Computational thinking analysis in solving elementary school AKM numeracy problems

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Abstract: Computational thinking skills play an important role in developing students' critical and logical thinking skills in solving problems. The purpose of this study was to explore computational thinking skills in all aspects (decomposition, abstraction, pattern recognition and algorithm) of grade IV Special Programme Learning Primary School in urban areas in solving AKM numeracy problems. Data collection was carried out through written tests, interviews, and documentation. The method applied in this study was qualitative with a case study design. The data validity test used was the source and method triangulation technique. In the data analysis technique, qualitative analysis techniques were used, namely data reduction, data presentation and drawing conclusions. The results of the study showed that the computational thinking ability of students can be categorized into complete and uncomplete. Learners with the complete category fulfill all four indicators of computational thinking, namely being able to decompose complex problems into simple ones (decomposition), being able to formulate important information (abstraction), identifying patterns (pattern recognition) and being able to compile systematic logical steps (algorithms). Learners with uncomplete abilities have not fulfilled the four indicators of computational thinking, namely namely some learners can identify relevant information (decomposition, abstraction), recognize patterns (pattern recognition) but most have not been able to design problem solving steps systematically (algorithms) and there are also some learners who have not been able to understand the problem at all and analyze problem solving.

Keywords: Computational Thinking, Minimum Competency Assessment, Numeracy, PISA

INTRODUCTION

In digitalization era, the rapid development of information and technology today brings substantial effect on education realm. It is the challenge difficult to face by the students in the future because the ever changing, uncertain, and complex condition (Fischer et al., 2023). This requires the improvement of graduated students' competency and skill to be competitive globally in facing Industrial Revolution 4.0 era. Thus, the students need to be equipped with adequate skill by implanting the 21st-Century life competencies (Oluwagbohunmi & Alonge, 2023).

A variety of challenges faced by the students in this globalization era requires an education system that can create generation with excellent competency and high-order thinking ability. The attempt of improving the quality of education departs from the development of critical thinking and problem solving skills in daily life (Öztürk, 2023). The competency is very important and urgent to possess by the students. This is in line with what is suggested by National Science Teacher Association (NSTA) (Abeden & Moi, 2022). One of competencies necessary to possess by the students in improving their critical reasoning ability in helping solving the complex problems is Computational Thinking (CT) ability (Dağ et al., 2023b) (Dağ et al., 2023)

Computational thinking is a series of mental activities that are abstract in nature. There are some indicators of CT stage including, among others: decomposition (decomposing complex problems into the simple ones), abstraction (generalizing or classifying), algorithm and procedures (procedure of solving problem), pattern recognition (recognition of problem pattern), and debugging/troubleshooting (removing error in problem solving) (Su & Yang, 2023). Computational thinking ability as a high-order thinking skill (HOTS) can help solve problem and improve performance in mathematic problems (Ersozlu et al., 2023).

CT skill is closely related to mathematic learning. In addition, it also contributes to technology development as a support. This is relevant, because mathematics support the way of thinking of decomposing complex problems into the simple ones as the solution (Mitrayana & Nurlaelah, 2023). CT-based mathematics learning contributes to improving learning outcome and activeness in training the students to be disciplined, independent, prestigious and having character (Sutama et al., 2023). In the attempt of developing computational thinking, the questions involving HOT-oriented non-routine problem solving ability are posed (Zaharin et al., 2018). The problem solving ability of students in Indonesia in high-order non-routine problem is still weak, as indicated with the result of PISA.

The result of survey conducted by Program for International Student Assessment (PISA) shows that the students' ability of analyzing problem solving in non-routine problem is still weak. In 2018, Indonesia ranks 72nd out of 78 countries in numeracy and literacy value, and 70th out of 78 countries in science field (McComas, 2019). The score of mathematics and science ability obtained in Indonesia is 379 (Maamin et al., 2021). The score decreases by 13 points in 2022, with the score of 366 (OECD, 2023).

One of high-quality educational indicators can be measured from the result of evaluation as the reflection of students' ability of solving problem. The students' low literacy and numeracy are also affected by the use of evaluation system in Indonesia at lower level (Sari et al., 2023). The National Assessment Program is an initial step in developing and improving the students' literacy and numeracy. Minimum Competency Assessment (Indonesian: Asesmen Kompetensi Minimum or AKM) as a parameter of basic competency assessment in mapping the quality of education as minimum competency including input, process and outcome evaluation in the attempt of improving and mapping the quality of learning, teaching, and educational service to the community (Susanto et al., 2023). One of abilities tested in AKM is literacy and numeracy ability being an indicator of learning and education qualities at each level of educational unit (Noviantini et al., 2023).

Majeed et al., (2022) study found that the learning prioritizing computational thinking process can evidently improve the students' logical reasoning ability and the ability of

adapting to technological advance. The related studies conducted by Sudadi et al., (2023) showed that the students' computational thinking ability based on metacognitive consciousness of problem solving including such aspects as abstraction, pattern recognition, and decomposition. Another study was also conducted by Simanjuntak et al., (2023) on the computational thinking ability of solving PISA problem, finding that not all students can attend the computational thinking process, some answers are inappropriate because the students understand poorly and do the calculation not carefully. On the other hand, two answers are appropriate (correct) in accordance with the computational thinking process. Considering the answer, it can be found that basically the students have had good mathematic computational thinking ability.

Recalling the importance of paying attention to computational thinking ability in understanding the problems in solving AKM numeracy questions, the students need to be introduced and trained with computational thinking earlier. This is because elementary education is an early basic foundation in implanting basic concepts appropriately. This is intended to prepare the students' thinking ability to be created systematically in solving various problems the students faced in the future (Morze et al., 2022). Therefore, the students need earlier understanding in solving mathematic questions not only based on concept or formula application but also by applying logical thinking ability (Zainudin & Zainudin, 2023).

METHODS

Research Subject

This research method is a qualitative research. This qualitative research method focuses on direct experience and in-depth insight into reality about variable, symptom, condition or complex variable (Toker, 2022). This research aims to explore the students' computational thinking ability in all aspects (decomposition, abstraction, pattern recognition and algorithm) in solving AKM-oriented numeracy questions. Data obtained include story, statement, and documentation of test result photograph organized in the form of description text (Aspers & Corte, 2021).

The subjects of research are the 4th graders of Special Program of SD Muhammadiyah (Muhammadiyah Elementary School) Kottabarat of Surakarta. The subjects of research were selected based on their mathematic ability. The author interviewed the mathematics teachers first and observed the result of daily quiz score and mid-semester summative score. Then, she classified the students with high, medium, and low mathematic abilities so that 3 students were selected to be the subjects of research.

TABLE 1. *Research subject*

Name of Student	Subject
AW	S1 (Subject 1)
LL	S2 (Subject 2)
AS	S3 (Subject 3)

TABLE 2. *Student Achievement Results*

Number of Students	Minimum Score	*Maximum Score*	Mean	Standard Deviation
27	3	300	30.67	23,03

TABLE 3. *Indicator of computational thinking*

Aspect of Computational Thinking	Description
Decomposition	Students are able to analyze important information known and questions posed
Abstraction	The students are able to formulate necessary information and to remove unnecessary element in converting problem into mathematic model
Pattern Recognition	The students can understand and identifies same or different pattern in solving problem.
Algorithm	The students can arrange the procedure of solving problem systematically.

Research Instrument

This research was carried out based on the exploration of the students' computational thinking test in solving AKM numeracy question as the main instrument. The instrument tests were 3 essay questions with numeric domain. The questions were composed based on 3 (three) cognitive levels: understanding, application, and reasoning with personal and social-cultural contexts.

Research Procedure

Data collection in this research involves some stages: 1) Data collected from the result of answering AKM numeracy question test and interview. Interview was carried out to confirm the process of answering the question. Interview was carried out directly in non-structured manner, aiming to obtain more detailed information. Interview recording was carried out using android gadget so that the subjects' speech can be stored; 2) the recording of each subjects is converted into interview dialog text; 3) data result categorization; 4) data reduction and display; 5) data validation.

Data verification with source triangulation was carried out through interviewing headmaster, teachers, and students. In method triangulation, the author analyzed the difference and the similarity of data of paper-based test result and the result of in-depth interview with the students. Data analysis was carried out using a qualitative analysis technique. Triangulation process would be continued again then if the inconsistent data was obtained, until the consistency of research subject's statement was obtained to get valid data.

Data Analysis

Data analysis in this research consists of a series of stages including: 1) coding; 2) data classification; 3) data reduction; 4) data display; 5) analyzing and interpreting computational thinking in answering AKM numeracy questions; 6) drawing conclusion. provided.

RESULTS

Based on table 2 in this study attended by 27 students with a minimum score of 3, it shows that students have great difficulty in solving AKM numeracy problems. While learners with a score of 87 have been able to understand the problem. The overall average score of students is 40.04, this shows that most of the numeracy skills of students are still low. In addition, the results of the standard deviation of 23.03 were obtained, which showed a significant variation among the abilities of students. Data of research on the indicator of computational thinking is analyzed and presented in Table 3.

Considering the description of each indicator of computational thinking, the result of analysis on the solution to problems in AKM numeracy is presented in the table 4.

TABLE 4. *Problem solving solution*

Aspect of Computational Thinking	Description		
	Question 1	**Question 2**	**Question 3**
Decomposition, Abstraction	Known: Mother bought 9 portions of kasuami IDR 20,000, colo-colo grilled fish IDR 30.000, and green banana ice IDR 7,000. Questioned: a. Total cost of order b. Change money Mother received when she paid 600,000 with tax of 10 %	Known: Option 1: hair cut IDR 10,000, hair wash and straightening IDR 20,000, short hair coloring IDR 90,000, short hair spa IDR 100,000, Option 2 blow wash cut IDR 15,000, medium hair coloring IDR 110,000, medium creambath IDR 75.000, extra toning treatment in option 1 Questioned: a. Total cost of each option b. Determining a more economical option c. Determining the option appropriate to the budget d. Total cost with extra toning treatment	Known: a zoo has 3 cages. Cage I contains 8 bears, cage II contains 6 bears, and cage III contains bears, the number of which as same as that in cages I and II. Each of bears needs 2.5 kg fruits costing IDR 8,000/kg. There are 30 visitors each of which brings 1 kg fruits Questioned: a. Total number of bears in the zoo b. Total fruits needed by all bears within 1 week c. Total cost spent for the bear for 1 week d. Determining the adequacy of fruits brought by the visitors
Pattern Recognition, Algorithm	a. Total cost = 9 × 20,000 + 9 x 30,000 + 9 x 7,000 = 513,000 b. Tax of 10 % x 513,000 = 51,300. Total cost 513,000 + 51,300 = 564,300. Change money = 600,000 – 564,300 = 35,700	a. Option 1: IDR 10,000 + IDR 20,000 + IDR 90,000 + IDR 100,000 = IDR 220,000. Option 2: IDR 15,000 + IDR 110,000 + IDR 75,000 = IDR 200,000 b. More economic option is the Option II (IDR 200,000) c. Options conforming to the budget are both options d. Extra cost: IDR 220,000 + IDR 140,000 = IDR 360,000	a. Total number of bears = 6 + 8 + 14 = 28 b. Total amount of fruits = (total number of bears x need for fruits per bear per day) x number of day = 28 x 2.5 kg/bear x 7 days = 490 kg c. Total cost = amount of fruits x cost per kg. Total cost = 490 kg x IDR 8,000/kg = IDR 3,920,000 d. Total amount of fruits brought by the visitors = 30 x 1 kg = 30 kg Thus, it is not enough because the need for fruit per day is 28 bear x 2.5 day = 70 kg.

FIGURE 1. *S1's answer sheet for question number 1*

Based on the percentage of indicators of students' computational thinking ability in solving AKM-oriented numeracy problems, it can be categorized as complete and uncomplete.

Complete Computational Thinking Category

SI's answer sheet with score of 87 as shown in Figure 1 has been able to elaborate important information to be written as "known" and "questioned" in the answer sheet. The students also have been able to convert numeracy problem into mathematic model. This can be seen from the result of interview with S1 in the following dialogue.

P   : Explain what important information that you can write on "known" and "questioned" in the question number 1?

S1   : It is found out that Mother ordered of 9 portions colo-colo grilled fish IDR 30,000, kasuami IDR 20,000, and green banana ice IDR 7000. It is asked the total cost Mother should pay and so is Mother's change money with tax of 10% if mother paid with money amounting to 600,000.

P   : In your opinion is there any unnecessary information written down? If any, explain!

S1   : I do not know

P   : In the question, there is a picture and description of various typical local Wakatobi food menus, in your opinion is the information important?

S1   : It is less important

P   : Try to know what the order of steps is for answering this question.

S1   : To answer the question Number 1a is to multiply 9 by 20,000, 30,000 and 7000, and then to sum them to get the result of IDR 513,000, Madam. Meanwhile, to answer the question number 1b is firstly to find the amount of tax, by multiplying 10% by 513,000 to get result of 51,300. Then, 513,000 is added to 51,300 to get the result of 564,300. Furthermore, to find Mother's change money is to reduce 600,000 by 564,300 to get the result of 35,700.

FIGURE 2. *S1's answer sheet for question number 2*

FIGURE 3. *S1's Answer sheet for the question number 3*

S1's answer sheet, as shown on Figure 2 in the question number 2, indicates that the student can simplify complex problems into the simple ones. However, S1 does not write the answer carefully in calculating the total cost in the option 1, in which S1 write the number incorrectly, 2,000,000. Subject 1 can elaborate the procedure of answering the question correctly in accordance with the guideline of Table 3. The result of interview with S1 contained in the question number 2 is cited below.

P   : *What is the procedure of answering the question number 2a?*
S1   : *I added treatment cost: haircut 10,000 to hair wash and straightening 20,000 to short hair coloring 9,000 to short hair spa 100,000 with the total result of 200,000 (the subject sums them with short summation on the paper)*

S1's sheet answer for the question number 3 as shown in Figure 3 indicates that the student can understand the problem in writing known and asked data. The Subject 1 can write the procedure of answering the question, but has not written the answer in the calculation of necessary cost. The result of interview with S1 related to the question number 3 is cited below.

> *P   : What is the procedure of answering the question number 3c?*
> *S1   : The total cost needed to buy fruits for 1 week is 490 x IDR 8,000 amounting to IDR 3,920,000 (the subject did short summation on the paper)*
> *P   : Why has the answer not been written at that time?*
> *S1   : I forgot it, Madam.*

Uncomplete Computational Thinking Category

From the S2's answer sheet scoring 73 as shown in Figure 4, it can be seen that the student has been able to simplify the complex problem into the simple one but has not been able to arrange the procedure of solving the problem in determining the change money. The result of interview with S2 is cited below.

> *P   : Do you think there is unnecessary information written? Explain, if any!*
> *S2   : Yes I do, luluta and lapa-lapa*
> *P   : What is the procedure of answering the question number 1b?*
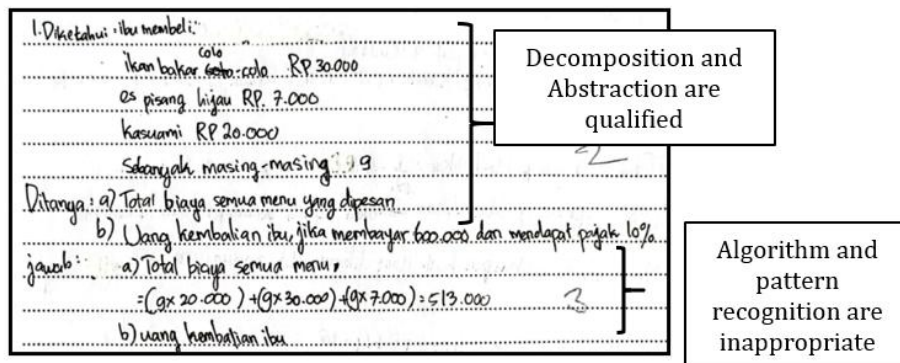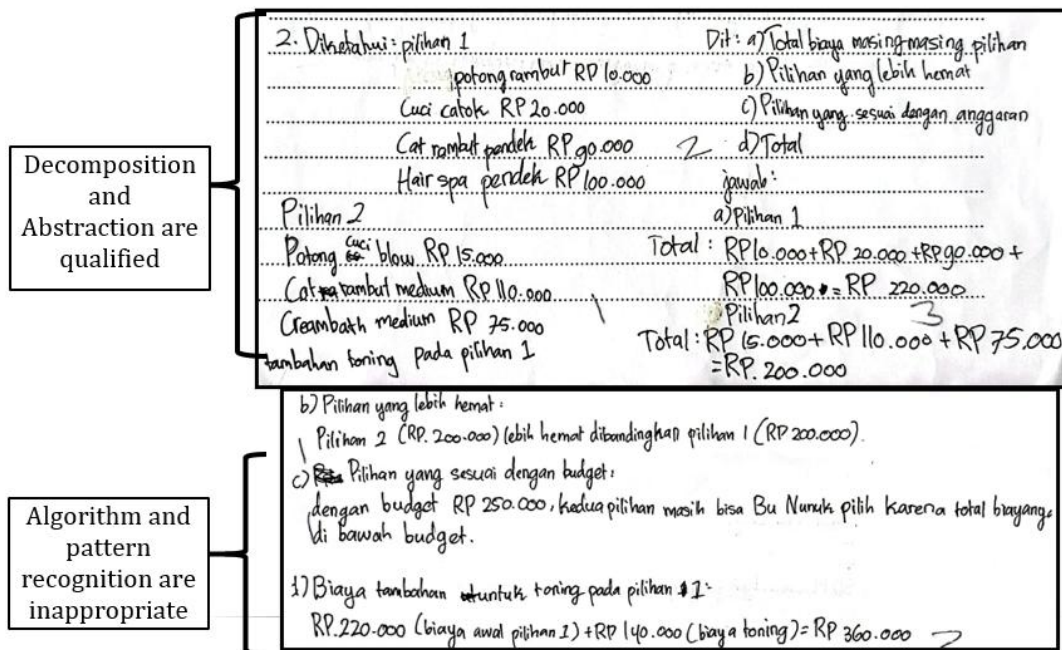> *S2   : I do not know.*

FIGURE 4. *S2's sheet for question 1*

FIGURE 5. *S2's answer sheet for question number 2*

FIGURE 6. *S2's sheet for question number 3*

S2's answer sheet for the question number 2, as shown in Figure 5, indicates that the students has been able to simplify the complex problem into smaller part that is more understandable. Subject 2 can identify information to be written d as "known" and "questioned". But, the subject 2 writes down total cost less carefully in the number 2b, particularly in option 1, 200,000. The result of interview with S2 is cited below.

P : What is the procedure of answering the question number 2?
S2 : Adding the cost of each option, In option 1 IDR 10,000 + IDR 20,000 + IDR 90,000 + IDR 100,000 = IDR 220,000 and option 2 IDR 15,000 + IDR 110,000 + IDR 75,000 = IDR 200,000 (writing down short summation on the paper)

S2's answer sheet for the question number 3, as shown in Figure 6, indicates that the student understands the problem related to writing down important information in the "known" and the "questioned". The subject S2 can write the mathematic model pattern including number of bears, number of fruits needed in 1 week. In the question number 3c, S2 can give appropriate reason why the fruits the visitors carry are not enough. The subject 2 cannot solve problem related to determining the necessary needed. The result of interview with S2 is cited below.

P : Your answer sheet for the question number 3c is still blank. Do you know how to answer the question?
S2 : I do not know
P : In the question number 3d, why it is not enough?
S2 : Because the visitors carry only 30 kg of fruits, while 490 kg of fruits are needed

S3's answer sheet scoring 30, as shown in Figure 7, indicates that the student can present information in the "known" and the "questioned". However, based on the result of interview, it can be seen that S3 has not understood the question completely. Following the reconfirmation, S3 was still confused with the number 9 written down. In the stage of answering the question, S3 did not know how to do so, as indicated with the number 68,000 unknown in the question and not included in the answer. The result of interview with S3 is cited partially below.

P   : Do you understand the question number 1?

S3   : Wait for a minute, please Madam, I will read it again.

P   : What information can you write in the "known" and the "questioned" from the question number 1.

S3   : It is known that mother buy colo-colo grilled fish 30,000, kasuami 20,000, and green banana ice 7,000.What is asked is what total cost of all menu ordered is, and mother's change money when mother paid 600,000 with tax of 10 %.

P   : What is your procedure of answering the question?

S3   : To answer the question Number 1a is 30.000 + 20.000 + 7000 resulting in 57.000

P   : You write number 9 in your answer sheet, what do you mean?

S3   : I do not know, Madam. I just saw my friend's answer.

P   : What is the procedure of answering the question umber 1b?

S3   : I do not know, Madam

FIGURE 7. *S3's sheet for Question number 1*

FIGURE 8. *S3's answer sheet for question number 2*

FIGURE 9. *S3's answer sheet for question number 3*

The question number 2 in S3's answer sheet, as shown in Figure 8, indicates that the student has not written important information in the "known" and the "questioned". Also, S3 has not been able to understand the problem, as indicated with the result of interview and error made by S3 in the procedure of answering the question incorrectly. S3 made error by including number into each of options. In addition, S3 has not been able to choose the hair treatment conforming to budget and total cost with additional hair treatment.

The result of interview with S3 is cited below:

P : *What information can you write in the "known" and the "questioned" from the question number 2?*
S3 : *It is known that the option 1 is hair cut 1,000, hair wash and straightening 20,000, short hair coloring emm... (waiting for a long time). Where is it, Madam?... it is not here.*
P : *this means hair coloring*
S3 : *Oh, it is 140,000. Short hair spa is 90,000. Option 2 hair blow wash cut 15,000, medium hair coloring 110,000, medium creambath 75,000*
P : *Then, what is the procedure of answering it?*
S3 : *em....(waiting for a long time) I am confused, Madam.*

The question number 3 in S3's answer sheet, as shown in Figure 9, indicates that the student can write important information in the "known" but do so inappropriately in the "questioned". S3 writes and determines the amount of fruits brought by visitors in Number 3d. S3 has not been able to understand problem, as indicated with the result of interview and has not written the answer on his/her work sheet.

The result of interview with S3 is cited below.

P : *What information did you write in the "known" and the "questioned" from the question number 3*
S3 : *It is known that the cage 1 contains 6 bears, cage 1 contains 8, cage 3 contains the bears the number of which is as same as that in cages 1 and 2.*
P : *So, how many bears are in the cage 3?*
S3 : *em...(waiting for long time), I do not know.*

Considering the result of work and interview with several subjects, several indicators of students' computational thinking ability are obtained based on their ability. The students' computational thinking outcome in solving AKM numeracy problem is presented in the table below.

TABLE 5. *Students' computational thinking levels in solving AKM numeracy problem*

Category	Name	Computational Thinking Indicator			
		Decomposition	Abstraction	Pattern Recognition	Algorithm
Complete	Subject 1	V	V	V	V
Uncomplete	Subject 2	V	V	V	-
	Subject 3	-	-	-	-

From the Table 5, it can be seen that each of students with different ability levels have different computational thinking indicators. The subject 1 with the complete category has met the four indicators of computational thinking: decomposition, abstraction, pattern recognition, and algorithm. Subject 1 showed deep understanding in all indicators, namely being able to describe the algorithm steps in more detail. In problem number 1, subject 1 was able to identify important information (decomposition), analyze irrelevant data (abstraction) and was able to use problem solving steps systematically (algorithm). Subject 1 was able to identify patterns in repeated calculations psds addition of taxes. In problem number 2, subject 1 was able to simplify complex problems into systematic steps. However, in the final result there was a slight calculation error due to inaccuracy, and was able to provide the right answer during the interview. In problem 3, subject 1 has understood the total amount of costs required. This shows good mastery of all indicators of computational thinking.

The subject 2 with the uncomplete category has met the three indicators of computational thinking: decomposition, abstraction, and pattern recognition. Students still have difficulty in applying complex algorithms. In problem number 1, subject 2 has quite good decomposition and abstraction skills, this can be seen in his ability to simplify important information in the problem. In problem number 1, subject 2 was able to identify basic information but had difficulty in determining the correct algorithm steps. In problem number 2, the subject succeeded in identifying information, but was often confused in implementing the appropriate pattern in problem solving. In problem number 3, subject 2 can understand the pattern of food needs based on data, but is unable to calculate the total cost as a whole. This shows that the subject has potential in the indicators of decomposition and abstraction, but assistance is needed in understanding the algorithm.

The subject 3 with the uncomplete category does not meet the four indicators of computational thinking. In problem number 1, subject 3 could not consistently identify important information and was wrong in the problem solving algorithm steps. In questions 2 and 3, subject 3 experienced confusion in understanding basic information and was not able to connect important information in forming problem solving steps. Based on the interview with subject 3, it shows that he tends to be influenced by friends' answers, which causes discrepancies in problem solving. This shows the need for special intervention to improve the understanding of computational thinking in analyzing and solving problems.

DISCUSSION

Considering the elaboration above, it can be seen that the difference of computational thinking ability between subjects in solving AKM numeracy problem is dependent on their ability level. The difference of problem solving made by the students is dependent on many factors, one of which is prior understanding when reading the question. It can be identified from the subject's ability of writing important data in the "known" and the "questioned". The research conducted by Nurharyanto & Retnawati (2020) revealed that the students' ability of identifying and writing important information affects the problem solving skill. The importance of problem solving strategy by involving mathematic modeling contributes to improve the students' literacy and numeracy abilities (Nuryadi & Hartono, 2021).

Different procedure of solving problem implemented by different students is dependent on their thinking ability. Subject 1 with the category of complete computational thinking ability has been able to fulfill all four indicators of computational thinking. This is in line with research conducted by Chongo et al., (2020), that the computational thinking ability of students with the complete category is able to fulfill all CT indicators including decomposition, abstraction, pattern recognition and algorithms. Subject 2 in the category of incomplete computational thinking ability has not been able to fulfill the four indicators of computational thinking. Subject 2 can identify relevant information (decomposition, abstraction), recognize patterns (pattern recognition) but most have not been able to design problem solving steps systematically (algorithm). Another study was also conducted by Silvia et al. (2023) to analyze the computational thinking ability in algebra material. Limited decomposition and abstraction abilities are due to students' difficulty in filtering important information and removing unnecessary data (Guggemos et al., 2023). This indicates that the students had not understood yet the problem in the question and thereby could not plan the strategy of answering the question systematically. Subject 3, who is also included in the category of incomplete computational thinking, has not been able to fulfill the four indicators of computational thinking. Subject 3 was not able to understand the problem at all (decomposition), identify relevant information (abstraction), and analyze the problem solving (algorithm). A related study has been conducted by Aisy & Hakim (2023) in mathematics learning in the material of number pattern in analyzing computational thinking skills..

Based on the analysis on the result of test and interview, it can be seen that the abilities of students' respective computational thinking indicator are different. In decomposition stage, the students have been able to simplify the complex problems into the simple ones and thereby they are more understandable and answerable (Ikun et al., 2023). The students can analyze important data from the problems by writing information known and questioned in the question. This decomposition stage facilitates the students to design the next steps in decision making. In the pattern recognition stage, the students can change problem into mathematic model by arranging logical steps in answering the question. Pattern recognition involves identifying relation in collecting data from similar problem. This process helps the students in arranging logical steps in developing a mathematic model in problem solving (Andrian & Hikmawan, 2021).

Another indicator equally important also plays main role in achieving the students' computational thinking ability in solving problem. In this abstraction stage, the students can formulate important information and remove unnecessary element in determining the solution to problem (Adeoye & Prastikawati, 2024). In algorithm stage, the students arranged the procedure of solving problem to determine appropriate arithmetic operation by calculating accurately. Algorithmic thinking is one of steps to develop a strategy to solve problem systematically (Sholihah & Firdaus, 2023). Therefore, computational thinking ability encourages the students to think analytically, critically, logically, and systematically in designing the answer to question as it needs in-depth understanding (Ruipérez, 2020).

The importance of computational thinking development the students possess earlier should get teachers' attention and guidance. Teachers should guide the students to practice thinking logically and systematically in analyzing HOTS-based numeracy question to solve problem (Nuryadi & Hartono, 2021). HOTS questions predisposing to the analysis of story problem require the students design appropriate assessment needing to be emphasized in the learning. The result of a research conducted by Kang et al. (2023) showed that the habituation in providing story problem also evidently improves the students' computational thinking ability effectively.

Considering the result of research presented in Table 1, it can be concluded that the mean score the 4th graders of SD Muhammadiyah Kottabarat Surakarta obtained is less than 40.04. It is because of the students' still low computational thinking ability of understanding the problems in-depth. This can be seen from the way they answer the question and reason expressed by S1, S2 and S3 who answer the question not carefully. Rohmah et al. (2022)

stated that literacy and numeracy abilities from the result of students' AKM score is still low in mathematics learning in elementary school. The related study carried out by Era Setiyawati et al. (2022) found that the students of elementary school have difficulty in understanding and doing mathematics task in the form of story problem.

The students' low analytic ability of solving problem is due to the lack of exercise in answering the question with direct practice. Another related study conducted by Dini & Maarif (2022) found that the habituation of analyzing problem will be more effective in the presence of practice associated with daily problems to understand the material better. This is in line with a research conducted by Piedade & Dorotea (2023) finding that assigning experimental task can grow and develop the computational thinking ability of students in elementary school.

CONCLUSION

The computational thinking ability of the 4th graders of elementary school in solving AKM numeracy problem is categorized into complete and uncomplete. The students with the complete category have fulfilled all four indicators of computational thinking, namely decomposition, abstraction, pattern recognition and algorithms. The students with the uncomplete category have not fulfilled all four indicators of computational thinking, namely some learners can identify relevant information (decomposition, abstraction), recognize patterns (pattern recognition) but most have not been able to design problem solving steps systematically (algorithms). There are also some learners who have not been able to understand the problem at all (decomposition), identify relevant data (abstraction), recognize settlement patterns (pattern recognition) and analyze the steps of the problem solving (algorithms).

The early step the students took in answering AKM numeracy question started with an indicator decomposition by identifying problem and formulating important data. This activity can be seen from the students' ability of writing information known and questioned in the question. This stage is important to do to help the students understand the problem. Through decomposition, the students perform abstraction to determine important information by removing unnecessary data. The students also convert the problems into mathematic model or equation as the indicator of pattern recognition. Furthermore, the students arrange logical and systematic procedure of solving problem as algorithm indicator.

Recalling the importance of the development of computational thinking ability to the students, this research can give the teachers and educational staffs a description related to how to plan appropriate, effective, and efficient strategy to improve the students' computational thinking skill in encountering the contextual problems.

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