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An Analysis of Students' Computational Thinking Skills on the Number Patterns Lesson during the Covid-19 Pandemic

Dwi Fitriani Rosali [1, *], Didi Suryadi[2]
[1,2]Department of Mathematics Education, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudhi No. 229, Bandung 40154, Indonesia

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Abstract
The development of the education curriculum in Indonesia makes students must have skills so that they can compete globally, especially in the 21st century. The development is closely related to technology and information. One of skills that support the development of technology and information is the computational thinking skills. This study aims to analyze students' computational thinking skills on the Number Patterns lesson during the Covid-19 pandemic. This study was qualitative-descriptive study with the subjects of 4 students from 8th grade in Makassar. The instruments used were a test of the computational thinking skills in the form of essay type test on the Number Patterns lesson and interview guidance. The results of this study indicate that all subjects meet the first indicator of problem decomposition and one subject meets the second indicator of problem decomposition, all subjects meet the indicator of pattern recognition, three subjects meet the indicator of abstraction and generalization, all subjects meet the first indicator of algorithmic thinking and two subjects meet the second indicator of algorithmic thinking on computational thinking skills. Thus, students' computational thinking skills during the Covid-19 pandemic are still low, so an educational framework is needed to improve students' computational thinking skills.

Keywords: Computational thinking, Number Patterns, Covid-19

(*) Corresponding Author: dewirosali@upi.edu

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INTRODUCTION

The development of the education curriculum in Indonesia is a challenge for Indonesia to develop a strategic educational framework. Moreover, the challenge dynamically makes Indonesia more sensitive to the development of the 21st century. The development of this century is closely related to the development of technology and information (Aryati, et. al., 2020). Along with the development of this century, Indonesia is also faced with the situation of the Covid-19 pandemic that demands Indonesia to implement the technology-based education. Thus, educators and students are expected to use the existing technology.

The use of technology can improve students' problem solving skills (Lee and Hollebrands, 2006). Problem solving skill is very important (Maulyda, et. al., 2020) and becomes one of the necessary skills in modern life (English and Gainsburg, 2015). Therefore, students are expected to have good problem solving skills and be able to use the technology as well as be expected to be able to create technology in the future.

The problem solving skill is not only about students are solving the problems, but also taking an effective approach in solving the problem, even concerning how they build their own methods in solving the problem. In relation to the use of technology, students are required to use it wisely. Therefore, it is necessary to integrate computational thinking in learning, especially in Mathematics learning (Weintrop, et. al., 2016).

Wing (2006) proposes that computational thinking skills should be considered as basic skills taught in the curriculum. The same is also found in (Bower et. al., 2017; Geary, et. al., 2000; Voogt, et. al., 2015; Weintrop, et. al., 2016). In line with that, some researchers, Hunsaker (2020), Román-González, et. al., (2017), Tabesh (2017) and Wing (2014) suggest that when entering the 21st century (which is closely related to technology and information), computational thinking skills become basic skills that must be possessed by all students as well as the ability to read, to write, and to count. Moreover, Institute for the Future published a document describing the skills that must be mastered or skills that are needed in 2020. One of the skills is computational thinking (Mohaghegh and McCauley, 2016). Buckley points out that computational thinking skills can improve the ability to think at the higher level which is also one of the important elements of the 21st century (Buckley, 2012).

Computational thinking is first introduced by Seymour Papert (Papert, 1990). After that, numerous studies have been conducted for the development and the exploration of the concept. Computational thinking is basically closely related to the computer science. However, computational thinking is a way of thinking in solving problems and in processing stages to obtain the solutions (Wing, 2006).

Computational thinking has various definitions described by previous researchers. Computational thinking originated from computer science, so many researchers define computational thinking by connecting it more to the field of computer science. Riley and Hunt (2014) state that the best way to identify computational thinking is that computational thinking is like the way computer scientists think and the way they reason. Sysło and Kwiatkowska (2013) emphasize that computational thinking as a set of thinking skills may not come from computer programming, but it should prefer focusing on computational principles than computer programming skills. Moreover, computational thinking is the process of recognizing the aspects of computing in the world around us and applying tools and techniques from computer science to understand how to reason about either original or artificial systems and processes (Furber, 2012).

Computational thinking can be also viewed in the perspective of problem solving that computational thinking is one of the approaches to solve problem (Hunsaker, 2020; Wing, 2008). In line with that, García-Peñalvo and Mendes (2018) suggest that computational thinking means an active problem solving method by which students use a set of concepts, such as abstraction, patterns and so on to process and to analyze data and create solutions to problems. Moreover, Aho (2012) states that computational thinking (as a thinking process) includes formulating problems so that the problem can be represented as computational stages and Algorithms.

According to Yadav, et. al. (2014), computational thinking is defined as a mental activity to abstract problems and to formulate automated solutions. Barr and Stephenson (2011) present the definition of compulsive thinking as a problem-solving process that includes characteristics: formulation of problems that make it possible to use computers and other tools to help the problem solved, to organize and to analyze data, to present data through abstraction, automation of solutions by algorithmic thinking, to analyze solutions that may obtain the most efficient solutions, and to generalize this problem solving process to a wider range of problems.

McClelland and Grata (2018) define computational thinking as a process of solving complex problems and breaking them down into smaller parts that are easier to solve. The process of solving complex problems into other smaller problems is called problem decomposition. This process is very helpful, especially for problem solver, in solving problems that basically cannot be solved directly. We can see the example in the proof of a theorem. Sometimes in the proof of a theorem, it is necessary to explore the simpler cases before, and the result is used as a lemma. Later, the lemma will be used to prove the main theorem.

Therefore, computational thinking is also closely related to computer science and how computer scientists think and reason. Moreover, computational thinking is a problem solving process. Then, it can be concluded that computational thinking is basically a set of problem solving processes as done by computer scientists according to certain method/methods.

One of the learning lessons closely related to computational thinking skills is the Number Pattern. In the lesson, students are required to recognize or to identify certain patterns or rules of a sequence of numbers. With the results of identifying the pattern, students will be able to break down the problem into easier parts to solve. In addition, students are also expected to form a pattern from problems. The skill to give a sense to a problem and solution should also be owned by students. With these skills, students will be easier to generalize solution to other different problems. The process of pattern identification and the process of pattern construction also require an algorithmic thinking process.

Next, in this research, the component of computational thinking skills are referred to the component of computational skill as described by Hunsaker (2020) and Lee, et. al. (2012). The components are problem decomposition, pattern recognition, abstraction and generalization, and algorithmic thinking.

Problem decomposition is the skill to break down the complex problems into simpler parts that are easier to understand and to solve (Angeli, et. al., 2016; Shute, et. al, 2017). The simpler parts are not random parts, but functional parts that collectively contain the whole system or problem. In relation to Number Pattern lesson, the decomposition process of the problem is divided into two indicators. The first is that students are expected to be able to write down the things that are known and are asked from the problems. The other is that students are expected to be able to use a certain summing technique to facilitate a simpler calculation. The summation is in the form of consisting of terms with a certain pattern. Students are asked to identify their characteristics.

The pattern recognition skill relates to the situation where the students should identify the regularity and deduce or construct a formation ruler (Barcelos, et. al., 2018). Pattern recognition includes finding similarities or patterns in problems that can help to solve complex problems in a more effective way. On the Number Pattern lesson, students are expected to be able to identify patterns or relationships contained in a sequence of numbers. The identification includes recognizing patterns in a summation consisting of specific terms.

Abstraction is the skill to give meaning (to model) key aspects of a problem (Shute, et. al,, 2017). This ability to create computational abstractions is important in solving multiple problems that have structural similarities but differ in detail (Weintrop, et. al., 2016). Meanwhile, generalization is the skill to formulate solutions in general so that they can be applied to other problems (Humpreys, 2015; Maharani, et. al., 2019). From the definitions, indicators of abstraction and generalization in the Number Pattern lesson are that students are able to identify the characteristics of a problem and are able to apply the obtained alternative solutions to similar new problems.

Algorithmic thinking is a skill related to design step-by-step solutions to problems (Angeli, et. al., 2016; Talib, et. al., 2019). Algorithmic thinking is different from coding which is a technical skill used in programming languages. Denning (2009) states that algorithmic thinking means mental orientation to formulate problems as conversion of multiple inputs into outputs and to look for algorithms to perform the conversions. Based on the meaning of algorithmic thinking as problem solving to obtain a sequent solution, pattern recognition indicators on Number Pattern lesson are divided into two indicators. The first, students are expected to be able to develop a pattern based on a given problem. The second is that students are able to develop the sequent process of solving a problem. The indicators of computational thinking skills in Number Pattern lesson are in the Table 1 as follows.

Table 1. Components and Indicators of Computational Thinking

Components	Indicators
Problem Decomposition	a. Students are able to write down the things that are known and are asked from the problems.
	b. Students are able to use a certain summing technique to facilitate a simpler calculation.
Pattern Recognition	a. Students are able to understand the given data, namely students are able to identify patterns or relationships contained in a series of numbers.
Abstraction and Generalization	a. Students are able to identify the characteristics of a given problem and to apply obtained alternative solutions to similar new problems.
Algorithmic Thinking	a. Students are able to develop a pattern based on a given problem.
	b. Students are able to develop the sequent process in solving a problem.

We have seen that the computational thinking is one the most important skills in this era and has a strong relation with the Number Pattern lesson. Therefore, we need to pay attention on it. As a first attempt, we want to know the students' skill related to the computational thinking skill. So, the purpose of this study is to describe the computational thinking skills of students on the lesson of Number Pattern during the Covid-19 pandemic.

METHODS

The research method used in this study was descriptive-qualitative research. The qualitative research conducted in this study focussed to describe the students' computational thinking skills on Number Pattern lesson. By this method, we obtained data in form of descriptions about the computational thinking skills of students on the lesson of Number Pattern during the Covid-19 pandemic. The subjects in this study were 4 students from 8th grade junior high school in Makassar. This research was conducted during the Covid-19 pandemic. The instruments used in this study were computational thinking skills tests and interview guidelines. The test was adopted from some articels regarding computational thinking, then the test and the interview guidelines had been validated by the expert lecturer. The computational thinking ability test consisted of 3 questions in the form of essay test on the Number Pattern lesson. It was used to measure the extent of students' computational thinking skills. Interview guidelines were used to reveal more in-depth about the computational thinking skill of Number Pattern lesson.

The data collected was in the form of computational thinking skill test results and interviews of some students. The data was then analyzed by using data analysis techniques. The steps of data analysis in this study were data reduction, data display, and conclusion or verification. Data reduction was used to collect data, to reduce data for obtaining the important things, and to summarize the data. Data display was focussed on organizing the reduced data and pesenting the data in form of narrative text, and this step was also used to make an easier understanding and to determine the next steps. While, conclusion or verification was the last step in data analysis that was expected to clear up the findings obtained in the research. The conclusion was drawn based on the data display and the discussion of the theory used in this study.

RESULTS & DISCUSSION

Results

The exposure of the results of the study refers to indicators of computational thinking skills in accordance with what described before. The research data is analyzed with the code "S_1" to represent the first subject, “S_2” to represent the second subject, “S_3” to represent the third subject, and “S_4” to the fourth subject, and “P” to represent the researcher. The research results based on the components of computational thinking skill are as follows.

Problem Decomposition

On the stage of problem decomposition, the four subjects basically have been able to identify and to understand about what is known and is asked of the question or problem. This can be shown from the results of the subject's answers and the interviews that have been conducted. Subjects can give explanations well, so the subjects do not have difficulty on the first indicator of problem decomposition. The stage of problem decomposition is an important step because the obtained results form this step will then be used to obtain a solution to the main problem.

Unlike the first indicator, there is only one subject that can meet the second indicator of the problem decomposition well. The subject is the fourth subject. The answer of the fourth subject is shown in the Figure 1.

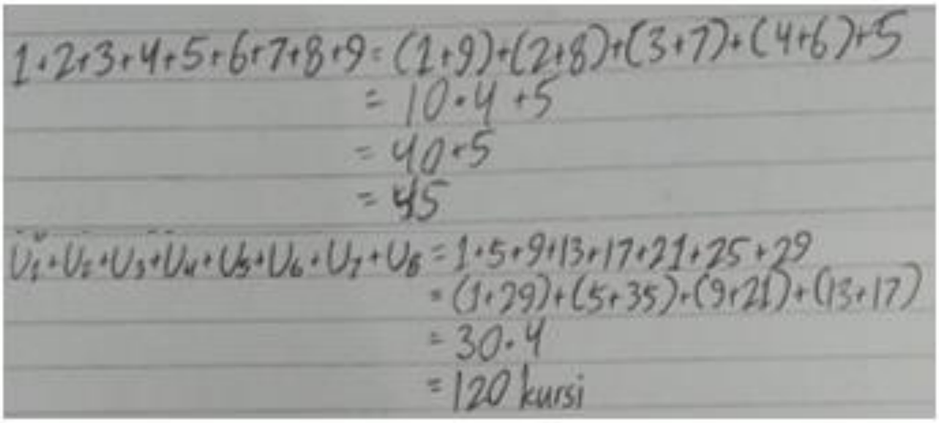


Figure 1. Answer of S_4

S_4 knows that there are at least two different ways to solve the problem, namely by counting them one by one and by using the way shown in the figure 1. It can be also seen based on the interviews that have been conducted.

S_4 : $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9$. *Actually, there are two ways I know, the first one is by adding the term from the beginning to the last. Sometimes, there is an annoying problem that includes the sum until* 2021. *To solve the problem, I use the second way, by adding the first and the last term, and then multiplied by its count. I learn it from the school book.*

This method is chosen because it will be much easier to do, especially when facing the problems involving summation with many terms. Thus, S_4 is already able to reduce a problem to another problem that is simpler and much easier to solve.

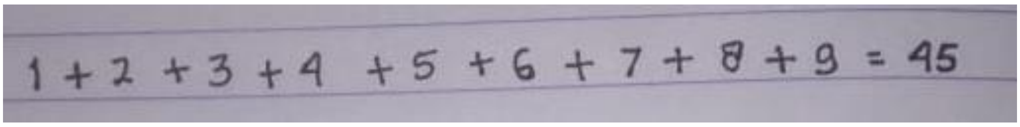


Figure 2. Answer of S_1

Unlike S_4, the other three subjects sum each term one by one to obtain the answer as in the Figure 2. From the, the subjects do not know any other way to solve it, moreover, the easier way especially when faced with the summation with many terms.

Pattern Recognition

The answers of the subjects related to pattern recognition are presented in the Figure 3. Subjects are required to determine the pattern of the given sequence of numbers by identifying the relationship between the previous number and the following number. Subjects are then asked to explain the general pattern of the sequence of numbers.

The third subject observes that the second number is the first number summed up by two, the third number is the second number summed up by two, and so on. Thus, all the three subjects have been able to identify that the pattern or rule of the sequence of numbers is to sum up two to the previous number to obtain the following number. The subjects' answers are basically the same. The slight difference lies only in the answer of the fourth subject. The subject does not write down the pattern in general.

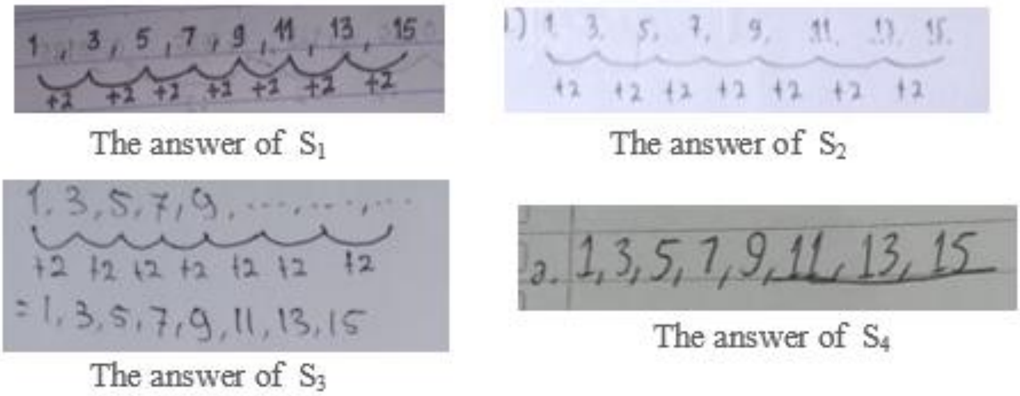


Figure 3. Answers of the subjects related to pattern recognition.

P : *What is the pattern?*
S_4 : *Odd number.*

P : *Anything else?*
S_4 : *The value is always summed by* 2 *from the previous one.*
P : *What is the characteristic of the odd number sequence?*
S_4 : *The characteristic is that there is no number in the sequence that can be divided by* 2.
P : *So, what is general form of this problem?*
S_4 : *If the question is to find the 101st term, we cannot use the usual summation technique. However, we should use the formula* $1 + 2$ *times* $(n - 1)$. *So, the answer is* $1 + 2(n - 1)$.

From the interviews with S_4, it is obtained that the subject considers the row as the sequence of the odd numbers, namely by summing 2 to the previous number. Besides of understanding it structurally, the subject understands that the rule will not work properly if we are faced with a higher order determination, such as above 100. S_4 provides a general formula to determine the $n - th$ number, or in more specific words, the $n - th$ odd numbers. Therefore, the subjects are able to recognize the pattern well, but with the different analysis order among subjects.

Abstraction and Generalization

At the abstraction and generalization components, subjects are expected to be able to identify the characteristics of the problem and be able to apply obtained alternative solutions to similar new problems. From the results of the analysis of subjects' answers and interviews, it is found that 1 of 4 subjects do not meet these criteria.

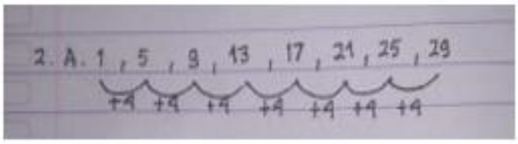
S_1 is unable to apply the technique of the solution he or she provides to other similar problems related to determine the next number based on the previous number. This can be seen from the following interview scripts.

P : *If the problems consist of two terms. For example, added by 4, and added by 2, have you accustomed with the problem or have you ever seen a problem like that?*
S_1 : *Not yet, I have not been taught ye. Just with the similar pattern in general.*

S_1 does not apply his computational thinking here because the subject just memorizes the rules, so he will find it difficult when facing other forms of patterns. Therefore, the skill of S_1 in abstraction and generalization are still lack. The subject gives a reason that he/she has not been yet taught. However, the subject actually still can capture the meaning of the pattern if he/she understands the essence of the pattern in general. From these results, it can be seen that the skills to abstract and to generalize are still needed to be improved.

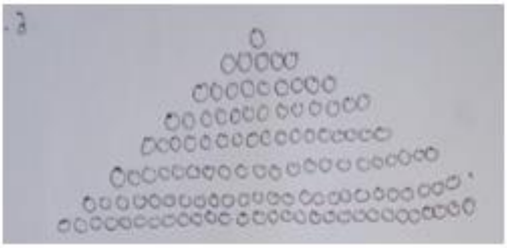
Algorithmic Thinking

At the algorithmic thinking component, subjects are expected to be able to develop a pattern based on a problem. From the results of answers and interviews of subjects, all subjects have been able to develop a pattern of a problem.

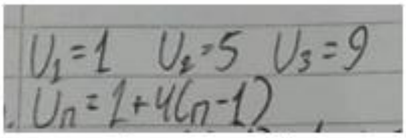


The answer of S_1

The answer of S_2



The answer of S_3



The answer of S_4

Figure 4. The answers of the four subjects related to indicators of developing a pattern

The subject's answer to this indicator is given in the Figure 4. The problem is as follows.

> *In a reception, there are chairs arranged with the rule that the first row consists of 1 chair, the second row consists of* 5 *chairs, the third row consists of* 9 *chairs and so on. Write the pattern of the arrangement of the chairs! How many chairs in the eighth row? How many chairs in total from the first row to the eighth row?*

Each subject has basically understood the problem, this is indicated by the subject's ability to develop the pattern. The patterns that the subject arranges have their own differences, although they basically give the same meaning. S_1 and S_2 have the similar answers, but S_1 provides more information.

S_1 : From the problem, I know that in the beginning, there is 1 chair, next 5 chairs, and then 9 chairs, and so on until the 8th row I create the pattern one by one and I get 29.

P : How do you find the next term?

S_1 : This is similar to the problem in number 1, I add 4 to the previous term.

S_2 does the same thing as S_1 does, by identifying that the pattern formed from the problem is to sum 4 to the previous number to obtain the next number. This can be seen from the following interview scripts.

S_2 : The number of chairs in the first row is 1, the second is 5 chairs and the third row is 9 chairs.

P : How is the next step?

S_2 : Hence, I construct the pattern 1, 5, 9. So, the pattern is adding 4 to the previous term.

Unlike the two previous subjects, S_3 gives the same pattern, but with different representations. The subject arranges them in order from the top to the bottom. Meanwhile, S_4 prefers to arrange the pattern in the form of a general formula Un. The following is the interview scripts with S_4.

S_4 : For the second problem, we know that the first row consists of 1 *chair, the second row is of* 5 *chairs dan the third row is of* 9 *chairs. Thus, my first sight that I see we always add* 4.

P : What is the pattern in the problem?

S_4 : The pattern is determined by the formula $Un = 1 + 4(n - 1)$.

P : *So, How the pattern in the form of sequence?*

S_4 : *If we form the sequence, we get* $1, 5, 9, 13, 17, 21, 24, 29, \cdots$

Subjects are also expected to be able to develop the sequent process of solving a problem. The solution is based on the given pattern, either the pattern given in the question or the pattern developed by the subject based on a problem. The subject's answer to the indicator is given by Figure 5.

Subjects present their answers in detail. In this problem, subjects are asked to determine the number of seats in the eighth row and the total number of seats from the first row to the eighth row. S_1 uses the formula of arithmetic sequences to solve the problem.

P : *For the problem 2.b, why do you us this formula? (arithmetic sequence)*

S_1 : *Because I follow the formula that has been taught when we learn number pattern lesson*

P : *When you were taught by your teacher, were you taught the formula directly?*

S_1 : *Yes, when my teacher taught by google classroom, we were given the formula like that (arithmetic sequence)*

P : *Except by using this formula, is there another way you know?*

S_1 : *I do not know another way*

S_1 is able to develop solution to the problem, but the subject does not apply his computational thinking yet. This is indicated by the use of the formula, although S_1 has understood the pattern he has created. From the results of the interview for the problem, the subject only uses the formula, without understanding the meaning/sense. The same results are also obtained for S_2.

P : *When you were taught the formula, did the teacher explain the derivation of the formula?*

S_2 : *No, my teacher just told us that this is the formula if we faced problems like this.*

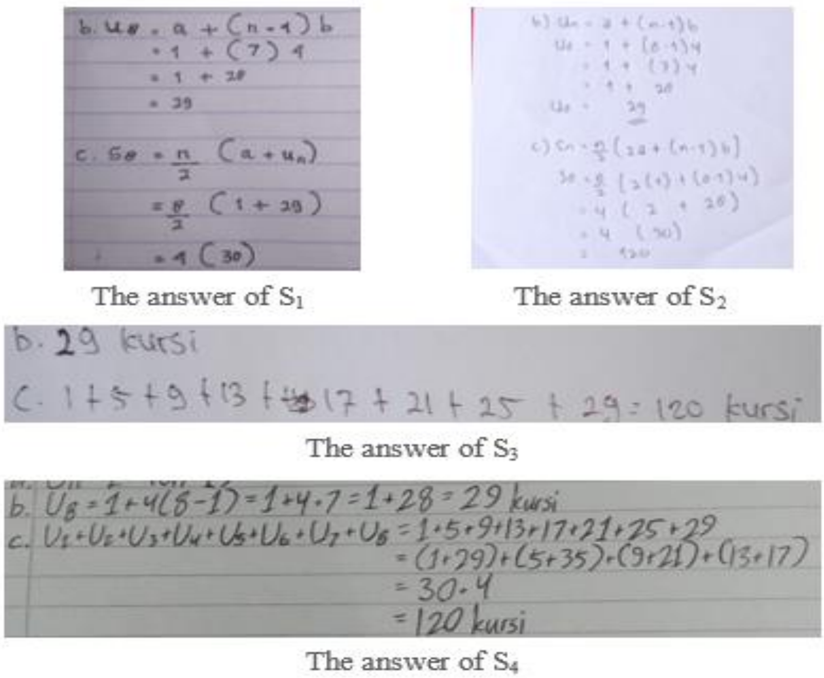


Figure 5. The answer of the four subjects related to indicator developing sequential solution.

Next, S_3 has been able to develop a solution to the problem by using information from the existing pattern as in the following interview scripts.

P : How is the solution for the problem 2.b?
S_3 : We know that the first row is of 1 *chair, the second row is of* 9 *chairs, the fourth row is of* 13 *chairs, and so on until the eighth row I get* 29 *chairs. So, from the pattern I see, I get the pattern is that each term is added by* 4*.*
P : Is there another way except by this representation?
S_3 : The number is added 4*.*
P : Except it, Is there another way?
S_3 : No.
P : How is the solution of 2.c? What is asked in the problem?
S_3 : How many chairs overall from the first row to the eighth row. So, I count the sum from the first row until the eighth row.
P : How do you get this answer?
S_3 : I sum one by one.
P : by calculator?
S_3 : without calculator, I calculated it by myself. But, from the beginning to the last.
P : Is there the pattern?
S_3 : Hmmm. Yes. We can calculate it from the beginning to the last, so $1 + 29 = 30$*, and so on.*

S_4 also uses the formula, but he/she is able to understand the use of the formula and give another further analysis. The subject understands that he or she will get the desired solution if he/she adds 4 to the previous number, but he thinks more about how efficient it is, especially if the problem involves high terms. S_4 also applies the technique he/she uses in the previous problem before in order to solve the second problem with the understanding that the problem is a problem about series (summation).

P : How is the solution of 2.b?
S_4 : Because we are asked the eighth term, I use the formula that I get in 2.a.
P : Why do you use the formula? Why do not you sum up one by one, so each term is added by 4*?*
S_4 : Maybe because I am used to do it like that. And it is difficult if we faced the question with higher term, for example 2021*, so I am used to use the formula like that.*
P : So, if there is another similar problem, do you still use this formula?
S_4 : If the question is about until the fifth row, maybe I prefer to use manual way, by adding term by term by a certain number, but if more than that, I should use the formula.
P : Is the formula that you use gotten by yourself or taught by your teacher?
S_4 : The teacher taught me. So, I just need to remember the formula.

Discussion

Based on the results, it is obtained some important findings related to the students' computational thinking skills. Generally, Students have had good skills in the first indicator of the problem decomposition. The students also have good skills in the pattern recognition component, but students just have good skills in the first indicator in the algorithmic thinking component. Meanwhile, students are still lack in other parts. The parts are the second indicator of problem decomposition component, abstraction and generalization component, and the second indicator of algorithmic thinking component.

Overall, in the problem decomposition component, the results are that subjects are able to do identification and to understand about the things that are known and are asked from the given problems. It is a good start for them. By knowing this, at least the students know what they have and what they want to achieve. However, subjects are still lack in breaking down a problem into another simpler problem.

At the pattern recognition component, subjects are able to recognize the patterns well, but with a note that each subject has a different level in analyzing the pattern. For example, a subject explains how to determine the next number by knowing the previous number. The other subject explains how to determine the next number by knowing the previous number and how to determine the number in the n-th position. In other words, there is subject giving more explanation about the fact in the pattern.

Subjects' skills are also still lack related to the third computational thinking component, that is abstraction and generalization. We find that there is subject who is not able to identify the characteristics of a given problem and are not able to apply obtained alternative solutions to similar new problems. The problem in this case is about the lesson of Number Pattern. The subjects still do not understand the meaning and the structure of the pattern in general deeply. The lack in understanding the meaning and the structure deeply implies that the students cannot obtain an alternative solution to solve another problem that is similar to the previous one. Therefore, this skill needs to be improved.

The last component of computational thinking in this study is the algorithmic thinking component. Subjects have been able to arrange the patterns of certain numbers in accordance with the problem, and subjects could develop a systematic solution. However, there are some notes about that. The notes are that subjects prefer to use the formula either for arithmetic sequence or for arithmetic series, but they do not fully understand the formula. Sometimes, it is very useful when students are faced with a problem that consists of arithmetic sequence or its variety, but not very useful when they are faced with the problem that consists of other type of sequence, for example a sequence of the quadratic natural numbers. So, we can say that subjects do not involve their computational thinking on the pattern as mentioned in the results.

Overall, the classification of components of computational thinking on each subject is shown on the Table 2.

Problem decomposition becomes very important part in solving problems because it is the first step to solve the problems (Rich, et. al., 2019). By this step, students are expected to know the things that are known and are asked from the problems and to do decomposition. Decomposition is an activity that divides the whole problems into smaller problems that can be solved (Palts and Pedaste, 2020). Decomposition is very required when facing large problems and/or complex task (Selby and Woollard, 2013). Hence, this skill can be extended to daily activity and becomes a skill that supports students to live in society.

As the first step, problem decomposition will affect the next steps greatly. If students have been good skills in problem decomposition, students will have bigger opportunity to solve the given problem. But, if the students still do not have a good skill on the component, students will be lost in the process of solving the problem. However, the results indicate the fact that problem decomposition becomes the least component in term of the number of subjects who satisfy the indicators, especially the second indicator, that is decomposition, as shown in the table.

Table 2. The Classification of Component of Computational Thinking

Components	Indicators	Subjects who satisfy the indicator
Problem Decomposition	a. Students are able to write down the things that are known and are asked from the problems	S_1, S_2, S_3, S_4
	b. Students are able to use a certain summing technique to facilitate a simpler calculation	S_4
Pattern Recognition	a. Students are able to understand the given data, namely students are able to identify patterns or relationships contained in a sequence of numbers	S_1, S_2, S_3, S_4
Abstraction and Generalization	a. Students are able to identify the characteristics of a given problem and are able to apply obtained alternative solutions to similar new problems	S_2, S_3, S_4
Algorithmic Thinking	a. Students are able to develop a pattern based on a given problem	S_1, S_2, S_3, S_4
	b. Students are able to develop the sequent process in solving a problem	S_3, S_4

These results show that problem decomposition skills become the most difficult computational thinking skill. The finding has been as stated by Selby (2015) that the cause of the difficulty is the lack of problem exercises conducted by students so that students are not accustomed solving more complicated problems. Moreover, questions or problems that are given in the class are usually in the form of routine questions or routine problems. Teachers should give non-routine questions, as it is known that non-routine problems can improve students' problem solving skills (Arslan and Altun, 2007).

When facing routine problems, we can guess the process from undersanding the problem until finding the solution directly. So, it just gives students' repetition problem solving activity. Students do not get more ideas in solving problem. Non-routine problems can be seen as problems having results that we cannot guess in advance (Saygılı, 2017). In other words, we cannot solve the problem directly. We cannot solve the problems by using either a known method or a known formula. Sometimes, we have to use several methods or fomulas. We have to do analysis, trial and error, and creative thinking to solve them. Moreover, the thoughts and approaches are more important than the achievement of the answering when solving non-routine problems (Mayer, et. al., 1995). Therefore, the involvement of non-routine problems can give more excellent ideas in solving problem.

Another deficient component is abstraction and generalization. This is in line with what Rijke, et. al. (2018) and Rich, et. al. (2019) have found. This is because students are accustomed to memorizing the formula without understanding its meaning. Understanding the meaning of the formula is important because it facilitates students when they try to remember the formula and when they want to use it. Moreover, student can also easily know wheter the formula can be used or not when facing a certain problem. To minimze this difficulity in abstraction and generalization, teacher can give students a problem that does not let them to use the formula in direct way, and students have to think about the fitness of the formula and the given problem.

The algoritmic thinking is thinking about how to find an algorithm to solve a certain problem. Futschek and Moschitz (2010) have found that inventing algorithms is one of effective learning methods. Students are also still having difficulty in algorithmic thinking. This is in line with Burton (2010) as well as Plerou and Vlamos (2016). Students is difficult when developing the sequent process in solving a problem. One of the possible causes is that students tend to refer to use the formulas without really understanding the given problem and the formula that they use.

Students should understand the given problem and the used formula, so they can know more about what the carachteristics of the problems that allow them to use the formula. Hence, students will use the right formula for the appropriate problem when facing another problem. Not only for problem solving in Mathematics, but also for problem solving in daily life, especially in society.

Recently, computational thinking is very developing in accordance with the Era of Evolution Industry 5.0. Moreover, the human being is fighting with the Covid-19 pandemic. This required us to be sensitive with the change that happens quickly. The computational thinking will be a very strong skill that can help students to live in society in the Era of Evolution Industry 5.0 and beyond. Therefore, the lacks of students' skill on computational thinking should be addressed because of the reason and also because computational thinking is one of the cognitive skills that must be developed in all areas of education (Rich, et. al., 2019). Moreover, a student can use computational thinking to expand his or her thinking beyond clear solutions, regardless of class as it encourages student's initiatives and innovations (Sanford and Naidu, 2016). The causes that are presented should also be taken into consideration.

CONCLUSION

As a conclusion in this study, in this pandemic Covid-19, students are still lack on computational thinking skills. It is indicated by several unmet indicators of each student. In the component of problem decomposition, all subjects have met the first indicator that is that the subjects are able to write down things that are known and are asked from the problem. However, there is only one student who uses a certain summing technique to facilitate a simpler calculation. In the pattern recognition, all of the subjects are able to understand the given data, namely students are able to identify patterns or relationships contained in a sequence of numbers. Next, three subjects have fulfilled the abstraction and generalization component, that is that students are able to identify the characteristics of a given problem and are able to apply obtained alternative solutions to similar new problems. In the algorithmic thinking, all subjects meet the first indicator and students are able to develop a pattern based on a problem. Meanwhile, there are only two students who are able to develop the sequent process in solving a problem. From these findings, it is needed to be underlined that the skills of students in problem decomposition and some other components are still very lack. For future research, we should establish certain methods or a set of learning instruments to tackle the lacks.

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