

MAPPING IDEA & LITERATURE FORMAT | RESEARCH ARTICLE

Improving Grade IV Mathematics Literacy Through the Realistic Mathematics Education Approach at SD Negeri 017/VIII Pintas

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ABSTRACT

The low mathematics literacy of students in mathematics learning is still a problem that is still often encountered in elementary schools. Learning that tends to be teacher-centered causes students to have difficulty understanding contextual problems, using mathematical concepts, and communicating the results of completion. Therefore, an innovative and contextual learning approach is needed, one of which is through the Realistic Mathematics Education (RME) approach. This study aims to describe the application of the Realistic Mathematics Education (RME) approach and analyze the improvement of mathematical literacy of grade IV students of SD Negeri 017/VIII Pintas. The research method used is Classroom Action Research (PTK) with the Kemmis and McTaggart models which is carried out in two cycles. The research subjects consist of 23 students. Data collection techniques include observation, questionnaires, tests, and documentation, while data analysis is carried out descriptively, quantitatively, and qualitatively. The results showed a gradual improvement in students' classical learning mastery percentage. In the pre-cycle, students' mathematical literacy mastery reached only 40.58%. Following the implementation of the RME approach, classical mastery increased in Cycle I to a range of 73.91%–87.10%, and further improved in Cycle II to a range of 91.30%–96.52%. This improvement was reflected in students' enhanced ability to understand contextual problems, apply mathematical concepts accurately, and communicate problem-solving results systematically. Based on these results, it can be concluded that the implementation of the Realistic Mathematics Education (RME) approach successfully improves the mathematical literacy of fourth-grade students in elementary school.

Keywords: Realistic Mathematics Education (RME), Mathematical Literacy, Classroom Action Research.

I. Introduction

Mathematics education at the elementary school level is the main foundation for students to develop logical and systematic thinking skills. However, the mathematical literacy ability of Indonesian students is still in the low category according to international standards, such as PISA, especially in the aspects of understanding the context of problems and problem solving (OECD, 2023). Some studies show that conventional learning approaches have not been able to facilitate students to develop the literacy skills required in modern mathematics learning. Therefore, contextual problem-based learning approaches such as RME are proposed as an alternative to improve the quality of students' mathematical literacy (Istiana et al., 2020). This low ability is due to learning that is still conventional and teacher-centered, so that students have difficulty relating abstract mathematical concepts to real situations (Ayunis & Belia, 2021). This non-contextual



learning inhibits students from interpreting information and drawing the correct conclusions from a mathematical problem.

Realistic Mathematics Education (RME) is a mathematics learning approach developed from the perspective of social constructivism, placing the real-life context as the starting point for mathematics learning. This approach emphasizes that students must start from their concrete experiences and build mathematical concepts gradually towards formal abstraction so that learning is more meaningful. RME emphasizes interactive, contextual, and progressive learning so that students can be actively involved in the mathematics learning process. The RME theory states that by starting from a situation that is real and relevant to students, their ability to formulate problem-solving strategies will increase so that it has a positive impact on mathematical literacy. The characteristics of RME that are inclusive of the context of students' lives are the basis for the selection of the approach in this study (Van Den Heuvel-Panhuizen & Drijvers, 2020).

In the context of learning in elementary schools, especially grade IV, RME has been extensively researched and shown positive results in various mathematics sub-competencies. Previous research, for example, reported that the application of RME has a significant influence on students' general mathematical literacy skills compared to conventional approaches. These results reinforce the assumption that the use of RME can be a solution to overcome the low mathematical literacy of elementary students. In addition, RME has also been shown to be effective in improving the mathematical problem-solving ability of grade IV students in certain materials such as the circumference and area of flat buildings. These findings show that RME is not only a theory, but also proven in classroom learning practice (Sumira et al., 2022)

The RME approach that emphasizes the real context of students' experiences is believed to strengthen the connection between everyday experiences and abstract mathematical concepts, thereby improving students' mathematical literacy skills. The learning process carried out through RME steps such as modeling real situations, building mathematical concepts, and reflecting at the end of learning is expected to encourage students to think critically and creatively. This is in line with the demands of the Indonesian basic education curriculum that encourages student-centered learning and strengthens higher-order thinking skills. In other words, RME not only targets the improvement of learning outcomes but also the development of students' cognitive skills that are relevant to real life. Therefore, the application of RME has a strong theoretical and empirical footing (Fahlevi et al., 2024).

The RME approach provides opportunities for students to rediscover mathematical concepts through the exploration of realistic problems, so that learning becomes more meaningful and inclusive of the characteristics of elementary school students (Isnaintri et al., 2024). Given the lack of implementation of RME specific to the Madrasah Ibtidaiyah environment in rural areas, this research is very urgent to fill these practical and theoretical gaps (Ayunis & Belia, 2021). Preliminary observations at SD Negeri 017/VIII Pintas show that the mathematical literacy ability of grade IV students is still low. This indicator of low literacy can be seen from the results of class assignments, students' responses when given story questions, and low students' skills in solving contextual problems. Many students only rely on formulas without understanding the meaning of the problem and its context, so when faced with real mathematical situations, they experience difficulties. In addition, mathematics learning activities in elementary schools are often traditional, with the dominance of lectures and practice questions that do not stimulate students' critical thinking.

To strengthen the findings of these observations, the researcher conducted a pre-survey of 25 grade IV students by providing several mathematical literacy-based questions that measured the ability to understand context, formulate mathematical models, and draw conclusions from real problems. As many as 15 out of 25 students (60%) were in the low mathematics literacy category. Students in this category showed difficulties in understanding the information in the story problems, determining the right solution strategies, and relating problems to relevant mathematical concepts. These findings reinforce the indication that the mathematical literacy of grade IV students at SD Negeri 017/VIII Pintas still requires more contextual and meaningful attention and learning interventions. This pre-survey data shows that there is a gap between the demands of the curriculum that emphasizes literacy and numeracy and the real conditions of students' abilities in the field. Therefore, a learning approach that is able to connect mathematical concepts with students' real experiences is needed, so that they not only memorize formulas, but also understand their

meaning and application in daily life. The Realistic Mathematics Education (RME) approach is seen as relevant to answer these needs because it places the real context as the starting point for learning and encourages students to build a gradual understanding towards formal concepts.

This study aims to describe the improvement of mathematical literacy of grade IV students of SD Negeri 017/VIII Pintas through the application of the RME approach. Although the RME approach has been widely studied, specific implementations that integrate rural local contexts to strengthen mathematics literacy in public primary schools still require in-depth study. Given the limited empirical studies on the implementation of RME that focus on the characteristics of primary school students in rural settings, this research is urgent to fill these practical and theoretical gaps (Darmiati & Juliandri Panjaitan, 2024). Practically, the results of this research are useful for teachers in developing innovative learning strategies, helping students improve their critical thinking skills and solving daily problems, and become a reference for schools in improving numeracy literacy competencies (Sumira et al., 2022).

II. Literature Review and Hypothesis Development

2.1. The Concept of Mathematical Literacy

Mathematical literacy is understood as the ability of individuals to formulate, use, and interpret mathematics in various real-life contexts (Ojose, 2011). This literacy requires a deep understanding of concepts and the ability to relate mathematics to everyday functional situations (Stacey & Turner, 2015). Mathematical literacy not only emphasizes mastery of calculation formulas or procedures, but also the ability to understand problems, reason logically, and communicate mathematical ideas appropriately. According to , mathematical literacy is related to students' capacity to use mathematical knowledge to solve everyday problems and make reasoned decisions. In the context of basic education, mathematical literacy is an important competency that must be developed from an early age so that students are able to think critically and applicatively. Therefore, mathematical literacy is seen as the main goal of learning mathematics in elementary school (OECD, 2023).

The Realistic Mathematics Education (RME) approach not only serves as a contextual foundation, but its specific mechanism is designed directly to strengthen the dimension of mathematical literacy. Through the process of contextualization and horizontal mathematicalization, students are guided to translate real-life everyday problems into mathematical symbols, which directly support the indicator of 'understanding contextual problems'. Furthermore, the modeling and reinvention mechanism stimulates students to construct mathematical concepts independently, thereby meeting the indicators of 'using mathematical concepts' accurately. Finally, through the stages of reflection and interactive discussion, students are trained to articulate logical arguments as well as draw conclusions, which directly strengthen the indicators of 'communicating the results of the solution' systematically (Van Den Heuvel-Panhuizen & Drijvers, 2020). Through the mathematical modeling stage, students are guided to build mathematical concepts gradually, starting from real situations, informal models, to reaching formal concepts (Gravemeijer et al., 2017). Effective mathematics learning requires moving away from rote memorization toward student-centered and contextual approaches that foster critical thinking and active engagement from an early stage, enabling students to connect mathematical concepts directly with their everyday lived experiences (Amoako Atta et al., 2023). Integrating realistic contexts and culturally relevant situations into instructional practices serves as a vital pedagogical bridge, transforming abstract mathematical ideas into accessible phenomena that stimulate active problem-solving and deeper conceptual comprehension among young learners (Amoako Atta & Bonyah, 2023). Enhancing student mathematics performance is fundamentally driven by instructional quality, wherein structured pedagogical support, interactive classroom environments, and teacher-guided facilitation effectively cultivate student motivation and mitigate cognitive hurdles in mastering complex mathematical tasks (Dramani & Arthur, 2024).

2.2. Realistic Mathematics Education (RME)

Realistic Mathematics Education (RME) is a mathematics learning approach that places the real-life context as the starting point for learning. This approach was developed based on the view that mathematics is a human activity that must be learned through a meaningful process, not just memorizing formulas. RME emphasizes that students need to build their own mathematical understanding through the exploration of contextual problems that are close to their lives. Effective mathematics learning emphasizes students' active involvement in constructing mathematical concepts on their own through meaningful and real contexts for their lives, rather than simply passively receiving knowledge. The Realistic Mathematics Education (RME) approach provides students with the opportunity to rediscover mathematical concepts through the exploration of real-life situations that are relevant to their experiences so that learning becomes more meaningful and enhances students' conceptual understanding. Through mathematical modeling, students are guided gradually from concrete situations to abstract understanding, so that the learning process becomes more meaningful and easy to understand (Isnaintri et al., 2024)

2.3. The Relationship of RME to Mathematical Literacy

The relationship between the RME approach and mathematical literacy lies in the focus of both on contextual problem solving. The context-oriented approach to mathematics learning has proven to be effective in developing students' mathematical literacy skills. Context-based learning allows students to understand problems, choose appropriate solution strategies, and interpret results meaningfully in everyday life situations, so that mathematical literacy is not only understood procedurally, but also functionally (OECD, 2023). In addition, the Realistic Mathematics Education (RME) approach encourages students to think mathematically through a process of reflection, discussion, and mathematical modeling. The process plays an important role in improving students' mathematical reasoning and communication skills, which are a key component of mathematical literacy. (Gravemeijer et al., 2017)

Furthermore, RME is designed to relate mathematics learning to students' real experiences so that mathematics can be used as a thinking and problem-solving tool in various contexts. Thus, RME focuses not only on achieving learning outcomes, but also on developing mathematical literacy competencies comprehensively and sustainably (Van Den Heuvel-Panhuizen & Drijvers, 2020). In the context of SD Negeri 017/VIII Pintas, the implementation of RME is expected to help grade IV students relate mathematics concepts to daily experiences in the village environment. The local context used in learning will make it easier for students to understand and be interested in mathematics materials. This is in line with the goal of mathematics literacy which emphasizes the ability to use mathematics in real life. Therefore, RME was chosen as an action approach in this study because it is conceptually and theoretically relevant to students' mathematics literacy problems. The selection of RME is also supported by the results of empirical research that shows its effectiveness in elementary school mathematics learning.

2.4. Mathematical Literacy as an Action Goal

Mathematical literacy in this study is positioned as the main goal of learning actions because mathematical literacy is an essential ability that students must have to face problems in daily life. Mathematical literacy is understood as the ability of students to formulate, use, and interpret mathematics in various contexts, including understanding problems, choosing solution strategies, and communicating the results of thinking logically and systematically. Thus, mathematical literacy focuses not only on mastering concepts and procedures, but also on the ability to use mathematics functionally in real situations. (Hidayana & Lianingsih, 2025). In the context of learning at Elementary School, the development of mathematical literacy is very relevant because students are at the stage of concrete operational development that demands real and meaningful learning experiences. At this stage, students are easier to understand mathematical concepts if learning is associated with direct experience and contextual problems that are close to daily life. Meaningful

and contextual learning allows students to build a deeper understanding of concepts and increase active involvement in the mathematics learning process.(Nazaruddin, 2024)

Contemporary mathematics learning theory emphasizes that mathematical literacy skills develop optimally when students are actively involved in solving contextual problems through exploration, discussion, and reflection activities. This active involvement encourages students to think mathematically, use logical reasoning, and communicate mathematical ideas and solutions clearly and concisely. This process directly contributes to the improvement of mathematical reasoning and communication skills as the main components of students' mathematical literacy. Therefore, the increase in mathematical literacy is used as the main indicator of the success of the action in this study. The success of action is not only measured by the increase in student learning outcomes quantitatively, but also by the ability of students to understand contextual problems, use appropriate mathematical strategies, and communicate the results of their thinking logically and meaningfully (Darmiati & Juliandri Panjaitan, 2024; Fatkurochman et al., 2024). Click or tap here to enter text.

2.5. RME as a Learning Action Approach

The Realistic Mathematics Education (RME) approach is used in this study as a learning action approach because it emphasizes the use of real-life situations and contexts that are meaningful to students. RME helps students build mathematical concepts through activities that are relevant to everyday experiences so that learning becomes more contextual and meaningful. RME places real problems as a starting point for learning so that students can develop problem-solving strategies, think logically, and understand concepts through an authentic mathematical modeling process. In its implementation, RME encourages active student engagement through exploration, discussion, and reflection on contextual problems, so that students not only receive information, but also play an active role in discovering and building their own mathematical knowledge. This approach has been shown to be related to an increased tendency of students to engage meaningfully in contextual mathematics learning, which is in line with the goals of mathematical literacy.(A'la et al., 2025)(A'la et al., 2025) RME has also been shown to be effective in improving students' mathematical literacy abilities when applied with appropriate media, such as the use of visual aids or learning technologies, which can strengthen students' understanding of mathematical concepts and reasoning. (Kartini et al., 2025). Thus, RME as a learning action approach focuses not only on the achievement of learning outcomes, but also on the process of developing students' mathematical competencies as a whole through meaningful real-life situations, which are very relevant to the learning context at Madrasah Ibtidaiyah.(Nurwahid et al., 2025)

2.6. The Relationship of RME Stages to Action Procedures

The stages of Realistic Mathematics Education (RME) are closely related to the learning action procedure because each stage is designed to guide students in building mathematical understanding gradually through a real context. In the RME model, learning starts from a situation that is meaningful to students and then continues to mathematical modeling and reflection, thus making learning activities more structured and sustainable with the objectives of the action to be achieved.(Rahmawati et al., 2025). The initial stage of RME is the use of contextual problems that are close to the student's experience, which serves as a stimulus to activate their thinking scheme before entering the formal mathematics stage. In the learning action procedure, this stage is manifested through the provision of real problems that stimulate students to discuss and begin to think critically about the situation at hand.(Riskayanti, 2023)

Furthermore, the modeling stage in RME provides an opportunity for students to represent problems in mathematical form that can be analyzed and processed further. In action procedures, this stage is carried out through representation activities, object manipulation, or the use of learning media that support students in building problem-solving strategies. The discussion and reflection stage is an important part of RME because students are invited to compare solution strategies, develop mathematical arguments, and strengthen their reasoning. In the learning action procedure, this stage is carried out through group work,

presentations, and feedback that allows students to evaluate their own and peers' ways of thinking.(Halimah, 2020). Thus, the relationship between the RME stages and the learning action procedure lies in the suitability of the flow of activities that both emphasize the contextualization of problems, modeling, reasoning, and reflection as the core of learning. This alignment supports the implementation of effective learning actions to develop students' overall mathematical literacy.(Alim et al., 2024)

2.7. RME Based Learning Action Design

The design of learning actions in this study is designed based on the principle of Realistic Mathematics Education (RME) which emphasizes learning mathematics through real contexts that are relevant to students' experiences. RME provides a learning framework that focuses on the use of contextual situations as a starting point, mathematical modeling, and students' reflection on problem-solving strategies, so that learning becomes meaningful and improves students' problem-solving skills in elementary school. At the planning stage, the design of RME-based learning actions begins with the selection of real problems that are close to the lives of Madrasah Ibtidaiyah students. This problem is chosen to trigger curiosity and encourage students to relate their real experiences to the mathematics material to be studied. These contextual problems are an important basis in designing learning activities so that students can start the process of thinking actively.(Permana Sari et al., 2024)(Hasanah et al., 2025). The implementation stage in the design of RME learning actions includes exploration, discussion, and mathematical modeling activities. In this stage, students work individually and in groups to develop mathematical representations of the given problems, as well as test various solution strategies. The role of the teacher is as a facilitator who guides without dominating, so that students have space to think and participate in the process of constructing their knowledge.(Widad & Hadi, 2025)

In addition, the RME learning action design also integrates class discussion and reflection as an important part of the learning process. This activity provides students with the opportunity to present ideas, compare solution strategies, and evaluate their own and peers' thinking. This shared reflection plays a role in strengthening students' understanding of concepts, mathematical communication, and reasoning. In addition, the RME learning action design also integrates class discussion and reflection as an important part of the learning process. This activity provides students with the opportunity to present ideas, compare solution strategies, and evaluate their own and peers' thinking. This shared reflection plays a role in strengthening students' understanding of concepts, mathematical communication, and reasoning.

III. Research Method

3.1. Place and Time of Research

This research was carried out at SD Negeri 017/VIII Pintas. The selection of this location was based on the results of a preliminary study that showed that the mathematical literacy ability of grade IV students in the school was still relatively low, especially in the aspect of understanding contextual problems, using mathematical concepts, and communicating the results of problem solving. The subjects in this study are grade IV students of SD Negeri 017/VIII Pintas for the 2026/2027 school year. The characteristics of the research subjects are heterogeneous, both in terms of the background of academic abilities and individual learning styles. The difference in the cognitive and affective characteristics of students is the main consideration of the researcher in applying the Realistic Mathematics Education (RME) approach, considering that the approach focuses on contextual, interactive learning, and emphasizes the active contribution of all students regardless of their differences in their initial abilities. The time for the implementation of the research is planned in the even semester of the 2026/2027 academic year, with a duration of approximately two months which includes the preparation stage, implementation of actions, observation, and final reflection.

3.2. Research Model

This research uses the Classroom Action Research (PTK) approach. The PTK model used is a cyclic model developed by Kemmis and McTaggart. This model views action research as a spiral process consisting of four main stages that are interrelated in each cycle, namely:

- a. Planning
- b. Implementation of actions (acting)
- c. Pengamatan (observing)
- d. Reflection

The implementation of this action is designed in two cycles, where each cycle consists of two face-to-face meetings. The results of reflection in the first cycle will be used as a basis for improvement to plan actions in the next cycle.

3.3. Data and Data Collection Techniques

The selection of research subjects used the total sampling technique, where all grade IV students at SD Negeri 017/VIII Pintas totaling 23 people were involved as participants because all of them faced similar problems related to low mathematical literacy. In the implementation of this class action, the researcher acted as a scenario designer as well as a teacher in the classroom, who was accompanied by two peer teachers as collaborative observers to record learning activities objectively during the cycle. The data collection techniques used in this study include:

- a. Observation: Used to observe student learning activities and the implementation of learning by teachers during the process of implementing the Realistic Mathematics Education (RME) approach.
- b. Test: A written test in the form of an essay question given at the end of each cycle to measure students' mathematical literacy skills.
- c. Questionnaire: A likert-scale questionnaire sheet used to measure affective responses as well as the level of students' perception of ease and motivation towards learning.
- d. Documentation: Includes grade archives, attendance lists, LKPD, and photos of classroom learning activities.

The data collection instrument was developed specifically to ensure validity and replicability. The mathematical literacy ability test is in the form of 5 essay questions based on real context developed based on three main PISA indicators: understanding contextual problems (scores 0–4), using mathematical concepts (scores 0–4), and communicating results (scores 0–4), with a total score of 12. The student response questionnaire consists of 15 statements on a four-option Likert scale (Strongly Agree to Strongly Disagree) that measure affective aspects of ease and motivation for learning. All instruments have gone through content validity tests through expert judgment (consideration of expert validators) and internal reliability with Cronbach's alpha coefficient that meets psychometric feasibility standards. The data collection procedure is carried out systematically at the end of each learning cycle. A written test in the form of an essay is given at the end of the second meeting in each cycle to measure the level of students' mathematical literacy, with a standardized assessment rubric on a scale of 1–4 based on indicators of formulation and use of concepts. Student response questionnaires are distributed after the test ends to measure students' affective perceptions using the four-option Likert scale. Meanwhile, the observation sheet of teacher and student activities is filled in directly by collaborative observers during the learning process at each meeting.

3.4. Variable Operational Definition

The variables studied in this study are described into operational definitions as follows:

- a. Realistic Mathematics Education (RME) approach: A mathematical learning approach that places contextual problems or real-life situations as the starting point for learning, which is then followed by mathematical modeling, discussion, and reflection.
- b. Mathematics Literacy: Students' ability to formulate, use, and interpret mathematics is measured through three main cognitive indicators, namely:
- c. Understanding contextual problems: Ability to identify known and asked information in a story question.
- d. Using mathematical concepts: Precision in selecting and applying appropriate calculation procedures or operations.

Communicating results: Skills explain the completion steps and draw final conclusions in a concise and logical manner.

3.5. Data Analysis Methods

Data analysis was carried out using quantitative and qualitative approaches in a descriptive manner:

- a. Quantitative Analysis: Used to process data on the results of students' mathematical literacy tests. The data is calculated to obtain the grade point average (mean) and the percentage of learning completeness classically. Learning is said to be classically successful if at least 75% of the total number of students has achieved the Minimum Completeness Criteria (KKM) score, which is ≥ 70 .
- b. Qualitative Analysis: Used to analyze data from observation of teacher and student activities as well as student response questionnaires through the stages of data reduction, data presentation, and conclusion drawn.

Quantitative data analysis was carried out by calculating the average grade of the class and the percentage of classical completeness. The percentage of completeness was calculated by comparing the number of students who obtained the final score of the mathematics literacy test ≥ 70 (according to the school's Minimum Completeness Criteria) to the total number of students, then multiplied by 100%. The qualitative data from the results of observation and questionnaire were analyzed through the stages of data reduction, descriptive presentation, and conclusion drawn. The quantitative results of the test and questionnaire were then integrated in a triangulated manner with the findings of qualitative observation to verify the consistency of improving the quality of the process and student learning outcomes in each cycle.

IV. Result and Discussion

4.1. Research Results

Before the implementation of the action, the researcher first conducted an initial observation (pre-cycle) to determine the condition of the mathematical literacy ability of grade IV students of SD Negeri 017/VIII Pintas. Observation was carried out during the mathematics learning process by observing student learning activities, student involvement during learning, and students' ability to solve mathematical problems related to daily life. Based on the results of observations, the learning process is still dominated by lecture methods and giving practice questions. Teachers explain more material in front of the class, while students tend to listen, take notes, and work on the questions given. Learning has not involved students in exploration, discussion, and problem-solving activities that are contextual.

During the learning activity, most students still have difficulty in understanding the information contained in the story problems, identifying problems that must be solved, choosing appropriate mathematical concepts, and explaining the reasons for the answers obtained. Students also tend to immediately look for the final result without first understanding the situation or context of the problem given. This Classroom Action Research (PTK) was carried out in two cycles to improve the mathematical literacy skills of grade IV students of SD Negeri 017/VIII Pintas through the application of the Realistic Mathematics Education (RME) approach. Before the action was given at the pre-cycle stage, students' mathematical literacy skills were still relatively low with a classical average score of 40.58%. After the implementation of learning actions using the RME approach in Cycle I and Cycle II, there was a consistent increase in both aspects of teacher activities, student activities, and the results of the mathematics literacy test. A summary of the development of research results from pre-cycle to the end of Cycle II is presented in Table 1.

Table 1. Development of Research Results from Pre-Cycle to Cycle II

Research Stages	Teacher Activity (%)	Student Activity (%)	Mathematics Literacy Test (%)	Questionnaire Student Response (%)	Category
Pre-Cycle	-	47,83	40,58	45,00	Less
Cycle I Meeting 1	88,46	80,00	73,91	76,87	Good
Cycle I Meeting 2	94,23	89,57	87,10	85,33	Excellent
Cycle II Meeting 1	96,15	94,78	91,30	90,03	Excellent
Cycle II Meeting 2	100,00	99,13	96,52	94,43	Excellent

Based on the results of descriptive analysis in each action cycle, the percentage of classical completeness of students' mathematical literacy showed a gradual increase, from 40.58% in the pre-cycle to 87.10% at the end of Cycle I, and reached 96.52% at the end of Cycle II. This increase in achievement shows that the application of the Realistic Mathematics Education (RME) approach has succeeded in supporting the improvement of students' understanding in solving contextual problems. The increase was also supported by the results of the student response questionnaire which reached the excellent category of 94.43%. Student learning activities in the pre-cycle stage are still quite active with an average percentage of 47.83%. Some aspects that are still low are students' activeness in discussing, the courage to ask questions, answering teachers' questions, and expressing opinions. This condition shows that learning is still teacher-centered so that student involvement in the learning process is not optimal. The results of this observation are the basis for researchers to apply the Realistic Mathematics Education (RME) approach in Cycle I. It is hoped that through the use of contextual problems, group discussions, and exploration activities, students' learning activities and mathematical literacy skills can be improved. The observation results show that most students still have difficulty in understanding the problems presented, choosing the right mathematical concepts, and explaining the process and results of problem solving. This condition shows that students' mathematical literacy skills before the implementation of the Realistic Mathematics Education (RME) approach are still not optimal, so learning actions are needed that can increase student involvement in understanding, solving, and communicating solving mathematical problems.

The mathematical literacy ability of students in Cycle I Meeting 1 has increased compared to pre-cycle conditions. The average percentage of students' mathematical literacy ability reaches 73.91% with the category Quite Good. Even though it has been in the Good category, there are still some students who are not confident in explaining the solution process and conveying the results of the discussion in front of the class. Therefore, at the next meeting, the teacher will provide more opportunities for students to discuss, ask questions, and present the results of group work so that the ability to communicate the results of problem solving can increase. Students' mathematical literacy skills in Cycle I Meeting 2 showed an increase compared to Meeting 1. The average percentage of mathematics literacy ability reached 87.14% with the category of Excellent. Improvements were seen in all three indicators, namely understanding contextual problems, using mathematical concepts, and communicating the results of completions. This shows that the application of the Realistic Mathematics Education (RME) approach is able to improve students' mathematical literacy skills

through the presentation of contextual problems, group discussions, and presentation of the results of the completion.

Students' mathematical literacy skills based on the observation results obtained an average percentage of 91.30% with the category of Excellent. All indicators have improved compared to Cycle I. Students are increasingly able to understand contextual problems, use mathematical concepts appropriately, and explain the results of the completion orally and in writing. Students' mathematical literacy ability based on observation results obtained an average of 96.56% with the category of Excellent. The three indicators have increased compared to the previous meeting so that the research target has been achieved. Based on the results of reflection at the end of Cycle I, it was found that some students still experienced obstacles in translating the sentences of the story into mathematical models due to the lack of habituation of visualizing concrete objects. Therefore, in the planning of Cycle II, the action was modified by integrating concrete teaching media based on the surrounding environment before students were directed to work on independent worksheets. This modification succeeded in encouraging a significant increase in classical completeness in Cycle II.

4.2. Discussion

The results of this study prove that the application of the Realistic Mathematics Education (RME) approach has a positive and significant impact on improving the mathematical literacy skills of grade IV students of SD Negeri 017/VIII Pintas. In the initial condition (pre-cycle), conventional and teacher-centered learning makes it difficult for students to understand story problems and relate formulas to real life. Through the implementation of the RME approach, learning begins by presenting contextual problems that are close to students' daily experiences. This is in line with Freudenthal's view that mathematics is a human activity, where mathematical concepts must be explored through meaningful real-world situations. With group discussion activities and mathematical modeling, students can build a gradual understanding of concepts, starting from the informal to formal levels. The improvement that occurred in all indicators—namely understanding problems, using mathematical concepts, and communicating results—showed that the RME approach was able to train students' high-level thinking skills. These findings are also in line with previous research that stated that RME-based learning is effective in improving the quality of the learning process and mathematics literacy outcomes in elementary schools. With the achievement of all success indicators at the end of Cycle II, the action was declared successful and proven effective.

When compared to the findings of previous studies by Sumira et al. (2022) or Istiana et al. (2020) which also applied RME at the elementary school level, the surge in classical completeness in this study showed a relatively sharper growth pattern from Cycle I (87.10%) to Cycle II (96.52%). The difference in the magnitude of this increase is mainly influenced by the characteristics of subjects who are in rural environments with the background of daily concrete experiences that are very close to the local context presented, so that the stages of horizontal mathematics and guided reinvention can take place faster than the control class or conventional experimental class in the previous study. The gradual improvement in the observed mathematical literacy indicators shows strong theoretical consistency with the learning principles of Realistic Mathematics Education (RME) as well as constructivist views. However, the findings of this increase in the percentage of completeness should be understood as a form of consistency of the instructional process in the action class, and not as absolute causal evidence of the effectiveness of the method in general. Given that the design of this study is a one-group Classroom Action Research (PTK) with no comparative classes, the interpretation of the results is limited to improving local learning practices in the classroom.

V. Conclusion

Based on the results of the analysis and discussion on the application of the Realistic Mathematics Education (RME) approach in improving the mathematical literacy of grade IV students at SD Negeri 017/VIII Pintas, the following conclusions can be drawn:



- a. The level of mathematics literacy of grade IV students of SD Negeri 017/VIII Pintas before the implementation of the RME approach was relatively low with an average percentage of 40.58% at the pre-cycle stage.
- b. After the implementation of the RME approach, there was a gradual and consistent increase in the level of students' mathematical literacy until it reached the very good category, namely 87.10% at the end of Cycle I and 96.52% at the end of Cycle II.
- c. The application of the Realistic Mathematics Education (RME) approach has succeeded in improving the mathematical literacy skills of grade IV students at SD Negeri 017/VIII Pintas gradually through two action cycles, which includes improvements in indicators of understanding contextual problems, using mathematical concepts, and communicating the results of completion systematically.
- d. Teacher activities, student activities, and students' affective responses through questionnaires also increased significantly to reach the excellent category at the end of the cycle, which indicates the creation of active and student-centered learning.

Although this study has shown positive results and achieved the established success indicators, there are some limitations that need to be noted:

- a. This study only involved one class with a limited number of subjects, namely 23 grade IV students in one public elementary school, so the generalization of the findings to the wider population is still limited.
- b. The scope of learning materials in this study is only focused on flat building materials in mathematics subjects, so the effectiveness of the RME approach on other mathematics materials or topics has not been thoroughly explored in this study.

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