ICEE-2

# Control Concepts and Creative Thinking Skills Basic School Students Through RME Learning Approaches

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**Abstract** The purpose of this study was to examine is there increasing mastery of concepts and creative thinking skills of students after learning approaches given Realistic Mathematics Education (RME). The study involved students in grade 3 in SDN 2 Jamblang by the number of 35 students composed of male students and 18 female students 17 people. The method used is classroom action research (PTK), which consists of two cycles with each cycle through the stages of preparation, action, action observation, and reflection. Data were obtained through observation and tests. From the initial data known number of students who completed 18 students and 17 students who have not completed. After action by RME results showed an increase, the data of 28 students completed and unresolved 7 student,

**Keywords**: The concept mastery, RME, Size, Square, Rectangular

**INTRODUCTION ~** Learning the 21st century is a transition of learning in which the curriculum developed at this time requires the school to change-centered learning approach educator (teacher-centered learning) to approach a student-centered learning (student-centered learning). This is in accordance with the demands of the future wherestudents must have the skills to think and learn. These skills include problem-solving skills (problem solving), critical thinking, collaboration, and communication skills. All of these skills can be owned by the students when teachers are able to develop lesson plans that contain activities that challenge students to think critically or creative thinking in solving problems. Activities that encourage students to collaborate and communicate should appear in any lesson plan made. Student-centered learning is different from educator-centered learning, learning the character of the 21st century following commonly referred to as 4C, namely Communication (Communication), Collaboration (Cooperation),

The fourth character of the 21st century learning to master students in performing school teaching in every field of study is no exception math, because math students learned to be able to think logically, analytical, systematic, critical and creative National Education candy (2006). Students are also expected to master the concepts, strategies and procedures and be able to apply for solving various problems whether simple or complex, routine and non-routine Kapur, M (2009). Extensive material square and rectangular learned that students from elementary grade III. Many students consider that this material is hard and is not important to learn. This view was not produced by the student's own thinking, but also relates to the process of learning mathematics. Based on discussions with the class teacher at SDN 2 jamblang and observation study found that in learning the material more emphasis to memorize a

variety of definitions, rules, formulas and mathematical formal procedures. When studying the material, students are immediately given the various definitions and concepts of broad abstract square and rectangular. For exampleFlat area is the size of the area bounded by the sides of the flat wake. Long straight side of the square has a horizontal side 4. If we multiply the length of the vertical and horizontal side, the obtained 4x4 = 16. So, the square area can be written L = sxs and area of a rectangle can be written L = pxl.During a process of learning is not performed and the flow gradually and logical thinking that is found variable, why and where of elimination and substitution to complete the spacious square and rectangular. In addition to experience difficulties when completing the questions presented in the form of a story, as well as students are not trained to solve the problem presented in various forms. This is due to the material square and rectangular area is given in the abstract symbol and emblem empty of meaning, and more emphasis on mathematical and procedural ways. Learning math just emphasize procedural and formulas to be memorized student, then used to work on the problems. As a result, the ability of reasoning, logical thinking, critical and creative students to thrive,

Creative thinking (creativity) is very important in learning mathematics. This is because creativity can affect the success of students learning mathematics and other sciences Lambertus, et al. (2014), and may help to explain and interpret abstract concepts so that students can achieve greater mastery of concepts Subanji (2011). On the other hand creative thinking is the highest level thinking skills are characterized by the ability to solve the problem in a way unusual, unique and different Beetlestone, F (1998).

Learning RME (Realistic Mathematic Education) is a field of mathematics that emphasize learning the process of thinking and provide an opportunity for students to actively learn Soedjadi. R. (2000).RME learning begins with contextual issues are familiar with the students. By presenting contextual issues are expected to (1) the process of learning and mathematical knowledge learned will be useful and meaningful for students Wijaya, A. (2012), (2) the students will focus on understanding and resolve the contextual problems by trial and error, suspect, the communication of ideas and mathematical ideas that involve the experience and capabilities of students Arsaythamby, V. & Zubainur, CM (2014) (3) through the process of mathematical and provision of scaffolding from the teacher, students are expected to actually know find the concept / mathematical rules, and (4) will bring out the creativity of the students when making the model and solve problems with the answers or strategies vary and new fluent and flexible Siswono, TYE (2006), Based on the description of the problem, the paper focuses on (1) how to think creatively in learning the material RME square and rectangular area, (2) is there a

significant difference between the abilities of female students and male students.

Below are examples of previous studies on the success of the use of RME that the results showed a significant difference between the approach Realistic Mathematics and traditional approaches in terms of achievements. This study showed no significant difference between Realistic Mathematics approach and the traditional approach in terms of attitudes towards mathematics Zakaria, E., & Syamaun, M. (2017). TTW (Think Talk Write) approach RME provides mathematical achievement is better than TPS (Think Pair Share) approach RME, Students with mathematical intelligence-logical high can achieve better math than students with low average, while students with high logical-mathematical intelligence can achieve better performance than students with lower intelligence, In the model TTW with the approach of RME, students with mathematical intelligence-logical high can achieve better math than students with low average, while students with mathematical intelligence-logical low average provide math achievement are the same, and in the model of TPS approach RME students with high intelligence logical-mathematical can achieve better math than those who have a low average, while students with intelligence logical-mathematical can achieve a better performance than those with lower intelligence, in every category of intelligence logical-mathematical, TTW with RME approach and TPS with RME approach provides the same math achievement Afthina, H., & Pramoedya, I. (2017).

## METHOD

This research is a class act with RME approach. This research is described in qualitative descriptive. Classroom action research was conducted in two cycles. Each cycle consists of four stages, namely planning, action, action observation, and reflection. Research conducted at the State Elementary School 2 Jamblang the first week in September 2019 until the third week of September 2019. The subjects were the students of class III Elementary School 2 Jamblang the academic year 2019/2020. Data collected in the form of cognitive learning outcomes, KBM using RME approach, and creativity of the students. Data collected in the study conducted by the method of observation, interviews and review of documents Moleong, LJ (2014). Qualitative data in the form of learning keterlaksanan description and documentation analyzed through the stages of data reduction, exposure data, and the conclusion of the analysis results. Data obtained from the observer through the observation sheet. Data are grouped cognitive achievement, calculated percentages presented in the form of a bar chart, described and analyzed the increase in the first cycle to the second cycle and then summed. Data KBM using RME and creativity of the students are grouped, analyzed based on the observation by the observer, the percentage of classical, presented in charts, reflected the increase from the first

cycle to the second cycle. The action was successful and the cycle can be stopped if there is an increase in the percentage of cognitive learning outcomes, KBM using RME approach, and creativity of the students.

**RESULTS**

Pre-cycle activities carried out are preliminary observations made during the four weeks that is on 5 - August 31, 2019 in the learning of mathematics. Observation activities conducted through observationstudentin the learning process and the author's experience as a teacher during the learning process. The findings obtained during the observations and the author's experience as a teacher of them as follows:

1. Students do not get excited, passive learning, playing, and bullying.
2. Students assume the subjects of mathematics is a difficult subject.
3. Students are not motivated to learn because of fear to the lesson.
4. Learning mathematics organized teachers have not associate with the real world around the student.
5. Teachers still less than the maximum use of instructional media in teaching and learning.
6. Based on the daily tests on basic competence earlier, there are many grades of students who have not achieved success indicators specified school mathematics courses.
7. Many students do not understand the concepts of flat wake.

**table 1**, Student learning outcomes Cycle I and Cycle II

| No. | Question | first cycle | | cycle II | |
|---|---|---|---|---|---|
| | | Percentage | | percentage | |
| | | I | II | I | II |
| 1. | 1. | 82% | 81% | 97% | 100% |
| 2. | 2. | 84% | 86% | 90% | 97% |
| 3. | 3. | 75% | 78% | 97% | 98% |
| 4. | 4. | 80% | 82% | 97% | 100% |
| 5. | 5. | 82% | 84% | 98% | 100% |
| 6. | 6. | 77% | 79% | 85% | 87% |
| 7. | 7. | 76% | 78% | 87% | 88% |
| 8. | 8. | 81% | 81% | 94% | 96% |
| 9. | 9. | 80% | 82% | 100% | 100% |
| 10. | 10. | 74% | 80% | 85% | 86% |
| Average | | 79% | 81% | 93% | 95% |
| On average Classical | | 80% | | 94% | |

Based on Table 1 above, that the research results in the form of cognitive learning outcomes in the first cycle of classical gained an average of 80% and the second cycle with classical average of 94%. As for the average increase in the classical style after the actions taken in the first cycle and the second cycle can be seen in Figure 1 below:

**Image 1**, The percentage of the cognitive learning classical

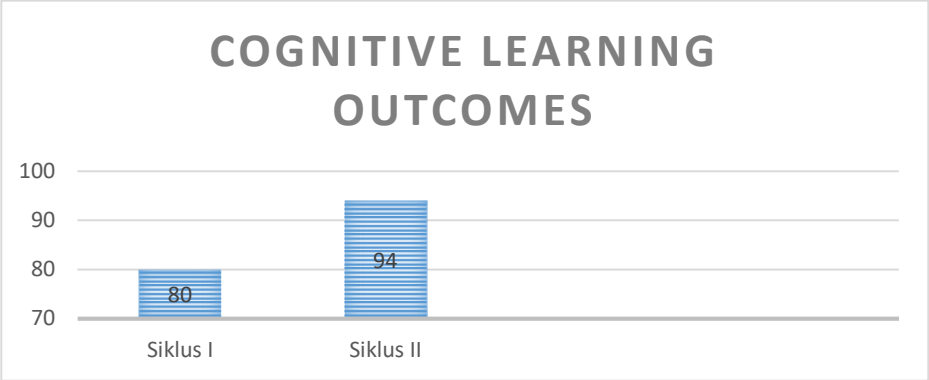



**Table 2.** KBM with RME approach Cycle I and Cycle II

| No. | Indicator | first cycle | | | cycle II | | |
|---|---|---|---|---|---|---|---|
| | | Percentage | | | Percentage | | |
| | | I | II | Average | I | II | Average |
| 1. | comprehension student on a given topic | 100% | 100% | 100% | 100% | 100% | 100% |
| 2. | Creativity student to ask or answer questions | 60% | 60% | 60% | 80% | 80% | 80% |
| 3. | Creativity student to give an opinion or reason | 60% | 60% | 60% | 60% | 80% | 70% |
| 4. | Creativity student to do exercise | 100% | 100% | 100% | 100% | 100% | 100% |
| 5. | Creativity student to work on the problems on the blackboard | 100% | 100% | 100% | 100% | 100% | 100% |
| 6. | Motivation student during the learning process | 100% | 100% | 100% | 100% | 100% | 100% |
| 7. | Interaction among fellow student | 100% | 100% | 100% | 100% | 100% | 100% |
| 8. | Students' ability to apply for a reason | 20% | 30% | 30% | 80% | 80% | 80% |
| 9. | creativity student in finding different ways to solve problems | 40% | 40% | 40% | 60% | 60% | 60% |
| 10. | creativity student in using his own ideas for solving problems | 40% | 40% | 40% | 80% | 80% | 80% |
| | Average | 72% | 73% | | 86% | 88% | |
| | Average | 73% | | | 87% | | |

In Table 2, it can be seen that there are indicators have increased, there are indicators that remain, and there are indicators that declined over the actions

taken in the first cycle and the second cycle. Learning activity when using RME approach, which is presented in Table 2 that the first cycle of classical obtained percentage of 73%, then an increase in the second cycle with the classical percentage of 87%. As for the average increase in the classical style after the actions taken in the first cycle and the second cycle can be seen in Figure 2 below:

**Figure 2.** Diagram Percentage of KBM with RME in the classical approach

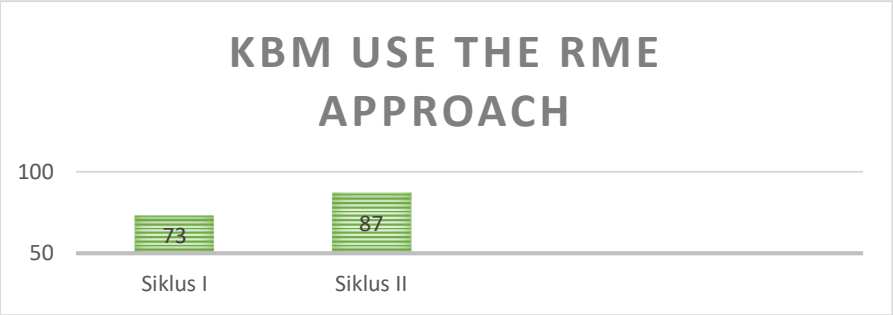
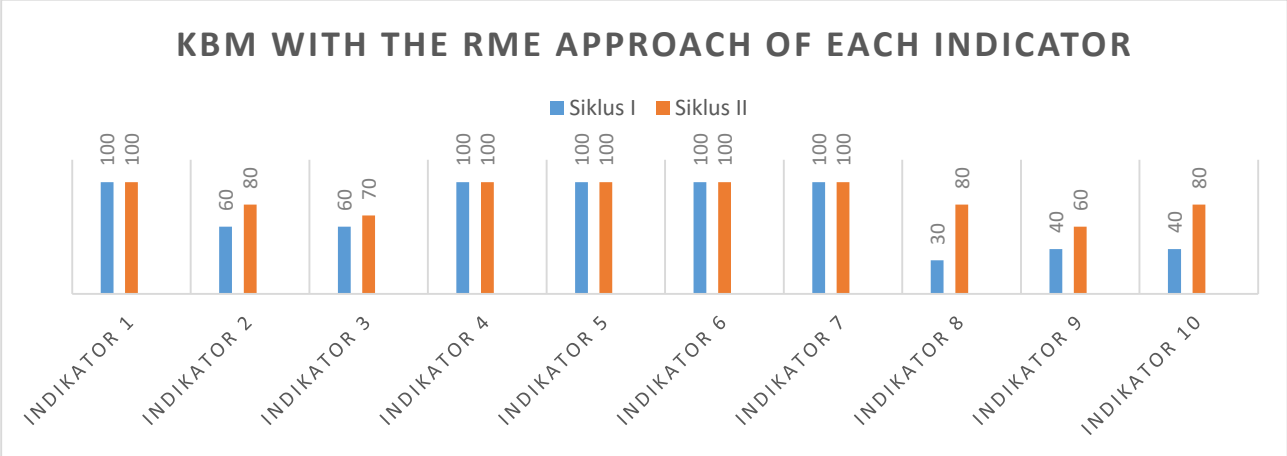



**Figure 3.** Diagram 10 Percentage Indicator Approach KBM with RME




In Figure 3, the activity of teaching and learning when using RME approach, obtained a percentage of each indicator of the 10 indicators that exist.

**Table 3.** Creativity student Cycle I and Cycle II

| No. | Indicator | first cycle | | | cycle II | | |
|---|---|---|---|---|---|---|---|
| | | Percentage | | | Percentage | | |
| | | I | II | Average | I | II | Average |
| 1. | Student understanding of a given topic | 94% | 94% | 94% | 100% | 100% | 100% |
| 2. | Ask and answer questions | 50% | 53% | 51% | 74% | 74% | 74% |
| 3. | Giving opinions and reasons | 44% | 47% | 46% | 68% | 76% | 72% |
| 4. | Exercises in group / on the board | 91% | 97% | 94% | 97% | 97% | 97% |
| 5. | Interaction among students | 88% | 91% | 90% | 97% | 97% | 97% |
| 6. | Finding different ways to work on the problems | 21% | 24% | 22% | 68% | 74% | 71% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7. | Using his own ideas for solving problems | 38% | 47% | 43% | 68% | 74% | 71% |
| | Average | 61% | 65% | | 82% | 85% | |
| | On average Classical | 63% | | | 84% | | |

Based on Table 3 above observation sheets creativity of the students, the first cycle of classical obtained percentage of 63%, then an increase in the second cycle with the classical percentage of 84%, which is described in detail in Table 3.

**Figure 4.** Diagram Percentage of Creativity student in classical

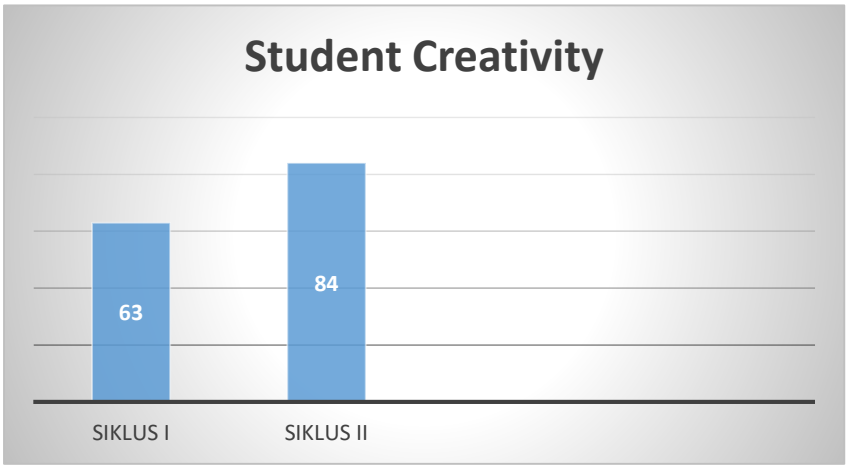
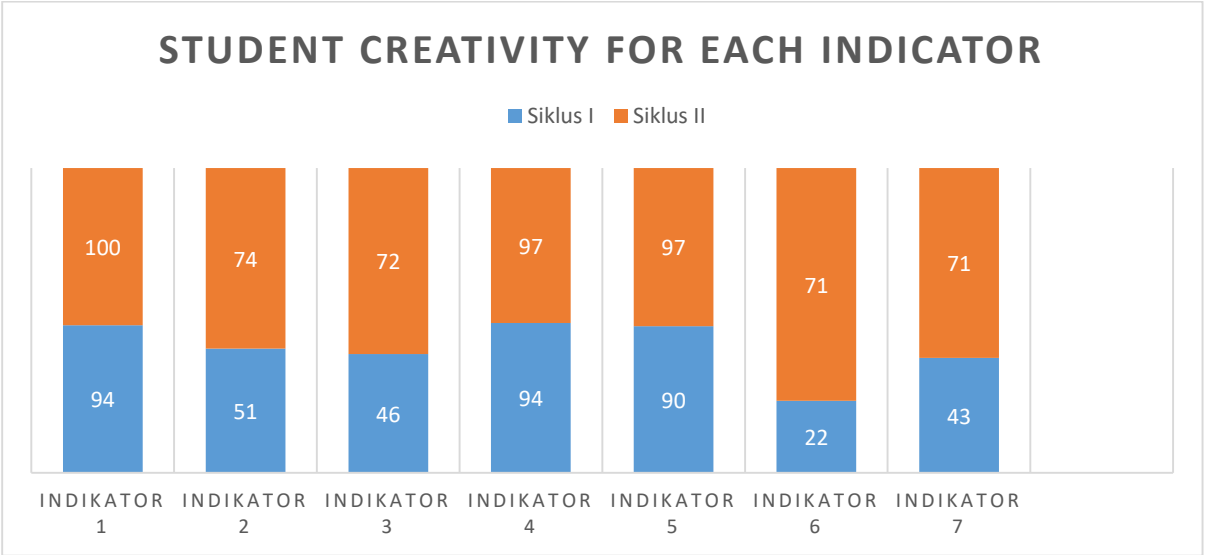



Figure 4 presents the percentage increases with the approach of classical learning keterlaksanaan RME after the actions taken in the first cycle and the second cycle. Based on Figure 4 can be seen that an increase in the percentage of students' creativity, which was originally the first cycle at 63% then to 84% in Cycle II.

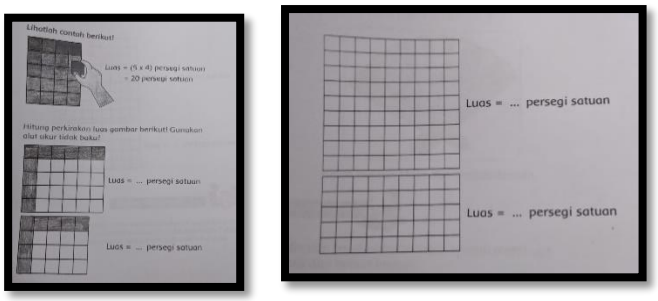
**Figure 5.** Percentage of Students Creativity Based Diagram 7 Indicators




In Figure 5 above, presents the percentage of students' creativity seen from the 7 indicators are observed when using RME approach.

Through learning RME, when students understand and solve contextual differences developed various mathematical models, and also the strategy or selesaian based on understanding, information and experience they have gained, will be able to develop the ability to think creatively mathematical students, so it will produce an answer or a way or strategy different (divergent) and new (novelty) fluently (fluency) and flexibility (flexibility) Siswono, TYE (2006). In addition, when students solve mathematical contextual will appear horizontally, that is a process that the students in expressing their ideas or find selesaian issues presented independently, does not need the same students from one another with the teacher even though Yuwono, I. (2005). In essence, the concept of learning by RME is based on the characteristics of mathematics and learning mathematics. Mathematics as a creative human activity and mathematics occurred because the students to develop ways to effectively and creatively to solve problems Hudojo, H. (2005). Presentation of realistic or contextual problem when learning of mathematics will involve the interpretation of the students of the situation, mathematical modeling and different strategies when solving a problem which is the main focus in the development of creative thinking abilities of students Wijaya, A. (2012). In RME learning when presented contextual problem will can bring creative thinking (creativity) students when making a mathematical model and solve the problem. Three aspects of creative thinking of mathematics, namely fluency, flexibility, and novelty in problem solving (problem solving) and the filing of a problem (problem posing) Silver, EA (1997). In this study, aspects and indicators of creative thinking of mathematics, includes (a) aspects of fluency, with regard to the ability of students express ideas and ideas fluently and correctly in solving the problem, (b) the aspect of flexibility, with regard to the ability of students to solve the problem by using a variety of ways or a different strategy, and (c) the novelty aspect, relates to the ability of students to solve the problem in a new way, or is able to use a different strategy than the other, or can use a new approach to solve the problem [18].

**Figure 6.** Examples of the problems in question




When students solve these problems, teachers monitor students and performing

scaffolding by providing a simple and specific questions on issues that had not understood the students.

Teacher: Consider an example, how many square box unit (small square) which meets the rectangle (big box)?

Varent : 20 square units.

Teacher : Side to top How many small square box?

Varent : 4 boxes

Teacher: The most left side there is how small square box?

Varent : 5 boxes

Teacher Where do 20 square units?

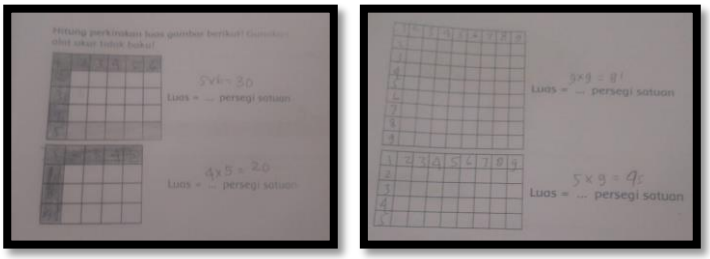
Varent : The top side of the leftmost X side (4 x 5) = 20

Teacher : Now, let's count the approximate more comprehensive picture (Varent try to resolve the issue with the results in Figure 7)

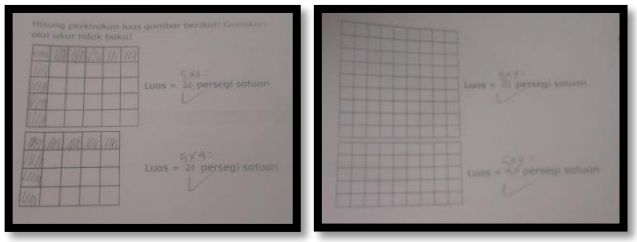
The dialogue shows that the task of the teacher provide scaffolding to students who are experiencing difficulties while understanding and solving problems. Scaffolding process can be done by providing simple or specific questions related to the problem, explain the meaning of the problem or provide questions that provoke the students so that they can think further to resolve the problems encountered. In order for meaningful mathematics learning, the role of the teacher is to link what is taught with old knowledge possessed by students, providing scaffolding when needed by the students and lead to thinking for students [19].

**Figure 7.** Below Diverse Troubleshooting (Aspect fluency)

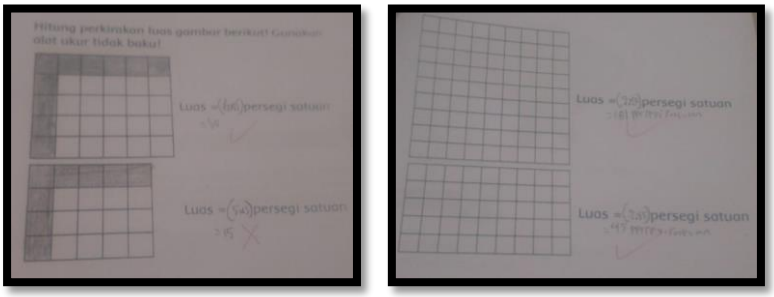
Completion owned Varent



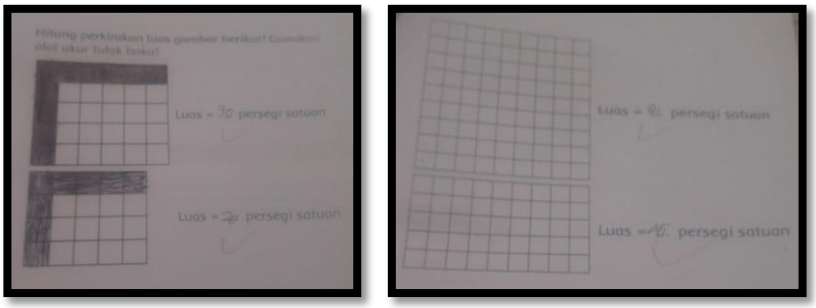
Completion owned Zahra



Completion owned Syafira A.

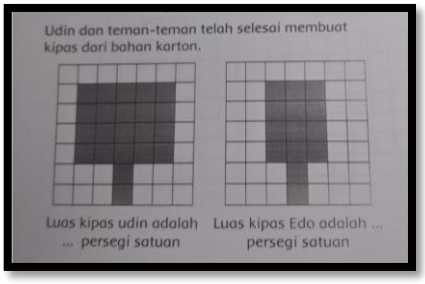


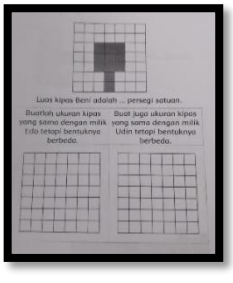
Completion owned Syafira



Based on dialogue and the settlement of the above shows that in the beginning Varent using a memory, for 5x6 the result is 30, then the new use reason to determine the outcome of 30 is far left side multiplied by the top side and give the numbers in the box on the exercises, while the settlement belongs to Zahra, he did not write down the numbers on the small box. Another case belongs Syafira settlement A. using wayVarent his upside-down with the top side is multiplied by the far left, the last of his Syafira, he immediately wrote down the answer without multiplying advance how he get the answer. The strategy used to solve the problem by using symbols / mathematical symbols and write down how to get the answers to these problems and to represent it to found the same answer, so in this context, the completion of all four students showed creativity (creative thinking) aspects of fluency in completing problem. Membelajarkan material for square and rectangular area used various contextual issues are familiar with the students. Furthermore, students are required to understand and resolve the issue. Emphasis is to solve the following problems by using reasoning, knowledge and abilities that have been obtained informal previous students.

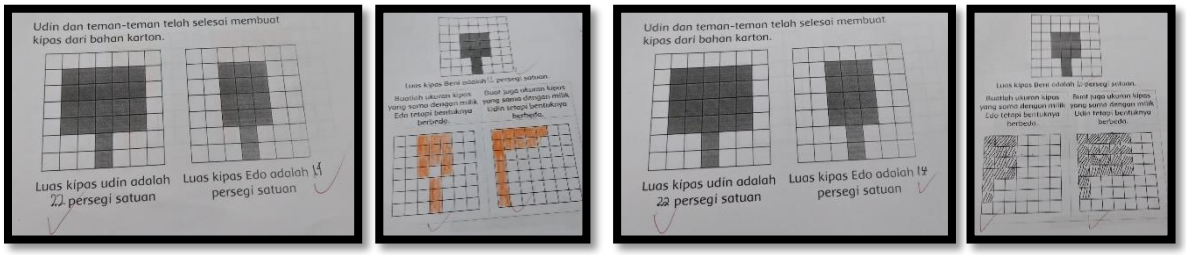
**Figure 8.** Calculating Size and Coloring Colored portion in accordance with the instructions in the LKS



Completion Fuji Thanksgiving and Bella Vista to the problem is presented as follows:

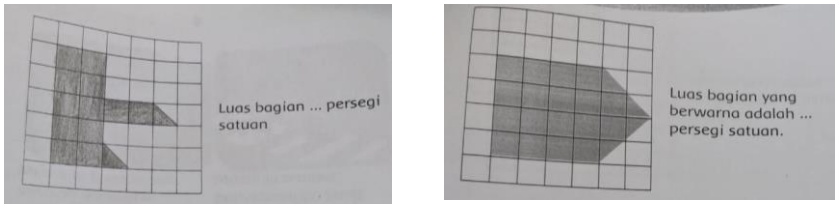
**Figure 9.** Various Troubleshooting (flexibility aspect and the aspect of novelty)



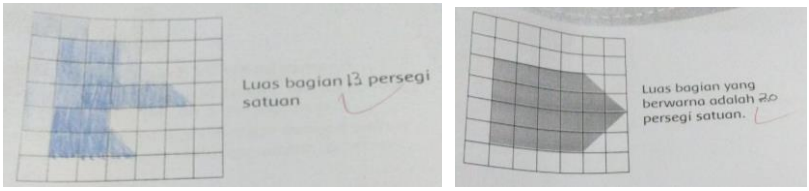

Completion of Fuji Gratitude Completion of Bella Vista

Based on the settlement, Fuji and Bella equally comprehensive answer correctly colored fan and also makes the same fan-owned Edo and udin but different shape. They both have the same creative thinking of the shape of their fan coloring. RME learning can bring out the creativity of students when solving problems related contextual broad flat wake.

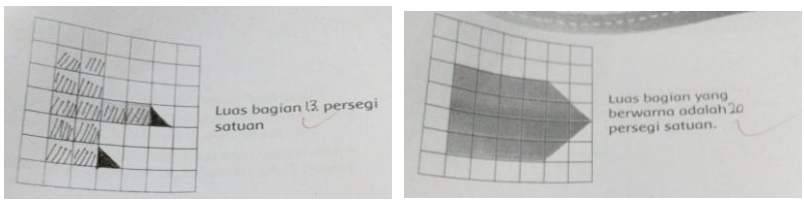
**Figure 10.** Calculating Size Some portions were not the Whole (Aspect fluency)




Een and Ananda Dika settlement to the problem is presented as follows:



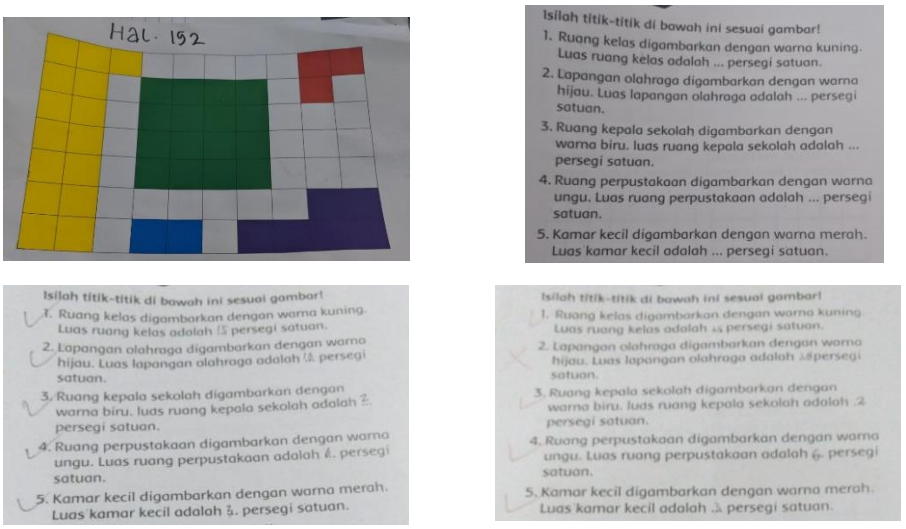

Completion of Een




Completion of Ananda Dika

Under the settlement, the Een and equally Dika Ananda answered correctly calculate the area of a few parts that are not intact.

**Figure 11.** Calculating the Size of a variety of rooms (Aspect fluency)




Completion of M.Faadhil

Completion of Pearl Sinta

Based on the settlement, and the Pearl Sinta M.Faadhil alike, answered correctly calculate the area of a part of the various rooms.

**DISCUSSION**

Creative thinking skills including high-level thinking skills required for the flyers to the students. Learning mathematics tend to be centered on the teacher, the students are not active in constructing their own knowledge, and do not stimulate students' thinking and reasoning power. This is consistent with the results of a field survey conducted by the authors in the school district of Cirebon, through interviews with classroom teachers. The result is during and after the process of learning, creative thinking skills students had not been assessed by the teacher. Most teachers assess students' mastery of concepts, using test questions which refer to the cognitive tests. Most teachers do not understand the forms and creative thinking skills assessment procedures. In addition, teachers have not had a test instrument that assesses students' creative thinking skills. Most teachers are not able to develop creative thinking skills instruments due to limited knowledge of the creative thinking skills assessment. The number of existing indicators of creative thinking during this time, the teacher chose the indicators required in the learning process. One of themaccording Torrance creative thinking ability is divided into three areas:

1. *Fluency* (Kelamcaran), which generate a lot of ideas in different categories / fields.
2. *Originality* (Authenticity), which has new ideas to solve problems.
3. *elaboration* (Decomposition), the ability to solve the problem in detail. [20]

While Guilford said five indicators of creative thinking, namely:

1. Sensitivity (sensitivity problem), is the ability to detect, recognize, and understand and respond to a statement, situation, or problem;

2. Fluency (fluency), is the ability to generate many ideas;
3. Flexibility (flexibility), is the ability to present various solution or approach to the problem;
4. authenticity (originality), is the ability to trigger gagsan with original ways, not cliché, and rarely given most people;
5. Elaboration (elaboration), is the ability to add a situation or problem that it becomes a complete and elaborate in detail, in which there are in the form of tables, graphs, drawings, models and words. [20]

## CONCLUSION

Of learning activity that is done, there are some conclusions that can be drawn from the research activities of this class action, among others: the first students will learn math with creative if the teacher creates a learning environment that gives rise to creativity, the teacher can make creative learning with the learning device planned and media used because it can support the implementation of the learning, the third one teacher can open themselves to the improvement of learning in order to create a conducive learning atmosphere, and the latter RME on learning mathematics can enhance student creativity and create a sense of happy students towards mathematics.

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