Profile of Mathematical Creative Thinking in Solving Number Pattern Problems of Grade VIII Students of SMPN 15 Palu Reviewed from the Student's *Self-Efficacy*

Yusrayudin [1*)] , Pathuddin [2] , Rita Lefrida [3]
[1,2,3] Universitas Tadulako
*) yusrayudin@gmail.com

Abstract

This qualitative research aims to obtain a description of the Profile of Mathematical Creative Thinking in Solving Number Pattern Problems of Grade VIII Students of SMP Negeri 15 Palu Reviewed from Student Self-Efficacy. The subjects of this study were one student who had high Self-Efficacy and one student who had Low Self-Efficacy. The instrument in this study was the researcher himself assisted by a Self-Efficacy Questionnaire, a mathematical problem-solving test and an interview guide. The data analysis techniques used included data condensation, data presentation, and conclusion drawing. The results of the study showed that subjects with High and Low Self-Efficacy at the stage of understanding the problem showed that the subjects fulfilled two indicators of creative thinking, namely the indicators of fluency and novelty. The stage of preparing a problem-solving plan showed that subjects with High Self-Efficacy fulfilled all three indicators of creative thinking, namely the indicators of fluency, flexibility and novelty, while subjects with Low Self-Efficacy only fulfilled two indicators of creative thinking, namely the indicators of Fluency and Flexibility. The stage of implementing the problem-solving plan shows that subjects with High and Low Self-Efficacy fulfill the three indicators of creative thinking, namely the indicators of fluency, flexibility, and novelty. The re-examination stage shows that subjects with High Self-Efficacy fulfill two indicators of creative thinking, namely the indicators of fluency and novelty. Subjects with Low Self-Efficacy also fulfill two indicators of creative thinking, namely fluency and flexibility.

Keywords: Profile, creative thinking, problem solving, number patterns, self-efficacy

Introduction

Mathematics has a special relationship with the world. Mathematics is a fundamental way of human thinking, encompassing ideas, processes, and reasoning. Mathematics is not simply a collection of numbers and formulas, but rather a product of abstraction, systematic reasoning, and cognitive organization developed to understand the world (Pathuddin et al., 2025). Mathematics has a special relationship with the world. It can be said that everyone, especially students who play a role as the future generation, needs mathematical knowledge in various forms and characteristics according to their needs (Simanjuntak, 2021) . This is because mathematics can equip students with creative, productive, critical, independent, collaborative, and communicative thinking and acting skills (Minister of Education and Culture Regulation No. 20 of 2016). However, in reality,

most students in the world of education dislike mathematics content (Karlina et al., 2020) . Students find solving math problems given by teachers difficult, so they dislike it. To solve mathematical problems, students need mathematical problem-solving skills. Students with good problem-solving skills will be able to solve problems effectively (Amalia & Jusra, 2022). Thus, this shows that student creativity is a crucial factor in learning, including mathematics. This is in line with the opinion (Abidin et al., 2018), which states that one of the important factors in mathematics learning objectives is the ability to think creatively.

Based on the description above, creative thinking is crucial in mathematics learning. However, many students still lack creative mathematical thinking skills, as observed in one of the public junior high schools in Palu, Indonesia. Interviews with mathematics teachers at the school revealed that many students have difficulty solving mathematical problems using various methods and strategies, indicating a lack of creative mathematical thinking skills.

Creative thinking is one of the essential skills required in the workplace because modern institutions need individuals who are not only knowledgeable but also capable of generating innovative ideas to support organizational development (Kulsum et al., 2019). According to Chen (2021), creative thinking is the process of constructing ideas based on fluency, flexibility, elaboration, originality, and sensitivity to investigation and problem development. Mathematical creative thinking refers to the ability to solve problems and develop logical and deductive reasoning by combining ideas, techniques, or approaches in new ways (Suherman & Vidákovich, 2022). According to Hetherington et al. (2020), teachers should actively encourage students' creativity during the learning process. Various features of creative pedagogy, such as praising students' original thinking, encouraging personal reflection, and involving students in hands-on tasks, can effectively enhance students' creativity in the classroom (Bell & McGregor, 2021).

In Indonesia, 50% of students are able to respond to the first step in problem-solving, but only 32% are able to complete the second step, and only 27% are able to solve the problem completely (Riyadi et al., 2021). Seventy percent of students face challenges in problem-solving and use strategic approaches to overcome word problems. Conversely, the remaining 30% seek help from external sources to solve these problems (Maegala et al., 2020).

Based on the description above, it confirms that mathematical problem-solving skills are important and must be possessed by every student. The results of the PISA study

presented by (Rizki et al., 2021) indicate that Indonesia's mathematics score in 2018 declined from 2015, when it ranked 74th out of 79 participating countries, with a score of 379.

Based on this, it can be concluded that students' mathematical abilities, particularly problem-solving and mathematical creative thinking skills, are generally still below average. Problem-solving is one of the essential objectives of mathematics learning because it enables students to develop logical thinking and solve mathematical problems systematically (Polya, 1985). Furthermore, problem-solving is one of the fundamental mathematical competencies that should be mastered by every student (Hendriana, 2020). Hendriana (2020) stated that mathematical problem-solving ability is one of the important mathematical competencies that students need to acquire. Moreover, engaging students in problem-solving activities can foster their mathematical creative thinking by encouraging them to explore various ideas, strategies, and alternative solutions (Suherman & Vidákovich, 2022; Kulsum et al., 2019).

The relatively low level of Indonesian students' mathematical creative thinking remains an important issue that requires serious attention. This condition is influenced by several factors, including teacher-centered learning practices and learning environments that do not sufficiently encourage students' creativity (Hetherington et al., 2020). In addition, students' low enthusiasm for learning and lack of confidence in their own abilities may hinder the development of their mathematical creative thinking skills (Suciawati, 2019). One important factor related to students' confidence is self-efficacy, which refers to an individual's belief in their ability to organize and perform the actions necessary to achieve specific goals (Cheema & Skultety, 2017).

Self-efficacy refers to the belief in one's ability to organize and carry out the actions necessary to achieve one's goals. *Self-efficacy* is one's belief in carrying out various tasks, from understanding concepts to solving problems (Cheema & Skultety, 2017).

The results of the initial observations conducted through interviews with teachers at one public junior high school in Palu, Indonesia, indicated that many students tended to have low self-confidence and gave up easily when solving mathematical problems. According to the teachers, approximately 70% of the students demonstrated low self-efficacy, while the remaining 30% showed a moderate level of self-efficacy. Self-efficacy is a strong predictor of academic success, as it reflects individuals' beliefs in their ability to

perform learning tasks successfully, work harder, and persist longer in the face of challenges (Hodges, 2018).

It can be said that high *self-efficacy will encourage high creative thinking skills. Students who have good self-efficacy* will be successful in their learning activities and are able to carry out their academic tasks smoothly (Fiqri et al., 2023). (Sayekti et al., 2020) explained in their research that students with high *self-efficacy* tend to answer questions in detail and completely, while students with low *self-efficacy* do not answer questions in detail and completely. Students with good *self-efficacy categories* have good problem-solving skills (Abidatul & Ulumul, 2021), this is because *self-efficacy* influences students in solving problems (Nurseha & Apiati, 2019).

The results of preliminary observations conducted through interviews with a mathematics teacher at one public junior high school in Central Sulawesi, Indonesia, indicated that most students experienced difficulties in solving mathematical problems. This finding was supported by the results of the mid-semester examination, in which many students obtained scores below the Minimum Mastery Criterion (MMC). One of the main factors contributing to students' low problem-solving ability is their difficulty in translating word problems into appropriate mathematical models. Previous studies have shown that students often fail to solve mathematical problems because they do not fully understand the problem situation (Ali, 2019). Furthermore, when faced with non-routine or contextual problems, many students are unable to apply their prior knowledge effectively or organize the knowledge required for problem solving (Yalçin, 2018). Consequently, students tend to solve only routine problems that are similar to the examples provided by the teacher.

The importance of creative thinking in mathematics lies in its role in enabling students to connect mathematical concepts with real-life situations, solve unfamiliar problems, and develop competencies required in the twenty-first century. Rather than merely memorizing formulas, students should understand mathematical concepts deeply so that they can apply them in various contexts. One mathematical topic that requires students to think creatively is number patterns. Number patterns are taught at the junior high school level and involve various non-routine and contextual problems that require students to construct mathematical models. Therefore, students need both creative thinking and problem-solving skills to solve number pattern problems effectively.

Previous studies have examined mathematical creative thinking, problem-solving ability, and self-efficacy from various perspectives (Kulsum et al., 2019; Suherman &

Vidákovich, 2022; Tuzzahra et al., 2023). In addition, several studies have investigated the relationship between self-efficacy and mathematical problem-solving ability (Sayekti et al., 2020; Septhiani, 2022; Abidatul Imaroh et al., 2021). However, these studies generally focused on examining the relationships among these variables or measuring their effects using quantitative approaches. Limited studies have explored qualitatively how students with different levels of self-efficacy demonstrate mathematical creative thinking while solving number pattern problems. Therefore, there remains a research gap regarding the characteristics of students' mathematical creative thinking profiles based on their self-efficacy levels in solving number pattern problems.

Addressing this research gap is important because understanding students' mathematical creative thinking profiles can provide valuable information for teachers in designing learning strategies that are better suited to students' characteristics and levels of self-efficacy. Such information is expected to support the development of students' creativity and problem-solving abilities in mathematics learning. Therefore, this study aims to describe the profile of mathematical creative thinking in solving number pattern problems among Grade VIII students based on their self-efficacy.

Method

This research is a qualitative descriptive study with a qualitative approach. This study aims to describe the profile of mathematical creative thinking in solving number pattern problems of grade VIII students of SMPN 15 Palu in terms of student *self-efficacy.*

The primary instrument in this study was the researcher, who directly collected, analyzed, interpreted, and reported the research data. As the primary instrument in qualitative research, the researcher was responsible for planning the study, selecting participants, conducting observations and interviews, interpreting the findings, and drawing conclusions. Supporting instruments included a self-efficacy questionnaire, a mathematical creative thinking test in the form of number pattern problem-solving tasks, and interview guidelines. The self-efficacy questionnaire was used to classify students according to their levels of self-efficacy, the mathematical creative thinking test was used to identify students' creative thinking profiles in solving number pattern problems, and the interviews were conducted to obtain in-depth information and to validate the results of the written test.

The collected data were analyzed using the qualitative data analysis model proposed by Miles, Huberman, and Saldaña (2014), which consists of data condensation, data display, and conclusion drawing and verification. The research findings are presented through the selection of research participants, descriptions of students' written responses and interview results, data credibility testing, and analysis of students' mathematical creative thinking profiles in solving number pattern problems based on their self-efficacy levels.

Data were obtained from the mathematical creative thinking test, the self-efficacy questionnaire, and semi-structured interviews. Based on the results of the self-efficacy questionnaire, one student with high self-efficacy (ST) and one student with low self-efficacy (SR) were purposively selected as the research participants for further analysis.

The determination of the research subjects' self-efficacy levels was based on the scores obtained from the self-efficacy questionnaire. The questionnaire results showed that, of the 32 Grade VIII students at one public junior high school in Palu, Indonesia, who completed the self-efficacy questionnaire, 19 students were classified as having high self-efficacy, with scores ranging from $115 < x < 160$, while 13 students were classified as having low self-efficacy, with scores ranging from $40 < x < 115$. Subsequently, one student with the highest score in the high self-efficacy category was selected as the High Self-Efficacy (ST) subject, and one student with the lowest score in the low self-efficacy category was selected as the Low Self-Efficacy (SR) subject. The selection was made based on the students' willingness to participate in the study.

After the data were collected from each subject, the researcher conducted a credibility check to ensure the trustworthiness of the findings. The research instruments, including the mathematical problem-solving test and the interview guide, had previously been validated by experts before being administered to the participants. Following the interviews, a member check was conducted by returning the interview transcripts and the researcher's interpretations to each participant for confirmation. The participants were asked to verify whether the recorded statements and the researcher's interpretations accurately reflected their ideas and problem-solving processes. Any unclear or inaccurate information was clarified and revised based on the participants' feedback to ensure the credibility of the data. The problem-solving test was administered on Friday, November 10, 2024, after the self-efficacy questionnaire results had been obtained on Friday, November

1, 2024. Subsequently, in-depth interviews were conducted with each selected participant to obtain more comprehensive information about their mathematical creative thinking in solving number pattern problems based on their level of self-efficacy.

Results and Discussion

creative thinking profile in solving number pattern problems with subjects who have high and low *self-efficacy* based on the problem-solving steps according to Polya:

1. Subject ST

a. Fluency data (*Fluency)* in understanding problems

Table 1. ST Subject Interview Quotes on Aspects of Fluency in Understanding Problems

PST 001 :	Let's look at the question first. What is the question? What is it actually about? How do you understand the question?
S ST 002 :	So Budi arranged 100 lights in a row, each consisting of green, yellow, and red. Every 5 seconds, the lights alternate colors in a pattern: the first five seconds, the green light is on, the other lights are off; the second five seconds, the yellow light is on, the other lights are off; and the third five seconds, the red light is on, the other lights are off. This pattern repeats every three lights, from green, yellow, and then red.
PST 003 :	So what else are you going to ask me to do?
SST 004 :	Next there are questions a and b, which are asked in sequence. to-30, decorative lights the what color?
PST 005 :	Now I ask, will these three lights light up in the same order?
SST 006 :	No, sis, it won't be the same because it repeats itself alternately.
PST 007 :	Can you give me another example of an object that's similar to this lamp but has a different light sequence? What examples do you see in our environment?
SST 008 :	Traffic lights, bro, but they have long pauses, bro, or disco lights that flash alternately constantly.

Based on the interview excerpt, it was revealed that subject ST fulfilled the fluency indicator in understanding the problem, that is, ST stated all the information in the question (ST 002 & ST 00 4). ST was fluent in writing all the information contained in the problem. ST expressed other ideas related to the problem and was able to provide contextual examples according to his understanding of the question (ST 008).

b. Novelty Data in understanding the problem

Table 2. Interview Quotes of Subject ST on the Aspect of Novelty in Understanding Problems

PST 013 :	So, what can you understand from that question?
SST 014 :	So Budi is stringing up the lights, bro, the lights are green, yellow, red, and they keep flashing 100 times, right? Because every 5 seconds the lights change color with a pattern, first the green light is on, second the yellow light is on, then the red light is on, and then this pattern repeats every three lights from green, yellow, then red. This is a question about a being asked to

	determine the color of the light that lights up when the sequence is 30.
PST 015 :	Then, what else?
SST 016 :	How many times does the green light flash from the first to the 30th sequence?
PST 017 :	Is there only one way to do this? Co, look carefully.
SST 018 :	No, Sis. Then you'll be asked, "How many times does the green light come on from the first to the 30th?"

Based on the written answers and interview transcripts, it can be seen that subject ST fulfills the novelty indicator. It can be seen that subject ST presents all the information in the Problem questions (ST 014, ST 016 & ST 018). Subject ST explores and translates the information in the questions according to his own language (ST 014, ST 016 & ST 018).

c. Fluency data (*Fluency)* in preparing resolution plans

Table 3. Interview Quotes of Subject ST on the Aspect of Fluency in Preparing a Settlement Plan

PST 019 :	So, when you first read this, what did you think? How do you plan to solve it?
SST 020 :	The first thing I did was look for the pattern that was formed, then I looked for the difference from the pattern, bro.
PST 021 :	Which pattern is the deck?
SST 022 :	Sis, in question a, the sequence is lit because green is 1st, yellow is 2nd and red is 3rd, so when the 30th sequence is easy to determine then I determine the 30th term with the difference being 3
PST 023 :	How come? Why is there a difference of 3?
SST 024 :	So, the 3 lights turn on alternately, sis.
PST 025 :	Why did you immediately determine the difference first?
SST 026 :	So that it can be easier, I think if I make it like that, actually there are other ways, but this is easier than the usual way, so I made it like this because the red sequence is 3rd, then the difference or difference is 3, then calculate the remaining terms, sis.
PST 027 :	What do you mean by this is a very short deck, just 3 times
SST 028 :	Because he is in 3rd place and the gap is 3
PST 029 :	Why is it like this, little brother?
SST 030 :	Because if I write 3, 6, 9 to the 30th term, it will take a long time, sis, so I'll just multiply it so it's quicker because the difference is also 3, it's easier, right?

Based on written answers and interview results, it can be seen that subject ST met the fluency indicator. Subject ST thought about and planned how to solve the problem by providing various alternatives, but he used this method rather than others (SST020). Subject ST understood the reasons for choosing the solution plan he created (SST026, SST030).

d. Data Flexibility in preparing a settlement **plan**

Table 4. Interview Quotes from Subject ST on the Aspect of Flexibility in Preparing Settlement Plans

PST 019 :	So, when you first read this, what did you think? How do you plan to solve it?
SST 020 :	The first thing I did was look for the pattern that was formed, then look for the difference from the pattern, bro.
PST 031 :	Okay, let's continue, can you explain your reasons?
SST 032 :	From the question, it is asked in question a in order, what color decorative lights are on because green is in order 1, yellow is in order 2 and red is in order 3, so when the order is 30 the red light is on and part b because the red light is on and red is in order 3 then I determine the 30th term with the difference being 3 then I immediately divide it to get the answer, sis
PST 033 :	Can you explain the plan? Is this really how it works?
SST 034 :	Actually, there are other ways, sis, but this is easier. There is a normal way that uses the formula to determine the nth term, which is Un, sis, but I use this method, I will continue, sis. So first I calculate it to form a pattern when the 10th sequence is green that lights up, the 20th sequence is yellow that lights up, so this 30th is red that lights up,
PST 035 :	Why did you plan it straight away for every 10th deck, is this pattern different from the usual method?
SST 036 :	Yes, sis, it's different from the usual way, so if it's easier, I think if I do it like that, sis, so the 30th sequence is easier, I get a bright color.
PST 037 :	Okay, okay, what about part B?
SST 038 :	I made it like this because it's green in the 1st sequence and in every 3 sequences, the green light comes on once.
PST 039 :	What do you mean by this is a very short deck, just 30:3
SST 040 :	Yes, sis, 30:3 = 10. Because there are 30 lights, and every 3 sequences there is one green light, then the green light will flash 10 times.
PST 041 :	Why is it like this, little brother?
SST 042 :	Because if I write them one by one it will take a long time, sis, so I'll just share them so it's quicker because the results are the same.
PST 043 :	Bro, how did you know in the beginning that you planned to work on this problem this way?
SST 044 :	Because the question is a kind of pattern, I thought about it before writing and I think this is the simplest.

Based on the interview excerpt, it can be seen that subject ST fulfills the flexibility indicator in preparing a solution plan as follows: Subject ST thinks and plans how to solve the problem (SST032) by providing alternatives for more than one solution method (SST034). Subject ST knows the reasons for choosing a solution plan (SST034, SST038). Subject ST offers (provides) various solution strategies that are different from the general method (SST036). Subject ST makes a problem solving plan by using a problem solving plan by looking for the pattern formed and seeing the difference (SST020). ST mentions the steps to determine the color of the lights that are lit by using

a pattern every 10 lights (SST034) and determining the term by looking at the difference first, ST uses this solution plan because this method is the simplest, easiest (SST036) and fastest according to the informant in the informant's mind (SST044).

e. Novelty Data in preparing a resolution plan

Table 5. Interview Quotes from Subject ST on the Aspect of Novelty in Preparing a Settlement Plan

PST 045 :	Okay, I see your idea is different from the one in the book, right?
SST 046 :	Yes, sis, we have been learning to determine the nth term for a long time, the formula is Un = a + (n-1) b, right sis?
PST 047 :	Yes, that's right, sis, so how come you immediately thought of doing something like this?
SST 048 :	This is asked to determine the light on the 30th sequence because the light on the green sequence is sequence 1, the 2nd is yellow and the 3rd sequence is red, in the 30th sequence what color light is on? Well, because the decorative lights alternately light up until they form a pattern, so in part a I get the 30th sequence the red light on and the 30th term of green is the result of 90 minus 2
PST 049 :	Please explain again, why is that possible?
SST 050 :	So actually to determine the nth term we use the Un formula, but I use this method, I'll continue, sis. So first I calculate it to form a pattern when the 10th sequence is green which lights up, the 20th sequence is yellow which lights up, so this 30th is red which lights up.
PST 051 :	Why did you immediately think of this for every 10th deck, is this pattern different from the usual method?
SST 052 :	Yes, sis, it's different from the usual way, so if it's easier, I think if I do it like that, sis, so the 30th sequence is easier, I get a bright color.
PST 053 :	Okay, okay, what about part B?
SST 054 :	Because the problem is green, green is the first sequence. So I made it this way in my own way, because every 3 sequences, the green light comes on once, so just divide 30 by 3.
PST 055 :	How can that be, bro? 30 : 3 = 10 ?
SST 056 :	Since there are 30 lights, and every 3 sequences there is one green light, then the green light is on 10 times.
PST 057 :	Can you explain, sis?
SST 058 :	The first sequence is the green light, the second sequence is yellow and the third is red. To make it easy, I will divide the number 30 by 3. This means the green light is on from the first sequence to the 30th sequence. The green light is on 10 times.
PST 059 :	Your thinking is great, bro. In the beginning, how did you know that you planned to work on this problem this way?
SST 060 :	Because from the question, sis, this question is a kind of pattern, sis, I thought about it before writing it, and in my opinion, this is the easiest, sis, and I really wanted to make it like this.

Based on the interview excerpt, it can be seen that subject ST fulfills the novelty indicator in preparing a solution plan, namely, Subject ST thinks and plans how to solve the problem by providing new and unique alternatives or solution strategies based on his

own understanding (SST048 & SST060). Subject ST uses a step pattern to determine the color of the light that is on by using a pattern of every 10 lights and determining the term by looking at the difference first (SST050). Subject ST verbally offers several solutions to solve the problem in a new and unique way according to his own understanding with the green light on in the 30th sequence by dividing the number 30 by 3, then obtained 10 times the green light is on (SST054, SST058)

f. Data on Fluency (*Fluency)* in Implementing Problem Solving Plans

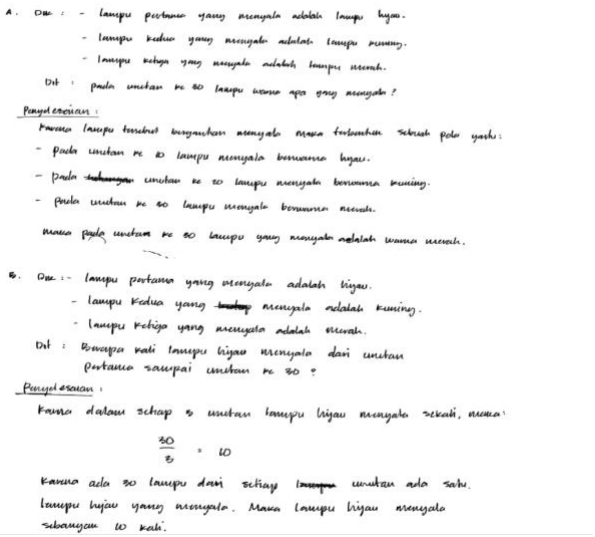
a. Dik : - lampu pertama yang menyala adalah lampu hijau.
- lampu kedua yang menyala adalah lampu kuning.
- lampu ketiga yang menyala adalah lampu merah.
Dit : pada urutan ke 30 lampu warna apa yang menyala ?
Penyelesaian :
Karena lampu tersebut berganti menyala secara berurutan sehingga pola yaitu :
- Pada urutan ke 10 lampu menyala berwarna hijau.
- Pada ~~kelompok~~ urutan ke 20 lampu menyala berwarna kuning.
- Pada urutan ke 30 lampu menyala berwarna merah.
Maka pada urutan ke 30 lampu yang menyala adalah warna merah.
b. Dik : - lampu pertama yang menyala adalah hijau.
- lampu kedua yang ~~lampu~~ menyala adalah kuning.
- lampu ketiga yang menyala adalah merah.
Dit : berapa kali lampu hijau menyala dari urutan pertama sampai urutan ke 30 ?
Penyelesaian :
Karena dalam setiap 3 urutan lampu hijau menyala sekali, maka :
$\frac{30}{3} = 10$
Karena ada 30 lampu dari setiap ~~lampu~~ urutan ada satu lampu hijau yang menyala. Maka lampu hijau menyala sebanyak 10 kali.

Figure 1. Subject ST's answer at the stage of implementing the settlement plan

Table 6. Interview quotes from ST subjects regarding aspects of fluency in implementing settlement plans

PST 075 :	How do the deck lights in question a work? Is the formula the same as finding the number of times the lights are on in part b?
SST 076 :	No, Sis, this formula is for finding the term a, while he is looking for the number of times the light is on, Sis.
PST 077 :	Okay, little brother, try to explain what you think the formula is.
SST 078 :	So I calculated that it formed a pattern when the 10th sequence was green, the 20th sequence was yellow, so the 30th was red.
PST 079 :	Why is this bias, this is the common way that you often get?
SST 080 :	No, sis, I think my answer is different from the general method which of course uses a formula.
PST 081 :	Okay, next part b, how about it, deck?
SST 082 :	For my part, I made it like this because shark is in the first order, so 30 : 3 = 10 until the green light flashes 10 times.
PST 083 :	So why are you sharing this again? Have you done this kind of work often?
SST 084 :	Yes, I often practice, so this is green in the first sequence and it is known that there are 30 lights, and every 3 sequences there is one green light, so the green light will flash 10 times.
PST 085 :	Oh yeah, so how are you?
SST 086 :	So how many times the green light comes on from the first sequence to

	the 30th sequence, namely 30 divided by 3, namely the green light comes on 10 times.

Based on the interview results and Figure 1, subject ST fulfilled the fluency indicator in implementing the problem-solving plan, namely, subject ST solved the problem according to the previously prepared plan, namely by using a pattern with a sequence of 10 to determine the sequence of lights that turned on and then multiplied to find the term (SST064). Subject ST solved the problem by involving previous abilities because subject ST often practiced questions (SST 066). Subject ST answered the pattern formed from the lights that turned on with the same pattern and then determined the lights on by looking at the sequence and difference or gap in the lights of the color (SST072).

g. *Flexibility* Data in Implementing Problem Solving Plans

Table 7. Interview Quotes from Subject ST on the Aspect of Flexibility in Preparing a Settlement Plan

PST 075 :	How do the deck lights in question a work? Is the formula the same as finding the number of times the lights are on in part b?
SST 076 :	No, Sis, this formula is for finding the term a, while he is looking for the number of times the light is on, Sis.
PST 077 :	Okay, little brother, try to explain what you think the formula is.
SST 078 :	So I calculated that it formed a pattern when the 10th sequence was green, the 20th sequence was yellow, so the 30th was red.
PST 079 :	Why is this bias, this is the common way that you often get?
SST 080 :	No, sis, I think my answer is different from the general method which of course uses a formula.
PST 081 :	Okay, next part b, how about it, deck?
SST 082 :	For my part, I made it like this because shark is in the first order, so 30 : 3 = 10 until the green light flashes 10 times.
PST 083 :	So why are you sharing this again? Have you done this kind of work often?
SST 084 :	Yes, I often practice, so this is green in the first sequence and it is known that there are 30 lights, and every 3 sequences there is one green light, so the green light will flash 10 times.
PST 085 :	Oh yeah, so how are you?
SST 086 :	So how many times the green light comes on from the first sequence to the 30th sequence, namely 30 divided by 3, namely the green light comes on 10 times.

Based on the interview excerpt and Figure 1, it was revealed that subject ST fulfilled the flexibility indicator in implementing the problem solving plan that Subject ST solved the problem according to the previously prepared plan, namely with answers from more than one solution method (SST076). Subject ST made a different pattern of 10 for the lights to turn on until they got red in the 30th sequence (SST078) **.** Subject ST

solved the problem differently in the general way (SST080) **.** Subject ST solved the problem by directly dividing the number 30 and the number 3 to get the number of times the green light turned on from the first to the 30th sequence (SST086) **.** Subject ST solved the problem by involving his actual abilities (SST084).

h. *Novelty* Data in Implementing Problem Solving Plans

Table 8. Interview Quotes from Subject ST on the Aspect of Novelty in Preparing a Settlement Plan

PST 0887 :	Okay, so do you think your method is correct?
SST 088 :	Yes, I did this in my own way and it is correct if I use the normal way too, sis.
PST 089 :	So, according to you, your method is different from the general method in class. Do you know the difference between your method and the general method?
SST 090 :	Yes, sis, if I use the formula, I can enter 3n = 30, sis, so the result is also 10, sis.
PST 091 :	Why did you think of this method straight away, why not just that method?
SST 092 :	I often practice, sis, and in my opinion, this method is the easiest and quickest to complete. If you use a formula, it takes time, in my opinion.
PST 093 :	Okay, next deck, do you think the tribal formula takes a long time?
SST 094 :	In my opinion, it takes longer than this, sis, that's why I use pattern 10 to speed up finding the color of the lights that come on, sis .
PST 095 :	So, for part b, you can summarize it because you practice often, okay?
SST 096 :	Yes, bro, so this is the 1st green light and knowing that there are 30 lights, and every 3rd sequence there is one green light, then the green light lights up 10 times.
PST 097 :	Okay, what's next?
SST 098 :	Make the green light turn on from the first sequence to the 30th sequence, which is 30 divided by 3, which is the green light turns on 10 times. That's it, sis.

Based on the interview excerpt, it can be seen that subject ST fulfills the novelty indicator in implementing the solution plan that Subject ST solves the problem according to the plan that has been prepared previously, namely in a new and unique way based on his own understanding (SST 088). Subject ST knows that there is another way using the n-formula, namely the number of lights 3n = 30 so that n can be obtained, namely 10 (SST 090) . Subject ST solves the problem by involving his actual abilities (SST 092). Subject ST makes a difference pattern of 10 because it is easier for him to know the color of the lights that will light up (SST 094) **.** Subject ST solves the problem by determining the lights from the first sequence to the 30th sequence, namely by dividing 30 sequences by 3 lights. After that, he gets the number of green lights (SST 098).

i. *fluency* data in rechecking

Table 9. Interview Quotes of Subject ST on the Aspect of Fluency in Re-Checking

PST 099 :	Are you sure the answer is correct?
SST 100 :	So far I'm sure, sis
PST 101 :	Are you absolutely sure? Try checking it again from start to finish.
SST 102 :	(*Checking the answer from beginning to end*) Yes, Sis, it's correct.

Based on the interview excerpt, it was revealed that subject ST fulfilled the fluency indicator in re-checking the completion results, namely, Subject ST recalculated the results of the work that had been done (SST102). Subject ST did calculations (scribbles) on the provided scribble sheet.

j. *Flexibility* Data in Rechecking Problem Answers

Table 10. Interview Quotes from Subject ST on the Aspect of Flexibility in Re-examining

PST 103 :	Oh okay, let me ask why this bias results in 10 times the result?
SST 104 :	Well, because the question is that the light will turn on 30 times while there are 3 lights, so if you divide the result, it will be 10, sis.
PST 105 :	Are you sure? Don't want to check anymore?
SST 106 :	Okay, I'll check again (*Checking the answer from start to finish*) That's it, Sis, it's correct.

Based on the interview excerpt, it was revealed that subject ST fulfilled the flexibility indicator in re-checking the completion results, namely Subject ST recalculated the results of the work that had been done (SST106). Subject ST re-checked in a different way, namely by doing mental calculations and if there was a solution step that according to his logic was correct, then the final answer was considered correct (SST104).

k. ST Novelty Data in Re-Checking *Problem* Answers

Table 11. Interview Quotes of Subject ST on the Aspect of Novelty in Re-examining

PST 105 :	Are you sure? Don't want to check anymore?
SST 106 :	Okay, I'll check again (*Checking the answer from start to finish*) That's it, Sis, it's correct.
PST 107 :	For example, if you use the Un formula to find the color of a light bulb, and ask for the order of the 30th light bulb, would you not want to check it again?
SST 108 :	Yes, so if you use the Un formula, sis, if it's 30, it means Un = 30, so the formula has 3 lights, meaning the last one is red, 3n, so n is also 30 divided by 3 equals 10, so it's perfect, this color is red, sis.
PST 109 :	It's suitable, it means it's the same
SST 110 :	Yes, it's the same, sis.

Based on the interview excerpt, it was revealed that subject ST fulfilled the novelty indicator in re-examining the completion results, namely that subject ST

recalculated the results of the work that had been done (SST106). Subject ST tested the results obtained in a new way (his own idea) and drew the correct conclusion (SST108).

2. Subject SR

a. Fluency data (*Fluency)* in understanding problems

Table 12. Interview Quotes of Subject SR on the Aspect of Fluency in Understanding Problems

PSR 001 :	So, do you understand the problem? How do you understand that?
SSR 002 :	Budi is arranging 100 green, yellow, and red lights in parallel. Every 5 seconds, the lights alternate colors in a pattern: the first five seconds, the green light is on, the other lights are off; the second five seconds, the yellow light is on, the other lights are off; and the third five seconds, the red light is on, the other lights are off. This pattern repeats every three lights, from green, yellow, and then red.
PSR 003 :	So what's next, sis?
SSR 004 :	Next there are questions a and b, namely asking: In sequence 30, what color are the decorative lights?
PSR 005 :	Now I ask, will these three lights light up in the same order?
SSR 006 :	Not really, sis
PSR 007 :	I think so? Hmm, or something like this: can you give me another example of something that's the same as this lamp but has a different light sequence? What examples do you see in our environment?
SSR 008 :	What do you mean, sis? I don't really know, sis.

Based on the interview excerpts, it was revealed that subject SR met the fluency indicator in understanding the problem, namely SR stated all the information in the question (SR 002 & SR 00 4). SR was fluent in writing all the information contained in the problem, although it took a while. SR was able to express other ideas related to the problem, although hesitant (SR 006). SR was unable to provide contextual examples according to his understanding of the question (SR 008).

b. SR Novelty Data *in Understanding Problems*

Table 13. Interview Quotes from Subject SR on the Aspect of Novelty in Understanding Problems

PSR 013 :	Okay, what can you understand from that question?
SSR 014 :	According to the question, Budi arranged the colors Green, Yellow, Red, and then lit up 100 times, right? Because every 5 seconds the lights alternate colors with a pattern, first the green light is on, second the yellow light is on, then the red light is on, then this pattern repeats every three lights from green, yellow, then red. This is a question a, which is asked to determine the color of the light that lights up when the sequence is 30.
PSR 015 :	What's next?
SSR 016 :	How many times does the green light flash from the first to the 30th sequence?
PSR 017 :	Is there only one way to do this?
SSR 018 :	I think so, Sis. After all, part B also asks how many times the green light comes on from the first to the 30th sequence?

PSR 019 :	Then look here, are there any conditions for doing the questions, meaning what conditions must be there or are needed in this question ?
SSR 020 :	Hm, I don't really know, sis

Based on the interview excerpts, it was revealed that the SR subjects fulfilled the novelty indicators in understanding the problem, namely, the SR subjects stated all the information in the problem questions (SR 014, SR 016 & SR 018). The SR subjects explored and translated the information in the questions according to their own language that they understood even though they did not know the conditions needed in the questions (SR 014, SR 016, SR 018).

c. SR Fluency Data in Developing Problem *Solving* Plans

Table 14. Interview Quotes of Subject SR on the Aspect of Fluency in Understanding Problems

PSR 019 :	Okay, so when you first read this, what did you think? How do you plan to solve it?
SSR 020 :	This is done by making a table by pairing the order and color, so I symbolize the colors with letters, sis.
PSR 021 :	What do you mean by writing that deck? Please explain
SSR 022 :	First, I made a table, sis. First, I gave the symbol red = M, green = H and yellow = K, red = M, so the pattern is the same so it is written repeatedly, sis.
PSR 023 :	How come, sis? Can you explain where this came from?
SSR 024 :	So I gave the symbol green = H, yellow = K, red = M. so the pattern is the same so it is written repeatedly, I made this table, it was studied in grade 1 and given the work using a table, so it is easy, so if the sequence is 30, what color light is on and it is red, and for part b it is 10 times, the rest I calculate the table one by one
PSR 025 :	Why did you immediately determine it using a table?
SSR 026 :	So that it can be easier, sis, because that's all that's on my mind.
PSR 027 :	What does this mean when the deck immediately turns red?
SSR 028 :	I saw from the table help, sis, because the color of the lamp that the pattern was looking for was red, so I paid attention to the number under the M symbol, sis, and I sorted it to get red.
PSR 029 :	Why is that the way you do it, little brother?
SSR 030 :	Because I'm also afraid to use the formula, because I forgot what the formula is, so I'm using the manual method, sis.

Based on the interview excerpt, it can be seen that the SR subject fulfills the fluency indicator in compiling a solution plan, namely, the SR subject thinks about and plans how to solve the problem by providing one solution and because he only knows the plan, he uses this method rather than other methods (SSR020). The SR subject knows the reasons for choosing the solution plan that was made (SSR026, SSR030).

d. SR Flexibility Data in Developing Problem Solving Plans

Table 15. Interview Quotes from Subject SR on the Aspect of Flexibility in Developing Problem-Solving Plans

PSR 019 :	So, when you first read this, what did you think? How do you plan to solve it?
SSR 020 :	The first thing I did was create a table that was formed and then write it in the HKM table.
PSR 031 :	Okay, let's continue, can you explain your reasons?
SSR 032 :	From the question, it is asked in question a in sequence 30, what color decorative lights are on because green is sequence 1, yellow is sequence 2 and red is sequence 3, by making a table by pairing the sequence and color, so I symbolize the colors with letters
PSR 033 :	Can you explain the plan? Is this really the way to do it? Is there another way?
SSR 034 :	For another way, I'm not sure, but this is easier. So I gave the symbol green = H, yellow = K, red = M, so the pattern is the same so it is written repeatedly. I made a table for this, I studied it in grade 1 and was given the work using a table so it was easy. So if the 30th sequence is on, what color light is on and it is red, sis.
PSR 035 :	Why did you plan it straight away with a deck table? Is this pattern different from the usual method?
SSR 036 :	Yes, sis, it's different from the usual way, so if it's easier, I think if I do it like that, sis, so the 30th sequence is easier, I get a bright color.
PSR 037 :	Okay, okay, what about part B?
SSR 038 :	I made this like this because I made a table from the start, so I calculated part b manually again, sis.
PSR 039 :	What do you mean by this deck, you write directly 10
SSR 040 :	Yes, sis, so after I made all this table, I counted the number of green lights, there were 10, that's why I made up to 30 sequences, right?
PSR 041 :	Why is it like this, little brother? This takes a long time, right?
SSR 042 :	Yes, that's right, sis, but what else can I do than if I don't get the answer, sis, so I'll just give it to you so you can get it, sis?
PSR 043 :	Bro, how did you know in the beginning that you planned to work on this problem this way?
SSR 044 :	Because the question is a kind of pattern, I was confused about what to do, so I had no choice but to use the table even though it took me a long time to get the results.

Based on the interview excerpt, it can be seen that the SR subject fulfills the flexibility indicator in preparing a solution plan. The SR subject thinks and plans a way to solve the problem (SSR032) by providing Does not have an alternative more than one way of solving, (SSR034). The SR subject knows the reason for choosing a solution plan even though it takes a long time SSR034, SSR038). The SR subject offers (gives) a solution strategy that requires a long solution even though it is different from the general method (SSR036). The SR subject makes a problem solving plan using a problem solving plan with the help of the HKM table (SSR020). SR mentions the steps

to determine the color of the light that is on using the help of the HKM table (SSR034), SR uses the solution plan because this method is what is in his mind and does not know another way (SSR042).

e. Data on SR's fluency *in* implementing problem solving plans

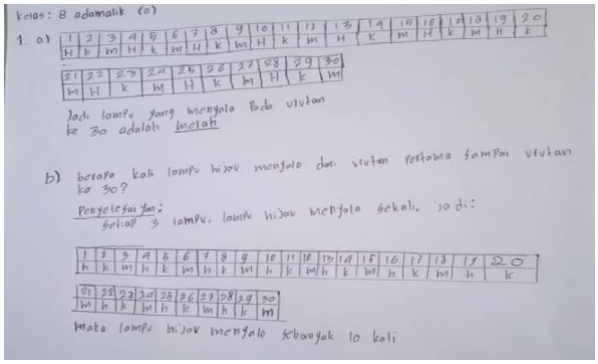

Figure 2. SR fluency answers for the plan implementation stage

Table 16. Interview Quotes from Subject SR on the Aspect of Fluency in Implementing Problem-Solving Plans

PSR 061 :	How was it, little brother? Can you do the problem?
SSR 062 :	Yes, it's quite possible, even though it's a bit difficult at first
PSR 063 :	Okay, try to explain how you found the answer, little brother.
SSR 064 :	First, I made a table to find out which color of light is in 30th place
PSR 065 :	How did you find that answer? Do you often practice questions like this?
SSR 066 :	No, sis, that's why I was confused at first about what I wanted to do and immediately thought of writing tables like this, sis. I gave the symbols H=green, K=yellow and M=red, then I entered them in the table, sis, 1 H, 2K, 3M up to this 30 M.
PSR 067 :	Okay, next part b, how about it, deck?
SSR 068 :	So I made it like this because shark is the first order, so I looked at the table help so that the green light turns on 10 times.
PSR 069 :	Oh, how come? Why did you share it again?
SSR 070 :	Because green is the 1st sequence and it is known that there are 30 lights, and every 3 sequences there is one green light, then the green light is lit 10 times.
PSR 071 :	Oh yeah, so how are you?
SSR 072 :	So how many times the green light comes on from the first sequence to the 30th sequence, namely the green light comes on 10 times.
PSR 073 :	Okay, okay, bro
SSR 074 :	Thank you, sis

Based on the interview excerpt and Figure 2, it was revealed that the SR subject met the fluency indicator in implementing the problem-solving plan. The SR subject solved the problem according to the previously prepared plan, namely by using SR to create a plan using a table and form a pattern to determine the terms of the lamp's flame. In part a, Student FD gave the symbol green = H, yellow = K, red = M so the pattern is the same so the SR student wrote the pattern repeatedly. The reason for making a table

was because this had been studied in grade 1 and was given the work using a table and so that it was easy to find the color of the lamp flame in the 30th sequence and the lamp flame in the 30th sequence was red. Next, in part b, the ST student looked at the table for help because there were many green lights being sought (SSR064). The SR subject solved the problem without involving previous abilities because the SR subject rarely practiced questions (SSR 066). The SR subject wrote down the steps that could be taken to solve the problem using a table. and create the symbol H=green, K=Yellow and M=red. Next I enter in the table sis 1 H, 2K, 3M Up to this 30 M and write the pattern of the green light to determine the number of times the green light flashes (SSR072)

f. SR Flexibility Data in Implementing Problem *Solving* Plans

Table 17. Interview Quotes from Subject SR on the Aspect of Flexibility in Implementing Problem-Solving Plans

PSR 075 :	How do the deck lights in question a work? Is the formula the same as finding the number of times the lights are on in part b?
SSR 076 :	No, Sis, this formula is for finding the term a, while he is looking for the number of times the light is on, Sis.
PSR 077 :	Okay, little brother, try to explain what you think the formula is.
SSR 078 :	So I gave the symbol H=green, K=yellow and M=red then I entered it in the table, bro 1 H, 2K, 3M until this is 30 M, so that when the sequence is 30 the color of the light that is on is M or red,
PSR 079 :	Why is this bias, this is the common way that you often get?
SSR 080 :	No, sis, I forgot the general method, that's why I gave you the manual even though it takes a long time.
PSR 081 :	Okay, next part b, how about it, deck?
SSR 082 :	For part b, I manually counted how many times the green light appeared so that the green light came on 10 times.
PSR 083 :	Have you worked like this often?
SSR 084 :	Honestly, do you rarely practice math problems?
PSR 085 :	Oh yeah, so how are you?
SSR 086 :	So how many times the green light flashes from the first sequence to the 30th sequence, namely 30, namely the green light flashes 10 times.

Based on the interview excerpt and Figure 2, it was revealed that the SR subject fulfilled the flexibility indicator in implementing the problem solving plan, namely the SR subject solved the problem according to the previously prepared plan, namely with one solution method (SSR076). The SR subject made a HKM table for the lights to turn on until the red color in the 30th sequence is red (SSR078) **.** The SR subject solved the problem differently from the general method, namely the manual method even though it took a long time (SSR080) **.** The SR subject solved the problem by directly counting the number of letters h to get the number of times the green light turned on from the first to the 30th sequence (SSR086) **.**

g. SR Fluency Data in Re-Examining

Table 18. Interview Quotes of Subject SR on the Aspect of Fluency in Re-Checking

PSR 099 :	Are you sure the answer is correct?
SSR 100 :	Not yet, sis
PSR 101 :	Why not? Try checking it again from start to finish.
SSR 102 :	(*Checking the answer from beginning to end*) Yes, Sis, it's correct.

Based on the interview excerpt, it was revealed that subject SR met the fluency indicator in re-checking the results. Subject SR recalculated the results of the work that had been done (SSR102). Subject SR did the calculations (scribbles) on the provided scribble sheet.

h. SR Flexibility Data in Re - Examining

Table 19. Interview Quotes from Subject SR on the Aspect of Flexibility in Re-examining

PSR 103 :	Oh okay, let me ask why this bias results in 10 times the result?
SSR 104 :	Well, because the question is that the light is on 30 times, while in the table there are 10 letters h or green lights, so if you divide the result, the result is 10, sis.
PSR 105 :	Are you sure? Don't want to check anymore?
SSR 106 :	Okay, I'll check again (Checking the answer from start to finish) Okay, Sis, it's correct.

Based on the interview excerpt, it was revealed that the SR subject met the flexibility indicator in re-checking the completion results. The SR subject recalculated the results of the work that had been done (SSR106). The SR subject re-checked using a different method, namely by doing manual calculations, and if there were steps in the solution that were logically correct, the final answer was considered correct (SSR104).

This section will discuss the results of research on the creative thinking profiles of ST and SR subjects in solving number pattern problems. Based on the research results, ST subjects, who are students with high self-efficacy, fulfill the creative thinking indicators, namely fluency , flexibility , and novelty . This is in line with the opinion (Tuzzahra et al., 2023) that there is an influence of high self-efficacy on mathematical creative thinking. The higher the student's self-efficacy, the higher the level of creative thinking. Self-efficacy and creativity cannot be separated from each other because they are closely related. High self-efficacy is related to vision while creativity is related to the thought process. Self-efficacy is related to student creativity in school, where every student's learning is directly related to creative intelligence, for example, students are guided by teachers in solving problems using images, lines, and other concepts. The following will be discussed in more detail the creative thinking profiles of ST and SR

subjects in solving problems according to Polya's equivalent with indicators of fluency , flexibility, and novelty .

Discussion

a. Creative Thinking Profile at the Problem Understanding Stage

Based on the test results and interviews with ST and SR subjects, it was obtained that ST and SR subjects could differentiate the concept of number patterns and problem forms that contain patterns. ST subjects could even mention being able to provide contextual examples according to their understanding of the problem. This is because ST subjects are students who have high self-efficacy. This opinion is in line with (Agus Susanta, 2020) that solving mathematical problems requires student creativity, student creativity requires self-confidence because students who have self-confidence will support in developing their ideas in learning. For example, developing example problems into real-world examples is important in learning mathematics. Meanwhile, SR subjects are still classified as lacking in providing examples of problems in the real world, SR still doubts what is understood in line with (Suciawati, 2019). The lack of creative thinking skills experienced by students when facing mathematics lessons can arise from a lack of confidence in solving mathematical problems. As a result, students are unable to optimize their abilities. Creativity in mathematics is termed mathematical creative thinking ability or briefly called creative thinking ability. The ability to think creatively is one of the higher-level thinking skills.

ST subjects are able to understand problems quickly because ST subjects often practice, unlike SR who need a long time in line with (Aksan, 2018) that a study on indicators of student problem understanding based on their ability to retell questions was conducted by Cummins and Verschaffel that what students remember is based on memory representations formed immediately after they read the questions. Students were asked to mention what they could understand when first presented with a question. Furthermore, students who have a complete and accurate understanding of the question will create better memory representations because their correct memory of the question information will mean that students understand the question correctly.

Subjects ST and SR understood the information contained in the problem with other ideas. Subjects ST were also able to provide abstract and concrete examples directly related to their interpretation due to their high self-efficacy and therefore their knowledge base. This

aligns with the opinion (Ishak Suryadi, 2018) that problem solving is an activity to find solutions to mathematical problems faced by utilizing existing mathematical knowledge.

Subject ST can analyze well and mention known problem information by separating the parts and looking for the relationship of the parts by presenting statements orally and in writing well with his own understanding in line with the results of Sukrening (2020) from the results of the work of the subject ST it appears that the subject can analyze the items contained in the problem. From the results of the interview it is also seen that the subject ST is able to explain the problem using his own language and sentences. Meanwhile, the subject SR identifies and mentions problem information after asking questions to match what he understands with existing information in line with the opinion of Purnomo et al. (2017) that students with low confidence tend to need clearer instructions or directions on how to solve problems. Subject SR expects information assistance to confirm his understanding because he is still doubtful about his abilities. Sumarmo (2012) states that problem solving can be in the form of creating new ideas, finding new techniques or products. Even in mathematics learning, problem solving has different interpretations, for example solving story problems, non-routine problems and applying mathematics in everyday life.

Subject ST expressed information in the problem using his own words and continued to look at the problem sheet, while subject SR still used the language in the problem. Subject ST stated the data contained in the problem completely and accurately and stated that the data provided was sufficient to solve the problem given. This is in accordance with what was stated by Sudarman (2011) that students are said to understand the problem if they can state what is known and what is asked using their own words, state the data contained in the problem completely, fluently, and accurately, and understand that the data provided is sufficient to solve the problem. In line with (Liawati & Wijayanti, 2020) Students with high self-efficacy were able to write down the known and asked questions in the questions accurately, completely, and fluently. Students with high self-efficacy wrote the statements in the questions into mathematical models accurately, completely, and fluently, while students with low self-efficacy wrote down the known and asked questions in the questions accurately, incompletely, and fluently. There were things known in the questions that were not written on the answer sheet.

The answers and interview results of subjects ST and SR at the stage of understanding the problem show that ST and SR meet the indicators of creative thinking, namely the indicators of fluency *and* novelty . First, they meet the fluency indicator *because* they provide many ideas in expressing all the information in the problem fluently and correctly. This is in accordance with the opinion of Ekayana (2020) that students have fluency in understanding the problem if they mention and write the information in the problem, namely the information that is known and asked in the problem, with various accuracy and fluency. Second, they meet the indicator of novelty *because* subjects ST and SR can understand the problem and translate the information in the problem with their own sentences. This is in line with the opinion of Leksmono (2019) that the indicator of novelty is if students are able to explore and translate the information in the problem according to their own language. Based on the description above, it was revealed that subjects ST and SR can understand the problem clearly and logically, but SR still has doubts due to the lack of honing his abilities with practice questions. In understanding the problems of ST and SR subjects according to the Polya equivalent of fluency *and* novelty *indicators* .

b. Creative Thinking Profile at the Problem -Solving Plan Development Stage

Based on the test results and interviews with ST and SR subjects, it was found that at the stage of compiling a problem-solving plan, ST and SR subjects tried to recall previously learned materials, namely number patterns, and used them to solve the given problem. This is in accordance with the opinion put forward by Hudojo (1988) that to solve problems, people must master previously learned materials and use them in new situations. At the stage of compiling a problem-solving plan, ST subjects used the concept of proposing a plan by taking the initiative to create a pattern with a difference of 10 to get the light to turn on in the 30th sequence, the information was organized to form a pattern that could make it easier for the subject, while SR subjects used the help of tables even though it took quite a long time. This is in line with the existence of self-efficacy which will have a positive impact on students in mastering the concepts of mathematics lessons (Akuba et al., 2020) with problems and being able to connect known data with existing concepts.

Subject ST developed alternative solutions to the problem given by the researcher using common or commonly used methods. Subject ST offered various solutions, namely three methods but following the same solution pattern. Subject ST offered several different

alternative solutions, namely two solution events in addition to the common method. In this case, subject ST provided solutions with more than one solution strategy, namely a common method and an uncommon method. This is in accordance with the opinion of Prayitno (2016) who stated that contextual problems require students to be able to combine various techniques, perspectives, and disciplines that will produce diverse solutions, which are guaranteed not to have only one correct solution.

The answers and interview results of ST and SR subjects at the stage of preparing a problem-solving plan show that ST meets the three indicators of creative thinking, *namely* fluency , flexibility *,* and novelty . First, it meets the fluency indicator *because* ST subjects offer more than one solution, namely a general way but following the same pattern. This is in accordance with the opinion of Munandar (2012) who stated that the fluency indicator is if it provides many ways or suggestions for doing various things. Second, it meets the flexibility indicator *because* ST subjects offer two different solution strategies, namely a general way and an uncommon way. This is in accordance with the opinion of Leksmono (2019) who stated that students have flexibility in making problem-solving plans if students are able to offer (provide) various solution strategies, different from the general strategy. Third, it meets the novelty indicator *because* ST subjects offer alternative solutions to problem solving in new, unique, and unusual ways. This is in line with Jagom's (2015) opinion that novelty refers to students' ability to answer problems by designing new and different techniques/methods or "unusual" methods used by students at their level of knowledge. Meanwhile, SR fulfills two indicators of creative thinking, namely *fluency* and *flexibility* .

c. Creative Thinking Profile at the Problem-Solving Plan Implementation Stage

Based on the test results and interviews with ST and SR subjects, it was found that at the stage of implementing the solution plan, ST subjects solved the problem in each step of the solution using high self-efficacy and based on logic. This can be seen when ST subjects made a pattern of light differences, namely a difference of 10 lights correctly. This is in accordance with the opinion of Rosidah (2014) who stated that high self-efficacy is the capacity to recognize and depict objects or patterns received by the brain. In line with research (Tuzzahra et al., 2023) there is a positive influence between self-efficacy and creative thinking skills in mathematics learning, researchers argue that if students have high self-efficacy, then the students are able to solve problems in a creative way.

Meanwhile, Subject SR solves problems in each step of the solution by using low self-efficacy so that he can only solve problems with the help of tables according to (Septhiani, 2022) Self-efficacy is able to have an important role in learning. With self-efficacy, students are able to choose productive, directed and planned actions to achieve optimal learning outcomes.

Subjects ST and SR also solved the problem with answers in an unusual way. This is different from the common way of solving the problem which is using a 10-digit pattern and the help of a table. This is in accordance with the opinion of Aisyah (2006) who stated that in principle we can combine several strategies when we are going to solve a mathematical problem solving problem. Even one problem solving problem can be solved with more than one strategy. Subject ST also solved the problem in a new, unique and different way from the previous solution strategy. In solving the problem with this new way, subjects ST and SR involved trial and error strategies, and logical thinking. This is in accordance with several mathematical problem solving strategies that have been put forward by Polya (1985), including; (1) trial and error; (2) making diagrams; (3) trying on simple problems; (4) making tables; (5) finding patterns; (6) breaking down goals; (7) considering every possibility; (8) thinking logically; (9) moving from behind; (10) ignoring the impossible.

The answers and interview results of SR and ST subjects at the stage of implementing the problem-solving plan show that ST meets the three indicators of creative thinking, namely fluency , flexibility , and novelty . First, it meets the fluency indicator *because* ST subjects solve problems with more than one solution, namely general methods but following the same pattern. This is in accordance with the opinion of Leksmono (2019) who stated that the fluency indicator is when students solve problems by providing several different ideas, but following the same pattern and producing the correct answer. Second, it meets the flexibility indicator *because* the subjects know the general method and different solutions. This is in accordance with the opinion of Siswono (2008) who stated that flexibility in problem-solving refers to students' ability to solve problems in various different ways. Third, it meets the novelty indicator *because* ST subjects solve problems in new, unusual, and different ways from previous strategies. This is in line with Munandar's (2013) opinion that novelty enables a person to produce new and unique expressions or to

find unusual combinations of ordinary elements. Meanwhile, Subject SR only fulfilled two indicators of creative thinking, namely *fluency* and *flexibility*

d. Creative Thinking Profile at the Re-Examination Stage

Looking back is not only about checking the correctness of the solution steps, but also includes considering alternative solutions and their representations, finding more efficient strategies, and using the process or method of solving other related problems. Therefore, students who perform the *looking back stage* well automatically have good abilities to review the three previous problem-solving stages (Leong, 2014). According to Krulik & Rudnick (1995), the fourth step of Polya's problem solving or *looking back* uses the term *look back and extend* which is divided into 4 parts, namely: (a) verifying the answer; (b) determining alternative solutions with interesting variations; (c) developing the answer in other situations (generalization/conceptualization) using "what if" questions; (d) discussing the answer

Based on the test results and interviews with the researchers with subjects ST and SR, it was found that at this stage, both subjects re-examined the work they had done by tracing the solution answers step by step in detail by calculating on a scratch sheet if they found work results that required recalculation. This is in line with Polya (1985) who stated that there are two ways of looking back on *the* results of work that have been done, namely: 1) tracing each solution result that has been done, and 2) using other methods to validate the results obtained in the first event.

Subject ST also rechecked his answer in a different way, namely by recalculating the results of the work that had been done step by step by mental calculation without doing calculations (scribbles) on the provided scribble sheet because if there was a solution step that according to his logic was correct then the final answer was considered correct too. In this case, subject ST used intuition in making conclusions directly. This is in line with the opinion of Mudrika & Budiarto (2013) that the type of intuition in the rechecking step is conclusive intuition with the following characteristics: drawing conclusions directly, summarizing in general with the basic idea of the problem that had previously been studied.

The answers and interview results of the two subjects at the re-examination stage indicate that ST fulfills the three indicators of creative thinking ability, namely fluency , flexibility , and novelty . First, it fulfills the *fluency* indicator because ST subjects re-examined by tracing step by step and recalculating. This is in accordance with Mairing's opinion (2018)

which states that the fluency indicator is when students test the results obtained and draw correct conclusions. Second, it fulfills the flexibility indicator *because* ST subjects re-examined their answers in a different way from the previous strategy, namely doing calculations mentally and using logic without doing calculations on a scribbled sheet. This is in accordance with Saraswanti's opinion (2018) which states that the flexibility indicator is changing the direction of thinking spontaneously in switching strategies. Third, it fulfills the novelty indicator *because* ST subjects re-examined their answers in new and different ways. This is in line with Silver's opinion (Siswono, 2007) that the novelty component is when students check answers with various solution methods and then create new and different methods. Self-efficacy plays a crucial role for students, as their confidence in learning mathematics will influence their learning outcomes (Pratiwi et al., 2019). Subject SR only met two indicators of creative thinking: fluency *and* flexibility .

Conclusion and Suggestion

At the problem-understanding stage , both students with high and low self-efficacy demonstrated creative thinking skills through *fluency* and *novelty indicators* . Both students were able to understand the information in the problem fluently and rephrase it using their own words, demonstrating the ability to capture the essence of the problem and interpret it in an original way.

Furthermore, at the stage of developing a problem-solving plan , quite striking differences were observed. Students with high self-efficacy demonstrated all three indicators of creative thinking: *fluency* , *flexibility* , and *novelty* . They were able to offer more than one alternative solution that followed a specific pattern, used different strategies, and demonstrated unique and unusual solutions. On the other hand, students with low self-efficacy were only able to demonstrate two indicators: *fluency* and *flexibility* , with a more limited number of strategies and approaches.

During the implementation phase of the problem-solving plan , students with high self-efficacy again demonstrated dominance across the three indicators of creative thinking. They were able to solve problems in a variety of systematic and innovative ways, using both common and uncommon strategies, even presenting approaches different from previous strategies. Meanwhile, students with low self-efficacy still demonstrated only two indicators: *fluency* and *flexibility* , without demonstrating any novelty in their strategies.

Finally, in the reexamining stage , students with high self-efficacy demonstrated more mature reflective efforts. They not only carefully reexamined the steps and calculations but also used a different approach from the initial strategy, demonstrating flexibility and novelty in their thinking. In contrast, students with low self-efficacy demonstrated only two indicators: *fluency* and *flexibility* , without displaying any novel approach to the reexamining process.

Overall, it can be concluded that students with high self-efficacy tend to show a more complete and comprehensive creative thinking profile than students with low self-efficacy, especially in the *novelty indicator* which appears consistent at almost all stages of problem solving.

The results of this study have important implications, namely providing teachers with information on how students with logical-mathematical intelligence think creatively based on their learning styles. These learning styles, in this case, are visual, auditory, and kinesthetic. This can be used by teachers to consider students' problem-solving steps by considering their different learning styles, whether visual, auditory, or kinesthetic, in order to improve students' creative thinking abilities.

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