JARME **Journal of Authentic Research on Mathematics Education**
Volume 8, No. 1, January 2026
https://doi.org/ 10.37058/jarme.v3i1.16408 **e-ISSN 2655-7762**

IMPLEMENTATION OF PROBLEM BASED LEARNING TO IMPROVE THE MATHEMATICAL LITERACY SKILLS OF GRADE VIII STUDENTS AT SMPN 6 WEST KARAWANG

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ARTICLE INFO

Article history
Received: 2025-07-12
Revised: 2025-07-16
Accepted: 2026-01-19

Keywords
Improvement, Mathematical Literacy Skills, Problem-based Learning Model

ABSTRACT

This study aims to improve students' mathematical literacy skills through the implementation of the Problem Based Learning *(PBL) model for Grade VIII students at SMPN 6 Karawang Barat. The background of this research is based on Indonesia's low performance in mathematical literacy as reflected in the PISA survey results from 2000 to 2022, where Indonesia consistently ranked in the bottom ten globally. This research employs a quantitative method with a* Pretest-Posttest Control Group Design*. The population of the study consisted of all eighth-grade students, with two classes selected as samples: one as the experimental group receiving PBL instruction and the other as the control group receiving conventional instruction. The research instrument was a mathematical literacy test that had been validated for reliability. Data analysis techniques included descriptive statistics and inferential statistical tests. The results showed that there was a significantly higher improvement in the mathematical literacy skills of students in the experimental group compared to those in the control group. The experimental group showed an average gain of 33.21, while the control group showed an average gain of only 25.16. Therefore, the application of the PBL model proved to be more effective in enhancing students' mathematical literacy skills compared to conventional learning models.*

Penelitian ini bertujuan untuk meningkatkan kemampuan literasi matematis siswa melalui penerapan model pembelajaran *Problem Based Learning* (PBL) pada siswa kelas VIII di SMPN 6 Karawang Barat. Latar belakang penelitian ini didasarkan pada rendahnya capaian literasi matematis siswa Indonesia berdasarkan hasil survei PISA tahun 2000–2022, yang menempatkan Indonesia pada posisi sepuluh terbawah secara global. Penelitian ini menggunakan metode kuantitatif dengan desain *Pretest-Posttest Control Group Design*. Populasi dalam penelitian ini adalah seluruh siswa kelas VIII, dengan dua kelas sebagai sampel: satu kelas sebagai kelompok eksperimen yang mendapatkan pembelajaran PBL dan satu kelas sebagai kelompok kontrol yang mendapatkan pembelajaran konvensional. Instrumen penelitian berupa tes kemampuan literasi matematis yang telah diuji validitas dan reliabilitasnya. Teknik analisis data yang digunakan meliputi uji statistik deskriptif dan uji statistik inferensial. Hasil penelitian menunjukkan bahwa terdapat peningkatan kemampuan literasi matematis siswa pada kelompok eksperimen secara signifikan lebih tinggi dibandingkan dengan kelompok kontrol. Kelompok eksperimen menunjukkan rata-rata peningkatan sebesar 33,21, sedangkan kelompok kontrol hanya mengalami peningkatan sebesar 25,16. Dengan demikian,

penerapan model PBL terbukti lebih efektif dalam meningkatkan kemampuan literasi matematis siswa dibandingkan dengan model pembelajaran konvensional.

How to Cite:

Sonia, Y. M., Sopiany, H. N., & Marlina, R. (2026). Implementation of Problem Based Learning to Improve the Mathematical Literacy Skills of Grade VIII Students at SMPN 6 West Karawang. *Journal of Authentic Research on Mathematics Education,* ***8***(1), 83-97. https://doi.org/10.37058/jarme.v3i1.16408

1. INTRODUCTION

Education is crucial in today's era. Generally, education is a lifelong process that develops each individual to survive and thrive. As time progresses, technology advances rapidly. One area that significantly impacts technological advancement is mathematics. Therefore, mathematics is a vital life science and a fundamental subject that students must master, especially to prepare themselves for the changing times (Connie Fatwa et al., 2019).

Mathematics is a way to find answers to problems faced by humans; a way of using information, using knowledge of shapes and sizes, using knowledge of counting, and most importantly, thinking within humans themselves in seeing and using relationships (Saputri et al., 2019). There are six components of mathematics learning in schools, namely*equity*(similarity),*curriculum*(curriculum),*teaching* (teaching), *learning* (learning), *assessment* (assessment), and *technology* (technology). These six components of mathematics learning support and are interrelated (NCTM, 2000).

The rules governing the objectives of mathematics learning are stated in the Regulation of the Minister of National Education Number 22 of 2009. (2006) regarding content standards, as follows: a) Understand mathematical concepts, explain the relationships between concepts and apply them flexibly, accurately, efficiently and precisely in problem solving. b) Using reasoning on patterns and properties, performing mathematical manipulations to make generalizations, construct proofs, or explain mathematical ideas and statements. Solving problems that include the ability to understand problems, design mathematical models, solve models, and interpret the obtained solutions. c) Communicating ideas with symbols, tables, diagrams, or other media to clarify a situation or problem. d) Having an attitude of appreciating the usefulness of mathematics in life, namely having curiosity, attention and interest in studying mathematics, as well as a tenacious and confident attitude in solving problems.

The focus of this study is mathematical literacy. Mathematical literacy is an individual's ability to formulate, use, and interpret mathematics in various contexts, including reasoning mathematically and using mathematical concepts, procedures, facts, and tools to explain and predict phenomena (Saputri et al., 2019). Mathematical literacy can help individuals to understand the role of mathematics in the real world and as a basis for consideration and decision making needed by society.

One of the problems identified by the author is the low level of students' mathematical literacy skills based on the results obtained inIndonesia's participation

inPISA (*Programme for International Student Assessment*) from 2000 to 2022. PISA is an international survey initiated by the OECD (*Organisation for Economic Co-operation and Development*) to measure students' cognitive skills in various countries. In PISA, the cognitive skills measured are aimed at literacy aspects, to map the ability to process information and apply knowledge in new contexts. PISA measures three areas of literacy: language literacy (reading), mathematical literacy (numeracy), and scientific literacy (Aditomo & Felicia, 2019).

The focus of PISA is literacy, which emphasizes the skills and competencies students acquire from school and can use in everyday life and in dealing with various situations (Muhtadin et al., 2021)This phenomenon can be seen in Indonesia's PISA results, where it consistently ranks among the bottom 10 of all countries each year.The following are the results of the assessment of Indonesia's participation inPISA (*Programme for International Student Assessment*) since 2000 to 2018 (OECD, 2023).

Table 1. Results of the Indonesian PISA Assessment from 2000-2022

Year of Study	Materials to be Assessed	Indonesia Average Score	International Average Score	Indonesia's ranking	Number of Study Participating Countries
2000	Reading	371	500	39	41
	Mathematics	367	500	39	
	Science	393	500	38	
2003	Reading	382	500	39	40
	Mathematics	360	500	38	
	Science	395	500	38	
2006	Reading	393	500	48	56
	Mathematics	396	500	50	
	Science	393	500	50	
2009	Reading	402	500	57	65
	Mathematics	371	500	61	
	Science	383	500	60	
2012	Reading	396	500	62	65
	Mathematics	375	500	64	
	Science	382	500	64	
2015	Reading	397	500	61	69
	Mathematics	386	500	63	
	Science	403	500	62	
2018	Reading	371	500	74	79
	Mathematics	379	500	73	
	Science	396	500	71	
2022	Reading	359	500	68	81
	Mathematics	366	500	68	
	Science	383	500	67	

This issue requires special attention from teachers, especially mathematics teachers. Indonesia's goal in participating in PISA is to assess the extent to which educational programs can help children develop math, science, and reading literacy skills that meet international standards. It also serves as a benchmark for comparing Indonesian education programs with those of participating countries worldwide.

Based on the results of a preliminary study conducted by the author with one of the Mathematics teachers for grades VIII and IX at SMPN 6 West Karawang, there are several things that the author should note, including: 1) There are some teachers who have already applied the learning model *Problem based learning* and several other learning models including conventional learning models. However, although some teachers have implemented the learning model *Problem based learning,* However, few teachers implement it and prefer conventional learning models. Conventional learning models are often known as traditional learning methods or also called lecture methods, because this method has long been used as a means of verbal communication between teachers and students in the learning and teaching process. This learning model is felt to make students less active and less enthusiastic in learning, they tend to remain silent when they do not understand what the teacher is conveying, so teachers feel less able to manage the class. The use of this learning model also causes students to be less motivated in learning. 2) Mathematical literacy skills in schools are still lacking because students still have difficulty mastering the concepts of mathematics learning materials and students still have difficulty translating mathematical story problems into mathematical language. Efforts made by teachers to enable students to follow the learning include suggesting students memorize formulas in several materials. An example of difficulty experienced by students is in statistics material where students have difficulty understanding the content of data presentations in the form of tables, bar charts, or line charts. Therefore, based on this, the author assesses that most students have abilities that tend to be low in mathematical literacy.

Through This problem requires evaluation and finding solutions to improve students' mathematical literacy skills.The causes of the problems above result in students only being able to apply existing concepts rather than studying and interpreting concepts in mathematics themselves (Conie Fatwa et al., 2019). Factors causing this problem can be caused by the lack of teacher ability in applying mathematics learning models and the lack of facilities owned by schools to support mathematics learning.Therefore, in this case, a learning model with a method that is able to grow and increase students' learning motivation is needed, where the learning model is not boring and can foster positive interactions between teachers and students or between students so that teachers do not have too much difficulty in controlling the class and managing students who do not understand the material, one of which is using the learning model.*Problem based learning.*

According to Tan (2000) in a book written by (Rusman, 2012) stated that*Problem based learning* is the use of various types of intelligence needed to confront real-world challenges, the ability to face everything new and existing complexity. Margetson (1994) suggests that the curriculum*Problem based learning* helps to enhance the development of lifelong learning skills in an open, reflective, critical, and active learning mindset. Curriculum*Problem based learning* facilitates successful problem solving, communication, group work and interpersonal skills better than other approaches.

The role of teachers in learning *Problem based learning* namely focusing on: 1) facilitating the process*Problem based learning:* changing the way of thinking; developing inquiry skills, using cooperative learning; 2) training students in problem-solving strategies; providing in-depth reasoning, metacognition, critical thinking, and systems

thinking; and 3) becoming an intermediary in the process of mastering information; researching the information environment, accessing diverse information sources, and making connections.

2. METHOD

This study employed a quantitative approach using a *Pretest-Posttest Control Group Design*. The design aimed to determine the effectiveness of the *Problem Based Learning* (PBL) model in improving students' mathematical literacy skills. Two groups were involved: an experimental group that received the PBL treatment and a control group that received conventional instruction. Both groups were given a pretest and a posttest to measure learning improvements.

The population of this study consisted of all eighth-grade students at SMPN 6 Karawang Barat. Sample selection was conducted using purposive sampling, based on recommendations from the mathematics teacher who identified two classes with relatively equal abilities. The experimental class was taught using the PBL model for the topic of statistics, while the control class followed the conventional lecture-based method.

The research instrument was a mathematical literacy test developed based on PISA literacy indicators. The instrument underwent content validation, reliability testing, discrimination index analysis, and difficulty level analysis. The test was administered twice: before (pretest) and after (posttest) the treatment. In addition, the researcher prepared instructional tools such as lesson plans, teaching materials, and student worksheets aligned with the PBL learning model.

Data were analyzed using both descriptive and inferential statistics. Descriptive statistics were used to observe the mean and distribution of pretest and posttest scores. Inferential statistics were conducted using the Mann-Whitney U test to determine significant differences between the two groups. The analysis revealed that the improvement in mathematical literacy skills was significantly higher in the experimental group compared to the control group.

Table 2. Pretest-Posttest Control Group Design

Group	Pretest	Treatment	Posttest
Experimental	Literacy Test	PBL (Problem Based Learning) Model	Literacy Test
Control	Literacy Test	Conventional Teaching Model	Literacy Test

3. RESULTS AND DISCUSSION

3.1. Results

N-Gain

In this study, the data*N-Gain*obtained from test results*pretest* And *posttest* divided by the difference between the ideal maximum score and the maximum score*posttest*conducted on students' mathematical literacy abilities in the control and experimental classes. The test*N-Gain* is a data analysis test that aims to measure the improvement in process skills and learning outcomes between before and after learning. In this study, the test*N-Gain* was conducted to determine whether there was an increase in students' mathematical literacy abilities between students who used the learning

model*problem based learning* with students who use conventional learning models. The results of the descriptive statistical test of the data*N-Gain* by using the help of computer programs *SPSS*version 30, as follows:

Table 3. Descriptive Statistical Test Result DataN-Gain

Group	N	Min	Max	Rate-Rata	Standard Deviation
Control	20	6,9	63,6	25,155	17,1464
Experiment	20	7,7	100	33,205	22,692

Based on table 3, it shows the results of the descriptive statistical test of the value*N-Gain* obtained by the control class and the experimental class. The average value*N-gain*in the control class, namely 25.155 with a standard deviation of 17.1464 and in the experimental class, namely 33.205 with a standard deviation of 22.692. So, the average*N-Gain* The experimental class had higher scores than the control class. The minimum and maximum scores for the control class were 6.90 and 63.6, respectively, while the experimental class had 7.7 and 100.

Normality Test

The following are the results of the data normality test.*N-Gain* students' mathematical literacy skills through control and experimentation with the help of computer programs*software SPSS*version 30 as listed in table 4, as follows:

Table 4. Data Normality Test ResultsN-Gain

Group	*Shapiro-Wilk*			Information
	Statistic	*df*	*Say.*	
Control	0,846	20	0,005	H_0 rejected
Experiment	0,852	20	0,006	H_0 rejected

Based on table 4, it shows the results of the data normality test.*N-Gain* mathematical literacy skills at a significant level$\alpha = 0{,}05$in the control and experimental classes. In the control class, the significance value of the normality test results was 0.005, which means the significance value was less than the significance level.$\alpha = 0.05$, so that it meets the testing criteria thenH_0rejected and data*N-Gain*In the control class, the distribution was not normal.

Meanwhile, in the experimental class, the significance value of the normality test results was 0.006, which means the significance value was less than the significance level.$\alpha = 0.05$so that it meets the testing criteria thenH_0rejected and data*N-Gain*in the experimental class is not normally distributed.

Test*Mann-Whitney U Test*

The following are the results of the non-parametric test scores*pretest*using using test*Mann-Whitney U Test*with the help of a computer program*software SPSS*version 30 listed in table 5, below:

Table 5. Test ResultsMann-Whitney U Test N-Gain

	Mark
Mann-Whitney U	147,500
Wilcoxon W	357,500
WITH	-1,421
Asymp. Sig. (2-tailed)	0,155
Exact Sig. [2(1-tailed Sig.)]*	0,157

Based on table 4, it shows that the results*Uji Mann-Whitney U Test* on the data *N-Gain* has a value of 0.155, then this shows that the significant value> 0,05This indicates that there was an increase in students' mathematical literacy skills, with a significant difference between the mathematical literacy skills of students in the control and experimental groups before being given treatment. Thus, both classes are considered to have increased mathematical literacy skills in the treatment conducted in the study.

3.2. Discussion

The process of learning mathematics using models*Problem based learning* has five main stages that must be carried out, namely student orientation to a problem, organizing students to learn, guiding student experiences both individually and in groups, developing work results according to the experiences gained by students and the final stage of analyzing and evaluating in the problem-solving process. In this study, the material given to students is related to statistics with a focus on the measure of central data. In this study, two classes were used as samples for the study, the first sample was the experimental class, namely class VIII D and the second sample class was the control class, namely class E. The experimental class learning was carried out four times while the control class was carried out three times. Including the provision of*pretest* to test students' initial abilities and provide*posttest* to test the results of the learning treatment given at the next meeting. Testing*pretest* was done at the first meeting while*posttest* was carried out at the last meeting. The following figure 1 is one of the documentations of the experimental class learning that received treatment with the learning model*problem based learning.*

Figure 1. Experimental Class Activity Documentation

The learning process carried out by students in experimental class activities with the treatment of learning models*problem based learning*was greeted with a good response

and enthusiasm by the students because the students felt a new nuance in learning and the students felt they could play a more active role in group discussions in their groups and could exchange ideas with other groups. In the process of this learning activity, it began by providing a trigger for students to remember how to read tables, bar charts and line charts, after the teacher felt the students could understand it, the learning continued with the core material of the research, namely the measure of data centralization (*mean, median, and module*). In this learning process, students are divided into 5 groups with each group consisting of 8-9 people who are divided randomly. The purpose of being divided into groups is so that students can discuss with their group mates and exchange ideas. In this group, students are given 2 tasks, namely students work on questions given by the teacher and group discussions to find the necessary information according to the teacher's instructions, after which students provide 2 representatives to present from each group. Figure 2. is one of the documentation of learning in the control class that received conventional learning model treatment.

Figure 2. Documentation of Control Class Activities

The learning process carried out by students in the control class activities with the conventional learning model treatment was greeted with good responses and enthusiasm by students, but students seemed bored with the learning undertaken because the learning flow was still the same as what students always go through in their daily lives. In the mathematics learning process using the conventional learning model, it begins with reminding them about presenting data in the form of tables, bar charts and line charts. This is done so that students can remember how to change presentations in diagram form into tables and vice versa, as well as this is done so that students can remember how to read diagrams in the form of bars and lines. After students are able to remember and understand the material on data presentation, the teacher can continue the material on measures of central data.

Based on the results of descriptive statistical tests before treatment was given (*pretest*) by the researcher, the average value of the experimental class was 31.38, while

the control class was 37. This shows that the control class has a better level of mathematical literacy ability than the experimental class. After the treatment (*posttest*) namely by applying a learning model*problem based learning* In the experimental class, the average value of the experimental class was 54.13, while the control class was 52. This shows that there was a change in students' mathematical literacy abilities, where after the treatment there was a change that the experimental class had better mathematical literacy abilities than the control class. Meanwhile, the increase that occurred in each class was that the experimental class experienced an increase in the average value of 22.75, while the control class experienced an increase in the average value of 15. This shows that the experimental class that received the treatment of the application of the learning model*problem based learning* got a higher average score than the control class, this shows that with the application of the learning model*problem based learning* considered more effective in improving students' mathematical literacy skills.

This relates to constructivist theory: active learning and knowledge construction. In the constructivist view, learners are "active agents trying to understand the world based on what they already know." Learning occurs when students are challenged to apply their own reasoning, utilize existing knowledge frameworks, and revise their thinking based on new information or experiences. Constructivism's emphasis on "active knowledge construction" directly opposes the passive reception of information often found in traditional mathematics classes. This active engagement is crucial for developing deep conceptual understanding, which is a prerequisite for the application and interpretation aspects of mathematical literacy, going beyond rote memorization. If students simply absorb facts, they may pass exams but struggle to apply knowledge in new situations or truly understand why mathematical principles work. Active construction, as encouraged by the learning model, is crucial.*problem based learning*, requiring students to manipulate information, make connections, and construct internal mental models. This active process directly supports the “using” and “interpreting” dimensions of mathematical literacy, as it enables students not only to perform procedures but also to understand the underlying logic and apply it flexibly across contexts, leading to stronger and more transferable mathematical understanding.*Problem based learning* Facilitates the process by placing problems as the primary trigger for learning, encouraging students to research, integrate theory and practice, and apply knowledge to develop solutions. This encourages exploration, interpretation, and reframing of mathematical ideas.(Kit Ee Dawn, 2023). The following is a picture of students presenting their learning outcomes and findings as a group:

Figure 3. Experimental Class Student Learning Process

In addition to constructivism theory, Vygotsky's learning theory is also a supporting theory in this research because Vygotsky's theory emphasizes that learning and concept construction occur through interactions with the social and physical environment. This relates to the learning model applied, where the learning model...*problem based learning* Orienting learning toward real-world elements close to students. For example, in mathematics lessons about statistics, students can look up population data from districts within a province and calculate the average population for that year.

Figure 4. Student Implementation in Searching for Information Regarding Population Data in 2024

Figure 4 shows student activity in a group. The class was divided into five groups, each consisting of eight students, randomly assigned. During the learning process, students responded positively to the learning process, but due to the limited number of communication devices available,*cellphone*This made it apparent that not all groups could play an active role. However, to address this issue, the researcher worked around this by assigning each student in the group their own duties and responsibilities, such as taking notes, moderating presentations, presenting, and writing down the group discussion results on the board.

In terms of the student learning process, of course there will be learning outcomes that students get. In this study, the researcher wanted to find out whether in learning by applying the learning model*problem based learning* can produce an increase in

mathematical literacy skills better than the application of conventional learning models, the answer will be answered based on the analysis discussion carried out by the researcher.

Normality test results *pretest* in the experimental class and the control class stated that the test results were not normally distributed (Fitriani et al., 2023). However, after conducting a test using non-parametric analysis, namely the Mann–Whitney U Test, the value obtained was *Asymp. Sig. (2-tailed)* of 0.034. This indicates that the value is smaller than 0.05, meaning there is no significant difference between the experimental class and the control class (Monike, Sudirman, & Kandaga, 2026). Therefore, this study still uses the same sample according to the predetermined class because the level of mathematical literacy ability of students in both classes is considered equivalent (Hwang & Chen, 2022).

Furthermore, after the *pretest* was conducted, the researcher continued by taking action on the students by applying the learning model. After the action of applying the learning model to the two classes, the same test was carried out, *posttest*. On the *posttest*, this shows that the two classes are not normally distributed, so the test is continued with the Mann–Whitney U Test, and the *Asymp. Sig. (2-tailed)* value obtained was 0.558. This shows that the value is greater than 0.05, meaning that the *posttest* showed a significant difference in the results between the experimental and control classes (Khasanah, Retnawati, & Widodo, 2021).

This can be seen based on the average *posttest* scores: the experimental and control classes were 54.13 and 52, respectively, meaning the experimental class had a difference of 2.13 compared to the control class. Therefore, based on the comparison of the *pretest* and *posttest* results, it can be concluded that the class has increased students' mathematical literacy skills. This is proven by the initial condition of both classes of students who still have equivalent mathematical literacy skills; with the implementation of a good learning model such as Problem-Based Learning (PBL), both conventional and non-conventional methods have increased students' mathematical literacy skills (Hwang & Chen, 2022). However, because this study also compares learning models, based on the results of the *posttest* analysis, it can be seen that by applying the Problem-Based Learning model, the results are better than conventional learning models (Monike et al., 2026).

This is in accordance with several previous studies, the first of which was conducted byKiawati et al., 2023 stated that students' mathematical literacy skills with problem-based learning models were better than those of students who followed conventional learning because the application of problem-based learning models provided direct learning experiences through everyday life problems presented in problem-based learning models.This is in accordance with several previous studies whichThe second was conducted by (Delvia et al., 2023) which stated that there was an increase in students' mathematical literacy abilities after using the learning model.*problem based learning*with the project assignment method on the SPLTV material in class X of SMAN 1 Sandai. The magnitude of the increase in students' mathematical literacy skills on the SPLTV material through the model*problem based learning*with the project assignment method at SMAN 1 Sandai based on the specified criteria is classified as moderate.This is in accordance with several previous studies whichThe third study, conducted by Musaad et al., 2023, stated that the use of problem-based learning (PBL) models was more effective in improving

students' mathematical literacy skills compared to other learning methods. The PBL model can also be a good choice in the context of developing students' mathematical literacy skills.

In this study there are supporting factors in the application of learning models.*problem based learning* namely students who have high motivation, curiosity, and good collaboration skills adapt more quickly to challenges in the learning process.*problem based learning*, so that mathematical literacy can develop more optimally. Other supporting factors include problem scenarios that are close to real life (e.g., calculating the average population in a region, the average temperature that will occur in each month), increasing student engagement and stimulating in-depth discussions with their group mates. Furthermore, in learning*problem based learning* making problems more measurable and keeping students motivated and able to complete assignments independently or in groups. The inhibiting factor in this study was the relatively large number of students in the class, around 35–40, this made it difficult for researchers to monitor the progress of each group, and reduced the effectiveness of individual feedback. Another inhibiting factor was the researchers' limited time in conducting the research because the students were already at the end of the school year and the limited number of researchers, resulting in a lack of specific teaching materials for implementing the learning model.*problem based learning* such as worksheets, modules, contextual questions so that researchers only need to use the teaching materials that students have at school.

Achievement and improvement of mathematical literacy skills of students who receive Problem-Based Learning (PBL) models are certainly declared successful because they show better results than students who received conventional learning models (Khasanah, Retnawati, & Widodo, 2021; Hwang & Chen, 2022). In this case, the Problem-Based Learning model in the learning process is able to involve students in their own way to understand new information provided step by step within the learning stages of PBL (Savery, 2015; Monike, Sudirman, & Kandaga, 2026).

Because students receive clear guidance in recalling previously studied materials related to new topics, organizing themselves around given problems, and being supported through motivational feedback, they are more engaged and enthusiastic in learning (Hmelo-Silver, 2004). PBL also provides students with new learning experiences—both individually and collaboratively—allowing them to develop and present their work through discussions and presentations, as well as to analyze and evaluate the processes used to solve problems (Fitriani, Rahayu, & Putra, 2023; Hung, Jonassen, & Liu, 2008).

This is highly beneficial for students because they gain new experiences in an application-based learning environment. PBL students also become accustomed to identifying problems, formulating hypotheses, and constructing strategies for problem solving, encouraging them to think systematically and creatively when translating real-world contexts into mathematical models (Barrows, 1996; Hmelo-Silver, 2004). Students are also encouraged to manage their time effectively and to seek information from both online and local resources. When presented with real-world, context-rich mathematical problems, students find learning more relevant, meaningful, and memorable (Hwang & Chen, 2022).

4. CONCLUSION

Based on the formulation of the problem and the research hypothesis obtained, the conclusion is that students' mathematical literacy abilities can be achieved by applying the learning model.*problem based learning* better than the achievement of mathematical literacy skills of students who use conventional learning models. This is based on the average that shows that the average achievement of mathematical literacy skills of students who use conventional learning models*problem based learning* higher than the mathematical literacy abilities of students who used conventional learning models with averages of 54.13 and 52, respectively.

Improving students' mathematical literacy skills using models*problem based learning* better than the mathematical literacy skills of students who received conventional learning models. This is based on the average N-Gain score produced by mathematical literacy skills using the model.*problem based learning* higher than the mathematical literacy ability using conventional learning models with an average of 33.21 and 25.16 respectively. Thus, it can be concluded that the application of the learning model*problem based learning* provides a better influence on achievement and improvement than the application of conventional learning models.

THANK YOU NOTE

Thank you to my academic advisors, Mrs. Hanifah Nurus Sopiany and Mrs. Rina Marlina, for their invaluable guidance, direction, and motivation throughout the process of writing this journal. I also extend my sincere gratitude to the Principal, the mathematics teacher, and all the staff at SMPN 6 Karawang Barat for their permission and assistance during the research. I would also like to thank my parents, family, and friends for their continuous support and prayers. May all the kindness and help given be a beneficial and blessed deed in the eyes of the Almighty God.

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