

## IMPROVING MATH LEARNING OUTCOMES BY IMPLEMENTING NUMERACY LITERACY DRILL EXERCISES

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### *Abstract*

This research aims to determine the ability to solve problems in mathematics lessons that apply the numeracy literacy drill method in class VI students of SD Muhammadiyah Kulur, Temon, Kulon Progo, Yogyakarta. The development model used in this research is Classroom Action Research which is based on the Kemmis and Mc action research (PTK) concept. This research has several stages, including initial reflection, planning, implementation of actions, observation and reflection. The instruments in the research include story questions related to literacy abilities, reasoning abilities and mathematical calculation abilities. Numeracy literacy mathematics questions can make it easier for students to understand the questions in the independent curriculum. Data analysis with quantitative description. The results of the research showed that there was an increase in the average student knowledge score from before the numeracy literacy drill method was applied to after the numeracy literacy drill method was applied in Cycle I and Cycle II. The average student knowledge score before the drill method was applied was 54.17. After the drill method was applied in cycle I the average student knowledge score was 80. In the application of the drill method in cycle II the average student knowledge score was 88.75. Thus, the application of the numeracy literacy drill method can improve the learning outcomes of class VI students at SD Muhamaddiyah Kulur Kebondalem Temon Kulonprogo.

**Keywords:** *Drill method, Mathematics Learning Outcomes, Numeracy Literacy Ability*

### **Introduction**

Education is the main foundation in shaping a generation that is qualified and able to compete in the era of globalization. One of the subjects that has an important role in the intellectual development of students is mathematics. Mathematics is not only a tool to support intelligence, but also has a significant impact on the development of students' logical and analytical thinking skills.

The implementation of numeracy literacy in elementary schools has several obstacles including low student interest in lessons related to mathematics, students' ability to understand problems is still low, and the implementation of learning is still conventional and monotonous. The basic concepts of mathematics have generally been mastered by students, such as number counting operations, but the skills in applying concepts to everyday problems are still not optimal. This can also be

stated as the cause of the low numeracy literacy of elementary school students.

One of the reasons why students' numeracy literacy skills are still low is the lack of introduction to numeracy literacy-based problem exercises. So that students have difficulty in understanding problems and problem solving techniques. Based on field surveys, there are still many elementary school teachers who only use LKS and thematic books for student practice problems, causing students' limitations to various types of numeracy literacy problem examples are limited, so that students' creativity in solving problems related to numeracy literacy is also limited. The provision of special book sources related to numeracy literacy in schools is also still lacking.

Successful mastery of a concept will be obtained if students have high thinking and reasoning skills, because concepts that have been understood will stick in students'

memories for a long time, so it is very important for students to have high thinking skills. Optimal learning outcomes shown by students cannot be separated from their creativity in solving problems. To solve problems, there are various abilities that can make students' thinking skills high and improve learning outcomes. In an effort to improve the learning process and results, teachers and students play an important role. Therefore, teachers must try to create suitable strategies because in a meaningful teaching and learning process, student involvement is very important.

The specific objective in this study is to improve students' ability in numeracy literacy problem solving, so that student learning outcomes in the independent curriculum will also increase. In addition, to help schools, especially mathematics teachers, in providing and solving numeracy literacy problems.

This research is important to do considering that the problems faced by students and teachers appear to be increasingly complex. In addition, it is expected to be able to influence student learning outcomes which are still low due to the difficulty of students in solving numeracy literacy problems.

**Research methods**

This research uses a type of classroom action research based on Kemmis and Mc Targgat's action research concept in the form of a research cycle. This research was carried out at SD Muhammadiyah Kulur with the address Kebondalem, Kulur, Kapanewon Temon, Kulon Progo Regency. This research was carried out in the second semester of the 2023/2024 school year for 4 months from February to May 2024. The subjects of this research were class VI students who totaling 13 people, consisting of 5 men and 8 women. The research carried out included classroom action research. So a special design for action research is very necessary. Action research is based on the philosophy that every human being does not like static things, but always wants something better.

The classroom action research design refers to the ideas of Kemmis and Mc Taggart as shown in Figure 1.

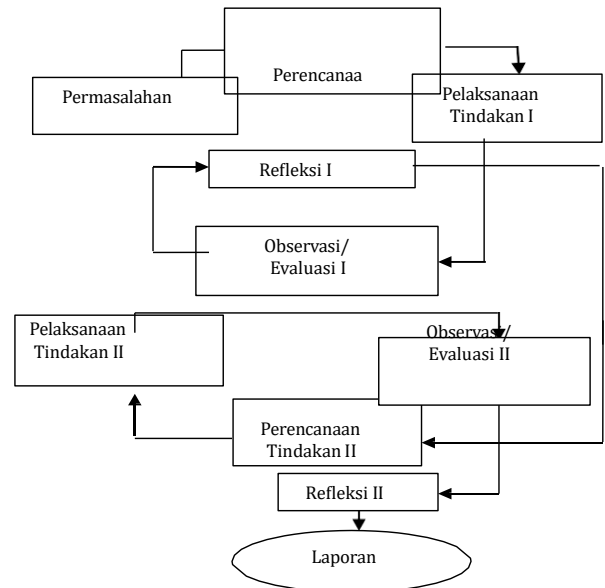


Figure 1. Kemmis and Mc Taggart

**Mathematics Learning Outcomes**

Learning outcomes are defined by several experts as follows: (1) Winkel, learning outcomes are the successes achieved by students, which are expressed in the form of numbers; (2) Bloom states that learning outcomes include the cognitive domain, affective domain and psychomotor domain. The cognitive domain includes knowledge, understanding, application, analysis, synthesis and evaluation. The affective domain includes attitudes, receiving, responding, values, organizing, character. , The psychomotor domain is a person's movement behavior and physical coordination, motor abilities and physical abilities. Studying mathematics trains students to become people who are more thorough, careful and not careless in their actions.

According to mathematicians it is:

Johnson and Rising (1972), mathematics is a pattern of thinking, a pattern of organizing, proving logic. So that mathematics is a language that uses terms that are defined carefully, clearly and accurately, its representation is with

symbols and concisely, it is more of a symbolic language about ideas than about sounds.

Kline (1973) Mathematics is not a solitary knowledge that can be perfect by itself, but the existence of mathematics is primarily to help humans understand and overcome social, economic and natural problems. Mathematics grows and develops because of the thinking process, therefore logic is the basis for the formation of mathematics.

James and J (1976) Mathematics is the science of logic regarding shape, arrangement, quantity, and concepts that relate to one another in large numbers which are divided into three fields, namely algebra, analysis and geometry. Hutauruk (2018), mathematical knowledge is a social and cultural product that is used as a thinking tool in solving problems and contains a number of axioms, definitions, theorems, proofs, problems and solutions.

Susilo, Metaphysics is not just numbers, symbols and formulas that have nothing to do with the real world, on the contrary, mathematics grows and is rooted in the real world. (quoted from wordpress.com - Smart Mathematics)

Based on the definition of mathematics above, mathematics learning outcomes are the result of the process of working on mathematical problems which are social problems solved by logical thinking, reasoning power using numbers, symbols, formulas, quantities and biased conclusions. Literacy in general is not just being able to read, but the ability to analyze reading which includes writing, symbols, numbers and graphs and being able to understand the concepts stored in sentences. Numeracy is not just about understanding mathematical competence. Knowledge of mathematics alone is not enough to make someone have numeracy abilities. Numeracy includes the ability to apply numerical and mathematical concepts in everyday life. From this understanding, numeracy literacy is the skill of: (1) using various kinds of numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life; (2) analyzing information displayed in various graphic forms, tables, charts etc., then use the

interpretation of the results to predict and make decisions,

According to Wikipedia, the definition of literacy is a general term that refers to a series of individual abilities and skills in reading, writing, speaking, calculating and solving problems at a certain level of expertise required in work, family and society in everyday life.

According to Marriam-Webster, literacy is the ability or quality of literacy which includes the ability to read, write, and recognize and understand visual ideas. From this understanding, digital literacy develops, the ability to use information and communication technology (ICT) to communicate information.

### **Understanding Numeracy**

Numeracy is the ability to analyze using numbers. Numeracy is the ability to apply the concept of numbers and symbols in basic mathematics to solve problems in everyday life. Numeracy is the ability to analyze information displayed in various forms, such as: graphs, tables and charts, then used to analyze and draw conclusions. From this understanding, numeracy literacy is the skill of: (1) Using various kinds of numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life. (2) Analyze information displayed in various forms of graphs, tables, charts, and so on, then use the interpretation of the results to make predictions.

### **Numeracy Literacy**

Numeracy literacy is a person's ability that combines literacy abilities and numeracy abilities. Literacy refers to a person's ability to read, write and understand reading texts. While numeracy refers to a person's ability to understand, use and manipulate numbers, numeration is the ability a person has to solve real problems in real life by processing numbers. Numeracy literacy requires logical thinking to make it easier for someone to understand mathematics, as well as helping students improve understanding and skills in problem solving. This is in line with the opinion of (Ekowati et al, 2019) which states that numeracy literacy is a person's ability to analyze and understand a statement packaged through activities in manipulating symbols or language found in everyday life and expressing these statements through writing and reading.

Another opinion states that numeracy literacy is a skill acquired in solving problems (Mahmud & Pratiwi, 2019). Thus, it can be interpreted that numeracy literacy is the ability to apply number concepts and calculation operation skills in everyday life.

Numeracy literacy consists of 3 aspects, namely aspects of counting, numeration relations and arithmetic operations. Numeracy is the ability to count an object as a whole, numeration relations relate to the ability to differentiate the quantity of an object, more, less, taller, shorter, etc. Meanwhile arithmetic operations is the ability to perform basic mathematical operations in the form of addition and subtraction.

Numeracy is the ability a person has to solve real problems in real life by processing numbers. Numeracy literacy requires logical thinking to make it easier for someone to understand mathematics, as well as helping students improve understanding and skills in problem solving. This is in line with the opinion of (Ekowati et al, 2019) which states that numeracy literacy is a person's ability to analyze and understand a statement packaged through activities in manipulating symbols or language found in everyday life and expressing these statements through writing and reading. Another opinion states that numeracy literacy is a skill acquired in solving problems (Mahmud & Pratiwi, 2019). Thus, it can be interpreted that numeracy literacy is the ability to apply number concepts and calculation operation skills in everyday life.

Numeracy competition is the knowledge and skill to use various kinds of numbers and symbols in mathematics to solve practical problems in everyday life and the ability to interpret quantitative information that is around us (Kemdikbud, 2017)

Mathematics has topics and concepts as a basis for understanding subsequent topics or concepts (Alfiyah et al., 2021; Pambudi, 2007). Thus, in studying mathematics, previous concepts must be truly mastered to be able to understand subsequent concepts (Dini et al., 2018; Sulastri, 2016). This of course has consequences for the teaching and learning process or mathematics learning. Therefore, learning mathematics cannot be done in leaps and bounds. Mathematics learning must be carried out step by step, starting from

understanding simple ideas and concepts to more complex levels. Concept mastery begins with mastering lower concepts and then continues with mastering higher concepts (Netriwati, 2018; Ningsih, 2016). This is a challenge faced by teachers on how to make mathematics something interesting. Therefore, teachers are required to create activities that make students happy and engrossed in learning mathematics.

Creating a relaxed atmosphere when studying can be done to improve student learning outcomes. One of the activities that makes students behave and be in the above atmosphere is through the application of innovative learning models (Kusumah et al., 2020; Yanni, 2018). The reality is that in implementing the teacher's main task, sometimes it is not carried out perfectly. When a student's test results still require remediation, a teacher will feel He failed in teaching Mathematics. From the initial learning which was carried out starting on July 3 2023 for class VI students at SD Muhammadiyah Kulur, it showed that the average student learning result was 40, the mathematics learning result was still low. The level of learning completion (students get a minimum score of 70) is only 46%, while the expected level is 85%. Even though the Minimum Learning Criteria (KBM) for Mathematics subjects in class VI at SD Muhamamdiyah Kulur is 70. This shows that the targets achieved by teachers have not been met. The low understanding of students is motivated by various things, including: mathematics learning activities still use conventional approaches, namely lectures, giving assignments, learning is dominated by teachers and involves very little student involvement. Teachers do not provide opportunities for students to acquire mathematical concepts on their own. The teacher writes down the material and then the students copy what the teacher does. So that the concept of the material is not embedded in students. Therefore, teachers must repeat the material in the next lesson. This results in a lot of time being spent teaching one material.

The solution that teachers can apply to overcome this problem is by using interesting learning methods. Teachers can apply the drill method. The drill method is an activity of doing the same thing over and over again seriously

with the aim of strengthening a skill (Fransiska et al., 2019; jauhariyah & Dardiri, 2017; Putri et al., 2019). Drill is a learning method that requires quite high mastery skills, so before giving practice the teacher must prepare well both the material and the questions to be practiced, it cannot be done spontaneously. (Erlinda, 2016; Jaelani & Aisyah, 2017). Evaluations are carried out immediately so that teachers can see the results of students' progress in training, such as comprehension, skills and accuracy of thinking. (Fransiska et al., 2019; Jaelani & Aisyah, 2017). This method has the following advantages following. 1) Learning material that is given in a serious atmosphere will be more firmly embedded in the student's memory because all thoughts, feelings and will are concentrated on the lesson being rehearsed; (2) Students will be able to use their mental powers better because with good teaching, students will become more organized, thorough and improve their memory; (3) The direct supervision, guidance and correction from the teacher allows students to make improvements on the spot. (Dewi et al., 2020). This can save study time and students can immediately find out their learning results.

### **Drill Method**

In learning mathematics, teachers must be smart in choosing the strategies they choose so that it is easy to determine the learning method or model that will be used. Several mathematics teaching methods that emphasize active student learning include discussion methods, assignments and project methods. To discuss mathematical numeracy literacy tasks, the relevant method is the Drill method.

According to Rostiyah (1985), one of the appropriate methods to use in learning mathematics is the Drill method. The drill method is a learning method where students carry out training activities, so that students have dexterity or skills that are higher than what they have learned. This is relevant to the material being trained, namely mathematical numeracy literacy questions. Questions like this require careful reading of the questions until they are resolved in a final conclusion statement.

Fahrurrozi (2020), the Drill method is an activity of doing similar things, repeatedly,

seriously with the aim of strengthening an association or perfecting a skill so that it becomes permanent. Meanwhile, the application of learning using the Drill method is by giving questions to students to find out the solution/answer, then the student presents it in front of the class which is repeated until all students understand the solution to the problem being discussed.

**Training/Drill Method.** According to Thoifuri, the drill method is generally used to obtain dexterity or skills from the material being studied. This method emphasizes students carrying out exercises/drills in order to have higher skills than they already have been studied.

According to Roestiyah N.K, the technique or training method or drill is a technique that can be interpreted as a way of teaching, namely students carrying out training activities, so that students have higher dexterity or skills than what they have learned. Exercises that are practical, easy to do, and regularly provide guidance to children/students to improve their mastery of these skills, so that students may even be able to master these skills perfectly.

The advantages of this method include that students can master the expected skills so that students have ready-to-use knowledge and will have the habit of studying regularly and disciplined. The weaknesses of this method include inhibiting the development of students' initiative skills, as well as forming inflexible habits.

The drill/drill teaching technique is used for the purpose of making students:

Have motor skills; such as memorizing words, writing, using tools and so on.

Develop intellectual skills, such as multiplying, dividing, adding, subtracting, drawing roots in congak calculations and so on.

Have the ability to relate a situation to things such as the cause and effect of lots of rain and flooding, the use of symbols/symbols on maps and so on.

In using drill/drill techniques to be successful and effective, teachers and students need to instill the following:

Regarding the characteristics of an exercise, each exercise must always be different from the previous exercise. This is caused by different situations and influences, according to

different responsiveness. It is possible that the training situation changes, so that the challenges faced are different from the previous situation, requiring a different response.

Teachers need to pay attention and understand the value of the practice itself and its relationship to the overall lessons at school.

In preparation before entering the training, the teacher must provide a clear understanding and formulation of objectives for students, so that they understand and understand what the purpose of the training is and how it relates to the other lessons they receive.

For successful implementation of the drill technique, teachers need to pay attention to the following steps: Use this exercise only for lessons or actions that are carried out automatically, that is, those that students do without using deep thought and consideration. But it can be done quickly as a reflex movement, such as calculating and memorizing. Teachers must choose exercises that have broad meaning, namely those that can instill an understanding of the meaning and purpose of the exercise before they carry it out.

In preliminary training, teachers must place more emphasis on diagnosis, because with initial fatigue we cannot expect students to be able to produce perfect skills. It is necessary to prioritize accuracy, so that students carry out the exercises correctly, then pay attention to speed, so that students can perform the speed and skills according to the specified time.

**Implementation of Actions**

Pre-cycle learning was held on Tuesday, March 26 2024 with material on mixed arithmetic operations. Student learning results in pre-cycle learning show that in pre-cycle learning there were 9 students whose grades were still low and No

Completed, 2 students had sufficient grades, and only 1 student had a good grade. There were 3 students who completed (25%) and 9 children (75%) who did not complete, with a KKM Mathematics score = 70.

**Evaluation/Observation**

At the evaluation/observation stage, the researcher as a teacher in the class carried out learning activities still using the expository method, numeracy literacy activities were not specific to discussing mathematics story

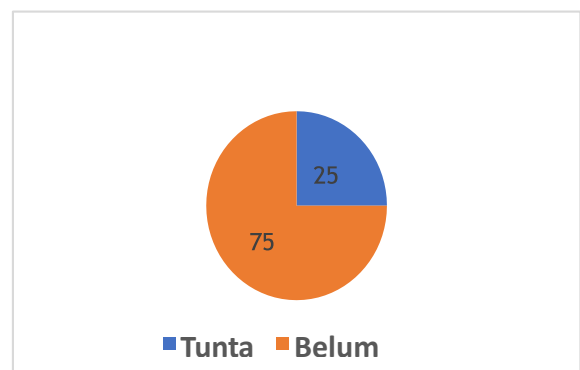
problems. The task of doing mathematics is not discussed in depth.

After the pre-cycle learning has been completed, the following are the results of the students' knowledge scores before the drill method was applied. Results of Reflection on Students' Knowledge Values in Pre-Cycle Learning

**Assessment Aspects Description**

- Lowest Value 30
- Highest Score 80
- Average in Pre Cycle 54.17
- Completed Students (KKM = 70) 3 Students (25%)
- Students Who Have Not Yet Completed 9 Students (75%)

Student learning completeness can be seen in the form of a pie chart as below.



**Description of Cycle I**

**Planning**

At the planning stage the researcher plans the activities that will be carried out in Classroom Action Research (PTK). The activities carried out by researchers at the planning stage of cycle I are as follows. Determine the material that will be the subject of discussion at the meeting in cycle I. Prepare a learning implementation plan (RPP) that is appropriate to the drill method learning. Prepare learning media in the form of activity sheets that will be carried out by each group. Develop assessment instruments and test answer keys consisting of a written test in the form of 10 essay questions to determine students' mathematics learning outcomes for each cycle.

Implementation of Actions

Implementation of actions in the form of learning in class which includes the following activities. Learning activities begin with greetings, prayer, presence, apperception, and explaining the learning objectives, Provide students with theoretical knowledge first, in accordance with the teaching material that will be applied using the drill learning method. Next, provide brief learning material.

Provide examples of practice questions before giving practice on the material learning that has been given. Providing practice questions on the material that has been given, then done by students with the guidance of the teacher.

Correct and correct training errors made by students. Students repeat the exercises that have been given to achieve correct automatic movements. The repetition is done three times. Teachers evaluate student learning outcomes by providing test sheets. Evaluation is carried out when carrying out the activity for the third time. The teacher provides evaluations to all students by giving practice questions to all students to determine students' understanding. After learning was carried out in the first cycle, there were 2 students who had a poor score, 2 students had a sufficient score, 6 students had a good score, and 2 students had a very good score.

**Observation / Observation**

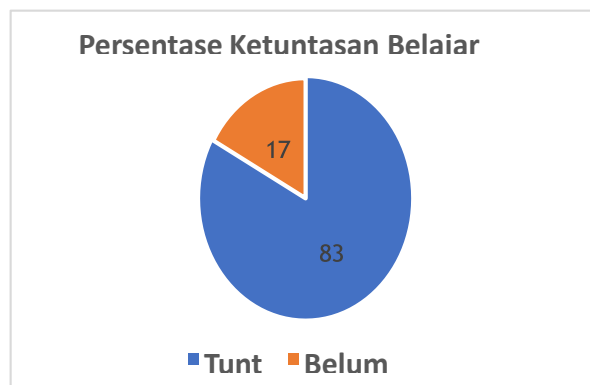
At the evaluation/observation stage, the researcher as a teacher in the class carried out learning activities using the drill method. Other researchers observe learning activities by observing the actions carried out by teachers and student activities during learning.

**Reflection**

After the first cycle of learning has been completed, the following are the results of the students' mathematics scores. Reflection Results on Students' Mathematics Scores in Cycle I Learning

Assessment Aspects	Description
Lowest Score	65
Highest Score	95
Average in Cycle II	80
Completed Students (KKM = 70)	10 student (83,33%)
rounded	student (0%)
Unfinished Students	2 Students (16.67%)

Student learning completeness can be seen in the form of a bar chart as below.



Description of Cycle II

**Planning**

At the planning stage the researcher plans the activities that will be carried out in Classroom Action Research (PTK). The activities carried out by researchers at the planning stage of cycle II are as follows.

Determine the material that will be the subject of discussion at the meeting in cycle II. Prepare a learning implementation plan (RPP) for cycle II that is appropriate to the drill method learning. Prepare learning media in the form of activity sheets that will be carried out by each group. Develop assessment instruments and test answer keys consisting of a written test in the form of 10 descriptive questions to determine student learning outcomes.

Implementation of actions in the form of learning in class which includes the following activities. Learning activities begin



with greeting, praying, attendance, apperception, and explaining the learning objectives. Provide students with theoretical knowledge first, in accordance with the teaching material that will be applied using the drill learning method.

Next, provide brief learning material. Provide examples of practice questions before giving practice on the learning material that has been provided. Providing practice questions on the material that has been given, then done by students with the guidance of the teacher. Correct and correct training errors made by students.

Students repeat the exercises that have been given to achieve correct automatic movements. The repetition is done three times.

Assessment Aspects	Description
Lowest Score	80
Highest Score	100
Average in Cycle II	88,75
Completed Students (KKM = 70)	12 student (100%)
rounded	0 student (0%)

Teachers evaluate student learning outcomes by providing test sheets. Evaluation is carried out when carrying out the activity for the third time. The teacher provides evaluations to all students by giving practice questions to all students to determine students' understanding of mathematics After the second cycle of learning was carried out, there were no students who had insufficient or sufficient grades. There were 7 students with good grades and 5 students with excellent grades.

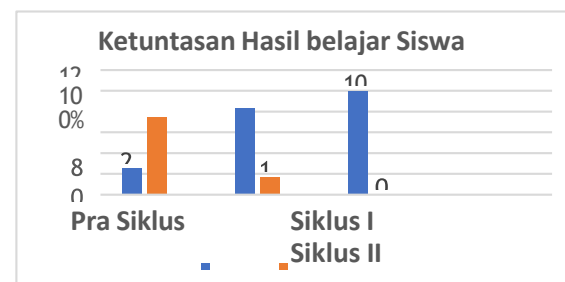
**Evaluation/Observation**

At the evaluation/observation stage, the researcher as a teacher in the class carried out learning activities using the drill method. Other researchers observe learning activities by observing the actions carried out by teachers and student activities during learning. Observations were carried out based on the observation sheet provided. Apart from observing attitudes, in the second cycle of

student learning, students' performance was also observed. The results of student performance are shown in table 4.8 below. During the observation, the researcher also assessed the students' skills.

**Reflection**

After the second cycle of learning has been completed, the following are the results of the students' mathematics scores. Reflection Results on Students' Mathematics Scores in Learning Cycle II From the learning activities in the pre-cycle, cycle I, and cycle II, the completeness of student learning outcomes can be observed in the following bar diagram.



The bar diagram shows that there was an increase in the completeness of student learning outcomes after the drill method was applied. During the pre-cycle, the percentage of students who completed was only 25%, then increased in the first cycle to 83%. Then it increased again in cycle II to 100%. Apart from the completeness of student learning outcomes, there has also been a decrease in incomplete student learning outcomes. During the pre-cycle, the percentage of student learning outcomes that had not been completed was 75%, then decreased in the first cycle to 17%. After that it decreased again in cycle 2 to 0%. Conclusion The research with the title can be concluded as follows:

Student activity in carrying out numeracy literacy activities using the drill method in the attitude aspect reached 25% in good criteria and reached 75% in very good criteria. Activities in the performance aspect reached 41.66% with good criteria and 58.34% with very good criteria. This shows that students carrying out the numeracy literacy process using the drill method are very enthusiastic in their efforts to achieve maximum mathematics learning results. The average student mathematics score before applying the drill method in mummer literacy was 54.17 with a



percentage of 25% of students who had completed it and 75% of students who had not completed it. After being implemented in cycle I, the average student mathematics score was 80 with a percentage of 83% of students completing and 17% of students not completing. In the implementation of cycle II the average student mathematics score was 88.75 with the percentage of students completing 100%. Thus it can be concluded that the application of the numeracy literacy drill method can improve the learning outcomes of class VI students at SD Muhamaddiyah Kulur Kebondalem Temon Kulonprogo.

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