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Analysis of Creative Thinking Ability Viewed from Student Metacognition in Learning Cycle 5E Assisted by Learning Management System

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Abstract

This study aims to describe the ability to think creatively in terms of students' metacognition with the 5E learning cycle assisted by LMS. The research subjects were twelve students with the high metacognition, ten students with the medium metacogniton, and ten students with low metacognition. Methods of collecting data using observation techniques using questionnaires or metacognition questionnaires. Based on the results of this study indicate that subjects with a high metacognition category have good knowledge of understanding important information. On the other hand, the subject is conscientious, focused, and confident that the implementation of the strategy is effective in solving problems. Subjects understand well the questions and organize important information. The results of the work are systematic and correct, and the subject is also aware of errors in the work process. In contrast to the metacognitive category of subjects who currently have good knowledge. In addition, the subject is quite good at writing conclusions. Subjects still need to be careful in monitoring the results of their work. The subject is quite good at evaluating the results of his work. Meanwhile, subjects with low metacognition have sufficient knowledge in understanding information. The subject has difficulty managing his strategy well. In addition, the subject cannot justify the wrong answer and is not careful in monitoring the results of the answer. Subjects do an adequate assessment of the results of their work.

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INTRODUCTION

Mathematics is one of the subjects that support creative ability. Good mathematics learning outcomes will make a country developed (Mashitoh, 2021). Mathematics as a too to develop one's thinking patterns (Nurjannah, 2018:15). The basis of all the inventions of new models is precise calculations and calculations, more precisely, mathematics. It is called the queen of all sciences and its basic science (Ibrokhimovich, 2022). Mathematics and science are highly integrated disciplines (Wang, 2022). Mathematics become students' resources to develop their math skills every time they work on a course assignment (Marciniak, 2020). So mathematical abilities need to be directed to follow a mathematical vision, one of which is to train creative thinking skills (Heriyanto, 2021).

Creativity is a dynamic property of the human mind that can be improved and should be appreciated (Nadjafikhah, 2012). Mathematic achievement is positively related to creativity (Liu, 2022). In addition, Mathematical creativity is measured by the flexibility, fluency, and originality of the problems constructed by students (Mann, 2006). Students work with the types of mathematical situations where students can be encouraged to use their knowledge flexibly in new applications. However, People's beliefs about creativity may differ from the underlying creativity structure, the conception and self-perception associated with the creativity structure may not closely match the actual cognitive mechanisms that contribute to creativity in the domain or the way these mechanisms interact to influence and shape the creativity of the diverse domains (Fetterly, 2004). Creativity theory is important in supporting teaching, learning, improving teacher understanding, and learning design (Kaplan, 2019). The creative process is a sequence of thoughts and actions that lead to the production of a new adaptive which has been identified as a combination of a series of cognitive processes (Lubart, 2001). Student can make some of these connections on their own as they recognize the connections between juggling, mathematics, and other disciplines (Monahan, 2021).

The low creative thinking ability of students is caused by students' metacognition. Students still experience confusion in using what kind of method to solve the problems they encounter. when students encounter problems that are different from the examples they have encountered, they feel confused to solve them. So that the completion of students tends to use the same way or there is no creativity.

Research on metacognition has increased in frequency since the 1970 (Harrison, 2017). Metacognition refers to the knowledge and regulation of one's cognitive processes that have been considered an important component of creative thinking (Jia, 2019). Metacognition in mathematics is used to refer to the awareness that individuals have about their own thoughts, their evaluation of those thoughts, and their regulation of those thoughts (Azizah, 2021). Metacognition as a universal psychological phenomenon that plays an important role in performance includes schools because in addition to making students assess their self-confidence the other thing is to recommend that feedback about the accuracy of student assessments be given to them (Coutinho, 2020).

Metacognition has an important role in success in the problem-solving process (Rosikhoh, 2021). Someone who has metacognitive skills can usually start his thinking by designing, monitoring, and assessing what is being learned (Krisnaresanti, 2018). So, if the metacognitive skills are not met, it can have an impact on less systematic and less coherent thinking. The development of students' metacognitive awareness at the junior high school level is very necessary to prepare students to become independent learners (Efrilla,2018:71). The metacognitive sensitivity for two individuals may be different even though they have the same ability to discriminate between right and wrong in their belief judgments (Volz, 2022).

Students' metacognitive abilities consist of metacognitive knowledge and metacognitive skills. Indicators of metacognitive knowledge include knowledge of declarrative, procedural, conditional and indicators of metacognitive skills include planning, managing information, monitoring, and evaluating. This shows that students require the role of metacognition in solving creative problems because students who have low metacognition are only able to fulfill an indicator, namely fluency or flexibility (Sulistyawati, 2018).

One of the learning models that can be used is the Learning Cycle 5E model (Cylindrica, 2021). The core of the Learning Cycle model focuses on constructivist ideas that allow students to explore concepts through the experience before formal introduction of concepts through texts and/or teachers (Kazempour, 2020; Agusti, 2021; Ramdani, 2021). The use of the Learning Cycle 5E learning model can provide opportunities for students to optimize learning methods and students' reasoning power, make it easier for students to understand a concept being taught and students can be more active in the learning process (Tanfiziyah, 2021). By exploring concepts students can freely determine different ways of solving the problem.

Technology has always been an important aspect of education through its support for teachers and students in removing barriers and limitations to learning development (Beyatli, 2018:3191). In addition, the ability to think creatively is also a fundamental ability that everyone must have in facing technological challenges (Ulinnuha, 2021). Currently, many things are used to help the study process in class, such as the internet. The internet is often used as a communication tool, but the next development is the internet also has the potential to be used for learning and education purposes. (Effendi, 1970). Halthis of course seen in terms of the internet has great potential with a learning management system. According to McGill, TJ, & Kobas, JE (2009) state that learning management system is a file information system that facilitates e-learning. The learning management system processes, stores and disseminates educational materials and supports administration and communication related to the teaching and learning process. Learning Management System is an infrastructure that can manage content, assess, find, collect, and present data to monitor overall learning activities (Hendri, 2014). The fact that online learning provides space for students as independent learners through extensive material exploration carried out by students, students become active in exploring material in understanding concepts and alternative solutions so that students can think creatively to solve problems in everyday. So, it is necessary to describe students creative thinking skill in term of metacognition in 5E Cycle Learning assisted by Learning Management System.

METHOD

This research is qualitative in nature which will describe the ability to think creatively in terms of students' metacognition. Data were obtained by using student metacognition questionnaires and interview guidelines. From the questionnaire scores obtained the sum for each category between students who had low, medium, and high metacognition scores. It was found that there were 12 students who had high scores of metacognitions, 10 students who had medium scores of metacognitions and 10 students who had low scores of metacognition. Interviews were conducted to subjects. The data analysis are data reduction, data display, and conclusion drawing/verification. The interviews used in this research were semi-structured form, documentation research. The observation technique to be carried out is direct observation. Provide an observation sheet form during learning to obtain teacher activity data. Filling in the observation sheet is done by means of a checklist. Filling in the activity observation sheet is done after the learning process is finished.

RESULTS AND DISCUSSIONS

Based on the explanation above, the validity of the data this study is classified into three categories (1) The high category of students creative thinking ability viewed from metacognition, (2) The medium category of students creative thinking ability viewed from metacognition, and (3) The low category of students creative thinking ability viewed from metacognition.

Creative Thinking Ability

Research subjects were analyzed based on indicators of creative thinking, namely fluency, flexibility, originality, and elaboration. The analysis of all subjects was based on the indicator of cretaive thinking skills:

1. Fluency

The questions that will be used to describe the fluency aspects of subjects are question number 1. Subjects are classified as the high metacognition careful to write things that are known and understand what is being asked by the problem. The subjects (E-14) and (E-26) were able to write the inequality model smoothly, properly, and correctly to get the correct result. When the work process was completed and analyzed by the subject researchers, subject was able

to solve problems smoothly and correctly. Likewise, the subject (E-1) and subject (E-2) also wrote down the model properly and correctly. As for the subject (E-4), the subject (E-10) only writes and understands the problem well according to what is asked in the question and the subjects can write down the model properly and correctly. Unlike subjects (E-13) and (E-16), subjects also wrote models well without difficulty. So, it's easy to understand the problem. On the subject (E-18) and subject (E-24) the subject also wrote the equation and inequality model well. So, subject (E-27) and subject (E-31) also have correctly written from what is known in the problem with writing the model correctly. The next process is when interviewing the subjects (E-14) and (E-26) are able to state and explain fluently the symbols used in solving questions. Meanwhile, based on the interview subject (E-1) and subject (E-2) can explain about the symbols used. No different from the subject (E-4), the subject (E-10) explained well and fluently about the symbols used both from the problem and in its solution. Furthermore, subjects (E-13) and (E-16) explained well even though they lacked detail, but what the subject explained was correct. Subject (E-18) and subject (E-24) also explained fluently without any confusion when explaining the solution that had been used both symbols and written symbols. Likewise, the subject (E-27) and the subject (E-31) were also fluent in conveying their explanations without any difficulty in explaining. Both subjects were fluent in solving problems by working on the questions to completion and the results were also correct.

The subjects of (E-8) wrote the linear inequality model of one variable correctly until they got the correct x value and wrote the result correctly as well. Meanwhile, the subject (E-32) wrote the linear inequality model of one variable correctly and the subject described the result in the form of a number line. So, it can be concluded that the subjects of (E-8) and (E-32) are already fluent in writing the linear inequality model of one variable well to get the correct final value as well. Subject (E-12) and subject (E-15) wrote linear equations of one variable well. Like the subject (E-19), the subject (E-20) got the correct and correct x results in writing a linear equation model and one variable inequality. Meanwhile, the subject (E-23) and the subject (E-28) wrote the model of linear equations and the inequality of one variable correctly and well, but they were less precise in writing the results of the x value. different from the subject (E-29) and the subject (E-30) to get the correct x result, but the writing of linear equations and inequality models for one variable is less precise. So, it is correct in diluting the value of x but somewhat incomplete in writing the model. The statement above is supported by conducting interviews with subjects (E-8) and (E-32) able to explain well and fluently because the subject is already fluent in writing down his ideas by writing an inequality model. The subject is also able to mention the symbols used even though the subject has not been able to imagine the solution at the beginning of the problem without doodling first. This is also supported by the results of interviews for the subject (E-12) and subject (E-15) that the subject (E-12) has been able to write the model well without confusion. Likewise with the subject (E-15) who explained that the subject could write the model well but had to doodle first and copy it on the answer sheet. While the results of the interview subjects (E-19) and (E-20) were also able to write the model well by writing it first on another paper and copying it on the answer sheet. In addition, the subject (E-19) also cannot imagine the equation model without scribbling it first. The results of the interview subjects (E-23) and (E-28) also could not imagine a model of linear equations and inequalities of one variable, but both subjects were able to explain what symbols were used and know their meanings. well. Furthermore, for the results of the interview subject (E-29) that the subject can explain the process of writing linear equations and one-variable inequality models well and clearly and for the subject (E-30) is also fluent in explaining in detail the symbols and which ones to write. model. The subject also explains well about finding the value of x.

The subject (E-9) writes down the known data in the form of inequalities and conclusions that are not written. Then, the subject (E-25) can understand what is known in the problem as evidenced in the subject's writing about the information about the question written in the form of a one-variable linear inequality model. Then, the subject does not write a conclusion. So, it was concluded that the subjects of (E-9) and (E-25) wrote down things that were known to be lacking in the problems they faced. Then, the conclusion is also not written well. It is the same with subject (E-3) and subject (E-5) that the subject knows and can write down what is known well but does not write a complete conclusion. Subject (E-5) wrote only

part of the conclusion. While the subject (E-6) wrote the wrong conclusion but wrote down what was known correctly. Subject (E-7) also wrote an almost correct conclusion by writing down what was known to be incomplete. Then, the subject (E-11) and subject (E-17) can understand well what is known in the problem and can write down what is known correctly as well. However, the conclusions written are inaccurate or not written in the form of a story. Like the subject (E-21) writing conclusions correctly but the calculation process is not precise and clear. While the subject (E-22) can write the model well and clearly, write down what is known correctly but the conclusion is not written down.

The next stage is when conducting interviews, the subjects of (E-9) and (E-25) are not fluent in expressing what is known and do not explain complete and clear conclusions about the problem. Subject (E-3) explained that the subject had not been able to explain what was known and was confused in answering the conclusion. While the subject (E-5) was able to explain smoothly about what symbols were used but could not explain the conclusion well. While the subject (E-6) and subject (E-7) were able to show the symbols used, could explain the meaning of the written symbols, but the subject (E-6) hesitated in explaining the conclusion. In contrast to the subject (E-7) who explained the conclusion was not smooth. Furthermore, the results of the interview of the subject (E-11) and the subject (E-17) were not different, namely the subject was confused when asked about the written conclusion, only that the subject (E-17) knew a little. about the meaning of symbols and models as well as the value of x being sought. In contrast to the subject (E-21) and subject (E-22) who are able to explain the meaning of symbols fluently but cannot explain conclusions smoothly.

2. Flexibility

Question number 2 will be used by researchers to describe aspects of fluency (flexibility). (E-14) subjects have been able to use a method to get the result properly and correctly. The subject (E-26) has been able to use in several ways to determine the results properly correctly. Then, the two subjects were able to write the conclusion of the problem correctly where the subject (E-14) wrote the word "so the consecutive even numbers are" while the subject (E-26) wrote the sentence "the numbers are sequential ". Similarly, the subject (E-1) and the subject (E-2) also write down the completion properly and correctly. Subject (E-1) wrote down more than one solution method, but the final result was almost the same. Meanwhile, the subject (E-2) also uses other methods to work on it, but the description is incomplete. As for the subject (E-4), the subject (E-10) wrote down the correct results using a clear and sequential method of completion. Likewise for the subject (E-13) and (E-16), the subject has used or wrote the method well and clearly and got the same result. It is also in the subject (E-18) and subject (E-24) that the subject gets the correct result by using different methods in linear equations and inequalities of one variable. So, the subject (E-27) and subject (E-31). I have also written down how to solve it properly accompanied by a detailed explanation. In addition, these subjects wrote conclusions accurately and clearly. The next activity was interviewing the subjects of (E-14) and (E-26). The subject (E-14) explained well about the method or method used by the subject. Likewise, the subject (E-26) was able to clearly explain the method used in solving the problem. Based on the results of the interview, the subject (E-1) and subject (E-2) can explain well and fluently about the method that has been written. Not different from the subject (E-4), the subject (E-10) explained in detail about the methods used from one method to another. Furthermore, the subjects (E-13) and (E-16) explained well about the process of the completion method, although it was less coherent and less thorough, but what the subject explained was correct. Subject (E-18) and subject (E-24) also explained well about the order of completion that had been used, both from written symbols and how to get the results. Likewise, the subject (E-27) and subject (E-31) were not confused in conveying their explanation of the method used and were able to demonstrate the process well.

Subjects of (E-8) and (E-32) both use the same concept but differ in their execution. The subject (E-8) has the work of assuming first and writing the equation model with the x variable and substituting it into the example, the subject is also able to write a good conclusion. Meanwhile, the subject (E-32) immediately wrote down the equation with variable and wrote an inaccurate conclusion. The subject (E-32) has no difficulty in assuming the number models 1,2, and 3 because they are already able to imagine the alleged solution but on the other hand have difficulty making conclusions according to the context requested by the problem. Subjects (E-12) and

subjects (E-15) used more than one method to get the equations right. Unlike the subject (E-19), the subject (E-20) wrote the method clearly and correctly regarding the work and correctly. In addition, the subject (E-19) is correct in writing the conclusion. Then, for the subject (E-23) and the subject (E-28) to describe and describe the method in linear equations and inequalities of one variable correctly and well but less precise in writing conclusions at the end of the work. On the other hand, subjects (E-29) and subjects (E-30) were correct in writing the equation but confused in imagining the results with inaccurate conclusions. So that the subject can write down concepts or ideas by writing down the method used but still having difficulty in writing conclusions.

The next stage is interviewing the subjects of (E-8) and (E-32). The subject (E-8) was able to explain how many methods were used. In addition, the subjects of (E-8) were able to understand the relationship between the questions they had encountered and the questions they were working on. While the results of the interview on the subject (E-32), the subject explained that the subject was able to explain well what method was used. However, the subject only understands the relationship between the questions that have been encountered and the questions that are being worked on. Subject (E-12) and subject (E-15) explained the method used well and fluently. In contrast to the subject (E-19), the subject (E-20) explained his explanation clearly and correctly regarding the results of the work and was also correct in writing conclusions. Subject (E-23) and subject (E-28) described and explained the method in linear equations and inequalities of one variable correctly and well but less precise in writing conclusions. On the other hand, subject (E-29) and subject (E-30) are correct in writing the conclusion but confused in explaining the method used or written. So that they are fluent in explaining their ideas and explaining how to solve them well. The results of the researcher's analysis stated that the two subjects were able to determine the value of x properly and correctly even though there were a few difficulties.

Subjects (E-9) and (E-25) have the same difficulties, namely having difficulty converting known information from problems into mathematical form, determining how to work, and conversely having difficulty making conclusions according to context prompted by the question. Then, the subject (E-3) and subject (E-5) are subjects who can write mathematical models well but still have difficulty in describing the calculation process for other methods. Subject (E-5) wrote the equation model well, but it was incomplete. As for writing the subject (E-6) the mathematical model is not appropriate because there are difficulties in converting story sentences into mathematical forms. In addition, the subject also wrote an inappropriate conclusion. Subject (E-7) also wrote a nearly correct conclusion by writing the method in one way. Then, the subject (E-11) and subject (E-17) can write down the method in one way but lacks detail. However, the conclusions written are not accurate or are not written in story form anymore. Like the subject (E-21) writing conclusions correctly but the method is only one way with a less clear description. While the subject (E-22) was able to use other methods, but the subject was less precise in writing conclusions. Interviews were conducted on subjects (E-9) and (E-25) where both subjects could not explain well about the problem and the subject did not describe the results of his work with good conclusions from the problem. Subject (E-3) explained that the subject had not been able to explain the written method. While the subject (E-5) was able to smoothly explain the process of drawing conclusions well even though they were confused by the written solution. Meanwhile, subjects (E-6) and subjects (E-7) were able to explain fluently what method was used but were confused in explaining written conclusions. Subject (E-6) hesitated in explaining the conclusion. On the other hand, subject (E-7) explains the conclusion and still has doubts about what has been written. Furthermore, the results of the interview subject (E-11) and subject (E-17) were not different, namely the subject was confused when asked about the conclusions that had been made, and only the subject (E-17) could show and explain the process from beginning to end but was confused about meaning of symbols in other methods. In contrast to the subject (E-21) and subject (E-22) who were less fluent and hesitant in explaining the method used but were able to get the correct result and could not explain the conclusion well.

3. Originality (Authenticity)

Question number 3 will be used by researchers to describe aspects of originality (authenticity). Based on the results of the analysis conducted by the researcher on the test results of the (E-14) and (E-26) subjects, the (E-14) subjects made an equation,

determined the results properly and correctly, then the (E-14) subjects and (E-26) are also correct in making equations to get the correct result. So that the subjects of (E-14) and subjects of (E-26) were able to use other methods to solve problems properly and correctly. The subject (E-1) modeled the equation well and the subject (E-2) also wrote the equation correctly. For the subject (E-4) write the equation form and inequality model with other symbols but get the correct result. Subject (E-10) only wrote one model with symbols that had been used, but the subject wrote a different way of working from the others. In contrast to subjects (E-13) and (E-16), this subject has also written an equation model well by writing other methods in the process which of course are also unique. So, the way to find a solution comes from his own idea. It was also found in the subject (E-18) and subject (E-24) that the subject wrote the equation and inequality model well even though the answer was not quite right. So, subject (E-27) and subject (E-31). has also written down ideas that came from his own imagination well with correct results. The next process is interviews with the two subjects. The interview results prove that the subjects of (E-14) and subjects of (E-26) can explain the problem-solving process well and explain their ideas or ideas smoothly. Based on the interview, the subject (E-1) and subject (E-2) explained well about the symbols used and the solutions. While the subject (E-4), the subject (E-10) explained that the subject explained the meaning of linear equations and inequalities of one variable well without confusion. Furthermore, the subjects (E-13) and (E-16) fluently explained the symbols used in the writing of the model and the different symbols that had been written in the completion. It was also explained by the subject (E-18) and subject (E-24) that the subject was able to write symbols well and it was different from the symbols used for work, but not all symbols were written with symbols. used. In addition, the subject also uses other variables according to what the subject wants to write. Then, the subject (E-27) and subject (E-31) are easy to explain their written id eas that are different from the formulas that are usually used.

The subjects of (E-8) wrote down what they knew well even though the results obtained were less precise. While the subject (E-32) has used his own method and got the correct result but did not write down the conclusion. In this case, the researcher also conducted interviews which stated that the subjects of (E-8) used the methods and symbols commonly used but there were differences in the way they were written. The subject was confident with the answer because he had already encountered similar questions and also thought that working with mathematical symbols would be more concise and less confusing. While the subject (E-32) explained that the subject also used the methods and symbols commonly used, but there were differences in the operation part because the subject wrote the answer directly, explaining the process a little. The subject (E-32) was a little hesitant with the results and the subject felt confused when working without using mathematical formulas. Subject (E-12) and subject (E-15) wrote a one-variable linear equation model well because the subject used symbols and variables that were different from those used. In addition, the subject (E-12) is correct in writing the conclusion. Like the subject (E-19), the subject (E-20) that the subject got the result x correctly in his own way, namely by using the concept of a linear equation of one variable, and the subject (E-19) was also correct in writing the equation model and linear inequality of one variable by using the concept of equations. As for the writing of the subject (E-23) and the subject (E-28) the result of writing the x value is not correct because there is an operating error in the previous section. However, it is correct to write models of linear equations and one-variable inequalities in their own way. In contrast to the subject (E-29) with the subject (E-30) that the subject both got the correct x results but slightly wrong or reversed in writing the equation model and linear inequality of one variable. So, it's true to find the value of x in his own way, but it's a bit inaccurate in writing models and making conclusions. Based on the results of subsequent interviews, the subject (E-12) and subject (E-15) were able to explain the symbols and variables used in the answers well and smoothly. Meanwhile, subjects (E-19) and subjects (E-20) were able to answer questions well and explain their explanations clearly and correctly in writing conclusions. Subjects (E-23) and subjects (E-28) were able to show and describe methods in linear equations and inequalities of one variable correctly and well but less precise in writing conclusions. Then, the subject (E-29) and subject (E-30) were correct in explaining the conclusion but were a little confused in explaining the variables and symbols used. So, they are good at explaining symbols and methods or ideas but confused in explaining the meaning of written

symbols. So that the subjects can work on their own ideas well even though they have not written the right conclusions.

The subject (E-9) wrote the inequality correctly using one of the methods, but the result was wrong. While (E-25) uses its own method by directly distributing and writing inaccurate conclusions. So that the subjects of (E-9) and (E-25) wrote the model correctly but the results and conclusions were inaccurate. The researcher also conducted interviews with the two subjects that both subjects were able to explain well about how to find the value of x by representing problems with inaccurate results. Next, the subject (E-3) wrote down a different method, but the result was not quite right, and the subject (E-5) also wrote down the result that the solution was correct, but the method was not quite right. Subject (E-5) wrote down the incomplete calculation process. As for the subject (E-6) it is correct to find the value of x and the process is correct, but the model made is not precise and without writing conclusions. So, the conclusion written is not true. Subject (E-7) also wrote a conclusion that was almost correct by writing down the method he usually used. Then, the subject (E-11) and subject (E-17) used the method commonly used to solve the problem. However, the conclusions drawn are also inaccurate. Then, the subject (E-21) wrote the wrong conclusion and the method used was only one way with an uncoordinated process. While the subject (E-22) has written symbols and variables that are different from usual and writes ideas quite clearly. but the subject did not write the conclusion. Based on the interview to the subjects, Subject (E-3) explained that the subject had difficulty in explaining the written method. While the subject (E-5) was able to smoothly explain the process of drawing conclusions well even though they were confused by the written solution. While the subject (E-6) and subject (E-7) were able to explain fluently how he could write the result x and how he wrote symbols. So, the subject seems confused in explaining it. Subject (E-6) was confused about explaining the results of his work because he did not write down the answer correctly. While the subject (E-7) explained that the subject was only trying to finish his work. So, the conclusion is still wrong. Furthermore, the results of the interviews for the subject (E-11) and the subject (E-17), namely the subject answered hesitantly because there were many doodles in the answer. The subject is confused about what to do. Subject (L-17) could briefly mention the process from start to finish but was confused by the workflow. In contrast to the subject (E-21) and subject (E-22) who were not fluent in explaining the method used because they were used to working on questions. So, the subject has not used new things in solving problems.

4. Elaboration (elaboration)

The question that will be used to describe the elaboration aspect of the (E-14) and (E-26) subjects is question number 4. Based on the answers of the subjects (E-14) the results of their work are detailed and the (E-26) work results are clear and coherent. So that the subjects of (E-14) and (E-26) in the elaboration aspect are classified as students who can write detailed and sequential answers. Then, the two subjects were also able to connect the one formula and the other formulas. Then, when asked about the reasons for their opinions they can provide logical and precise explanations. Both subjects have curiosity and a strong effort to do the questions well. Subject (E-1) and subject (E-2) also wrote down the calculation process sequentially. Subjects also wrote down the results in detail. As for the subject (E-4), the subject (E-10) wrote the answer by connecting one formula with another formula. The subject can write well one formula with another formula. Not different from the subject (E-13) and (E-16) the subject also wrote things that were known to be clearer when working. Subjects also write down the correct answer with the correct process. So, the results of the work are quite complete. It is also found in the subject (E-18) and subject (E-24) that the subject works quite completely and sequentially. So, the subject (E-27) and subject (E-31) also work using the concept of equations. But the subject (E-31) wrote the results correctly and the process was also neat and quite complete. Likewise, when conducting interviews, the subjects (E-14) and (E-26) were able to provide detailed explanations and how they relate one formula to another formula. Based on the description above, the subjects of (E-14) and (E-26) have been able to write models of equations and linear inequalities of one variable smoothly. (E-14) and (E-26) subjects were also able to determine the value of x in different ways and varied in detail. In addition, the subjects of (E-14) and (E-26) were also able to elaborate well in working on the questions. Then, the results of the interviews with the subjects (E-14) and (E-26) where the two subjects could explain smoothly and in depth about the working process, either from

writing a linear equation or inequality model of one variable, determining the value of x, linking one formula with another formula. Based on the interview subject (E-1) and subject (E-2) were able to explain the reasons why write the equation formula. In addition, the subject is also able to explain the workflow well. Subject (E-4) and subject (E-10) were able to explain how the solution was obtained properly and correctly. Subject (E-4) is also able to display the details of his work smoothly. While the subjects (E-13) and (E-16) were able to answer questions well about the work process in detail and sequentially. Subject (E-18) and subject (E-24) were well explained without confusion about how the results were obtained using the written formula. Similarly, subject (E-27) and subject (E-31) are also good at showing the detailed part of their work. So that the subject can clearly express the reason smoothly.

Subjects (E-8) can describe the shape of the space beams in good detail along with the length, width, and height. Then, the subject also wrote the formula for the circumference of the block correctly. So that the subject also writes the inequality model properly and correctly with the correct results as well. In addition, the subject (E-8) wrote the conclusion correctly. Meanwhile, the subject (E-32) is not precise and detailed in describing the shape of the beam space, but it is appropriate in writing the formula for the circumference of the beam to get the inequality model. The subject also wrote the conclusion properly and correctly. So, the conclusions from each subject can relate one formula to another in detail. Likewise, when conducting interviews, the subjects of (E-8) explained well in mentioning which formulas were related to each other, besides that the subject also had curiosity to work on questions by looking for relevant sources. So that the subject (E-8) does not like the fast way but tends to like the coherent and detailed way. The results of the interview with the subject (E-32), namely the subject has the curiosity to solve the problem, besides that the subject tends to like a detailed but not sequential solution and is able to explain the answer well. Based on the description above, the subjects of (E-8) and (E-32) have been able to relate one formula to another with the encouragement of curiosity to solve problems in detail and in order. Subjects (E-12) and subjects (E-15) have not been able to describe the shape of the beam well. In addition, the subject (E-12) was able to describe the block well but was wrong in writing the long part of the block. Like subject (E-19), subject (E-20) can draw blocks well and write formulas correctly but there is no relationship between the following points. While the subject (E-19) only describes the beam, not accompanied by the length, width, and height of the beam. As for the subject (E-23), the formula for the area of a cuboid is correct, but the result is wrong. Subject (E-28) was able to write the formula for the area of a block with precise results. In addition, the subject can relate one formula to another. Subject (E-29) and subject (E-30) correctly wrote down the result x, had described the shape of the block correctly with detailed explanations. Then, the results of the interviews with the subjects of (E-8) and (E-32) where the two subjects could explain in detail the problem solving that they developed well. Based on the results of the interview, the subject (E-12) and subject (E-15) were able to explain the process to get the value of x smoothly. In addition, the subject (L-12) depicts well the image of the blocks that have been drawn smoothly. On the other hand, subjects (E-19) and subjects (E-20) were able to show the part of formula one with related formulas to explain the relationship well without difficulty. Meanwhile, the subject (E-23) and the subject (E-28) were also able to explain the result of x well by showing a detailed calculation process. Then, the subject (E-29) and subject (E-30) were fluent in explaining how to write and relate one formula to another. In addition, the subject (E-29) explained the process of getting the value of x well and clearly. So that the subject can relate one formula to another and be able to explain his work in detail.

The subject (E-9) and (E-25) have different reasoning, including (1) on the subject (E-9) understanding the question has not been proven unambiguously clear. In addition, (E-9) is less precise in describing the shape of the beam space with incomplete answers, (2) on the subject (E-25) reasoning is also in the category less visible in the conclusion. Subject (E-3) and subject (E-5) that the subject did not write a conclusion well. In addition, subject (E-3) only depicts the rays without any other calculations. Subject (E-5) wrote only part of the conclusion. As for the subject (E-6), the conclusion is not correct, but it is correct in writing the block formula. Subject (E-7) also explained the block correctly along with its length, width, and height but had not yet written the formula words for each other.

Then, for subjects (L-11) and subjects (L-17) have written the formula correctly along with the correct units. However, the conclusions written are incomplete. Like the subject (E-21) where the subject only writes half the conclusion of the sentence and has not finished until the end. So, the conclusion tends to be unclear. While the subject (E-22) has not been able to describe the beam well but is correct in writing one formula with another formula. In addition, the conclusions written are correct. The interviews with the subjects (E-9) and (E-25) that the two subjects learned to connect formulas with one another and deepen their understanding and are less able to work on questions. Based on the description above, the subjects of (E-9) and (E-25) have been able to write an inequality model and are still confused about finding the value of x. Then, the results of interviews with the subjects (E-9) and (E-25) where the two subjects can explain simply about the inequality model and linear equations of one variable even though many opinions are inaccurate. Subject (E-3) had difficulty explaining the picture of the blocks that had been drawn because they were confused in writing the length, width, and height of the blocks. While the subject (E-5) can explain a well-written formula. Subjects (E-6) and subjects (E-7) explained while showing the results of the relationship between one formula and another well, but the subject had difficulty in writing conclusions. Subject (E-6) has not been able to describe the block well but relates the formulas to each other correctly. While the subject (E-7) explained that the subject only wrote down the length, width, and height of the beam. In addition, the subject can write conclusions properly and correctly. Furthermore, the results of interviews for the subject (E-11) and the subject (E-17), namely the subject answered hesitantly to the written conclusion and the subject only wrote the calculations directly. Subject (L-17) was able to correctly state the length, width, and height of the beam without difficulty. In addition, the subject describes a solution for the value of x. In contrast to the subject (E-21) and subject (E-22) confusion when explaining the relationship between one formula and another. However, the subject was able to explain well how he got the solution.

The Creative Thinking Ability Viewed from Students Metacognition

The indicators of student's metacognition are as follows a) metacognitive knowledge (knowledge of declarrative, procedural knowledge, and conditional knowledge), b) experience/metacognitive regulation (planning, information management strategy, monitoring, debugging strategy, and evaluation/assessment).

Based on the metacognition questionnaire and creative thinking skills test was given to the experimental class, especially to selected subjects of them, subject (E-14) and subject (E-26) has knowledge of good declarative. Subject (E-14) knows data or important information in the problem then the subject has studied information about the problem. Subject (E-26) have knowledge of formula/method which will be used to solve the problem. On the subject's procedural knowledge (E-14) solves that problem in a clear way/strategy. Because the subject works in sequence according to the stages. Next on the subject (E-26) has a way that different with write answers in order, detail, and clearly in solving the problem. The conditional knowledge of (E-14) subjects have accuracy in completing problem and have an unyielding attitude. But the subject (E-26) has the belief that the method/strategy used has been in accordance. Due to (E-14) and (E-26) have checked the results of their work. In the aspect of experience/ metacognitive regulation, namely in the planning aspect, the subject (E-14) takes time to understand the questions thoroughly are you serious then after understanding the subject start for work question. While the subjects of (E-26) were more tend focus on the information already known then solve the matter. In the aspect of information management strategies, the subject (E-14) knows important information in question and make a summary so that it can help when the subject will work on the problem. While there is a subject (E-26) drawing shapes room to make it easier for the subject to complete question. The third aspect is comprehensive monitoring of the subject (E-14) which is in the good category. Shown by the results of the work that correct and massage. While the subject (E-26) has good observations in process completion problem even though the subject does not re-read the results of his work. Furthermore, in the aspect of the debugging strategy the subject (E-14) tries to read the problem carefully so as not to make mistakes in the resolution process. While the subject (E-26) is looking for information-other information to fix the error on

resolution of the problem. The last aspect is the aspect of the assessment / evaluation of the subject (E-14) just making observations about problem solving process. On the other hand, the subject (E-26) chooses to make a single note about the result of his work.

Subject (E-1) and subject (E-2) have good declarative knowledge because the subject can know important information from the question. In addition, the subject (E-1) is also able to find out the information needed to solve the problem. Subjects (E-4) and subjects (E-10) also know and understand the formulas that will be used to solve problems properly. So that the subject (E-16) and subject (E-13) have good procedural knowledge. In addition, subjects (E-18) and subjects (E-24) were able to determine the right method or method to solve problems with good planning. Subjects (E-1) and subjects (E-2) have good information management strategies because the subject guesses which formula is suitable, then it is written with a detailed calculation process and the subject corrects the results of his work after doing it. So that the subject (E-27) and the subject (E-31) have good control as well. Subject (E-27) and subject (E-31) are also good debugging strategies. Subject (E-31) and subject (E-27) had good evaluations or assessments because after the subject corrected the answer, the subject knew there was an incorrect result and then corrected it marked with a scribble.

Subject (E-8) and the subject (E-32). Subjects (E-8) have knowledge of quite good declarative because the subject know the formula for the circumference of a block well. Then, on the subject (E-32) have knowledge of good directional because the subject know size on the beam well as important information to get the formula for the perimeter of the block. Next on the procedural knowledge, subject (E-8) tries to work carefully even though in the end their area little scribbles in his work. While (E-32) has short comings in terms of accuracy of the problem-solving process and there is no scribbles on the workmanship. The last one is the assessment/evaluation of subjects (E-8) find out the errors in the process of solving the problem as well as with the subject (E-32) also knows the error when working on the problem. Subject (E-12) and subject (E-15) have good declarative knowledge because the subject can know one important thing from the question. In addition, the subject (E-15) is also able to know the information used to answer the problem. Subject (E-19) and subject (E-20) also understand the equation that will be used to answer well. Furthermore, the subject (E-23) and the subject (E-28) have good procedural knowledge because the subject works in an orderly and neat manner. In addition, subjects (E-29) and subjects (E-30) were able to determine the right method even though there were still doubts in the process of writing answers. Subjects (E-30) and subjects (E-29) have good information management strategies because the subject groups important information to plot as complementary material. So that the subject (E-12) and the subject (E-15) have good mastery as well. Subject (E-20) and subject (E-19) also have a good debugging strategy. Subjects (E-23) and subjects (E-28) had good judgments or judgments because after the subjects corrected some writings that were considered wrong.

Subjects (E-9) have knowledge of not enough due to subject don't understand the information or data that the overall importance contained in the matter. Then, the subject (E-25) h knowledge of declarative enough pretty because in the process of understanding the problem the subject only knows several only important information even though the subject has worked on the problem carefully.

The second knowledge is the procedural knowledge of the subject (E-9) have difficulty in using the right strategy when working on a problem. Next the subject (E-25) explains step by step about the strategy used in working on the problem even though the results obtained is correct. Then, the conditional knowledge of subject (E-9) experience confusion in determining what and how the strategy is use in solving problems even though the subject describing the shape of the beam space that is not right. On the other hand, the subject (E-25) often had trouble in implementing the strategy to be used and the subject stopped working on the problem when the problem occurred that difficult. The next stage is experience/metacognitive regulation. Subjects (E-9) have good planning not enough caused by the results of the ability test creative thinking is unclear and the subject takes a long time to understand the problem. While the subject (E-25) mention to search value x. Then, the information management strategies subject to (E-9) is not visible in the process of his work and cannot mention information or important data in the problem. Next the subject (E-25) experience little difficulty in setting strategies that will be used to solve question problems. In the aspect of comprehension

monitoring, the subject (E-9) monitors the results of his work, but the subject (E-9) is not careful in doing this. While the subject (E-25) can monitor the results of his work by reading repeat results the answer even though the work there is not true yet.

The next aspect is the debugging strategies of the subject (E-9) unable to justify his wrong work. As well as with subjects (E-25) which is not clear in the steps of the work. Then, in the aspect of assessing / evaluating the subject (E-9) does not assess the learning process whether the learning process he is doing is correct or not. While the subject (E-25) assesses the results of his work that is wrong. Subject (E-3) and subject (E-5) have good declarative knowledge because the subject can know one important thing from the problem. In addition, the subject (E-3) is also able to know essential things or information in the question. Subject (E-6) and subject (E-7) also understand the equation and inequality model quite well but are still lacking in writing down the signs. Then the subject (E-11) and subject (E-17) had less procedural knowledge because the subject was confused after writing formulas and models, doubting written answers. In addition, the subject (E-21) and the subject (E-22) have not been able to determine the right method because the subject does not understand the questions in the matter. Subjects (E-3) and subjects (E-5) have good information management strategies because the subjects have done well even though the writing method is not quite right. Subjects (E-6) and subjects (E-7) have less control because the subject only does part of the equation. Subject (E-11) and subject (E-17) also have a good debugging strategy. Subjects (E-21) and subjects (E-22) had poor ratings or assessments because the subject did not re-check after doing the task. So, the subject does not know whether the answer given is correct.

CONCLUSION

Subjects with high metacognition category have good knowledge of understanding important information. The subject is conscientious, focused, and confident that the implementation of the strategy is effective in solving problems. Subjects understand well the questions and organize important information. The result of the work is systematic and correct, and the subject is also aware of errors in the work process. In contrast to the metacognitive category of subject who currently have good knowledge. In addition, the subject is quite good at writing conclusions. Subjects still need to be careful in monitoring the results of their work. The subject is quite good at evaluating the results of his work. Meanwhile, subjects with low metacognition have sufficient knowledge in understanding information. The subject has difficulty managing his strategy well. In addition, the subject cannot justify the wrong answer and is not careful in monitoring the results of the answer. Subjects do an adequate assessment of the results of their work.

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