyday life				√	
5.	The teacher observes and gives students the opportunity to ask questions during the group discussion process.				√	
6.	The teacher monitors the work of each group.				√	
7.	The teacher guides students/groups who have difficulty.				√	
8.	The teacher gives the opportunity to several students to present the results of group discussions.			√		
9.	The teacher asks the opinion of the results of the discussion from other groups.				√	
10.	The teacher draws learning conclusions from the learning carried out.			√		
11.	The teacher asks again things that students have not understood.				√	
12.	The teacher informs the upcoming material.				√	

Table 9 . Teacher Activities During Learning in Cycle II (Observer II)

No	Observed Activity	No	Not enough	Enough	Good	Very good
1.	The teacher gives an apperception about the material to be taught.				√	
2.	The teacher conveys the goals and things that students will learn in learning.				√	
3.	The teacher divides students into several groups to discuss the problems they will work on.					√
4.	The teacher gives problems to students in the form of questions related to everyday life					√
5.	The teacher observes and gives students the opportunity to ask questions during the group discussion process.				√	
6.	The teacher monitors the work of each group.				√	

No	Observed Activity	No	Not enough	Enough	Good	Very good
7.	The teacher guides students/groups who have difficulty.				√	
8.	The teacher gives the opportunity to several students to present the results of group discussions.					√
9.	The teacher asks the opinion of the results of the discussion from other groups.				√	
10.	The teacher draws learning conclusions from the learning carried out.				√	
11.	The teacher asks again things that students have not understood.				√	
12.	The teacher informs the upcoming material.				√	

At the implementation stage, it can be seen from the results of observations assessed by the observer, the teacher's activity in cycle II has increased but has not yet achieved perfect results. This happened because the teacher only fixed the problems in cycle II.

Table 10 . Results Observation Cycle I I Observer I and II

No	Observers I	No	Observers II
1	Must be more precise in allocating time	1	Haven't made efficient use of the whiteboard yet.
2	There are still many questions that provoke simultaneous answers	2	There were a number of things that were asked by students that were not clear.
		3	The angle used in the problem is less effective.
		4	Pay less attention to inactive groups.

From the results of observations of students in cycle II who had been given actions on the activity instrument in general, they had reached the active category (A), namely the average of 36 students who took part in learning in cycle I, who were declared inactive as many as 2 students and those who were active as many as 34 students or 94.44% because the target of 75% activity so in cycle II reached the active category.

2) Reflection Stage

After the data is obtained from observations at the level of cycle II, problems that become obstacles in learning need to be reflected with the help of observers for further action. The following table reflects the results of cycle II shown in table 11 .

Table 11 . Reflection Results of Cycle II Observer I and II

No	Observers I	No	Observers II
1	Problem Timing in step by step Solution View the RPP for the timer	1	Problem Haven't made efficient use of the whiteboard yet. Solution Divide the blackboard into two parts. Write neatly to help students focus on learning.
		2	Problem There were several questions asked by students that were not clear. Solution Ask questions if students can answer them, if students are silent then provoke answers.
		3	Problem The angle used in the problem is less effective. Solution Use special angles in solving problems.
		4	Problem Pay less attention to inactive groups. Solution Provide groups that seem inactive to be given motivation to complete.

Discussion

Based on the results of observations in class X MIPA 7 on January 10 2023 at SMA Negeri 1 Indramayu, where the school is the place for researchers to carry out field experience programs. It can be seen that the learning process carried out by the teacher still uses the direct learning model or the lecture method. When the teacher explains the material, students only listen without anyone asking, this is because the teacher does not give students the opportunity to ask questions and the teacher immediately gives questions to work on. However, the teacher answered directly on the blackboard, without giving students the opportunity to understand the problems given and students only recorded the results of the teacher's work. The learning approach is still teacher centered (teaching centered learning), while what is expected should be student centered learning (student centered learning) where students are required to be more active and the teacher is only a facilitator to monitor students in carrying out their learning. Based on some of the findings of these problems, it is necessary to make improvements to improve students' ability to solve problems. One of the steps that can be taken is to change the learning model that is suitable for solving student problems. the appropriate learning model for doing a problem is using the Inquiry learning model, where this learning focuses on students and requires students to find their own problems through group discussions to improve learning outcomes and the engagement of student in class X MIPA 7 .

The use of the inquiry learning model in cycle I begins with learning with indicators of solving problems in trigonometry material with trigonometry comparison sub-material about angles, the observer notes that there are still deficiencies that need to be corrected in subsequent cycles. In cycle I, not all group members could discuss well with their group mates when solving a problem. Another drawback is also found in the teacher, namely the teacher has not been able to organize time properly so that it takes a lot of time when explaining material. As a result of this, the main goal of learning is not carried out optimally, where students must be more active and solve their own problems. The teacher should display a timer on the infocus screen, not vary the problem solving questions and the teacher does not give rewards or punishments to students. Based on observations of the actions of the first cycle, it can be seen that the actions have reached the predetermined performance indicators, but are not yet optimal and need to be improved in cycle II. The use of the Inquiry learning model in cycle I can improve student mathematics learning outcomes, namely out of 36 students, 22 achieve mastery learning with a class average of 73.5 or below KKM, namely 75 with many students who have high activity, namely 88.89 % of target 75%.

The use of the inquiry learning model in cycle II begins with learning with indicators of solving problems in trigonometry material with sub-materials about sine rules, observers note that the teacher has been able to overcome some of the deficiencies in cycle I and there has been an increase indicating that learning activities have been carried out properly. In this regard, the teacher has been able to organize students well and has been very optimal and the teacher continues to try to correct deficiencies in cycle I. Regarding the presentation of the material delivered by the teacher, it looks smooth, clear, systematic, and easy to understand. It's just that when the application of the Inquiry learning model was not implemented optimally due to the lack of time allotted. Based on the results of observations of teachers and students during the second cycle of action, it appears that the implementation of the actions has reached the predetermined performance indicators. The use of the Inquiry learning model in cycle II can improve student mathematics learning outcomes, namely out of 36 students, 33 students achieve mastery learning with a class average of 84.4 or above the KKM, namely 75, with many students having activeness, namely 94.44%. of the target of 75%. Thus it can be said that the action cycle II has achieved success.

The use of the inquiry learning model in cycle I to cycle II shows an increase. So, the use of the Inquiry learning model using problem solving according to Polya's theory can improve student learning outcomes in trigonometry material experiencing instability from cycle I to cycle II. This is in line with the research of Fetra et al. (2020) aims to describe the steps for implementing the Inquiry learning model and improving learning outcomes in theme 7 content of social studies, Indonesian and natural sciences in grade 5 students at SDN Cebongan 01 Salatiga, and is also in line with research (Finisia, Suroso, and Yustinus 2018) aims to determine the increase in mathematics learning outcomes for grade 5 students at SDN Sidorejo Lor 05 Salatiga through the application of Problem Based Learning integrated with Polya theory steps. So from this research problem solving with the Polya concept by applying the *inquiry learning method* is an alternative to be

applied as a learning method, especially in Trigonometry material.

CONCLUSION

The following conclusions are drawn from the results of observations and data processing during the research, which include data analysis to determine the increase in student trigonometry learning outcomes and observational analysis to determine student's engagement. Furthermore, it was concluded that the use of the Inquiry learning model using problem solving according to Polya's theory could improve students' trigonometry learning outcomes through tests at the end of each cycle I was not too significant and cycle II became significant. The use of inquiry learning models using problem solving according to Polya's theory can increase student activity in learning.

The results showed that the use of the inquiry learning model using problem solving according to Polya's theory could increase student's engagement in learning and student mathematics learning outcomes in trigonometry material. Thus the use of the inquiry learning model using problem solving according to Polya's theory can be applied in Mathematics Teaching and Learning Activities (KBM) in schools as a learning model to be able to improve student trigonometry learning outcomes.

REFERENCES

- Bidhayanti, Maryana Elvira. 2019. "Analisis Kesulitan Belajar Dengan Kemampuan Pemecahan Masalah." *Prosiding Seminar Nasional & Call For Papers*: 333–38.
- Fetra Bonita Sari, Risda Amini, Mudjiran. 2020. "Peningkatan Hasil Belajar Tema 7 Melalui Model Pembelajaran Inquiry Pada Siswa Kelas 5 SDN Cebongan 01 Salatiga Semester II Tahun 2018/2019." *Jurnal basicedu* 3(2): 524–32.
- Finisia, Adinda Risqi, Suroso, and Yustinus. 2018. "Penerapan Model Problem Based Learning Terintegrasi Langkah Teori Polya Untuk Meningkatkan Hasil Belajar Matematika Pada Siswa Kelas 5 SD Negeri Sidorejo Lor 05 Salatiga Semester II Tahun Pelajaran 2017/2018." *Jpkm* 5(1): 73–81.
- Gunadi, F, W Jannah, and M Taufan. 2021. "Hasil Belajar Trigonometri Berdasarkan Gaya Belajar Siswa." ... *Nasional Matematika dan ...*: 139–46.
<https://prosiding.biounwir.ac.id/article/view/157%0Ahttps://prosiding.biounwir.ac.id/article/download/157/114>.
- Inganah, Siti, Annisa Nurina Vidyastuti, Retno Wahyu, and Arian Sah. 2023. "High School Students' Mathematical Skills in Addressing Minimum Competency Assessment Problems Using Working Backward Strategy." 15: 999–1008.
- Lee, Chien I. 2017. "An Appropriate Prompts System Based on the Polya Method for Mathematical Problem-Solving." *Eurasia Journal of Mathematics, Science and Technology Education* 13(3): 893–910.
- Lee, Chun Yi, and Ming Jang Chen. 2015. "Effects of Polya Questioning Instruction for Geometry Reasoning in Junior High School." *Eurasia Journal of Mathematics, Science and Technology Education* 11(6): 1547–61.
- MacDonald, Kyle, and Michael C. Frank. 2016. "When Does Passive Learning Improve the Effectiveness of Active Learning?" *Proceedings of the 38th Annual Meeting of the Cognitive Science Society, CogSci 2016* (August): 2459–64.
- Mahajan, Mrunal, and Manvinder Kaur Sarjit Singh. 2017. "Importance and Benefits of Learning Outcomes." *IOSR Journal of Humanities and Social Science* 22(03): 65–67.
- Mello, David, and Colleen A Less. 2013. "Effectiveness of Active Learning in the Arts and Sciences." *Humanities Department Faculty Publications & Research*: 45.
http://scholarsarchive.jwu.edu/humanities_fachttp://scholarsarchive.jwu.edu/humanities_fac/45%0Ahttps://scholarsarchive.jwu.edu/humanities_fac/45/?utm_source=scholarsarchive.jwu.edu%2Fhumanities_fac%2F45&utm_medium=PDF&utm_campaign=PDFCoverPages.
- Sanita, Risky, and Indri Anugraheni. 2020. "Meta Analisis Model Pembelajaran Inquiry Untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar." *Jurnal Kependidikan: Jurnal Hasil Penelitian*

dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran 6(3): 567.
Yildirim, Deniz, and Suleyman Sadi Seferoglu. 2021. "Evaluation of the Effectiveness of Online Courses Based on the Community of Inquiry Model." *Turkish Online Journal of Distance Education* 22(2): 147–63.