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DEVELOPMENT OF LKPD BASED ON CONTEXTUAL TEACHING AND LEARNING ON SQUARE AND RECTANGULAR MATERIALS TO IMPROVE LEARNING OUTCOMES OF GRADE IV ELEMENTARY SCHOOL STUDENTS

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ABSTRACT
Student Worksheets (LKPD) are one of the teaching materials that play an important role in the learning process. In the data structure of mathematics subjects, LKPD is CTL-based with square and rectangular shapes. This research was conducted on grade IV students of SDN 106161 Laut Dendang. Elementary school students in the fourth grade were used as research participants. This study uses an analysis, design, development, implementation, and evaluation (ADDIE) model. The results of this study can be seen and proven by using the Likert scale to assess the material and aspects that are still being developed, namely: a) Validity that gets a score (4.8) from media experts and (4.43) from experts in materials. b) Efficiency, i.e. obtaining a score of 3.96 from students and 4.6 from teachers. c) Fairness of use of estimated N-Gain reaches value 0.8110. The study's findings, students' enthusiasm in learning math about square and rectangular shapes should be made easier for educators and prospective teachers. In addition, this development is expected to help students gain a deeper understanding of the subject matter they are learning, thereby increasing their interest in CTL-based LKPD exercises.
Keywords: LKPD, Learning Method, CTL

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PRELIMINARY

Education is needed from time to time, because education leads humans to develop and continue to progress into real life (Pamungkas et al., 2017). Without education, the generation will be destroyed, that is one of the meanings of education in the community, explained in Law of the Republic of Indonesia Number 20 of 2003, Education is a conscious and planned effort to create a learning atmosphere and learning process to increase the potential of students, getting teaching is everyone's right and obligation, training is a way to work on the nature of existing Human Resources (HR) because efforts to further develop education will never stop (Mahardika et al., 2020). According to Uno & Lamatenggo

(2016), quality education is education that is tailored to the needs of students, the times, and curriculum, as well as professional teachers and changes made by science and technology. By creating learning tools, teachers must be creative and innovative in managing learning (Khotimah et al., 2020).

We can update the curriculum and provide supporting resources, such as LKPD for students, teaching aids, and training books, among others to improve the quality of education (Listari & Gazali, 2022). From elementary to tertiary level, exercises that include teaching and learning activities may be effective (Pradiptha & Wiarta, 2021). For this reason, teachers must help build how they can interpret new groups based on past data. Students should be able to independently build knowledge with the help of the instructor necessary. Learning should be integrated into the building process, not procuring data. It is necessary to persuade students to associate information with its application in everyday life. Therefore, students learn mathematics without having to memorize a series of formulas, definitions, algorithms, or theorems; Instead, it requires teachers and students to look for shortcuts and quickly remember or memorize math information (Kamarullah, 2017).

To get rid of students' understanding that mathematics is difficult, it must start from the teacher himself. First of all, educators must change the traditional learning worldview to a gradual learning worldview. This implies that learning is not only focused on educators who only exchange learning materials but ways in which students can seek their own insights with the educator's task as a facilitator. Second, teachers must change the negative world view of science among students. Instructors must have the option to turn the daunting world view of arithmetic into fun learning. Many things can be done in changing this world view, for example educators can use appropriate learning strategies and models, educators can develop to make interesting teaching materials to empower students in learning, and teachers can relate the material being discussed with students. Underlying circumstances include students' everyday climate (Agustina et al., 2019).

According to Wijaya et al (2019), 48% of 28 teachers in Indonesia are involved in drill and practice to achieve success in sibling relationships, 31% are involved in *drill* and *practice*, and 17% use or develop new specific strategies, this suggests that a teacher is using strategies to support students who are proficient in math (Chin & Fu, 2021). According to Janah (2020), that the ability of teachers to integrate methods, models, or strategies into the educational process to achieve maximum goals greatly determines the success of students in learning mathematics (Mawaddah & Siswanto, 2022). The teacher's ability to integrate

methods, models, or strategies into the educational process to achieve maximum goals greatly determines student success in learning mathematics (Shodikin et al., 2022).

The Contextual Teaching and Learning (CTL) learning model is a relevant approach strategy to do because the Contextual Teaching and Learning (CTL) learning model is a learning and teaching thinking that helps teachers connect subject matter with current reality. According to Suastra (2013:113) interprets Contextual learning model is a learning concept that helps educators in relating the material (content) taught with the actual situation (context) and encourages students to generate the knowledge they have with daily life in their routines as members of family, population, and labor. The learning process occurs naturally through the child working and participating in activities, not through the transfer of knowledge from teacher to student (Gading et al., 2019). Meanwhile, according to Johnson (2000) the CTL approach is a decision to encourage students to be active in learning and learning to connect their abilities with daily attendance so that they are better prepared to face global challenges. According to Nurhadi (2003) that there are seven main parts underlying the use of relevant contextual learning in the classroom. The seven components are constructivism, inquiry, questioning, learning communities, modeling, reflection, and authentic assessment. This component can improve students' ability to solve problems can improve their learning outcomes (Surata & Marhaeni, 2019).

However, in today's era, mathematics is a learning that many students fear, because mathematics is a theoretical science, full of symbols and formulas, so they think mathematics is a scary and difficult learning to learn (Hidayanti & Ain, 2021). According to (Gazali, 2016) said that mathematics becomes very difficult for students because every learning begins with abstract concepts. The purpose of the abstract concept is to start with an explanation of the learning material is not the same as the questions given so that it makes students not understand it. According to (Kaliky & Juhaevah, 2018) Mathematics is no longer considered like objective or fun learning, because according to mathematics learners as very scary learning. According to (Nurmawati & Ain, 2022) this could happen due to various experiences of students from the beginning of knowing mathematics. For example, teachers who explain less fun by transferring things that can be understood by teachers only but not students, lack of learning media that can be exemplified directly in front of the class, the absence of question books or worksheets to hone the potential of students.

Student Worksheets (LKPD) are tools to help and work with learning and learning practices so that close coordination efforts will be formed between students, to increase student activity in further creating learning achievements. According to Widjayanti (2008),

teachers can use LKPD for students as a learning tool to lead learning activities. The LKPD that has been prepared previously can be adjusted to the circumstances and circumstances of future learning training. Meanwhile, the Ministry of Education and Culture stated that LKPD is a sheet containing tasks that must be completed by students. Activity sheets usually contain instructions and steps for completing tasks. The use of LKPD has the advantage of facilitating learning completed by teachers, allowing students to move more freely and teaching them to understand and complete writing tasks (Umbaryati, 2016).

To eliminate the misconception that mathematics is boring, tedious, or even scary, learning can be started from the teacher's teaching and learning process and LKPD teaching materials. According to (Gazali, 2016) LKPD is a source of learning materials that help students learn. To encourage students to learn more about learning, including mathematics, the role of educators must be greater in creating learning media design in relation to LKPD. In addition, according to (Sagita et al., 2020) One type of printed educational material known as LKPD can help students become more independent, organized, and well organized. The use of teaching materials that are more varied or interesting for students can reduce the boredom experienced by students when learning mathematics.

Based on an interview with class IV homeroom teacher, Dermila Siregar S.Pd at SDN 106161 Laut Dendang, stated that teachers experience learning difficulties due to lack of student activity which causes the Minimum Completeness Criteria (KKM) not to be met. The significance of daily test results, especially noticeable in students with scores below 70 is a lack of understanding of flat-form material. Only 10 out of 28 students were able to proceed to the KKM level. According to (Junitasari et al., 2021) The cause of KKM is not achieved because students are not interested in and complete LKPD, which can help them understand the material. They also don't follow the learning process, there are no real-world examples, and the questions and explanations don't apply to what students do on a day-to-day basis. In addition, researchers found that LKPD contains contradictory data. and unattractive because of its gray color and photocopying.

It didn't end there, researchers also found a problem where students never opened textbooks to read or answer questions after doctors mentioned that information didn't stay in school. The things in the book will make them more likely to get bored. In addition, according to one student, the language of the book and the lack of explanations make it difficult to understand. Just a short recipe and the questions are difficult to understand. In order for students to feel accepted in the world of books when reading, the language used in the book should be more informative and strong if they already use standard language and

use appropriate images. This is because young students will be exhausted if they use language that is too formal (Wiranata & Sujana, 2021).

Based on the description of the problem above, the researcher proposed a solution to revive students' interest in mathematics, especially flat and rectangular geometry. Researchers develop from an existing textbook into an interesting LKPD and make students not feel bored when reading the LKPD book. That is by relating the material to objects around students and presented through the CTL-Based LKPD book which contains material, animated images, sample questions, and practice questions. Researchers see a problem that many students actually do not understand mathematical concepts related to flat shapes, especially squares and square shapes. As a result, researchers make it easier for educators and those who want to become educators to encourage students to learn mathematics on data material. Students should be able to better understand the material they are learning as a result of this progress, thus sparking their interest in CTL-based LKPD practice questions. Students can also complete this LKPD alone, in groups, or at home.

In this research by making teaching materials, namely LKPD to facilitat Teaching and learning process in the classroom so that students can be trained. The purpose of this study was to see the level of validity and student responses to the development of CTL-based LKPD regarding flat planes and rectangular shapes.

METHODS

Using the Contextual Teaching And Learning (CTL) method, the purpose of this study was to see the level of validity and student responses to the development of CTL-based LKPD regarding flat fields and rectangular shapes using the ADDIE development research model. According to (Puspasari & Suryaningsih, 2019) ADDIE Abbreviation For (Analysis Design Development Implementation Evaluation) because the stages are more objective and clear, specialists ensure that the ADDIE model is a simple and coordinated model to run.

According to (Cahyadi, 2019) Media, teaching resources, learning methods, and other developmental processes all benefit from the ADDIE development model. Despite its high degree of adaptability, the ADDIE model is highly effective and well known to the general public. A comprehensive and structured framework is provided by the ADDIE model. This model has been improved to make it easier to use by going through assessments and modifications at each stage of ADDIE. As mentioned earlier, there are five phases of the ADDIE model: Analysis, Design, Development, Implementation And Evaluation.

Figure 1 ADDIE Development Model

The following is the stageof the ADDIE Development Research Model:

1. Analysis

   Analyze whether students are motivated to learn or not, unaware of environmental conditions, aware of the relationship between material and everyday problems, and understand concepts from previous learning materials. Direct procedures to help achieve learning outcomes that can be felt in real circumstances in everyday life. As a result of the above analysis, learning objectives are structured effectively and efficiently. CTL learning model.

2. Design

   The movement of ADDIE's development research model is a rapid cycle that begins with planning ideas and content in products. For each product fulfilled, a plan is made. Instructions for applying the product manufacturing design must be written clearly and in detail. Product configuration is still an idea at this stage, and will form the reason for the next progressive stage. At this stage, begin planning, which includes setting learning goals, growth opportunities to fill individual gaps of students, combining tests according to planned learning objectives, and establishing learning methodologies to make LKPD fit CTL learning in the form of semi-open learning. LKPD semi-open organized, semi-directional.

3. Development

   ADDIE's development research model includes activities to bring pre-made product designs into production. In the previous stage, a reasonable structure for executing the new item was arranged. After that, the conceptual framework is transformed into a ready-to-use product. At this stage a product performance appraisal instrument should also be developed.

At this stage, pages with variations are also developed LKPD display looks more attractive. In addition, to facilitate students' understanding of the material, LKPD displays images and content related to daily life. Changing and formatting settings on LKPD are also developed with planning design settings suitable for looking beautiful and attracting students' attention to peruse CTL-based LKPD.

4. Implementation

At this stage the plans and techniques that have been made included in LKPD are implemented in real situations, especially in classes that expect to direct student members according to the Contextual Teaching And Learning (CTL) model which will bring students to have critical thinking to produce results as information, abilities and mentality.

5. Evaluation

In ADDIE model development research, the evaluation stage is used to get feedback from customers on the product so that changes can be made to meet the evaluation results or to meet needs that have not been met by the product. The ultimate goal of evaluation is to evaluate progress toward development goals. This stage is carried out to evaluate the missing stages so that deficiencies can be identified and corrected.

In this study, the subjects were grade IV students of SD Negeri 106161 Laut Dendang. The trial was conducted on 20 grade IV students. The following categories of data are used in research and development: 1) for media information to be considered important for media planned by specialists, consent sheets from instructors and students and surveys from educators and students should also be assessed on the basis of the material and media specialists. 2) Questionnaires given to teachers and students demonstrate practicality. 3) Media effectiveness can be measured from students' scores on *Pre-Test* and *Post-Test* forms.

Various data collection techniques are required for the creation of CTL-based LKPD media. Instruments in the form of media validation sheets and materials used by experts to evaluate media. After that, questionnaire sheets were given to students and teachers to see how they responded and how useful the use of media in education was. This research uses both qualitative and quantitative data analysis in making research and development of LKPD media. Qualitative data was collected through responses from educators and teachers and advice from media and materials experts. The developed Likert calculation scale is used to validate the material, and quantitative data is collected from the results of media validation sheets.

1. Validation Test

Evaluations conducted by media experts and learning materials are illustrated in the following table. The evaluation was carried out using the scoring guide questionnaire calculation scale for material validation and LKPD design validation:

Table 1. Validity

No	Category	Value
1.	Highly Valid	5
2.	Valid	4
3.	Quite Valid	3
4.	Invalid	2
5.	Highly Invalid	1

Calculate validation values for each aspect of the assessment using references such as:

$$P = \frac{f}{N}$$

Information:

P : Validation Value

F : Average score obtained

N : Number of question indicators

Table 2. Validation Criteria

No.	Validation Criteria	Validation Level
1.	3,25<P<4.00	Very Practical
2.	2,50<P<3,25	Quite Practical
3.	1,75<P<2,50	Less Practical
4.	1,00<P<1,75	Impractical
5.	2,50<P<3,25	Very Practical

2. Response Test

Calculate the average score for the assessment aspect response test using references such as:

$$X = \frac{\sum Xi}{n}$$

information:

X : The value of the student response questionnaire

Xi : The sum of the scores of each criterion

N : number of question indicators

Table 3. Practicality Criteria

No.	Practicality Criteria	Level of practicality
1.	3.25<P<4.00	Very Practical
2.	2.50<P<3.25	Quite Practical
3.	1.75<P<2.50	Less Practical
4.	1.00<P<1.75	Impractical
5.	2.50<P<3.25	Very Practical

3. Effectiveness Test

Data analysis carried out to test the effectiveness of learning outcomes is by using the gain index (Normalized Gain)

$$\text{Normalized gain (g)} = \frac{Score\ Post\ Test - Score\ Pre\ Test}{Score\ ideal - Score\ Pre\ Test}$$

Table 4. Normalized gain categories (g)

No.	Normalized Gain Value	Interpretation
1	0.00 < g < 0.30	Low
2	0,30 < g <0,70	Keep
3	0,70 < g < 1,00	Tall

RESULT AND DISCUSSION

From the results of development research that has been carried out by researchers in the form of Development of LKPD based on Contextual Teaching Learning (CTL). In square and rectangular material to improve the learning outcomes of grade IV elementary school students, the data analysis that has been collected from material expert validation tests and media expert validation tests to assess LKPD products is valid or invalid using questionnaire data instruments (Agustina et al., 2019). The questionnaires that have been filled out by experts are then converted to a table using the Likert scale achievement rate conversion. Which produces data as below:

Table 5. Results of Media and Material Expert Assessment on CTL-Based LKPD

No	Information	Value	Category
1	Media expert validation	4,43	Highly Valid
2	Material expert validation	4,8	Highly Valid

Based on the table above, the achievement value on the media expert validation test results is 4.43 with very valid qualifications so it does not need to be revised and is feasible to use. Then the validator gives suggestions to multiply the image and reduce words that are

ambiguous or unclear in placement and adjust the form of the question whether the question includes a fill or an essay.Then proceed with the assessment of the material expert validation test which gets a score of 4.8 with very valid information and does not need to be revised so that the material compiled is suitable to be taught to students.

Then, the practicality of LKPD can be seen from the questionnaires given to educators and students, after using LKPD media in Square and Rectangular learning. The results of the questionnaire that have been collected are then converted into a table as follows:

Table 6. Results of CTL-Based LKPD Practicality assessment

No	Information	Value	Category
1	Educator Questionnaire	4,6	Very Practical
2	Student Questionnaire	3,96	Very Practical

The results of the questionnaire from one of the Class IV-A teachers, Mrs. Dermila Siregar, S.Pd, obtained the results of the questionnaire in which the questionnaire was filled out from educators worth 4.6 with the Very Practical category. The questionnaire was given to 20 students of grade IV-A of SD Negeri 106161 Laut Dendang. Obtained questionnaire results obtained from students as many as 3.96 with very practical categories.

CTL-based LKPD media on square and rectangular material can be said to be effective if you find an increase in learning outcomes after using LKPD media (Listari & Gazali, 2022). Students are initially given a question sheet in the form of a *PreTest* and then after the *Pre Test* is complete, enter the media to be developed, namely CTL-Based LKPD. After the LKPD is given, students are asked to understand the contents of the LKPD and are accompanied by researchers to solve the description problem. After completion, students are given *Post Test* questions which aim to find out whether there is an increase or not after using LKPD from researchers.

Table 7. Recapitulation of PreTest and Post Test results

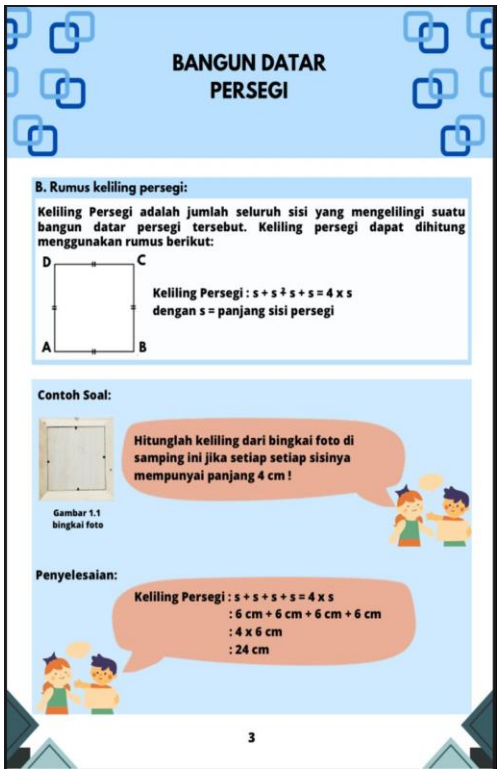
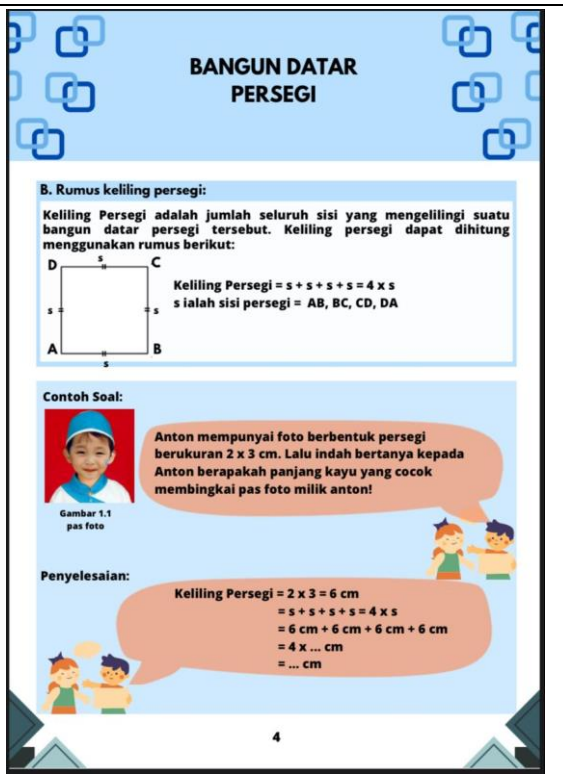
No	Pre Test	Post Test	Ideal Score	N-Gain Score	N-Gain Interpretation
1.	39	88,5	61	0,8110	Tall

From the results of the table above, it can be seen that the application of the CTL-Based LKPD book is very influential on the value of students. Because when using the LKPD book, students experienced significant development, which initially got an average score from the *Pre* Test of 39 then after using CTL-Based LKPD learning media, the *Post*

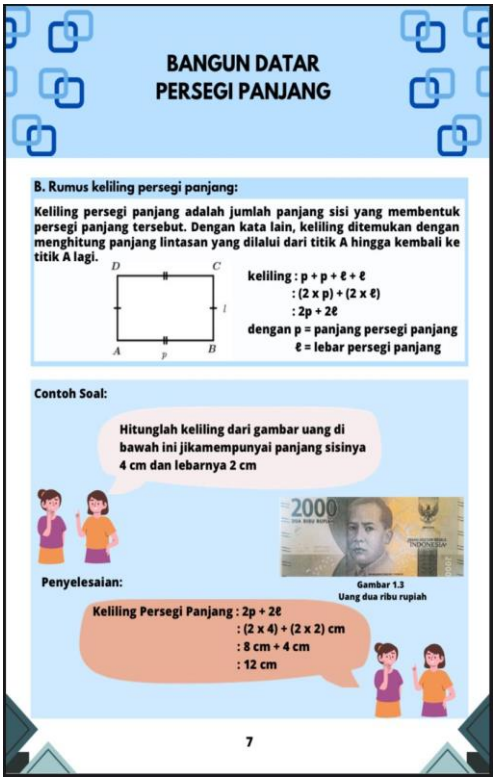
Test results obtained by students had an average score of 88.5. Then the value of N-Gain when totaled is 0.8110 which shows that the interpretation of the N-Gain value is high.

Not only stopping there, there are inputs from media experts and material experts regarding the quality of teaching materials for LKPD Based on Contextual Teaching And Learning (CTL) that can be reconsidered in order to improve and perfect LKPD made by researchers. Although the assessment questionnaire from material experts received a value of 4.8, the questionnaire from media experts received 4.43, and respondents from subject experts and educators of class IV-A received 4.6, all of which were said to be very valid and very practical. However, there are suggestions, comments, and other inputs so that this CTL-Based LKPD becomes perfect and minimizes existing shortcomings. Below are the comparison sections before revision and after revision.

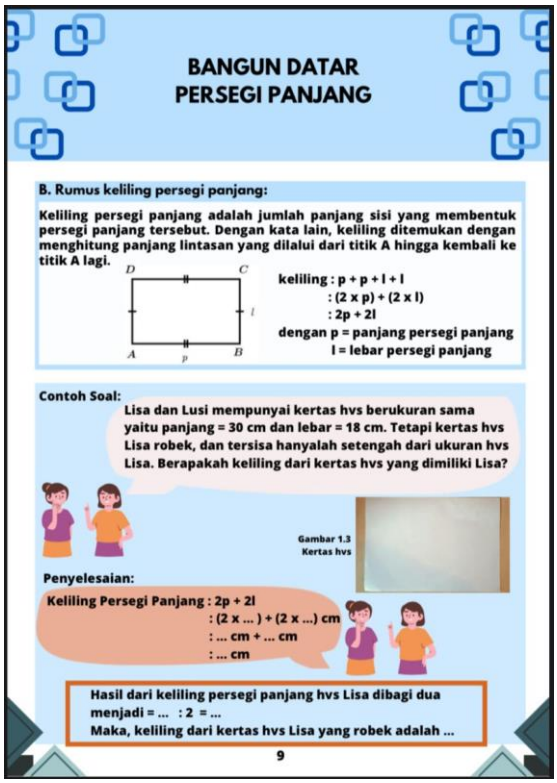
Table 8. Differences Before and After Revision

No	Media Revision	
1		
	Before Revision	After Revision

2

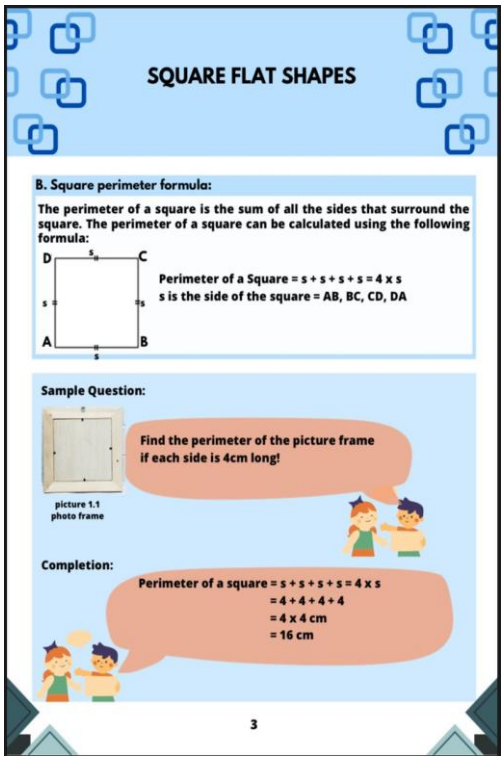
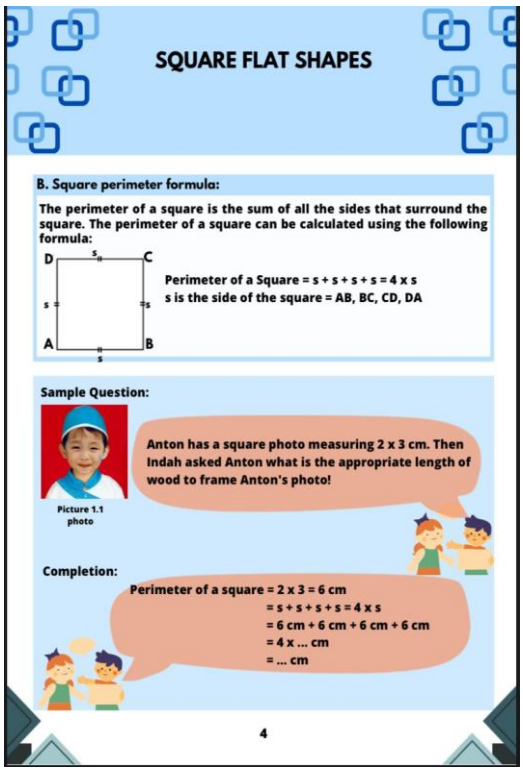


Before Revision



After Revision

English Version

No	Media Revision	
1		
	Before Revision	After Revision

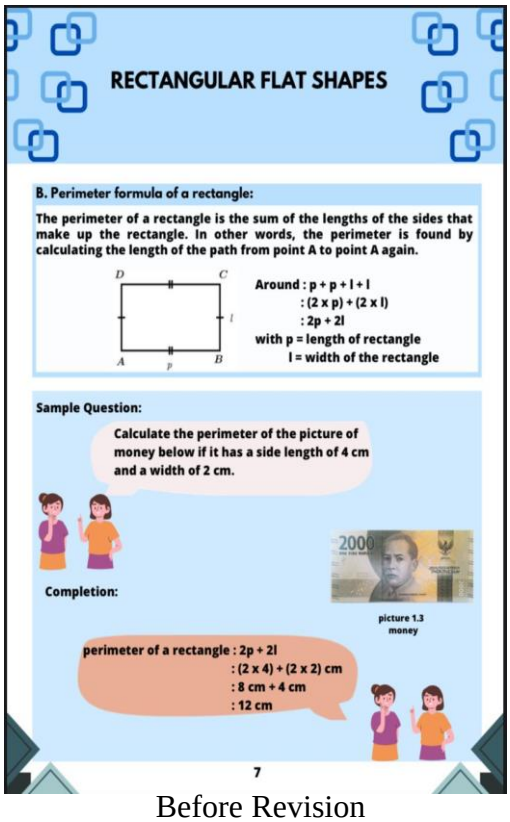
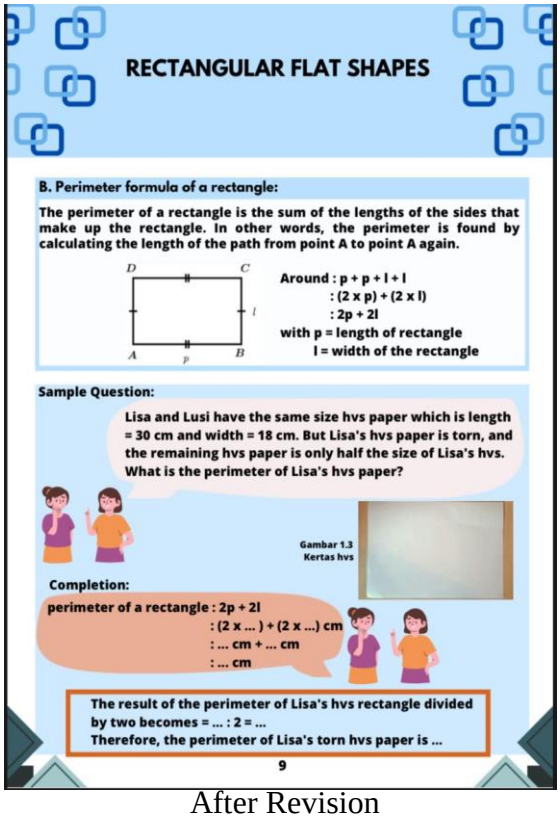
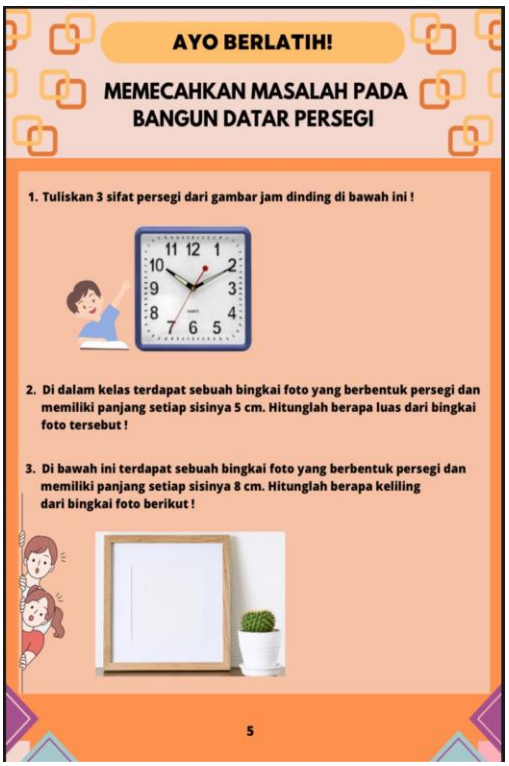
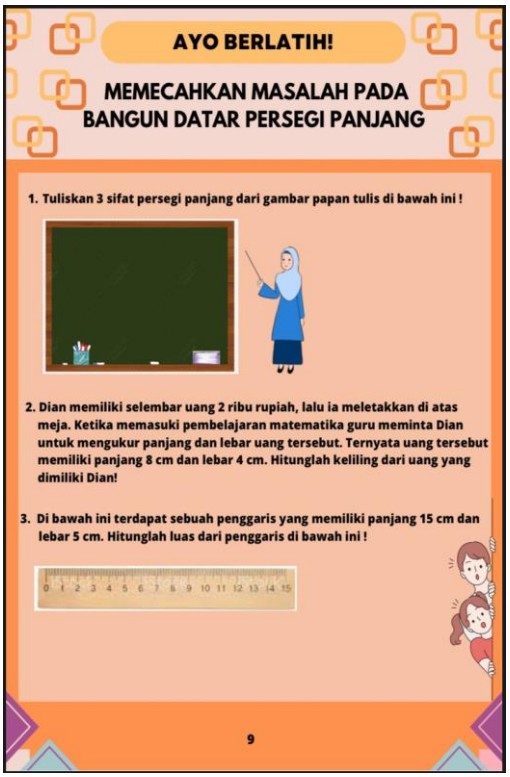
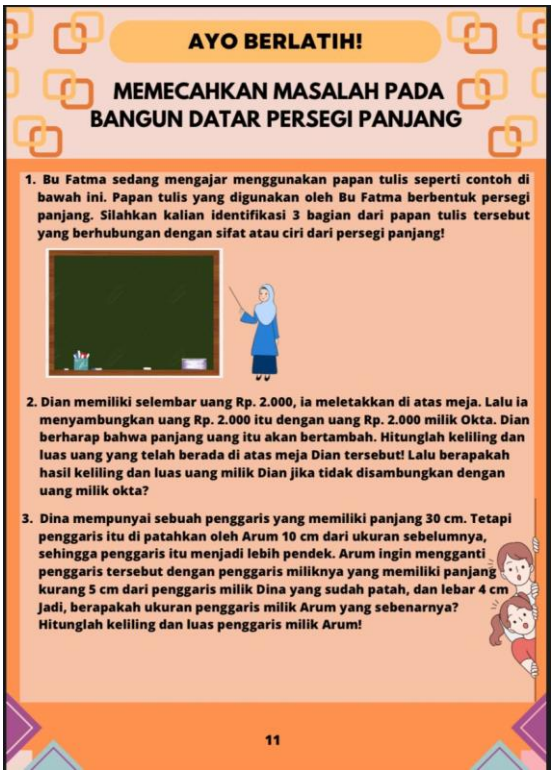
2	 Before Revision	 After Revision

Table 8 explains that The difference before and after the revision Improve the area and circumference formulas of flat rectangular shapes and improve example questions to be more realistic with objects around students through easy-to-understand pictures so as to facilitate student understanding in learning flat and square building problem material direct procedures to help achieve learning outcomes that can be felt in real situations in everyday life. As a result of the above analysis, learning objectives are structured effectively and efficiently. For example, providing information and making a distinction between one banknote and one sheet of HVS paper, as well as being given clear information so that students can easily understand it.

By pairing the topic (substance of education) with the life setting and needs of students will build their inspiration to move forward and will make education and educational experiences more productive and powerful. The contextual approach to education is also known as contextual teaching and learning. In complex situations, contextual learning situations occur.

Table 9. Differences Before and After Revision

No	Media Revision	
1		
	Before Revision	After Revision
2		
	Before revision	After Revision

English Version

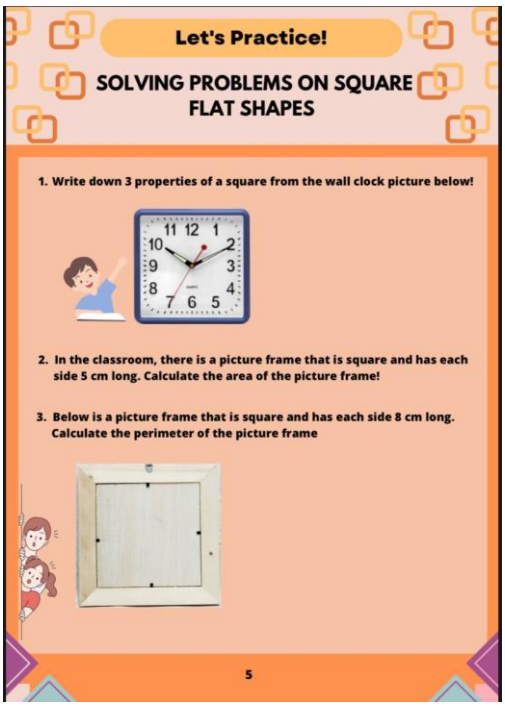
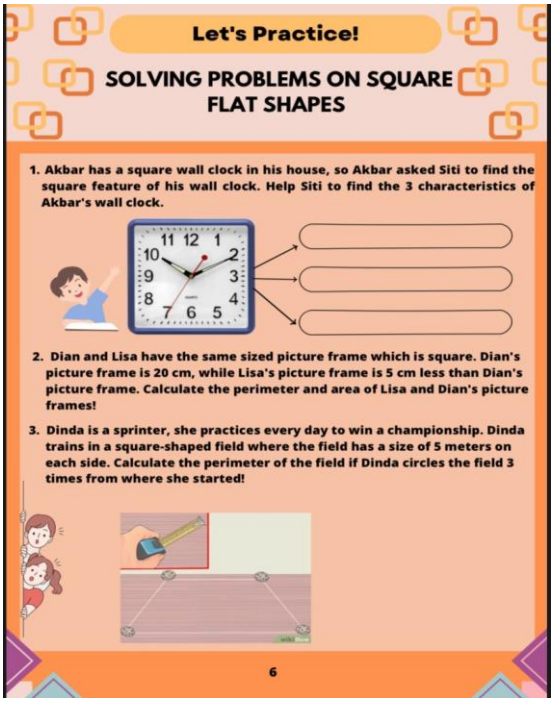
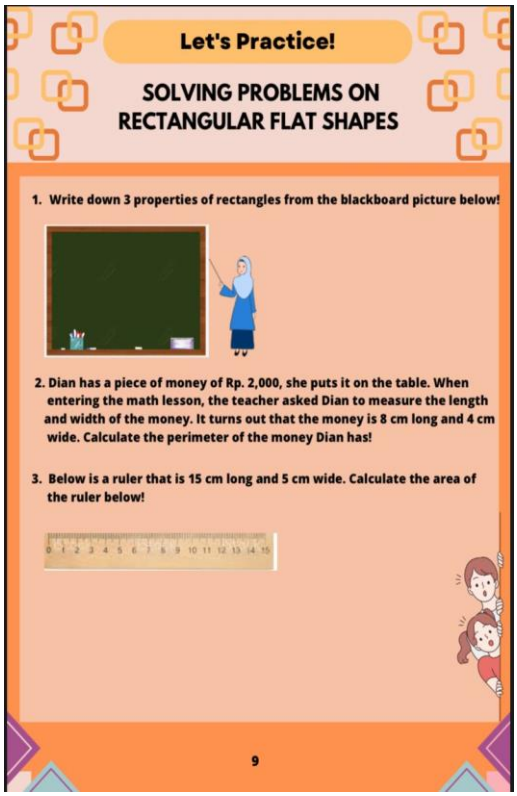
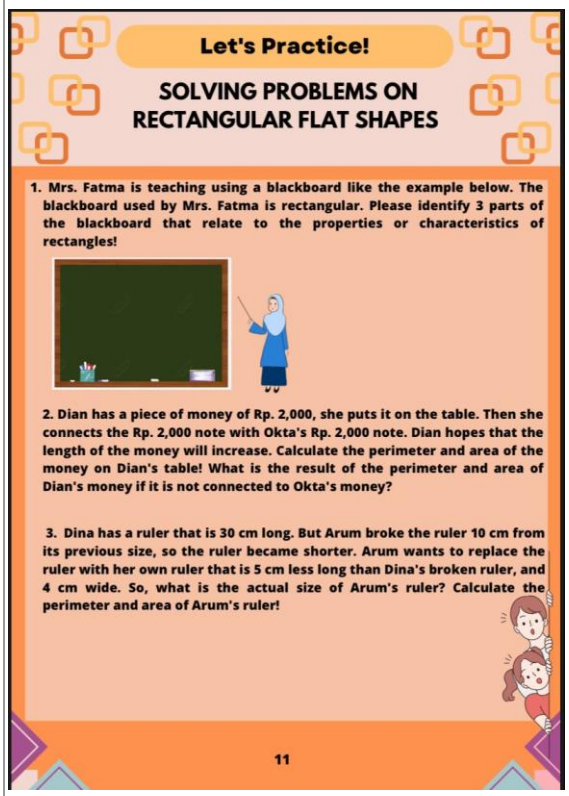
No	Media Revision	
1		
	Before revision	After Revision
2		
	Before revision	After Revision

Table 9 explains that before and after revisions Refine and add HOTS questions to each square and rectangular flat build problem exercise by adding captions and pictures that are easy for students to understand and interesting to read and understand. For example, providing details on the wall clock picture is given a simple caption so that students are easy to understand the question and not confusing.

CONCLUSION

Based on the results of the research and discussion above, it can be concluded that the CTL-Based LKPD on square and rectangular flat building materials is valid and feasible to be used with very good categories, it can be seen and proven from the assessment using the Likert scale along with aspects in development, namely: a) Validity that reaches a score of (4.8) by media experts and (4.43) from material experts. b) Effectiveness that achieves scores (4.6) from educators and (3.96) from learners. c) Practicality using N-Gain calculation reaches a value of (0.8110) which is said to be high. The research using CTL-based LKPD media was successfully carried out in Class IV-A of SD Negeri 106161 Laut Dendang.

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