UJME 9 (2) 2019: 129-139
UNNES JOURNAL OF MATHEMATICS EDUCATION
https://journal.unnes.ac.id/sju/index.php/ujme/
ISSN: 2252-6927 (print); 2460-5840 (online)

Mathematical literacy ability of 8th graders in Problem Based Learning with Think Talk Write approach

Warniatun[a,*], Iwan Junaedi[a]

[a] *Departmen of Mathematics, Universitas Negeri Semarang, Indonesia Sekaran Gunungpati, Semarang 50299, Indonesia*

[*] *E-mail address: warniatun@students.unnes.ac.id*

ARTICLE INFO

Article History :
Received 6 August 2019
Received in revised form 9 September 2019
Accepted 1 November 2019

Keywords :
Mathematical Literacy Ability; Problem Based Learning; *Think Talk Write* Approach

Abstract

The purposes of this study were to explore how the Problem-Based Learning model with the Think Talk Write approach affect mathematical literacy ability. This study used mixed methods with concurrent embedded models. The subjects of this study were a class in a Junior High School in Margasari. Observation, documentation, tests, and interviews were used to collect data. The design used in this study was a randomized pretest-posttest control group design. The method of data collection in this study is the method of documentation, tests, observation, and interviews. The purpose of the interview is to find out students' mathematical literacy abilities. The data analysis in this study was an analysis of the initial data test, analysis of the results of tests of mathematical literacy ability, and qualitative data analysis. Test data includes the normality and homogeneity test. The normality was checked using the Kolmogorov-Smirnov Test, the homogeneity was checked using the Levene test, and the similarities between the two class was checked using the Independent-Sample T-Test. The students' mathematical literacy abilities were analyzed based on the results of the post-test using the Miles and Huberman Model. The study revealed the profile of mathematics literacy abilities of students in the setting of Problem-Based Learning.

1. Introduction

According to the 2015 draft PISA (Program for International Student Assessment), mathematical literacy is the ability of individuals to formulate, apply, interpret mathematics in various contexts, including the ability to do mathematical reasoning and use concepts, procedures, facts as tools to describe, explain, and predict a phenomenon or event. Mathematical literacy ability can help individuals recognize the role of mathematics in everyday life and as a basis for consideration and determination of society's decisions. According to Zulkarnain in Dewi (2015: 165), there is a big problem in Indonesia's mathematics education. The problem is the ability of students to solve problems related to everyday life. Mathematics has an important meaning in helping people solve problems in everyday life. Concepts in mathematics can be applied to solve the problems at hand. The importance of mathematical literacy has not been balanced with the quality of learning quality in Indonesia.

According to Stacey (2011), PISA's focus is literacy that emphasizes the abilities and competencies of students obtained from school so that they can be used in daily life and in various situations. Mathematical literacy ability in PISA (Program for International Student Assessment) as an official activity under the OECD (Organization for Economic Cooperation and Development) on student assessment at the international level, the results achieved by Indonesian students are far from satisfying. The mathematics literacy ability of Indonesian students is still relatively low.

Based on the results of observations made by interviewing one of the mathematics subject teachers in SMP Negeri 3 Margasari, class VIII students' mathematical literacy ability was still low. In learning the material around and around the circle, the teacher of SMP Negeri 3 Margasari explained that students were still having difficulties when faced with questions related to everyday problems regarding the

To cite this article:

Warniatun, W., & Junaedi, I. (2020). Mathematical literacy ability of 8th graders in Problem Based Learning with Think Talk Write approach. *Unnes Journal of Mathematics Education, 9*(2). 129-139 https://doi.org/10.15294/ujme.v9i2.32421

circumference and area of a circle. Students are confused in determining their fingers and how to write the information obtained from the problem. Some students also cannot work on the problem if the problem is more complex.

In learning, students only listen to what the teacher explains then write the material, the teacher has explained. Next, the teacher gives the task to be done by students and students work on the task with the teacher's predetermined time. With such learning, the teacher's role is very dominant and the lack of student feedback on the lesson, because if a question and answer session is held, students rarely ask or even not. Then if there is a problem working session in front, many students are silent even among students who are still pointing at each other because they are afraid they cannot work on the problem when working on the problem.

Based on these conditions, it is necessary to innovate student-centered mathematics learning and provide opportunities for students to improve their learning activities to find their concepts in mathematics. One of them is problem-based learning with a think talk write approach. Implementing an appropriate problem-based learning model can improve students' mathematical literacy ability. The problem-based learning model is a learning model that can help teachers embed concepts in students in the real world. Students can learn and work together in groups to find solutions to the problems they face.

Think talk write (TTW) is one type of cooperative learning that emphasizes students' communication abilities and creativity in the stages of implementation. TTW facilitates students in practicing their spoken language in the talking stage, which is speaking, and developing creative thinking at the think stage (thinking) and writing (writing). Basically, think talk write method can help students communicate their failures through verbal and literary writing after they go through the thinking stage. Through think talk write, students from a mindset to understand the problem and solve the problem. In the end, students will be more interested in learning mathematics to improve their mathematical literacy ability.

Based on the description above, the formulation of the problem in this study are: (1) how is the quality of mathematics learning with the problem-based learning model with think talk write approach towards class VIII students' mathematical literacy abilities? and (2) how class VIII students' mathematical literacy abilities in learning use a problem-based learning model with think talk write approach?.

2. Research Methods

The research method used in this study is a mixed-method with a concurrent embedded design model. Quantitative research design uses Pretest-Posttest Control Group Design. This study's population were second semester VIII graders of SMP Negeri 3 Margasari, Tegal Regency, academic year 2018/2019. The sample in this study was class VIII B as an experimental group given treatment in the form of problem-based learning model learning with think talk write approach and class VIII A as a control class that was given treatment in the form of an expository model. Taking this sample is based on a simple random sampling technique. The selection of research subjects was based on the purposive sampling technique.

In this study, the subject of research was based on the following considerations: (1) the results of the pre-test of mathematical literacy abilities were divided into three groups, namely the upper group, middle group, and lower group; (2) researchers consult with mathematics subject teachers in grouping students based on the value grouping process that has been carried out by researchers; (3) the researcher observes the activeness of the students during class learning.

The design used in this study was a ramdomized pretest-posttest control group design. The data collection method in this study is the method of documentation, tests, observation, and interviews. The purpose of the interview is to find out students' mathematical literacy abilities.

The data analysis in this study was an analysis of the initial data test, analysis of the results of mathematical literacy ability test, and qualitative data analysis. Test data includes the normality test to determine whether the two groups of samples come from populations that are normally distributed, homogeneity test to find out whether the sample group is homogeneous and the average difference test to find out whether the sample group has the same initial ability. The normality test uses the Kolmogorov-Smirnov Test, homogeneity using the Levene Test, and the similarities between the two using the Independent-Sample T-Test with the help of SPSS 22.0. Then it was found that the odd semester value data of class VIII A and VIII B of SMP Negeri 3 Margasari came from populations that were normally

distributed, both homogeneous data variances, and there were no differences in the mean values of the two classes or the initial abilities of the two classes.

Analysis of the data on the results of the mathematical literacy ability test was used to answer the problem formulation of how the quality of mathematics learning with problem-based learning model with think talk write approach using research instrument validation data on the learning process planning, the results of observation sheet learning at the implementation stage, and at the evaluation stage with normality test using the Kolmogorov-Smirnov test and the similarity test of variance using the Levene test with the help of SPSS 22.0. Furthermore, the data were tested using the hypothesis I test (proportion test) using the One-Sample t-Test with the help of SPSS 22.0, hypothesis II test (two difference test average) using the SPSS 22.0 Independent-Samples t-Test test, and hypothesis testing III (increase in mean difference test and normalized gain criteria). Then the analysis of students' mathematical literacy abilities was analyzed based on the results of the post-test. The presentation of data on students' mathematical literacy abilities is based on the post-test data. Furthermore, data reduction has been made, post-test data reduction. From the results of data reduction then data is presented and conclusions are drawn with indicators of mathematical literacy abilities, namely: (1) communication, (2) mathemasing, (3) representation, (4) reasoning and argument, (5) devising strategies for solving problems, (6) using symbolic, formal and technical language and operations, and (7) using mathematical tools.

Data analysis in qualitative research is done before entering the field, while in the field, and after completion. Analysis during the Miles and Huberman Model fields, namely data reduction, data display, and conclusion drawing / verification. Before reducing data, researchers conduct data collection first. In this study, researchers used the triangulation technique as an existing technique of collecting data and data sources. This research uses triangulation techniques to use different data collection techniques to get data from the same source. The researcher used the test results to measure mathematical literacy abilities, while the results of the subject's observations during learning and the results of interviews of research subjects were used to confirm and explore more deeply the results of tests on students' mathematical literacy abilities. Checking the validity of the data is done as an effort to account for the research conducted. Some things need to be considered in checking the validity of the data, namely determining the criteria and techniques for checking the validity of the data. There are four criteria used to determine data trustworthiness, namely, degree of trust (test credibility); transferability (transferability test); dependence (dependability test); and certainty (confirmability test).

3. Results and Discussion

3.1. *Quality of Mathematics Learning with Problem Based Learning Model with Think Talk Write Approach*

3.1.1. Planning of The Learning Process

Based on the data from the instrument validation assessment, the following data are obtained.

Table 1. Results of Learning Device Validation

Component	Percentage		Final Percentage
	Validator 1	Validator 2	
Syllabus	83,33%	95,83%	89,58%
Lesson Plan	75%	85%	80%
Learning Implementation Sheet	76%	96%	86%
Mathematics Literacy Ability Test	97,5%	90%	93,75%
Interview guidelines	80%	90%	85%

Based on Table 1, the average percentage obtained by each component, namely syllabus, lesson plan, learning implementation sheet, mathematics literacy ability test, and interview guidelines are 89,58%; 80%; 86%; 93,75%; and 85%. The five components fall into a very good category so that it can be concluded that the problem-based learning device with the think talk write approach is valid and can be used.

3.1.2. Implementation of The Learning Process

Based on the results of the observation sheet on the quality of learning in the experimental class with a problem-based learning model with think talk write approach, the following data are obtained.

Table 2. Percentage of Quality of Learning Problem Based Learning Models with Think Talk Write Approach

Meeting	Score	Percentage	Criteria
1	139	86,875	very good
2	151	94,375	very good
3	153	95,625	very good
4	158	98,750	very good
Total	601	93,906	very good

Based on Table 2, it was found that the average learning quality of the problem based learning model with the think talk write approach to space and shape content on the circumference of the surrounding sub-circle and circle area had a quality very good learning category.

3.1.3. Evaluation of learning

The quality of learning problem-based learning model with think talk write approach is also indicated by the results of preliminary data analysis and final data. In the final data analysis there is a hypothesis testing, namely as follows (1) students' mathematical literacy abilities in problem based learning with think talk write approach achieve classical completeness; (2) students 'mathematical literacy abilities in circle material through problem-based learning with think talk write approach is better than students' mathematical literacy abilities through expository learning; and (3) improvement of mathematical literacy abilities with problem based learning models with think talk write approach is higher than students' mathematical literacy abilities with expository learning models.

The initial data were analyzed through several tests, including the initial test data in the form of a normality test with the Kolmogorov Smirnov Test assisted by SPSS 22.0 and test the similarity of variance with the SPSS 22.0 assisted Levene Test. The normality test shows that $sig\ (2-tailed = 0{,}085 > \alpha = 0{,}05$, then H_0 is accepted. So the odd semester PAS data values of class VIII A and VIII B of SMP Negeri 3 Margasari come from populations with the normal distribution. Then in the test, homogeneity results obtained that the $sig = 0{,}808 > \alpha = 0{,}05$, then H_0 is accepted, so the odd semester PAS data values of class VIII A and VIII B of SMP Negeri 3 Margasari have the same or homogeneous variance. The result is that $sig = 0{,}32 > \alpha = 0{,}05$, then H_0 is accepted, so there is no difference in the average odd semester PAS grades of class VIII A and VIII B in SMP Negeri 3 Margasari.

The pre-test of mathematical literacy abilities obtained that the results of the pre-test of mathematical literacy abilities in the experimental class VIII B, including the highest value obtained by students were 31,25, the lowest value obtained was 13,75 and the average was 20,46. While the pre-test results of mathematics literacy abilities in control class VIII A, including the highest score obtained by students is 32,5, the lowest value obtained is 10 and the average is 22,83.

The post-test results of mathematical literacy abilities obtained that the results of the post-test mathematical literacy abilities of the experimental class VIII B, including the highest value obtained by students were 100, the lowest value obtained was 67,5 and the average was 80,58. While the post-test results of mathematics literacy abilities in control class VIII A, including the highest score obtained by students is 93,75, the lowest value obtained is 62,5 and the average is 76,17.

The post-test results were analyzed through several tests, including test data in the form of a normality test with the Kolmogorov Smirnov Test assisted by SPSS 22.0 and a homogeneity test with SPSS 22.0 assisted Levene Test. The pre-test data normality test showed that $sig\ (2-tailed = 0.176 > \alpha = 0{,}05$, then H_0 was accepted. So the class VIII A and VIII B pre-test data for SMP Negeri 3 Margasari came from populations with the normal distribution. The post-test data normality test showed that sig $(2-tailed = 0{,}200 > \alpha = 0{,}05$, H_0 was accepted. So the class VIII A and VIII B post-test data of SMP Negeri 3 Margasari came from populations with normal distribution. Then the pre-test data homogeneity test shows that $sig = 0{,}398 > \alpha = 0{,}05$, then H_0 is accepted, so the pre-test data of class VIII A and VIII B students have the same or homogeneous variance. -test results obtained that $sig = 0{,}982 > \alpha = 0{,}05$, then H_0 is accepted, so the post-test data of class VIII A and VIII B students have the same or homogeneous variance.

Then the hypothesis I test was carried out, namely the learning completeness test with the proportion test. This test was conducted to find out whether the mathematical literacy abilities of students of SMP Negeri 3 Margasari, who obtained learning with a problem-based learning model with think talk write approach achieved classical mastery learning. Students are said to complete learning if they reach classically the completeness criteria, that is, at least 75% of the number of students in the class has finished learning. The classical completeness test uses the One-Sample t-Test with SPSS 22.0. Based on the calculation of the classical average completeness test with SPSS 22.0 obtained a significant value of post-test data that is $sig = 0{,}000$, where $sig\ value = 0{,}000 < \alpha = 0.05$. So that H_0 is rejected, meaning that students who are subjected to learning with a problem-based learning model with think talk write approach has achieved classical completeness in space and shape content of mathematical literacy abilities. Factors that influence include the syntax of problem-based learning, because problem-based learning can make students more active in learning activities. After all, students learn from problems that are close to them to produce effective learning outcomes. Another factor that encourages learning outcomes is the think talk write approach in learning that emphasizes the activities of thinking, compiling, testing, reflecting and writing down ideas obtained from the problem. In the implementation of problem-based learning with think talk write approach in the experimental class, students have been seen actively to develop information during learning through discussion to develop students' mathematical literacy abilities.

Hypothesis II test is used to determine whether the mathematical literacy abilities of SMP Negeri 3 Margasari students who get a problem-based learning model with think talk write approach is better than the mathematical literacy abilities of students who obtain expository learning models. Based on the calculation of the difference test on average with SPSS 22.0 obtained a significant value, namely $sig = 0{,}040$, where $sig\ value = 0{,}040 < \alpha = 0{,}05$. So that H_0 is rejected, meaning that the average learning outcomes of mathematical literacy abilities in space and shape content taught by problem-based learning model with think talk write approach is better than the average learning outcomes of students' mathematical literacy abilities in the expository learning model. Factors that influence the differences in learning outcomes are in the class that applies problem based learning with think talk write approach requires students to solve problems by competing to exchange information so that the source of information is not only from the teacher but also from various sources. The teacher here acts as a facilitator to direct the problem so that when the discussion remains focused on achieving competence. Another factor is the think talk write approach; students are required to be active in group discussions. Starting from thinking about the problems given, then students discuss discussing their investigation of the problem. And finally, the students write down the ideas they got. Through these activities, students are able to explore their mathematical literacy abilities.

Hypothesis III test is used to find out whether the increase in mathematical literacy abilities of students of SMP Negeri 3 Margasari who obtain learning with a problem-based learning model with think talk write approach is better than students who obtain expository learning. The normalized Gain Criteria Test was used to determine the increase in the average student's mathematical literacy abilities after learning and can also be seen whether there were improvements both classically and individually.

The summary of analysis results through the classical gain test is shown in Table 3.

Table 3. The Results of Gain Test from Experimental Class Classically

Class	Content	Normalized Gain	Criteria
Experiment	*Space and Shape*	0,755893	High

Summary of analysis results through the individual gain tests are shown in Table 4.

Table 4. The Results of Gain Test from Experimental Class Individually

Class	Content	Criteria	The number of students	%
Experiment	*Space and Shape*	High	26	86,67%
		Medium	4	13,33%
		Low	0	0%

So there is an increase in the average mathematical literacy ability of students in the experimental class, both classically and individually, on space and shape content. Classically the average increase is shown through table 3, where the gain is normalized on space and shape content of 0,755893. So, the nominal gain is included in the high category. This means that the mathematical literacy ability of the experimental class students increases with a high category. While individually, the average increase is shown through table 4, where the normalized gain in space and shape content of students in the low category is 0%, students in the medium category have 13,33%, and students in the high category have 86,67%.

The summary of analysis results through the classical gain test is shown in Table 5.

Table 5. The Results of Gain Test from Control Class Classically

Kelas	Content	Normalized Gain	Criteria
Control	*Space and Shape*	0,691145	Medium

The summary of analysis results through the individual gain test is shown in Table 6.

Table 6. The Results of Gain Test from Control Class Individually

Class	Content	Criteria	The number of students	%
Control	*Space and Shape*	High	8	26,67%
		Medium	22	73,33%
		Low	0	0%

So there is an increase in the average mathematical literacy ability of students in the control class, both classically and individually, on space and shape content. Classically, the average increase is shown in table 5, where the gain is normalized on space and shape content of 0,691145. So, the nominal gain is in the medium category. This means that the mathematical literacy ability of the control class students increases with the medium category. While individually, the average increase is shown through table 6, where the normalized gain in space and shape content of students in the low category is 0%, students in the medium category have 73,33%, and students in the high category have 26,67%.

The factors that influence the increase in mathematical literacy abilities are implementing problem based learning with think talk write approach in the general implementation of active and critical student learning.

From the discussion above, it can be concluded that the students' mathematical literacy abilities have met the classical completeness test, the average difference test, and the average improvement test. So that it shows that students 'mathematical literacy abilities in problem based learning with think talk write approach goes beyond classical completeness, that is, at least 75% of the students in the class reach KKM, which is 75, average students' mathematical literacy abilities in problem based learning with think talk write approach is better than students'mathematical literacy abilities in expository learning, and increasing students' mathematical literacy abilities in the problem based learning model with think talk write approach is higher than increasing students' mathematical literacy abilities in the expository learning model.

The results of this study support the research conducted by Istiandaru (2014), which states that learning that applies problem-based learning can improve mathematical literacy abilities. The results of this study also support the research conducted by Indah et al. (2016), which states that problem-based teaching is an effective approach to teaching high-level thinking processes. This learning helps students process the information made in their minds and compiles their own knowledge about the social world and its surroundings. The learning model of problem-based learning involves students in solving real problems, motivation and curiosity increases, thus increasing the students' mathematical literacy abilities. Wardono (2018) also states that the advantages of implementing problem based learning include student learning is always problem-oriented, teachers always try to guide students, both individuals and groups, to always learn to the fullest, students are encouraged to present all work/learning results in various forms and ways, students are always directed to analyze and evaluate the problem-solving process. Furthermore, the study of Prayitno (2016) states that the learning strategies of think talks write can improve students' mathematical literacy abilities in solving geometry problems, both the questions given to the student worksheets and the written tests. The stages in the learning strategy think talk write helps students reflect, organize, and improve their understanding so that they can answer geometric questions that are given well.

3.2. *Mathematical Literacy Ability of Class VIII Students*

Data obtained during the study included the results of the pre-test and post-test of mathematical literacy abilities, in addition to the results of the pre-test and post-test data also obtained in the form of interviews and student observations during learning.

According to Arikunto (2013: 298), grouping students with standard deviations determines groups by dividing the class into groups. A standard deviation limits each group. In this study will be divided into three groups, the steps in determining the group of students are as follows: (1) sum up the scores of all students; (2) look for the average value (mean) and standard deviation (standard deviation); and (3) determine group boundaries. The determination of the boundaries of this group can be written as follows:

$score \geq (\bar{X} + SD)$ Upper group
$(\bar{X} - SD) < score < (\bar{X} + SD)$ Middle Group
$score \leq (\bar{X} - SD)$ Lower Group

The research subjects were divided into three groups, the upper, middle, and lower groups. Then after being analyzed in groups, the subjects were included in three categories, namely category I, category II, and category III. Category I is students who can fulfill the seven mathematical literacy indicators, category II is students who can fulfill six indicators of mathematical literacy, and category III is students who can only fulfill five indicators of mathematical literacy.

To find out the mathematical literacy abilities of students in the experimental class, data reduction, data presentation, and conclusion are made first. Data reduction is made on the results of observations, post-tests, and interviews with the research subjects using the three results simplified into a simple, good, and neat arrangement of languages regarding the mathematical literacy abilities of the research subjects. Then the data is presented and conclusions drawn from students' mathematical literacy abilities. Analysis of students' mathematical literacy abilities was analyzed based on the results of the post-test. From the results of data reduction then data is presented and conclusions drawn with seven components of mathematical literacy are: (1) communication; (2) mathemasing; (3) representation; (4) reasoning and argument; (5) devising strategies for solving problems; (6) using symbolic, formal and technical language and operations; and (7) using mathematical tools.

The upper group consists of 5 subjects, namely E-13, E-07, E-08, E-14, and E-26. Based on the analysis of the upper group's mathematical literacy abilities subjects generally have good mathematical literacy abilities. The upper group subject can understand, interpret and present information from the problem, translate the problem by forming equations and using mathematical formulas, plan the appropriate resolution strategies and explain the steps of completion, and use mathematical tools to help solve problems. They were making it easier for students to solve problems carefully and precisely. This is also evident when answering interview questions and when learning in class. At the time of the interview, the top group subjects were very fluent in answering the questions raised. This also happens when learning in class; the upper group subject is active in learning and fluent in answering problems.

Overall, the upper group subjects have good mathematical literacy abilities. This is indicated by the ability of the upper group subject to master the seven components of mathematical literacy, namely communication, mathematical, representation, reasoning and argumentation, devising strategies for solving problems, using symbolic, formal and technical language and operations, and using mathematical tools even though there are still few obstacles. Because the upper group subjects fulfilled the seven components of literacy, the upper group subjects were included in category I.

The upper group subject can master the communication component shown by the ability to read and interpret statements, questions, and objects in a problem and can write down the information that is known in full and write down what is asked in the problem and communicate the results of the settlement. Mathematising is shown by the ability to change problems that are defined from the real world into mathematical forms correctly (including the preparation, conceptualization, making assumptions and formulation of models) or the interpretation of mathematical results or mathematical models into actual problems. Representation is demonstrated by the ability to restate problems by forming equations and using the right formula to solve problems. Reasoning and argument are shown by the ability to reason and give reasons (arguments) that involve logical thinking to explore and connect problems to make reasonable conclusions. Devising strategies for solving problems are shown by the ability to choose and plan or strategy to solve problems. Using symbolic, formal, and technical language and operations are demonstrated by using various languages, symbols, techniques and operations in mathematical contexts to solve problems. Using mathematics tools is shown by using mathematical tools such as calculators or rulers to solve problems.

This reinforced the research of Rini (2016), which stated that the upper group subjects had no difficulty in the mathematical literacy process and did not make mistakes while doing the questions which is not right in answering.

The middle group consists of 23 subjects namely E-15, E-24, E-25, E-21, E-03, E-23, E-20, E-22, E-16, E-10, E-30 , E-02, E-11, E-29, E-01, E-05, E-06, E-09, E-17, E-18, E-19, E-27, and E-28. Based on the analysis of mathematical literacy abilities, the middle group's subject has varied mathematical literacy abilities, some are good and some are quite good. The middle group's subject is quite capable of understanding, interpreting and presenting information from the problem, translating the problem by forming equations and using mathematical formulas, planning the appropriate resolution strategies and explaining the steps of completion, and using mathematical tools to help solve problems and making it easier for students to solve problems carefully and precisely. Constraints in the middle group also vary. There are those who have not been able to draw conclusions from the problem. Some have not been able to use mathematical symbols correctly and precisely, and some have not been able to both.

Because the middle group subject's ability varies, the middle group subjects are in category I, category II, and category III. Those who meet category I have six subjects, namely E-24, E25, E-03, E-16, E-10, and E-02. The subject can master the seven components of mathematical literacy, namely communication, mathematical, representation, reasoning and argumentation, devising strategies for solving problems, using symbolic, formal and technical language and operations, and using mathematical tools even though few obstacles. Those who meet category II have nine subjects, namely E-21, E-23, E-20, E-30, E-11, E-29, E-06, E-17, and E-18. E-23, E-06, and E-18 subjects have not mastered the reasoning and argument component and E-21, E-20, E-30, E-11, E-29, and E-17 subjects have not mastered the components of using symbolic, formal, and technical language and operations. While those who meet category III, there are eight subjects E-15, E-22, E-01, E-05, E-09, E-19, E-27, and E-28. The subject has not been able to master the seven components of mathematical literacy, namely only

mastering the components of communication, mathematical, representation, devising strategies for solving problems, and using mathematical tools even though there are still few obstacles.

The middle group subject can master the communication component shown by the ability to read and interpret statements, questions, and objects in a problem and can write down information that is known in full and write down what is asked in the problem and communicate the results of the settlement. Mathematising is shown by the ability to change problems that are defined from the real world into mathematical forms correctly (including the preparation, conceptualization, making assumptions and formulation of models) or the interpretation of mathematical results or mathematical models into actual problems. Representation is demonstrated by the ability to restate problems by forming equations and using the right formula to solve problems. Subjects E-24, E25, E-03, E-16, E-10, E-02, E-21, E-20, E-30, E-11, E-29, and E-17 are able to master components reasoning and argument are shown by the ability to reason and give reasons (arguments) that involve logical thinking; to explore and connect problems so that they can make reasonable conclusions. While the subjects E-23, E-06, E-18, E-15, E-22, E-01, E-05, E-09, E-19, E-27, and E-28 have not mastered the reasoning component and argument. The subject group is mastering the components of devising strategies for solving problems shown by the ability to choose and plan or strategy to solve the problem. Subjects E-24, E25, E-03, E-16, E-10, E-02, E-23, E-06, and E-18 are able to master the components using symbolic, formal, and technical language and operations indicated by the ability to use various languages, symbols, techniques and operations in mathematical contexts to solve problems. Whereas subjects E-21, E-20, E-30, E-11, E-29, E-17, E-15, E-22, E-01, E-05, E-09, E-19, E-27, and E-28 have not mastered the components using symbolic, formal, and technical language and operations. The subject group is mastering the components using mathematics tools shown by the ability to use mathematical tools such as calculators or rulers to solve problems.

This reinforces the research of Ardyanto (2016), which states that the middle group subject has varied mathematical literacy abilities; some have been able to explore and connect problems so that they can draw conclusions and some have not been able to make conclusions. Some have been able to use mathematical symbols to solve problems, and some are less observant in seeing mathematics in a problem, so that problem solving is not as expected.

The lower group consists of 2 subjects, namely E-12 and E-04. Based on the analysis of mathematical literacy abilities, the lower group's subject generally has quite good mathematical literacy abilities. The lower group's subject is quite capable of understanding, interpreting and presenting information from the problem, translating the problem by forming equations and using mathematical formulas, planning the appropriate resolution strategies and explaining the steps of completion, and using mathematical tools to help solve problems. They were making it easier for students to solve problems carefully and precisely. Constraints in the lower group cannot draw conclusions from the problem and have not been able to use mathematical symbols correctly and precisely.

Overall, the lower group subjects had fairly good mathematical literacy abilities. This is indicated by the ability of the lower group subjects can only master the five components of mathematical literacy, namely communication, mathematical, representation, devising strategies for solving problems, and using mathematical tools even though there are still a few obstacles. In the reasoning and argument component and using symbolic, formal and technical language and operations, the lower group's subject has not mastered it well. Because the lower group subject did not fulfill the seven components of literacy and only fulfilled the five mathematical literacy components, the lower subject group was in category III.

The lower group subjects are able to master the communication component, which is shown by the ability to read and interpret statements, questions, and objects in a problem, and can write down information that is known in full and write down what is asked in the problem and communicate the results of the settlement. Mathematising is shown by the ability to change problems that are defined from the real world into mathematical forms correctly (including the preparation, conceptualization, making assumptions and formulation of models) or the interpretation of mathematical results or mathematical models into actual problems. Representation is demonstrated by the ability to restate problems by forming equations and using the right formula to solve problems. The lower groups' subject have not been able to master the reasoning and argument components because they have not demonstrated the ability to reason and give reasons (arguments) that involve logical thinking to explore and connect problems so that they can make reasonable conclusions. Subjects under the group mastering lomponen devising strategies for solving problems shown by the ability to choose and plan or strategy to solve problems. The lower group

subjects have not been able to master the components using symbolic, formal, and technical language and operations because they have not demonstrated the ability to use various languages, symbols, techniques and operations in mathematical contexts to solve problems. Subjects under the group mastering the components using mathematics tools are shown by the ability to use mathematical tools such as calculators or rulers to solve problems.

This reinforces the research of Ardyanto (2016), which states that the lower group's subject has not been able to explore and connect problems so that they can draw conclusions and have not been able to use mathematical symbols to solve problems. The problem is not as expected.

4. Conclusions

Based on the results of the study and discussion, conclusions were obtained regarding the quality of mathematics learning with a problem-based learning model approached think talk write, namely: (1) Planning of the learning process has a very good category; (2) Implementation of the implementation process has very good criteria; and (3) Evaluation of learning has good criteria. At the evaluation stage, students 'mathematical literacy abilities in problem-based learning with the think talk write approach achieved classical completeness, namely at least 75% of the students in the class reached KKM, namely 75, average students' mathematical literacy abilities in problem based learning with think talk write is approach better than students' literacy abilities in expository learning, and increasing students' mathematical literacy abilities in the problem based learning model with think talk write approach is higher than increasing students' mathematical literacy abilities in the expository learning model.

Based on the results of the research and discussion, conclusions were obtained regarding the students' mathematical literacy abilities in learning using a problem-based learning model think talk write approach with the following pattern, from 30 students grouped into three groups, namely: (1) upper group subjects had good mathematical literacy abilities and can master seven components of mathematical literacy; (2) the middle group subjects have varied mathematical literacy abilities, some are good and some are quite good; and (3) the subject of the lower group has quite good mathematical literacy abilities, because of the components of reasoning and argument and using symbolic, formal and technical language and operations, the subject of the lower group has not mastered well.

References

Ardyanto, B. E. (2016). Kemampuan Literasi Matematika Siswa Kelas VII Pada Pembelajaran React dengan Pendekatan Realistik Berbantuan Edmodo. *Undergraduated Thesis*. Semarang: Universitas Negeri Semarang.

Arikunto, S. (2013). *Dasar-dasar Evaluasi Pendidikan*. Edisi Kedua. Jakarta: Bumi Aksara.

Dewi, S. C., Wardono, & Soedjoko, E. (2015). Implementasi Model PBL dengan Pendekatan Realistik berbantuan Edmodo untuk Meningkatkan Literasi Matematika Kelas VII. *Unnes of Journal Mathematical Education*. p-ISSN 2252-6927. e-ISSN 2460-5840.

Indah, N., Mania, S., & Nursalam. (2016). Peningkatan Kemampuan Literasi Matematika Siswa Melalui Penerapan Model Pembelajaran *Problem Based Learning* di Kelas VII SMP Negeri 5 Pallangga Kabupaten Gowa. *Jurnal Matematika dan Pembelajaran (MaPan),* 4(2):198-210.

Istiandaru, A., Wardono, & Mulyono. (2014). PBL Pendekatan Realistik Saintifik dan Asesmen PISA Untuk Meningkatkan Kemampuan Literasi Matematika. *Unnes Journal of Mathematics Education Research*. ISSN 2252-6455.

OECD. (2016). PISA 2015 Draft Mathematics Framework. Paris: OECD Publishing.

Prayitno, A. 2016. Pembelajaran *Think-Talk-Write* dalam Meningkatkan Kemampuan Pemecahan Soal Geometri. *Jurnal Pengajaran MIPA*. 21(2):135-141. p-ISSN 1412-0917. e-ISSN 2443-3616.

Rini, E. P. (2016). Analisis Literasi Matematika Siswa Kelas VII SMP dengan Model PBL Pendekatan Realistic Mathematics Education (RME) Berbantuan Kartu Masalah. *Undergraduated Thesis*. Semarang: Universitas Negeri Semarang.

Stacey, K. (2011). The PISA View of Mathematical Literacy in Indonesia. *Journal on Mathematics Education (IndoMS. J.M.E)*. 2(2): 95-126.

UNICEF, I., & UNICEF. (2000). *Fefining quality in education. In Education Working Paper. Programme Division*. New York. A paper presented by UNICEF at a meeting of the International Working Group on Education, Frorence, Italy.

UNICEF. (2000). *Curriculum report card*. Working Paper Series, Education Section, Programme Division. New York: Author.

Wardono, Waluya, St. B., Kartono, Mulyono, Mariani, S. (2018). Literasi Matematika Siswa SMP pada Pembelajaran Problem Based Learning Realistik Edmodo Schoology. *PRISMA 1, 477-497*.