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Mathematical Literacy-Oriented Student Worksheets for the Sidoarjo Context

Mohammad Faizal Amir (*), Ainiya Rahma Septiarini, Mahardika Darmawan Kusuma Wardana
Universitas Muhammadiyah Sidoarjo, Mojopahit Street No. 666 B Sidowayah, Celep, Sidoarjo 61215 East Java, Indonesia

Abstract: This study aims to produce valid and practical student worksheets (SW) oriented toward mathematical literacy for the Sidoarjo context to improve the mathematical literacy of elementary school students. This type of study is a design research of development study. The subjects of this study were students of grade IV A Kepunten State Elementary School for the academic year 2021/2022 totaling 25 students. Data collection techniques are walkthrough, observation, test, and interview. Sampling technique using purposive sampling with descriptive analysis. The results of the SW mathematical literacy using the Sidoarjo context on the area and circumference of a valid flat shape material based on content, construct, and language after going through the development stage in the form of expert review and one-to-one. The practicality of SW is seen in the small group development stage. The effectiveness of developed SW has a potential effect on students' mathematical literacy skills. This shows that mathematical literacy-oriented SW for Sidoarjo context can be used for the subject of area and circumference This study implies that it can fill the gap between mathematical literacy problems and the need for alternative teaching materials in the form of SW that involves a cultural context. Hence, teaching materials are available in facilitating mathematical literacy construction as well as understanding the content for elementary students, especially in learning subjects of areas and circumferences in the Sidoarjo region.

Keywords: Student Worksheet, Mathematical Literacy, Sidoarjo Context
(*) Corresponding Author: faizal.amir@umsida.ac.id, 085706670541

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INTRODUCTION

Mathematical literacy skills are essential for students (Baumert, Nagy, & Lehmann, 2012; Lestari & Waluya, 2020; Rahmawati, Usodo, & Fitriana, 2021). According to the OECD (2019), mathematical literacy is an individual's ability to formulate, use, and interpret mathematics in various contexts. This includes mathematical reasoning and using mathematical concepts, procedures, facts, and tools to describe, explain, and predict events. Mathematical literacy is expected to make students genuinely understand the role of mathematics in modern life they face in the future in various situations they encounter (Charmila, Zulkardi, & Darmawijoyo, 2016). In addition, mathematical literacy skills help students understand mathematics's role and usefulness in life and can be used to make the right decisions as educated human beings (Hayati & Kamid, 2019).

The mathematical literacy ability of students in Indonesia is still relatively low. Based on the PISA (The Program for International Student Assessment) test conducted by the Organization for Economic Cooperation and Development (OECD), the organization conducts evaluations to determine students' mathematical literacy skills worldwide. In 2018 Indonesia was ranked 69 out of 79 countries' PISA participants with an average math score of 379 out of an OECD average score of 487 (Kemendikbud, 2019; Nur'aini, Ulumuddin, Sari, & Fujianita, 2021). Meanwhile, a four-year survey conducted by the International Association for Evaluation of Educational Achievement (IEA) through a test known as TIMSS (The Trend in International Mathematics and Science Study) showed that Indonesia is ranked 64 out of 72 countries surveyed (Fenanlampir, Batlolona & Imelda., 2019). So, based on these surveys, the mathematical literacy skills of Indonesian students have not been able to compete with other countries in the world (Afriyanti, Wardono & Kartono, 2018).

The essential factors for this low mathematical literacy ability are that teachers have not linked mathematics with student culture in learning mathematics (Manoy & Purbaningrum, 2021). The teacher only conveys what is written in the book without encouraging students to think critically (Arisetyawan, Suryadi, Herman & Rahmat, 2014). Mathematics taught in schools is not contextual and far from the reality of everyday life (Anggraini, Warniasih, & Jana, 2019; Anim & Saragih, 2019). According to Mania and Alam (2021), one of the factors that cause students not to apply mathematics to solve daily life problems is that teachers do not connect mathematics with the culture in the student environment.

SW is one of the teaching materials that can be used in learning mathematics (Jamil & Khusna, 2020). SW provides instructions or an overview of students' problem-solving steps (Choo, Rotgans, Yew & Schmidt, 2011). A good SW can make it easier for teachers to learn and help students solve problems independently (Basuki & Wijaya, 2021; Sipayung & Simanjuntak, 2018; Vitoria & Monawati, 2020). In this case, the development of SW to develop students' mathematical literacy needs to be done. SW to be developed needs to be integrated into the context of the environment as part of student life. Because the use of context in learning mathematics in elementary schools is considered very important (Fajriyah, Putri & Zulkardi, 2017). This is because learning using context allows elementary school students to find meaningful relationships between abstract and practical ideas in real-world contexts. Meanwhile, the concept is internalized through discovering, reinforcing, and connecting (The Cornerstone of Tech Prep, 1999). One context that can be used is the local context. Using local contexts helps elementary school students understand math problems from their everyday lives (Charmila et al., 2016). Using content and context that relates to students' daily activities makes learning easier (Laurens, Batlolona, Leasa & Batlolona, 2018).

Several previous studies have been carried out on the development and use of SW to facilitate students' mathematical literacy construction through local cultural contexts. Study by Wildani, Triyana, and Mahmudah (2020) produces SW mathematical literacy on statistical material that helps students grow and develop mathematical literacy skills. Study by Manoy and Indarasati (2018) builds SW mathematical literacy in statistical material that can improve student learning outcomes. A study by Disnawati and Nahak (2019) shows that SW enhances student learning outcomes within the context of the Timor Weaving culture. It is evident from student learning outcomes in the number pattern material, which is higher than the minimum completeness criteria (70%) than that set by the school. Study by Lestari, Darmawijoyo, and Aisyah (2018) produces SW in the context of the Banyuasin traditional house, which can improve student learning outcomes both in the cognitive (knowledge) and affective (attitude) domains. However, the

development of SW in these studies has not used the local cultural context in the Sidoarjo region.

Previous studies have been used the local context of Sidoarjo culture in the form of temples and batik. Still, they have not focused on the development of SW oriented to the local context of temples and batik, especially the typical Sidoarjo batik with milkfish motifs and the context of the Medalem temple. Manoy and Purbaningrum (2021) integrates Sidoarjo batik to improve high school students' mathematical literacy. Rachmawati (2012) researches ethnomathematics in the life of the people of Sidoarjo, and study by Sholihah, Dewi, and Mariana (2021), explores mathematical concepts in Jetis Sidoarjo batik for elementary school students.

Based on the literature review and the studies' results, it is essential to develop a mathematical literacy-oriented SW for the Sidoarjo cultural context. This is useful for improving the mathematical performance of elementary school students more optimally by linking the construction of knowledge and literacy of students in the Sidoarjo region based on the regional context. However, a study on the development of mathematical literacy-oriented SW using the local cultural context through batik with the motif of milkfish and Medalem temple for elementary students in the Sidoarjo region has never been done. Thus, this study aims to develop a mathematical literacy-oriented SW using the Sidoarjo context that is valid, practical, and effective to potentially improve the mathematical literacy skills of elementary school students.

METHODS

The method used in this study is a design research type of development study. This development study aims to produce valid, practical and effective mathematical literacy-oriented SW for the Sidoarjo context and has the potential effect of developing mathematical literacy skills of elementary school students. The study was carried out in the 2021/2022 academic year involving 25 grade IV A students at Kepunten State Elementary School, Tulangan District, Sidoarjo Regency, East Java. The sampling technique used purposive sampling because students had previously been familiar with temple and batik motif as local cultural values around them. Developing this study consists of two stages: preliminary study and formative evaluation (Aryati, Pujiastuti, & Sudiana, 2020). The formative evaluation stage consists of self-evaluation, prototyping (expert review, one-to-one, and small group), and field test (Aryati et al., 2020; Tessmer, 1993).

Preliminary Study Stage

In the preliminary study stage, the researchers analyzed student abilities, curriculum analysis, context analysis, content, and determined mathematical literacy indicators and Sidoarjo cultural context analysis to be used as a reference for designing SW. Mathematical literacy indicators can be seen in Table 1.

Table 1. Indicator Mathematical Literacy

Mathematic Process	Indicator Mathematical Literacy
Formulate mathematical situations	• Identify mathematical variables and structures in real-world problems and make assumptions. • Build an understanding of context to guide or accelerate the process of solving mathematical problems, such as working on a level of accuracy appropriate to the context.

Using mathematical concepts, facts, procedures, and reasoning	• Implement effective and continuous control mechanisms on all multi-procedures oriented to mathematical solutions, conclusions, and generalizations. • Describe, defend, or justify the processes and procedures used to determine mathematical results or solutions.
Interpret, apply and evaluate mathematical results	• Connect pieces of information to arrive at a mathematical solution and make generalizations or multi-step arguments. • Mathematical results are interpreted in various formats according to the situation or use, comparing or evaluating two or more representations according to the situation • Construct and communicate arguments in terms of the context of the problem.

(Source OECD, 2021)

Formative Evaluation Stage

1. Self-evaluation

This study's formative evaluation stages adopt the flow of formative evaluation type development (Tessmer, 1993); see Figure 1. In the self-evaluation stage, the researcher designed a mathematical literacy-oriented SW using the Sidoarjo context by paying attention to three aspects: construct, content, and language. SW is designed to refer to the core and basic competencies according to the applicable curriculum, namely the 2013 curriculum, learning objectives, and questions in SW. Then, the researchers assessed the results of the designs that had been made. The results of the assessment are called prototype 1.

2. Expert review and one-to-one

Simultaneously, the first prototype SW design results were given to the expert (expert review) and three students with different abilities (low, medium, and high) to assess the SW based on content, construct, and language. The results obtained at the expert review stage and one-to-one are used to revise prototype 1 to produce prototype 2.

3. Small group

Prototype 2 was tested on students at the small group stage. This stage involves six students with various cognitive abilities (high, medium, and low). Students are asked for their opinions and comments on the SW they have done at this stage. This stage focuses on the practicality of the SW that has been developed. The findings at this stage are used to revise prototype 2. The results of the revision are called prototype 3.

4. Field test

The last stage is the field test. At this stage, the researchers conducted trials on students who were research subjects using prototype 3. The main focus of this field test was to see the potential effects and effectiveness of developing mathematical literacy-oriented SW using the Sidoarjo context in understanding the area and circumference of flat shapes. The selection of this material is based on material analysis at the self-evaluation stage that the mathematical content contained in the Sidoarjo temple and batik culture is understanding the area and circumference of flat shapes.

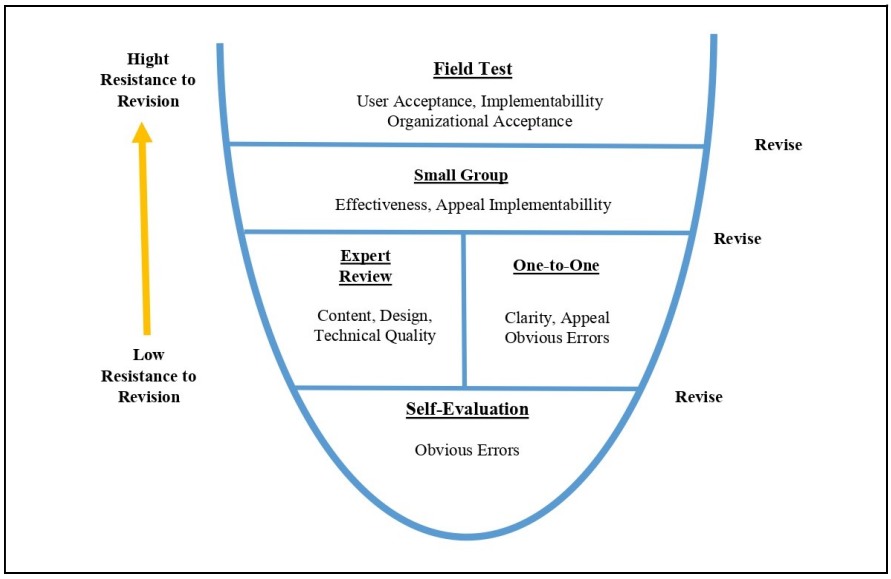


Figure 1. Study Flow Formative Evaluation Type Development (Tessmer, 1993).

This study's data collection techniques were walkthrough, observation, tests, and interviews. Walkthroughs collect expert feedback to validate the first prototype. Expert review validation included a walkthrough. Meanwhile, the instruments used in this study were validation sheets, questionnaires, and evaluation test sheets in the form of SW. Validation sheets are used to determine the level of validity of the SW developed based on experts' judgment. In this study, two math education experts with expertise in formative assessments and one basic education expert with a local cultural background were consulted. The questionnaires were used to determine the level of practicality of the SW, which was developed based on students' answers. Evaluation test sheets in the form of SW were used to determine the effectiveness of the potential effects on the construction of students' mathematical literacy skills development.

The data analysis technique used descriptive analysis qualitatively and quantitatively. Qualitative analysis was used to analyze the self-evaluation results, comments and suggestions from validators at the expert review stage, and comments and input from students at the one-to-one and small group stages. In comparison, quantitative analysis was used to analyze the results of the SW practicality questionnaire scores obtained from students and the results of the SW effectiveness test on students' mathematical literacy skills.

The validity, practicality, and effectiveness of the SW are based on the adaptation of the assessment category by Riduwan (2012): less than 20% is bad, 20%-40% is very deficient, 41-55 is deficient, 56%-70% is adequate, 71%-85% is good, and 86%-100% is very good. Validation is based on expert judgment and practicality based on students' classical responses using a Likert scale of 1-5, with very good criteria getting the highest score and very bad getting the lowest score, with a maximum score on the content aspect of 45, the constructed aspect of 20, and the language aspect of 35. Meanwhile, the justification for the minimum assessment to determine the effectiveness of SW is classically based on minimum completeness of >60% of the results of students' mathematical literacy skills. The minimum fullness of this value is adjusted to the minimum criteria the school has set for mathematics subjects.

RESULTS & DISCUSSION

Results

Stage Preliminary Study

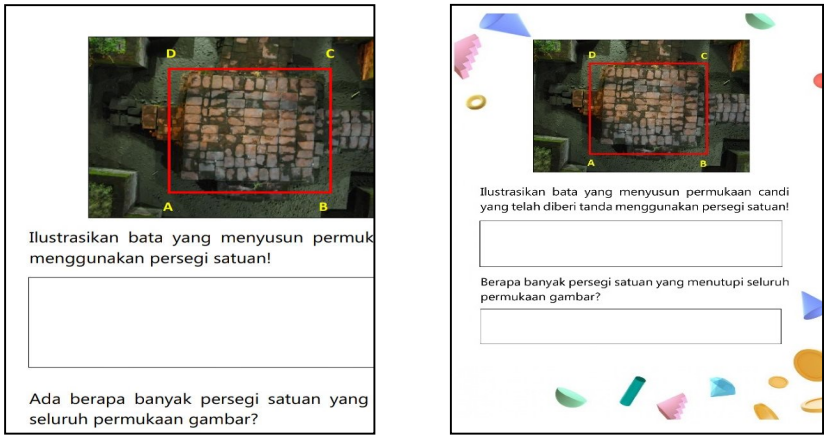
This stage is divided into two, namely the preparation stage and the design stage. In the preparation stage, the researcher conducted curriculum analysis, student ability analysis, context analysis, content, and mathematical literacy ability indicators, and Sidoarjo cultural context analysis, which will be used as a reference for designing SW. The curriculum analysis stage is carried out by identifying mathematics learning materials in elementary education units by the curriculum used, namely the 2013 curriculum. The mathematical content contained in the Sidoarjo temple and batik culture is FOR understanding the area and circumference of flat shapes. In this study, the basic competencies and indicators used are for finding the formulas for the area and perimeter of squares, rectangles, and triangles and for solving problems related to the area and perimeter of squares, rectangles, and triangles. In the student analysis stage, the analysis was carried out by collecting data on class IV A students of Kepunten State Elementary School, totaling 25 students with various abilities. The construction of SW development was carried out based on the analysis of context, content, and indicators of mathematical literacy. Meanwhile, Sidoarjo's cultural analysis is done by finding and determining the culture that will be implemented in learning mathematics. The Sidoarjo culture applied in the construction of this SW is the typical Sidoarjo batik with milkfish motifs and the construction of the Medalem temple. Meanwhile, the selection of this study sample was determined in a preliminary study of grade IV A students who were relatively more familiar to the milkfish batik motif and had a place to live as a demographic background with an average of fewer than 4 kilometers from the Medalem temple.

After doing the analysis stage, then it was followed by the SW design stage. The mathematical literacy-oriented SW design using the Sidoarjo context aimed at motivating students in learning mathematics and assisting students in finding formulas for the area and perimeter of squares, rectangles, and triangles, as well as solving problems related to the area and perimeter of squares, rectangles, and triangles associated with the context of Sidoarjo. The steps taken by this researcher included: (1) Developing the SW structure, starting from setting titles, basic competencies, learning objectives, activity steps, indicators, supporting information, and assignments. (2) Arrange steps in SW according to indicators in mathematical literacy.

Formative Evaluation Stage

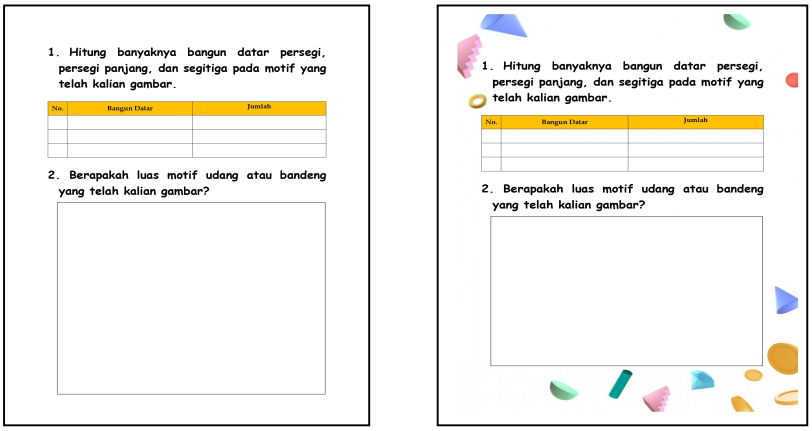
1. Self Evaluation

At this stage, the researcher evaluates the initial SW design prepared. Researchers reviewed SW according to the 2013 curriculum and the context of Sidoarjo. The SW design has been prepared by the 2013 curriculum and the Sidoarjo context. The result of the revision is called prototype 1 (See Figure 2 and Figure 3).



Before Revision After Revision

Figure 2. Revision of SW Prototype 1 on Temple Context



Before Revision After Revision

Figure 3. Revision of SW Prototype 1 on Batik Context

In the self-evaluation stage, the researchers construct based on the analysis of context, content, and indicators of mathematical literacy. The result of this activity is the SW before the revision. Finally, the researchers discussed again to determine the readability construction and display of SW, which was more suitable for elementary students, so that SW reached the revised revision. The SW before and after the revision of SW prototype 1 in the temple context is to readjust sentences or terms considered "ambiguous" for elementary students and make the SW layout more attractive by adding pictures (see Figure 2). Revisions in the form of adding pictures were to make the SW more attractive. Moreover, it were also made to the SW prototype 1 in the context of batik regarding a more pleasing appearance.

2. Expert Review

This stage involved three experts: two mathematics education lecturers (validators 1 and 2) and one basic education lecturer (validator 3) from Muhammadiyah University of Sidoarjo. The written responses and suggestions from the validators were used as material for revising the SW. Table 2 shows suggestions for improvement from the three validators. Meanwhile, the results of expert validation can be seen in Table 3.

Table 2. Results of Suggestions Validator

Validators	Suggestions
Validator 1	SW design is less attractive, the stages do not reflect mathematical literacy indicators, pay attention to writing.
Validator 2	Eliminating symbols in the picture, pay attention to the flow and making it more constructive for students' understanding.
Validator 3	Adding a picture of a batik motif, looking at the plot again, adding one more question about batik.

Table 3. Expert Validation Results

Aspect	Validators			Score Max	Percentage	Category
	Validator 1	Validator 2	Validator 3			
Content	40	35	35	135	81,5%	Valid
Construct	15	20	20	60	91,6%	Very valid
Language	30	30	30	105	85,7%	Very valid
Average of All Aspects				300	83,3%	Valid

Table 3 shows that there are three aspects of assessment in the validation of experts, which were then developed into 20 questions. The experts' validation results showed that the score obtained on the content aspect was 81.5%, with a valid category. The construct aspect obtained a score of 91.6% with a very valid category and the language aspect obtained a score of 85.3% with a very valid category. The average score obtained from all aspects is 83.3%, with a valid category but with revisions.

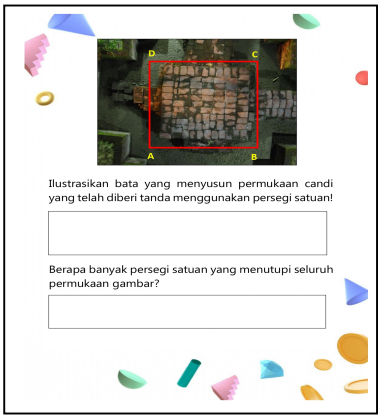
3. One-to-one

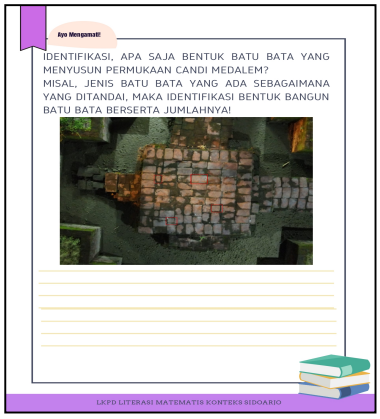
Along with the validation by experts, a one-to-one stage is carried out. This stage involves three students with various abilities (high, medium, and low). Students are asked to read and pay attention to the questions in SW. Students are asked to provide responses related to the clarity of the question's meaning. The results of the responses from students are used as material for revising prototype 1. The results of these student suggestions are in Table 4.

Table 4. Results of Student Suggestions

Validator	Suggestions
Student 1	The question is clear
Student 2	The question on page 4 is a little confusing
Student 3	Easy-to-understand question

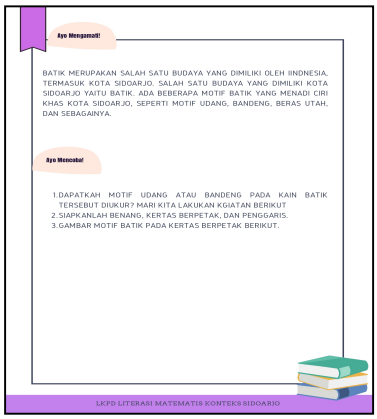
The results of the revised SW prototype 1 can be declared valid because it has been validated at the expert review stage and tested at the one-to-one stage. The revised prototype 1 is called prototype 2 (see Figure 4 and Figure 5), which is tested at the small group stage.

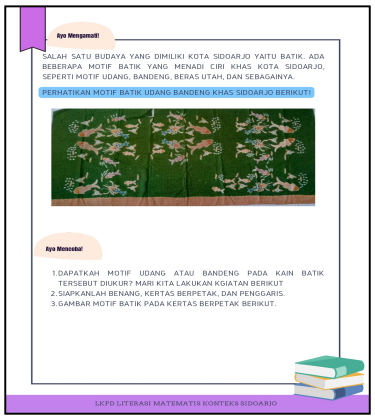




Prototype 2 Before Revision Prototype 2 After Revision

Figure 4. Revision of SW Prototype 2 on Temple Context





Prototype 2 Before Revision Prototype 2 After Revision

Figure 5. Revision of SW Prototype 2 on Batik Context

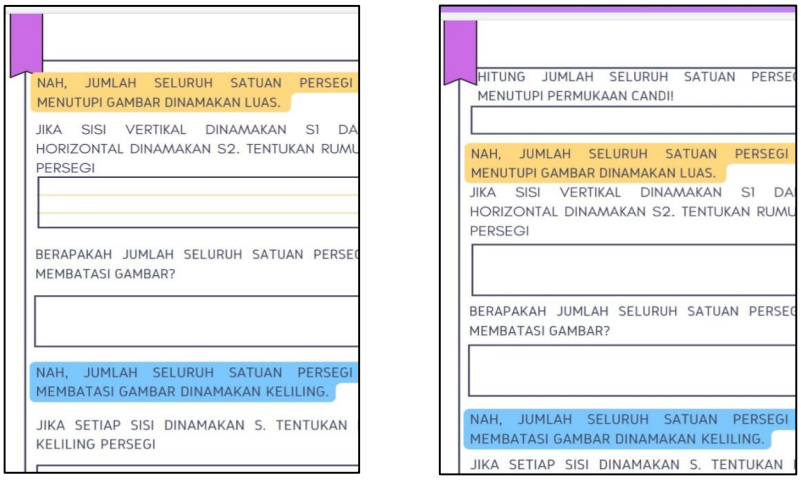
4. Small-Group

The researcher tested prototype 2 with 6 students with various abilities (high, medium, low) at this stage. This small group stage aims to determine the practicality of the SW that has been prepared by conducting interviews with each student with various abilities (high, medium, and low). The shortcomings encountered during the pilot at the small group stage were used as the basis for revising the SW. Drawbacks and follow-up for SW improvement based on interview results can be seen in Table 5.

Table 5. Practically Results, Drawback, Follow-up in Small Group

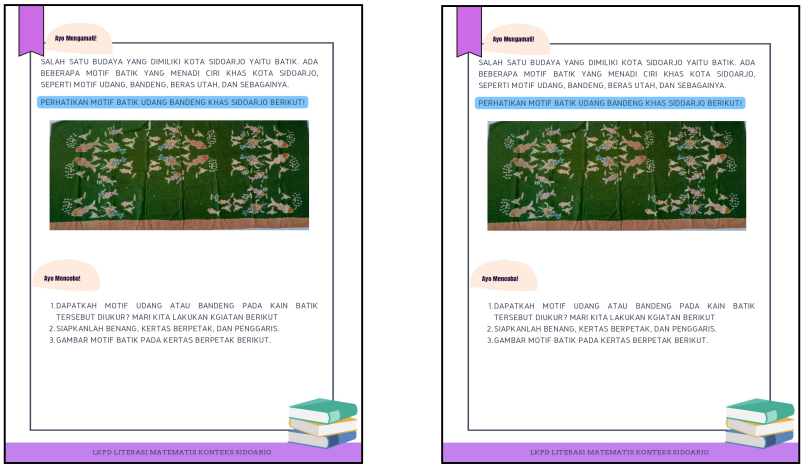
Student Abilities	Drawbacks	Follow-up
Hight	The question is clear and SW is easy to use	Researchers use SW in the context of temple and batik without changes
Medium	Easy-to-understand question	Researchers use SW in the context of temple and batik without changes
Low	The question on SW temple context for page 4 is a little confusing	The researcher added a question construct in the form of "count the number of all square units that cover

the surface of the temple"



Prototype 3 Before Revision Prototype 3 After Revision

Figure 6. Revision of SW Prototype 3 on Temple Context



Prototype 3 Before Revision Prototype 3 After Revision

Figure 7. Revision of SW Prototype 3 on Batik Context

The follow-up to the SW deficiency is in Table 5, in the form of the revised results in Figure 6 and Figure 7. The revised prototype 2 is prototype 3, SW-oriented mathematical literacy using a valid and practical Sidoarjo context. Thus, at this stage, the SW developed can be applied to the field test stage because students see it as being understood and used.

5. Field Test

At this stage, the SW was tested on grade IV students at the Kepunten State Elementary School, which consisted of 25 students. The time allotted to do this SW is 120 minutes. This stage aims to see the practicality and potential effects of the SW that has been developed. Documents from the field test results include student SW answer sheets, mathematical literacy test answer sheets, and questionnaires about SW. At this stage, the potential effects of SW developed through a mathematical literacy test are also seen. Table 6 shows the percentage of students' mathematical literacy test scores.

Table 6. Percentage of Student Mathematical Literacy Test Results

Value Range	Frequency	Percentage	Category
86-100	12	48%	Very Good
71-85	4	16%	Good
56-70	7	28%	Adequate
41-55	2	8%	Deficient
20-40	-	-	Very Deficient
0-19	-	-	Bad

Based on Table 6 by descriptive analysis, it can be seen that the results of the mathematical literacy test were given to 25 grade IV students at Kepunten State Elementary School. From the data analysis on the mathematical literacy test, the area and circumference of a flat figure have been determined. It is known that 12 students scored between 86-100 in the very good category, 4 students between 71-85 in the good category, 7 students between 56-70 in the adequate category, 2 students scored between 41-55 in the deficient category. The students' errors in all categories include determining the formula and doing calculations. Because as many as 16 students (64%), based on the determination of the school's potential effect, the minimum completeness of the math score is more than 60%. It can be stated that the developed SW fulfills the potential effect. Meanwhile, the results of student responses are classically based on the questionnaire can be seen in Table 7.

Table 7. Student Response Results

Indicator	Score	Percentage	Category
Feelings of pleasure in the use of mathematical literacy-oriented SW using the context of Sidoarjo	153	87,4%	Very Good
Student motivation to learn to use mathematical literacy oriented SW using the context of Sidoarjo	93	93%	Very Good
Benefits and understanding of students in using mathematical literacy-oriented SW using the Sidoarjo context	81	81%	Very Good
Average of All Aspects		87,1%	Very Good

Based on Table 7 by descriptive analysis, it is known that the students' responses after using mathematical literacy-oriented SW using the Sidoarjo context. This can be seen from the indicators of students' enjoyment of mathematical literacy-oriented SW using the Sidoarjo context of 87.1% in the very good category. Students' learning motivation after learning to use mathematical literacy-oriented SW for the Sidoarjo context of 93% with a very good category. The understanding and benefits of mathematics lessons after using mathematical literacy-oriented SW using the Sidoarjo context was 81% in the very good category.

Discussion

The SW development was carried out in 2 stages: preliminary study and formative evaluation consisting of self-evaluation, expert review, one-to-one, small group, and field test involving three validators and 25 grade IV A students at Kepunten state elementary school. After going through revisions at the self-evaluation, expert review and one-to-one stages. SW was tested at the small group stage by involving 6

students with different cognitive abilities (high, medium, and low). Students were asked to provide feedback and input used as material to revise the SW. After the revision is complete, the SW is tested in a large group at the field test stage. After passing these stages, it can be seen that the developed SW meets the valid, practical, and effective criteria. Using the Sidoarjo context in the development of SW is new for students at the school. This benefits both teachers and students because it provides new experiences in solving problems related to their daily lives. Moreover, the contexts taken are very close to their environment, namely Sidoarjo batik and the Medalem temple building located in the same district in Tulangan.

The purpose of this study was to produce a valid, practical, and potential mathematical literacy-oriented SW for the Sidoarjo context. The validity of the developed SW can be determined through qualitative expert validation. First, content (compatibility with essential competencies, learning objectives, connecting the Sidoarjo context to the material, accuracy in the order of presentation, and problems based on specified indicators). Second, presentation (SW based on mathematical literacy indicators). Third, language (according to the improved spelling, the language is not multi-interpreted, and easy to understand).

From a practical point of view, based on an expert review, it is known that SW can already be applied in learning. Based on the analysis of student answers at the one-to-one stage and also in the small group. It is known that mathematical literacy-oriented SW can be done well by students. Although some students have difficulty working on it, it is their first time working on mathematical literacy-oriented SW for the Sidoarjo context. In addition, from the comments and also student answers during the interview, namely at the one-to-one and small group stages, in general students understand the instructions and construction of SW, but some questions are "confusing" in terms of construct questions involving the context of the temple. However, it can be seen that the developed SW encourages students to solve the existing questions. Integrating mathematics and culture can make mathematics meaningful to students and boost their performance (Prahmana, Yunianto, Rosa & Orey, 2021). In addition, integrating local culture in mathematics learning is essential to maximize students' mathematics learning achievement (Simamora, Siragih & Hasratudin, 2018). Hence, it can be said that the developed SW meets the practical criteria.

Students were very active during the learning process during the field test process. Learning becomes more meaningful because they learn based on contexts related to their own environment. According to Zuliyawati and Mariana (2019), using a mathematical context means introducing mathematical concepts through a particular problem or situation to make learning more meaningful. The results of questionnaires and interviews conducted with several students indicate that the SW developed makes students interested and motivated to learn mathematics. They are easier to understand the area and perimeter of flat shapes. The use of SW based on the local cultural context really helps students learn more effectively (Hairida & Setyaningrum, 2020; Jufrida, Basuki, Sawitri, & Afriani, 2019; Kusdayanti, Nyeneng, & Maharta, 2019; Rosyid, Budiaman, & Hasanah, 2019). In addition, according to Rohimatussa'diyah, Pamungkas, and Alamsyah (2020) the existence of a relationship between the experiences that students have with the material being taught makes learning mathematics more meaningful because students take an active role in learning.

From the analysis of the mathematical literacy test results based on the assigned assessment category, it was found that 12 students (48%) scored 86-100 in the very good category, 4 students (16%) scored 71-85 in the good category, and 56-85 students scored. 70 as many as 7 students (28%) in the adequate category, and those who scored 41-55 were 2 students (8%) in the deficient category. Because as many as 16 students (64%),

based on the potential effect determined by the school, the minimum completeness score in mathematics is more than 60%. So, it can be concluded that the mathematical literacy-oriented SW using the Sidoarjo context developed by the researcher has a potential effect in developing the mathematical literacy skills of elementary school students. This is in line with a study by Manoy and Purbaningrum (2021) that the habit of solving mathematical problems related to culture (ethnomathematics) can improve students' mathematical literacy. Using mathematical literacy-oriented SW using the Sidoarjo context is new at Kepunten state elementary school, so students feel interested and motivated to learn to use this SW. According to study results by Disnawati and Nahak (2019), ethnomathematics-based worksheets motivate students to learn mathematics because of its cultural elements.

Student responses after using SW mathematical literacy using the Sidoarjo context are students' enjoyment of SW mathematical literacy using the Sidoarjo context by 87.4% and students' learning motivation after learning to use SW mathematical literacy using the Sidoarjo context 93%. Finally, understanding and the benefits of mathematics lessons after using SW mathematical literacy using the Sidoarjo context are 81%, with all three aspects getting very good categories. In this case, SW is said to be practical according to students' perceptions. Romli, Abdurrahman, and Riyadi (2018) said using SW provides opportunities for students to participate in learning actively. In addition, using SW can improve students' mathematical literacy skills because the context presented is interesting (Effendi, Zulkardi, Putri & Yaniawati, 2019).

CONCLUSION

Based on the study, it can be concluded that the developed mathematical literacy-oriented SW for the Sidoarjo context was valid, practical, and effective over the area and circumference of flat shapes. Mathematical literacy-oriented SW for the Sidoarjo context in the area and circumference of flat shapes has been proven to potentially affect the mathematical literacy skills of grade IV A students at Kepunten State Elementary School. The developed SW makes students active and motivated to participate in the learning process. The results of this study can be used as a teacher's reference material to make effective teaching materials for the learning process. The results of this study have implications for the availability of teaching materials in the form of SW that involve local cultural contexts. So, teaching materials make mathematical literacy and understanding easier for elementary students, especially in learning areas and circumferences in the Sidoarjo region. Recommendations in the form of suggestions for future studies can be made using generalization test analysis and a broader sample to ensure that the results of SW development are more appropriate for elementary students.

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