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Utilization of Contextual-Based Student Worksheets (LKPD) to Improve Mathematical Literacy of State Islamic Junior High School Students

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Abstract

Mathematical literacy remains a persistent challenge in Indonesian education, as highlighted by the 2022 PISA report. Preliminary assessment results showed that most students (82.14%) at an Islamic junior high school had not yet achieved a good level of mathematical literacy. This study aims to examine the utilization of contextual-based worksheets (LKPDs) that integrate mathematical problem-solving with Islamic values and daily religious practices to improve students' mathematical literacy skills. The study employed a Classroom Action Research (CAR) design involving 28 eighth-grade students at a State Islamic Junior High School. The participants, aged between 13 and 14 years old, were selected because preliminary observations showed that their mathematical literacy skills were mostly at a sufficient or low level. Data were collected through tests, interviews, and documentation. Research data were analysed using qualitative-descriptive method. The findings revealed a significant improvement in students mathematical literacy skills, as indicated by the percentage of students achieving at least a 'good' level of mathematical literacy: 17,86% in the preliminary stage, 39,29% in Cycle I, and 78,57% in Cycle II. These findings suggest that the utilization of contextual-based worksheets effectively improves the mathematical literacy skills of Islamic junior high school students.

Keywords: Contextual Worksheets (LKPD), Mathematics Literacy, Classroom Action Research, Junior High School, Learning Improvement.

Introduction

The 2022 Programme for International Student Assessment (PISA) survey showed that the mathematical literacy skills of students in Indonesia are still low, particularly in their ability to model complex situations mathematically and to select, compare and evaluate appropriate problem solving strategies in these complex situations (OECD, 2023). Research by Masfufah & Afriansyah (2021) also suggests that student's mathematical literacy skills remain low, as reflected in their performance in solving mathematical problem. The low level of students' mathematical literacy may be attributed to their limited mastery of basic mathematical competencies (Syafruddin, Khaerunnisa, et al., 2022).

The abstractness of mathematical objects is an inherent characteristic of mathematics learning and cannot be avoided. Liang Gie considers mathematics to be a body of abstract knowledge that exists primarily in the human mind (Putawa, 2022). Therefore, addressing challenges in mathematics learning requires teachers to adopt creative and innovative instructional approaches (Hida et al., 2026; Junior et al., 2025; Kilpatrick, 2001; Pastor & Pedro, 2023).

One innovation that can be implemented is mathematics learning through a contextual approach. Contextual mathematics learning seeks to connect the subject matter studied by students with their real-life experiences and encourages them to establish relationships between their existing knowledge and its application in everyday life (Mardianto et al., 2022). As a result, students are able to perceive the relevance and practical benefits of the mathematical concepts they learn. Furthermore, a contextual approach can serve as a bridge to students' understanding of mathematics, as it creates a learning environment that is closely aligned with their own experiences (Ferede et al., 2025; Lutvaidah, 2016).

In addition, learning media play an important role in supporting the effectiveness of learning activities (Mar'atusholihah et al., 2019). The use of appropriate learning media helps create a positive and conducive learning environment while also motivating students and enhancing their enthusiasm for learning mathematics. Learning media are considered one of the essential components in facilitating the achievement of learning objectives for both students and teachers (Sanjaya, 2015). To support the development of students' mathematical literacy skills, one alternative is the use of mathematics learning media in the form of student worksheets.

Student Worksheets, or *Lembar Kerja Peserta Didik* (LKPD), are instructional materials that contain a series of activities to be completed by students as part of the learning process related to the subject matter being studied (Farabi et al., 2025). LKPDs are designed to enhance students' thinking skills and support their understanding of the material presented. In addition, they encourage active engagement with learning content and provide students with direct learning experiences, enabling them to develop a deeper understanding beyond mere acquisition of knowledge (Farabi et al., 2025). Furthermore, LKPDs facilitate students' understanding of mathematical concepts and assist them in solving problems, particularly those related to real-life situations or contextual settings.

During the preliminary study conducted at an Islamic junior high school, the researchers identified problems related to students' low levels of mathematical literacy. This issue was evident during the learning process, as students often experienced difficulties in visualizing mathematical objects presented in mathematical problems. Consequently, they struggled to relate ideas to relevant mathematical concepts. In addition, students demonstrated limited ability to solve and interpret problems related to real-life situations. They were also not accustomed to providing structured and systematic solutions when solving mathematical problems. These difficulties may be attributed to students' limited ability to solve mathematical problems that require the integrated application of mathematical literacy skills (Alya et al., 2025; Haryani & Harso, 2023). Therefore, the researchers utilized contextual-based LKPDs to address this issue, as these worksheets provide structured learning steps, examples, and exercises designed to help students solve mathematical problems related to real-life situations in a systematic manner and enhance their mathematical literacy (Ahmad & Nasution, 2019; Gee & La'ia, 2023; Latif, 2022).

Several previous studies have examined the potential of learning media to improve students' mathematical literacy skills. For example, Latif (2022) reported that the elements of students' mathematical literacy can be enhanced through the use of LKPDs. One effort to support the development of mathematical literacy is the implementation of innovative learning approaches, including the use of LKPDs. Furthermore, Ahmad and Nasution (2019) found that mathematics learning using a contextual approach can improve students' mathematical literacy skills.

Similarly, Buchori (2019) stated that a contextual approach facilitates students in solving mathematical problems encountered during learning activities.

Based on the findings of these previous studies, the present study aims to examine the use of contextual-based LKPDs as learning media to improve the mathematical literacy of Islamic junior high school students. Accordingly, the study addresses two main research questions: (1) How are contextual-based LKPDs implemented in mathematics learning for Islamic junior high school students? and (2) How does the use of contextual-based LKPDs improve students' mathematical literacy skills?

Methods

This study employed the Classroom Action Research (CAR) model developed by Kemmis and McTaggart, which consists of iterative intervention cycles involving the stages of preliminary reflection, planning, action, observation, and reflection (Arikunto et al., 2015). During the preliminary reflection stage, the researchers conducted several initial activities, including problem identification, classroom observation, data collection, and an analysis of students' mathematical literacy based on the results of the Daily Assessment Week (PPH) conducted during the even semester of the academic year at a State Islamic Junior High School.

Subsequently, each cycle was implemented through the stages of planning, action, observation, and reflection. The findings from the reflection stage in Cycle I were used as the basis for improving the learning process in Cycle II (Arikunto et al., 2015; Gogus, 2012).

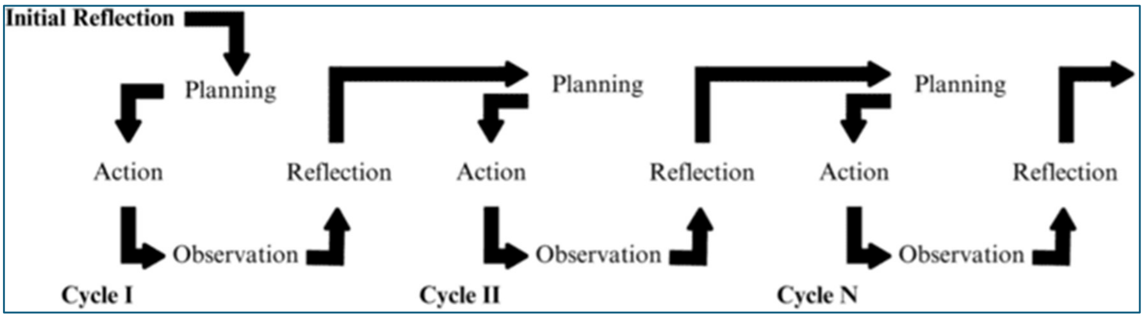


Figure 1. Research Procedure.

This study was conducted at an Islamic junior high school and involved 28 eighth-grade students. Cycle I and Cycle II were each implemented over four meetings. The participants were selected based on preliminary observations indicating that their mathematical literacy skills were predominantly at a basic or low level.

The study focused on two primary variables: contextual-based worksheets (LKPDs) and students' mathematical literacy skills. Operationally, contextual-based LKPDs were defined as instructional materials containing learning activities that directly link mathematical problem-solving with Islamic values and daily religious practices. Mathematical literacy was defined as an individual's capacity to formulate, apply, and interpret mathematical concepts in various situations. It also involves the ability to reason mathematically and to use mathematical concepts, procedures, and facts to describe, explain, or estimate phenomena (Kuswidi, 2015).

To ensure data validity, methodological triangulation was employed through tests, interviews, and documentation. The test instrument consisted of mathematical problems integrated into the contextual-based LKPDs. Subsequently, semi-structured interviews were conducted to gain deeper insights into students' reasoning and to obtain comprehensive information regarding their responses. In addition, documentation was used to systematically record the development of students' mathematical literacy skills and the implementation of the contextual-based LKPDs.

Data were analysed using the interactive model proposed by Miles and Huberman (1994), which consists of four stages: data collection, data reduction, data display, and conclusion drawing. The data were then examined using a descriptive comparative approach to evaluate changes in students' mathematical literacy skills across the preliminary reflection stage, Cycle I, and Cycle II. The analysis was guided by the mathematical literacy indicators of the PISA framework (Saputri et al., 2021; Utami et al., 2020), as presented in Table 1.

Table 1

Indicators of Student's Mathematical Literacy Skills

Indicator of Mathematical Literacy Based on PISA	Criteria
1	Formulating real problems in problem solving
2	Using math in problem solving
3	Interpreting the solution in problem solving
4	Evaluating the solution in problem solving

Based on the indicators of mathematical literacy skills in the Table 1, the predicate of mathematical literacy skills can be arranged as shown in Table 2.

Table 2

Predicate of Mathematical Literacy Skills

Criteria for Mathematical Literacy Skills	Predicate
Students are able to fulfill four predetermined indicators	Very Good
Students are able to fulfill three predetermined indicators	Good
Students are able to fulfill two predetermined indicators	Sufficient
Students are able to fulfill one predetermined indicator	Poor
Students are not able to fulfill the predetermined indicators	Not Capable

Results and Discussion

The study findings are presented sequentially, beginning with the results of the preliminary reflection stage and followed by the implementation of contextual-based LKPDs in Cycle I and Cycle II to improve students' mathematical literacy.

Initial Reflection

This stage was conducted to identify the initial level of students' mathematical literacy based on their performance in the Daily Assessment Week (PPH) during the even semester in

Class VIII L of the Islamic Junior High School. Examples of students' work from the preliminary reflection stage are presented in Figures 2 and 3.

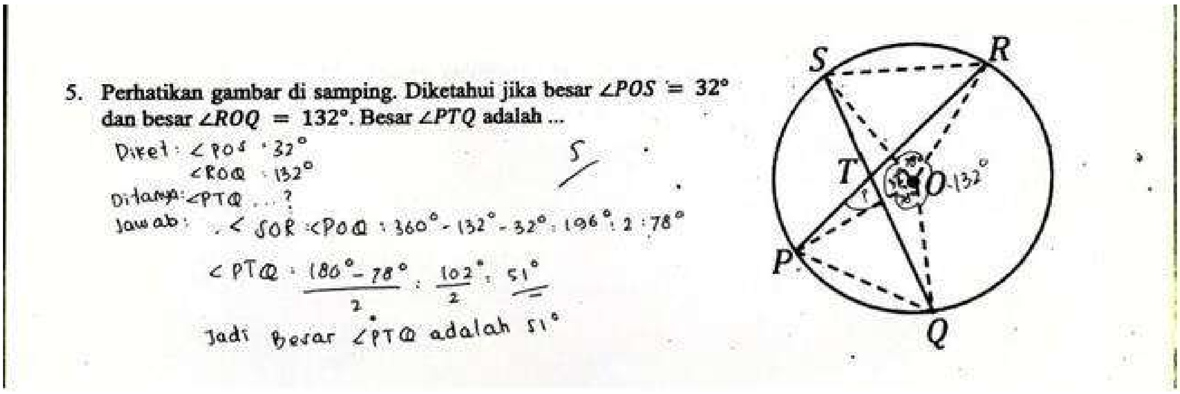


Figure 2. Student Work Results in Initial Reflection (a).

Figure 2 illustrates the results of a student's work during the preliminary reflection stage (a). The student was able to formulate the real-world problem and apply relevant mathematical concepts using an appropriate mathematical model to solve it. However, an error occurred in the application of angle properties during the problem-solving process. To verify the student's reasoning, the researcher conducted an interview, the results of which are presented below.

R: How did you determine ∠SOR = ∠POQ?

S: From the circle figure, ∠SOR and ∠POQ are divided into two equal angles by ∠SOP and ∠ROQ .

R: How did you determine the measures of ∠SOR and ∠POQ ?

S: By using the angular measurement of a full circle.

The interview results indicate that the student was able to apply an appropriate mathematical model at the beginning of the problem-solving process. However, the student was not yet able to carry out the mathematical modelling process accurately enough to arrive at the correct solution. The researcher found that the student understood the initial solution strategy for Problem 5 and was able to apply angle properties to determine the measure of an angle in a circle. Nevertheless, the student made an error in the calculation process, resulting in an incorrect answer.

In addition, the student was not yet able to appropriately apply the properties of angles in determining the measure of ∠PTQ. In Problem 5, the student's mathematical literacy skills met only the first and second indicators.

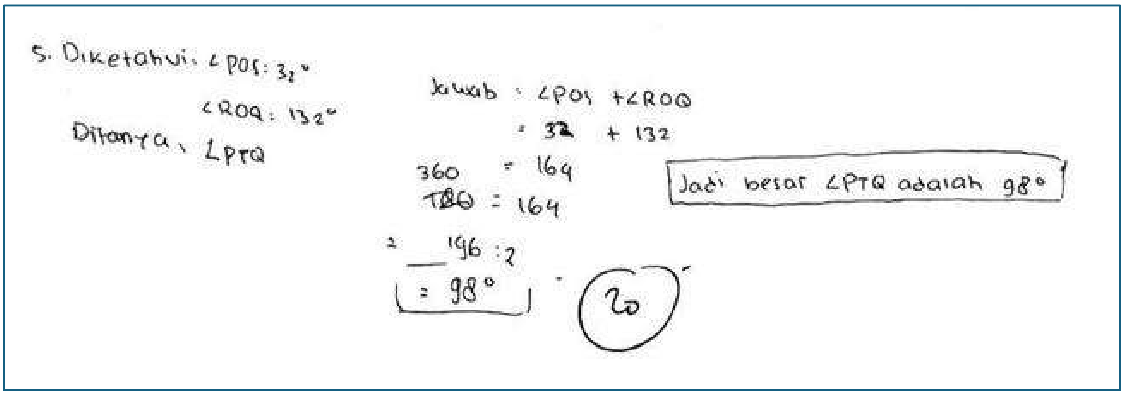


Figure 3. Student Work Results in Initial Reflection (b).

Figure 3 presents the results of a student's work during the preliminary reflection stage (b). The student formulated the real-world problem by identifying the known and required information. The student then applied the properties of angles in circles and solved the problem mathematically. However, some of the written explanations regarding the angle properties were not sufficiently coherent and clear. To verify the student's reasoning, the researcher conducted an interview. The results of which are presented below.

R: Why did you write 360°=164°?

S: Because 360° represents the measure of a complete circle, while 164° is the measure of ∠POS + ∠ROQ. There was also a minor writing error, as an additional notation of ∠SOR + ∠POQ should have been included .

R: How did you determine 196°: 2?

S: Because ∠SOR and ∠POQ have the same angle measure.

Based on the interview results, the student demonstrated the ability to apply mathematics using appropriate mathematical models and to express mathematical reasoning correctly in order to obtain the correct solution. In Problem 5, the student's mathematical literacy skills met three indicators: the first, second, and third indicators.

Based on the analysis of the mathematical literacy skills of 28 students in solving the Daily Assessment Week (PPH) evaluation tasks, the results are presented in Table 3.

Table 3

Results of Analysis of Student's Mathematical Literacy Skills at Initial Reflection

Indicator of Mathematical Literacy Based on PISA	Predicate	Number of Students	Percentage
0	Not Capable	0	0 %
1	Poor	4	14,29 %
1,2	Sufficient	19	67,86 %
1,2,3	Good	2	7,14 %
1,2,3,4	Very Good	3	10,71 %
Total		28	100 %

The analysis revealed that 14.29% of students were classified as having poor mathematical literacy skills, 67.86% as sufficient, 7.14% as good, and 10.71% as very good. These findings indicate that 82.15% of students demonstrated mathematical literacy skills at the sufficient level or below, while only 17.85% achieved a good or very good level. The low level of students' mathematical literacy was also evident during the learning process. Students often experienced difficulties in visualizing mathematical objects presented in mathematical problems. In addition, their ability to solve word problems and interpret real-life situations remained limited. Students were also not accustomed to providing structured and systematic solutions when solving mathematical problems.

Cycle I

Planning

To address the problem of students' low mathematical literacy skills, the researchers planned to utilize contextual-based LKPD. These worksheets provide structured learning steps, examples, and exercises designed to help students solve mathematical problems related to real-life situations and, consequently, improve their mathematical literacy (Ahmad & Nasution, 2019; Gee & La'ia, 2023; Latif, 2022).

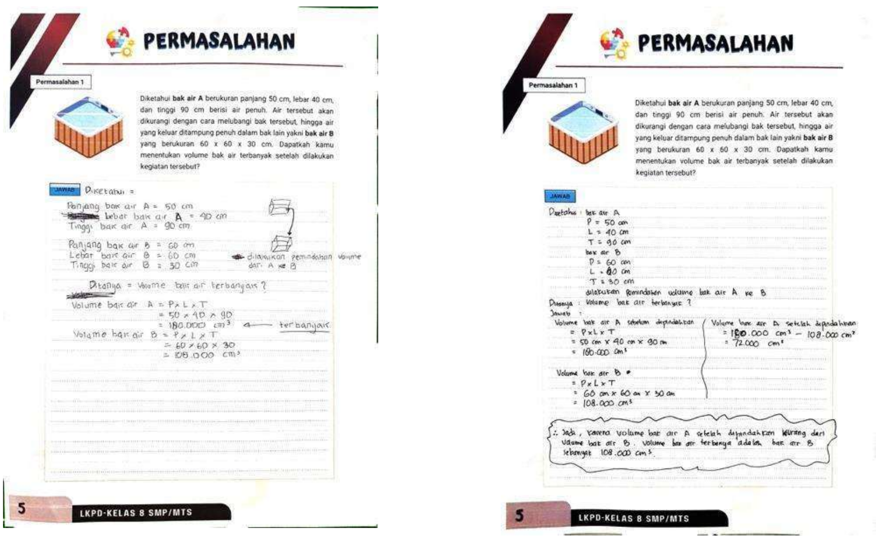
As the study was conducted in an Islamic school, some of the contextual problems incorporated Islamic contexts, including one involving the Ka'bah. In addition, the LKPD included contextual problems related to objects familiar to students, such as bookshelves, toy cubes, cuboid-shaped containers, and other everyday items. The LKPD were systematically organized following the sequence of topics in solid geometry with flat surfaces, including the definitions, properties, nets, and volumes of cubes and cuboids. They also contained response spaces that allowed students to complete the required answers independently. The LKPD used in Cycle I is presented in Figure 4.

Figure 4. LKPD Cycle I.

Action and Observation

During Cycle I, the researchers implemented the planned learning scenario by utilizing the contextual-based LKPD. Students began by observing contextual problems related to cubes and cuboids presented in the worksheets. In this activity, they were provided with problems involving a miniature of the Ka'bah and a bookcase as contextual representations. The LKPD also included explanatory notes on relevant mathematical terms to support students' understanding of the material. Subsequently, students completed activities related to the elements of cubes and cuboids, including identifying their properties, nets, and volumes. Finally, students worked independently on contextual problems provided on the last page of the LKPD.

The implementation of the learning scenario was subsequently observed by the researcher. The observation focused on students' responses to the test questions provided at the end of the contextual-based LKPD, which were used to assess the achievement of mathematical literacy skills. Figure 5 presents examples of students' work in Cycle I. To ensure systematic and comprehensive recording of observational data, the researcher employed documentation techniques. In addition, informal interviews were conducted with students to obtain supplementary information regarding the development of their mathematical literacy skills during learning activities using the contextual-based LKPD.



(a) (b)

Figure 5. Student Work Results in Cycle I.

To verify the student's response, the researcher conducted an interview, the results of which are presented below.

R: Did you realize that the volume of water in Tank B was obtained from Tank A?

S: Yes.

R: Then why did you not subtract the volume from Tank A after the subtraction process?

S: Oh, I just realized there was a mistake. That means the volume of Tank A should be $180{,}000\ cm^3 - 108{,}000\ cm^3$

The interview results for the student's work in Cycle I (b) are presented below.

R: Why did you write the volume of Tank A under two different conditions?

S: Because the problem describes two situations involving Tank A: before and after it was perforated.

The observations conducted during the learning process indicated that students were highly enthusiastic about completing the activities related to the definitions, properties, nets, and volumes of cubes and cuboids in the LKPD. However, some students were still unable to solve the problems independently. In addition, several students experienced difficulties maintaining focus on the main learning objectives. Based on these findings, the researchers conducted a reflection on the implementation of Cycle I and identified several aspects that required improvement.

Reflection

One of the weaknesses identified in Cycle I is illustrated in Figure 5(a). The student formulated the real-world problem by identifying the known and required information. The student then applied the formula to calculate the volume of the cuboid and solved the problem mathematically. However, a specific condition stated in the problem was not taken into account, resulting in an inaccurate answer. In addition, the student did not evaluate the solution obtained. The interview results related to the student's work in Cycle I (a) indicated that the student was able to apply mathematics using an appropriate mathematical model and to perform the mathematical modelling process correctly. However, the researcher found that the student was less careful when completing the final solution. As a result, the student was unable to obtain the correct answer and did not evaluate the solution. Based on this analysis, the student's mathematical literacy skills met only the first and second indicators.

Meanwhile, Figure 5(b) illustrates a student's work that demonstrates a good ability to formulate a real-world problem by identifying the known and required information. The student then applied the formula to calculate the volume of the cuboid and solved the problem mathematically while taking into account the specific conditions described in the problem. The student also evaluated the solution by rechecking the correctness of the answer and providing a concluding statement that directly addressed the problem.

The interview results related to the student's work in Cycle I (b) indicated that the student was able to apply mathematics using an appropriate mathematical model and to perform the mathematical modelling process correctly. Furthermore, the student was able to interpret the solution and evaluate the answer appropriately. Based on this analysis, the student's mathematical literacy skills met all of the assessed indicators.

The results of the analysis of mathematical literacy skills among the 28 students in Cycle I, based on their responses to the test questions administered at the end of the cycle, are presented in Table 4.

Table 4
Results of Analysis of Student's Mathematical Literacy Skills in Cycle I

Indicator of Mathematical Literacy Based on PISA	Predicate	Number of Students	Percentage
0	Not Capable	0	0 %
1	Poor	3	10,71 %
1,2	Sufficient	14	50,00 %
1,2,3	Good	7	25,00 %
1,2,3,4	Very Good	4	14,29 %
Total		28	100 %

Based on the results of the mathematical literacy skills analysis in Cycle I, as presented in Table 4, 10.71% of students were classified as having poor mathematical literacy skills, 50.00% as sufficient, 25.00% as good, and 14.29% as very good. Compared with the preliminary reflection stage, the proportion of students with poor mathematical literacy skills decreased from 14.29% to 10.71%, while the proportion of students with sufficient mathematical literacy skills decreased from 67.86% to 50.00%. In contrast, the percentage of students classified as having good mathematical literacy skills increased from 7.14% to 25.00%, and those with very good mathematical literacy skills increased from 10.71% to 14.29%.

Overall, the results of the Cycle I analysis showed that 60.71% of students demonstrated mathematical literacy skills at the sufficient level or below, whereas 39.29% achieved a good or very good level. As the expected level of achievement had not yet been reached, the intervention was continued in Cycle II.

The activities implemented in Cycle I were subsequently reflected upon to identify areas for improvement and to achieve a higher level of student performance. Based on discussions between the researchers and the teacher, as well as feedback from students, several revisions were made to enhance the effectiveness of the learning activities while maintaining their original objectives.

The reflection results indicated that the contextual-based LKPD should include a summary section at the end of the learning activities to strengthen students' understanding, improve retention, and encourage reflection. In addition, the contextual problems presented in the LKPD should be introduced by the teacher at the beginning of the lesson to help focus students' attention on the learning context. These recommendations are consistent with previous studies (Nurdyansyah & Fahyuni, 2016; Syafruddin, Pamungkas, et al., 2022; Wilfridus et al., 2021, Huda, 2025).

Furthermore, students still required teacher guidance when working with the contextual-based LKPD and performing mathematical calculations. The revised learning design was subsequently implemented in Cycle II.

Cycle II

Planning

Based on the reflection results from Cycle I, the revised learning design utilizing the contextual-based LKPD was implemented in Cycle II. The learning material in Cycle II continued to focus on solid geometry with flat surfaces, specifically the subtopics of prisms and pyramids. Students engaged in activities related to identifying the definitions, properties, nets, and volumes of prisms and pyramids.

The LKPD incorporated learning materials and activities connected to real-life contexts familiar to students through objects commonly encountered in their daily environment. Prior to the implementation of the LKPD, the teacher introduced the relevant concepts and contextual problems presented in the worksheets. In addition, guidance was provided to students who experienced difficulties in understanding the instructions and completing the activities. The LKPD used in Cycle II is presented in Figure 6.

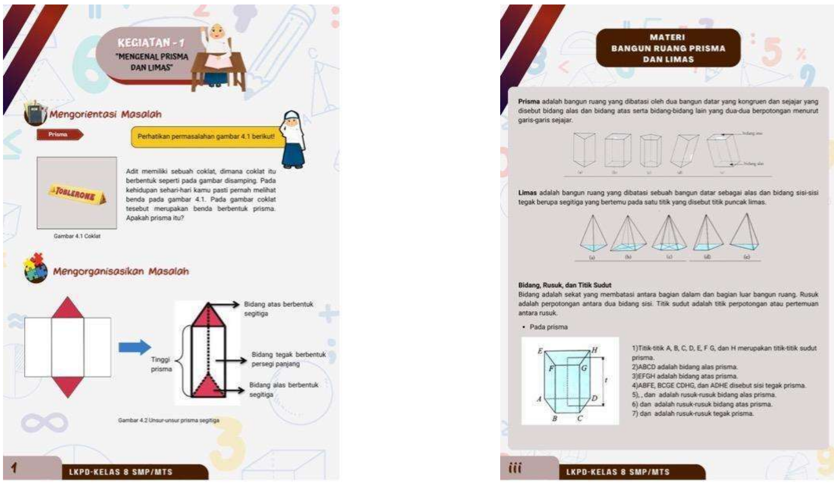
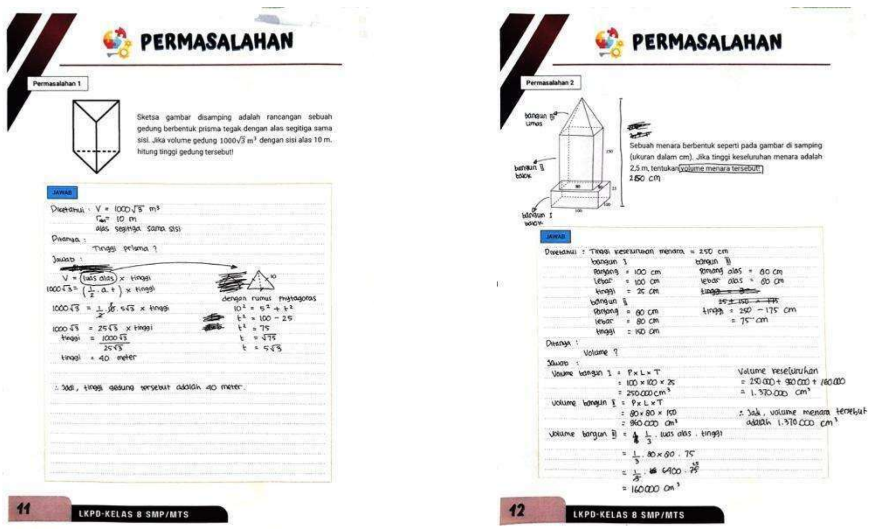


Figure 6. LKPD Cycle II.

Action and Observation

In Cycle II, the learning activities began with the presentation of contextual problems related to prisms and pyramids to focus students' attention on the learning context. Subsequently, students were provided with the contextual-based LKPD. They examined and analyzed several illustrations related to prisms and pyramids presented in the worksheets. During the completion of the LKPD activities, students continued to receive guidance from the teacher when necessary.

At the end of the lesson, students were provided with a summary of the material covered to reinforce their understanding and improve retention of key concepts. The teacher also emphasized the main ideas discussed during the learning activities through this summary. The implementation of the learning scenario was observed by the researcher. In addition, tests, documentation, and informal interviews with students were conducted to collect data on the learning process and students' mathematical literacy skills. Examples of students' work in Cycle II are presented in Figure 7.



(a) (b)

Figure 7. Student Work Results for The First and Second Question in Cycle II.

To verify the student's response, the researcher conducted an interview, the results of which are presented below. The interview results related to the student's work on the first question in Cycle II (a) are as follows:

R: Why did you use the Pythagorean formula?

S: To determine the height of the base so that I could calculate the area of the prism's base.

R: How did you obtain the value of $10^2 = 5^2 + t^2$?

S: It was obtained using the Pythagorean theorem, which states that the square of the hypotenuse is equal to the sum of the squares of the other two sides. In this case, 10 is the hypotenuse, while 5 and *t* are the other two sides.

The interview results related to the student's work on the second question in Cycle II (b) are as follows:

R: Why did you divide the tower into three geometric solids?

S: To make it easier to calculate the total surface area of the structure.

R: Are you confident that your answer is correct?

S: Hmm, I think this is correct.

No significant problems were encountered during the implementation of the learning activities or in the use of the contextual-based LKPD. Based on the observations of the teacher's instructional practices and students' responses, the implementation of learning in Cycle II was considered highly successful. This was evident from the effective execution of all learning activities outlined in the lesson plan by the teacher.

Reflection

Figure 7(a) shows that the student formulated the real-world problem by identifying the known and required information. The student was able to apply mathematics using an appropriate mathematical model and to carry out the mathematical modelling process correctly. Before calculating the volume of the prism, the student first determined the height of the base using the Pythagorean theorem and then proceeded to solve the problem mathematically.

After obtaining the solution, the student evaluated the answer by rechecking its correctness and providing a concluding statement that directly addressed the problem. Based on this analysis, the student's mathematical literacy skills fulfilled all of the assessed indicators.

Figure 7(b) also demonstrates a strong ability to formulate a real-world problem by identifying the known and required information. The student then applied the appropriate formulas to calculate the volumes of the geometric solids and solved the problem mathematically while taking into account the specific conditions described in the problem. To simplify the solution process, the student decomposed the structure into three geometric solids: two cuboids and one pyramid.

The student was able to solve the problem correctly and evaluate the solution by rechecking the accuracy of the answer and providing a concluding statement that directly addressed the problem. The student's work in Cycle II (b) indicates the ability to apply mathematics using appropriate mathematical models and to carry out the mathematical modeling process correctly. Furthermore, the student was able to interpret the solution and evaluate the answer appropriately. Based on this analysis, the student's mathematical literacy skills fulfilled all of the assessed indicators.

The results of the analysis of mathematical literacy skills among the 28 students in Cycle II, based on their responses to the test questions administered at the end of the cycle, are presented in Table 5.

Table 5

Results of Analysis of Student's Mathematical Literacy Skills in Cycle II

Indicator of Mathematical Literacy Based on PISA	Predicate	Number of Students	Percentage
0	Not Capable	0	0 %
1	Poor	1	3,57 %
1,2	Sufficient	5	17,86 %
1,2,3	Good	13	46,43 %
1,2,3,4	Very Good	9	32,14 %
Total		28	100 %

Based on the results of the mathematical literacy skills analysis in Cycle II, as presented in Table 5, 3.57% of students were classified as having poor mathematical literacy skills, 17.86% as sufficient, 46.43% as good, and 32.14% as very good.

Compared with Cycle I, the proportion of students with poor mathematical literacy skills decreased from 10.71% to 3.57%, while the proportion of students with sufficient mathematical literacy skills decreased from 50.00% to 17.86%. In contrast, the percentage of students classified as having good mathematical literacy skills increased from 25.00% to 46.43%, and those with very good mathematical literacy skills increased from 14.29% to 32.14%.

Overall, the results of the Cycle II analysis showed that 21.43% of students demonstrated mathematical literacy skills at the sufficient level or below, whereas 78.57% achieved a good or very good level. These findings indicate a substantial improvement in students' mathematical literacy skills compared with both the preliminary reflection stage and Cycle I. As the predetermined success criteria had been achieved, the implementation of Cycle II was considered successful, and no further cycle was required.

Improving Students' Mathematical Literacy

A comparison of students' achievement of the mathematical literacy indicators across the preliminary reflection stage, Cycle I, and Cycle II is presented in Figure 8.

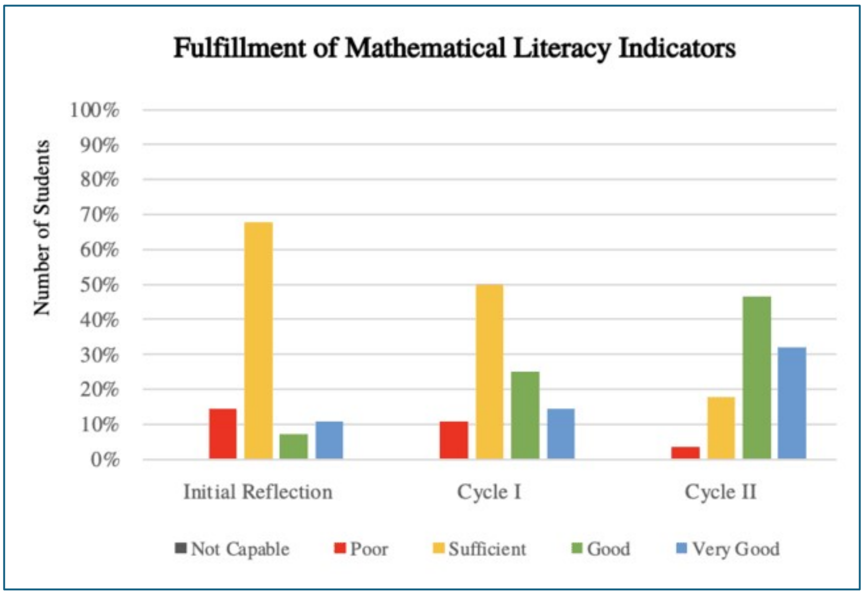


Figure 8. Fulfillment Comparison of Mathematical Literacy Indicators at All Stages.

Based on Figure 8, a comparison of students' mathematical literacy performance across all stages shows a clear improvement over time. The proportion of students classified as having poor mathematical literacy skills decreased from 14.29% in the preliminary reflection stage to 10.71% in Cycle I and further to 3.57% in Cycle II. Similarly, the percentage of students with sufficient mathematical literacy skills declined from 67.86% in the preliminary reflection stage to 50.00% in Cycle I and 17.86% in Cycle II.

In contrast, the proportion of students classified as having good mathematical literacy skills increased from 7.14% in the preliminary reflection stage to 25.00% in Cycle I and 46.43% in Cycle II. The percentage of students classified as having very good mathematical literacy skills increased from 10.71% in the preliminary reflection stage to 14.29% in Cycle I and further to 32.14% in Cycle II. Overall, these findings indicate a continuous improvement in students' mathematical literacy skills following the implementation of mathematics learning utilizing contextual-based LKPD.

This finding is consistent with previous studies reporting that mathematics learning based on a contextual approach can enhance students' mathematical literacy skills (Ahmad & Nasution, 2019). Furthermore, the contextual approach has been shown to facilitate students' understanding and support them in solving mathematical problems encountered during learning activities (Buchori, 2019; Yu et al., 2015).

The implementation of the contextual-based LKPD integrated abstract mathematical concepts with students' everyday experiences, particularly those related to their socio-cultural environment and Islamic religious practices. This contextualization created a meaningful learning environment that enabled students to construct mathematical understanding through familiar situations.

The use of the LKPD contributed to the improvement of students' mathematical literacy skills by providing pedagogical scaffolding throughout the learning process. Consistent with the findings of Novikasari and Ulpah (2022), instructional materials grounded in Islamic contexts can support students' conceptual understanding of mathematics. By connecting real-life situations with abstract mathematical concepts, the LKPD guided students in formulating, applying, and interpreting mathematics in meaningful contexts. Such scaffolding is particularly important, as students often require support in bridging informal everyday language and formal mathematical communication (Haryani & Harso, 2023).

These findings provide further insights into previous research on contextual mathematics learning. While Ahmad and Nasution (2019) reported that a contextual approach can improve students' mathematical literacy, the present study suggests that the use of contexts that are relevant to students' socio-cultural and religious backgrounds may further support their engagement and participation in learning activities. This finding is consistent with recent studies indicating that the integration of Islamic values into mathematics learning can support not only students' cognitive development but also character formation and the creation of meaningful learning experiences (Setiawan et al., 2025).

The contextual nature of the LKPD enhanced the relevance and meaningfulness of the learning materials, which may have contributed to students' ability to solve mathematical problems more effectively. This finding supports previous studies by Buchori (2019) and Yu et al. (2015), which emphasized the role of contextual learning in facilitating mathematical problem solving. Furthermore, the structured design of the LKPD provided systematic guidance throughout the learning process, supporting Latif's (2022) assertion that well-designed worksheets can enhance various aspects of students' mathematical literacy.

From a pedagogical perspective, these findings highlight the importance of designing instructional materials that are culturally and contextually relevant to students' backgrounds. Such materials can create more meaningful learning experiences and support the development of mathematical literacy skills.

Despite the positive findings, several limitations of this study should be acknowledged. First, as a Classroom Action Research (CAR) study, the research involved a relatively small sample of 28 students from a single Islamic Junior High School. Consequently, the findings should be interpreted within the specific context of the study and may not be readily generalizable to other educational settings.

Second, the intervention was implemented over only two cycles, limiting the ability to examine the long-term retention and sustainability of students' mathematical literacy skills. Therefore, future research could explore the implementation of contextual-based LKPD in a wider range of educational contexts, across different grade levels, and with larger participant populations.

In addition, longitudinal studies are needed to investigate the long-term effects of contextual-based LKPD on students' mathematical literacy development. Future studies may also consider integrating digital or interactive worksheet formats to examine their potential for supporting student engagement and learning in contemporary educational environments.

Conclusion

Based on the findings and discussion, the implementation of contextual-based worksheets (LKPD) through two cycles of Classroom Action Research (CAR) was associated with improvements in the mathematical literacy skills of eighth-grade students at an Islamic Junior High School. The results showed a progressive improvement in students' performance across the research cycles. While most students initially demonstrated poor or sufficient levels of mathematical literacy, the proportion of students achieving good or very good levels increased from 17.86% in the preliminary reflection stage to 39.29% in Cycle I and 78.57% in Cycle II.

These findings suggest that the integration of real-world contexts into mathematics instructional materials can support the development of students' mathematical literacy skills. The contextual-based LKPD provided opportunities for students to connect mathematical concepts with meaningful situations encountered in their daily lives, thereby facilitating the processes of formulating, applying, and interpreting mathematics.

Future research may examine the implementation of contextual-based LKPD across different grade levels, larger participant populations, and a wider range of mathematical topics. In addition, studies exploring the integration of digital or interactive features into contextual-based worksheets may provide further insights into their potential to support students' engagement and learning in contemporary educational settings.

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