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HIGH LEVEL THINKING ABILITY IN SOLVING HOTS QUESTIONS IN MATHEMATICS SUBJECTS

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Abstract

The fast development of knowledge and technology on the revolution 4.0 century required humans to have high level thinking skills. In the world of education, HOTS is the students' thinking ability who do not only remember but also expected to be able to develop the ideas. This descriptive research aims to determine the ability to think at a higher level and to find out the obstacles in solving HOTS questions in mathematics on fifth grade students. The data was collected by giving a description test and interview to 90 students. The results of the PAP analysis on the final score of the test showed that 50 students (56%) had HOTS Thinking Ability was in the sufficient category. The next part through content analysis, the interview results showed that there were 61 students (68%) students had problems in the process of forming mathematic sentences. Based on this research, it could be concluded that the fifth grade students of SD Markus Medan tend to have sufficient HOTS thinking ability and were still low in answering questions with C6 cognitive domains, while the students' constraints were in the process of forming mathematic sentences. The conclusion obtained had implications in improving students' thinking abilities at each cognitive level through HOTS based assessment.

Keywords: *Thinking Ability, HOTS, Mathematics Subjects*

A. Introduction

In the era of industrial revolution 4.0, the development of knowledge and technology is increasingly rapid. This changes the quality of human resources (HR) needed in the world of work. The ability to solve problems is one of the most important components needed today. Apart from that, the ability to think critically and creatively is also something that everyone must master in the era of revolution 4.0. This thinking ability is also known as thinking skills at a higher level or also known as Higher Order Thinking Skills (HOTS). The rapid development of knowledge and technology has an impact on various sectors in society. The problems faced by society are increasingly complex. Therefore, the current generation needs to be equipped with skills in high-level thinking so that in the future they can solve the problems they face. In the world of education, high-level thinking skills are one of the aspects that students are expected to have. The 2013 curriculum makes high-level thinking skills one of the goals in the learning process. High-level thinking ability is defined as a thinking process that includes the ability to describe material, criticize and be able to create solutions to problems. High-level thinking abilities are also seen as skills in relating facts to a problem.

These three abilities are known as higher order thinking skills or HOTS (Higher Order Thinking Skills). As stated by Sani (2019: 52), the important thing that needs to be done is to prepare the younger generation with critical, creative thinking skills and skills in making decisions to solve problems. Meanwhile, Faridah (2019:2) also stated that to adapt to the era of revolution 4.0, the ability to develop creativity and solve problems is needed. Critical and creative thinking is needed in solving problems, because the rapid development of knowledge and technology has resulted in the challenges and problems that humans will

face in the era of revolution 4.0 becoming more complex (Driana and Ernawti, 2019: 110).

Students' higher level thinking can be trained and improved. So many countries use HOTS as an inseparable part of classroom learning (Musrikah, 2018:341). Students' ability to receive learning and the way students solve problems on different mathematics problems also make them have different higher-level thinking abilities. Considering that human nature is created uniquely from each other, the abilities that humans have are also basically diverse. Responding to this, Pratiwi (2019:128) explained that to develop HOTS-based items that are good for students, teacher quality is a very important part in this case. Teachers must have a good understanding of cognitive processes in Low Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS). Moreover, according to Widana (2017:32), teachers play a role in optimizing HOTS assessments, both in daily tests, end-of-semester assessments and school exams. This is intended to train and identify the categories of students' high-level thinking abilities. However, a research study by Schulz & FitzPatrick (2016) found that teachers showed uncertainty about the HOTS concept and they were not prepared to teach or assess HOTS. The results of a subsequent study by Retnawati (2018) showed that teachers' knowledge about HOTS, their ability to increase student HOTS, solve HOTS-based problems, and activities to measure student HOTS were still low. Similar findings were obtained by Driana and Ernawati (2019), elementary school teachers who participated in their research did not have a comprehensive understanding of HOTS. So there is a lack of training activities and measurement of students' high-level thinking abilities. The main problem was also found in research observations. In observations carried out at SD Markus Medan, the Principal stated that

the school is fully aware of the importance of developing students' high-level thinking skills for competitiveness. Teachers at these schools have also attended workshops or seminars regarding the development of HOTS questions and assessments, but the implementation has not been fully optimal. Remembering that daily test questions, or grade promotion assessment questions are still in the realm of C1 to C3 only, there are C4s but not many. Through the results of these observations, it can be interpreted that the category of higher level thinking abilities possessed by each student is not yet known. In broader terms, this has an impact on students' readiness to face more complex problems in the 21st century.

The absence of training activities and ability measurement has an impact on students' low abilities in the cognitive domains of analysis, evaluation and creation, this is based on a study by Yuliati and Lestari (2018). In order for students' HOTS to develop well, students need to get used to measuring through HOTS, otherwise it will cause the HOTS potential in students not to develop Arifin and Retnawati (2017:11). An explanation by Budiarta (2018: 103) states that HOTS can be interpreted as the ability of a complex thinking process which includes breaking down material, criticizing and creating solutions to problem solving. Responding to the same thing, Thomas and Thorne (2009) define HOTS as the ability to think by making connections between facts regarding a problem. Problem solving is not just done through the process of remembering or memorizing, but requires making connections and conclusions from problems. Accompanying similar things, Annuuru, et al (2017: 137) explain that HOTS is the ability to combine facts and ideas in the process of analyzing, evaluating up to the creation stage in the form of providing an assessment of a fact that has been studied or being able to create from something that has been studied. The process of analyzing, evaluating and

creating is part of the cognitive taxonomy created by Benjamin S. Bloom in 1956. In the end it was refined again by Anderson and Krathwohl (2001) into C1-memory (remembering), C2-understanding (understanding), C3-applying, C4-analysis, C5-evaluating, and C6-creation. Tanujaya (2017:78) explains that levels one to three are low-level thinking skills or LOTS (Lower Order Thinking Skill) and levels four to six are HOTS (Higher Order Thinking Skill). So, if viewed from the cognitive realm, HOTS is the ability to analyze, evaluate and create. Based on this, Sulianto (2018:10) presents a picture of the cognitive level in Bloom's revised taxonomy in Figure 1.

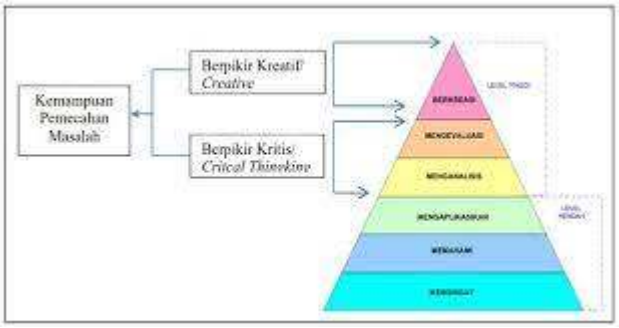

Figure 1. Taksonomi Kognitif HOTS

Figure 1 includes processes C4 and C5 as critical thinking, while C6 is part of creative thinking abilities, critical and creative thinking process abilities are used to solve problems or create solutions to make decisions. These three cognitive processes are moved when they encounter a new problem, the success of high-level thinking abilities lies in a person's success in moving these three thinking processes, Saido (2015: 14). Adapted from the opinions of Anderson and Krathwohl (2001:68), Wahyuni (2018:85) and Anggraini (2019:3), the meaning and indicators of the three HOTS cognitive levels can be summarized in table 1.

Table 1. Cognitive Level and HOTS Cognitive Indicators

Aspect	CognitiveLevel dan Indicators	Definition
Critical Thinking	**C4 – Analyze**	The process of breaking down material and then looking for its overall relationship
	Differentiate	Able to sort information into relevant and irrelevant parts
	Organize	Able to identify information into an organized structure
	Interpret	Able to determine the pattern of relationships between parts of each information structure
	C5 – Evaluation	The activity of making a decision based on predetermined criteria and standards
	Inspect	Able to check and determine the wrong part of a process or statement
	Criticize	Able to accept and reject information through predetermined criteria
Creative Thinking and Problem Solving	**C6 – Create**	Able to accept and reject information through predetermined criteria
	Formulate	Able to provide a perspective on a problem
	Plan	Able to design a way to solve problems
	Produce	Able to create ideas, solutions or decisions from previously created designs

The ability to analyze, evaluate and create as explained by the Ministry of Education and Culture (2014) has become the SKL (Graduate Competency Standard) at the elementary school (Primary School) level in

the realm of knowledge and skills. In this section it is also explained that the development of the 2013 Curriculum is expected to be able to form individuals with the power to think and act productively and creatively (Kurniasih & Sani, 2014). Responding to this, Sulis (2019: 553) stated that the application of HOTS in learning evaluation is reflected in the questions that students must complete. The questions given are not only limited to the application level (C3) but also to the creation level (C6). HOTS questions are questions that involve the cognitive parts C4 analysis, C5 evaluation, and C6 creation (Surata, 2018, p. 3). The same thing was expressed by Setiawati (2019:38) that HOTS questions are questions that are in the realm of the thinking dimensions of analyzing, evaluating and creating. HOTS questions involve real problems, through reasoning and logic students are expected to be able to solve these problems. Apart from that, Widana (2017:36) also explains HOTS questions as questions that require students to think critically and creatively to answer the questions. In short, Hanifah (2019:6) explains that the HOTS question is an instrument deliberately designed to measure high thinking abilities. So HOTS questions are questions that contain cognitive domains C4 to C6, which means a person's high-level thinking ability can be measured using HOTS questions. HOTS questions can be oriented to each subject. Especially mathematics subjects which have been separated from the theme for grades IV to VI of elementary school. According to Hamdi (2018: 126), mathematics subjects are a field of knowledge that has a central role in developing the competencies needed to face the 21st century environment.

Understanding mathematics is central to the young generation's readiness to live in modern society. Wicasari and Ernaningsih (2016:250) added that sharpening logic through learning mathematics is the same as

training high-level thinking skills. As a basis for the development of modern knowledge and technology, mathematics also plays a role in advancing human thinking. In various fields, this branch of knowledge is useful for solving problems until it is ultimately used as a standard that determines educational progress in a country (Pratama and Retnawati, 2018: 1). Mathematics subjects provide the ability to think logically, analytically, systematically, critically, innovatively and the ability to collaborate. These subjects need to be taught from the basic education level. Through mathematics subjects, it is hoped that students will be able to apply its uses to everyday life (Widana, 2019: 14). Likewise, Suarjana (2017:104) stated that mathematics subjects are needed by everyone to solve various problems, through the process of calculating and thinking. Being able to solve problems means being able to examine a problem and being able to use that knowledge in new situations. This ability is usually known as Higher Order Thinking Skills (Dinni, 2018, p. 107).

Based on this opinion, mathematics subjects are a teaching component that is the basis for the development of other teaching fields. With its universal nature, mathematics can advance human thinking power which is used to find ways out of problems through the process of calculating and thinking. The important role of mathematics in improving and knowing students' HOTS thinking abilities can be implemented in analytical activities. This activity of analyzing high-level thinking skills is useful as a track record of the learning process that has taken place previously. Through the results of a study by Azizah (2018), higher level thinking ability analysis activities are a solution for describing students' HOTS abilities. Developing students' higher-level thinking abilities can also be achieved through this analysis activity, in accordance with a study by Wiwin (2017). As the results of a study by Intan & Kuntarto (2020) found

that the high-level thinking abilities of class V students at SD Markus Medan Sridadi were in the sufficient category with the average score obtained being 64.77. These results also show that students' abilities are still low in the cognitive domain C6 (creating).

This study obtained the same category results as in this research, namely that the high-level thinking abilities of fifth grade elementary school students in answering HOTS questions in mathematics were in the sufficient category and the students' low ability in answering questions in the cognitive domain C6 (creating). Intan and Kuntarto used the average value as a division into the HOTS thinking ability category, while this study used PAP as a division into the HOTS thinking ability category. The research by Intan and Kuntarto only focused on high-level thinking skills, without including a discussion of students' obstacles to answering HOTS questions in mathematics subjects. In the results of the study, it was also stated that to determine high-level thinking abilities, analytical activities are needed. Therefore, it is important to carry out analytical activities to determine students' high-level thinking abilities. Analysis activities were carried out to determine the category of high-level thinking abilities possessed by students and the reasons why students with low levels had not achieved the expected abilities. After knowing where the student's weaknesses are, the teacher can determine the next steps to optimize the student's thinking power. This research was carried out by distributing HOTS questions in mathematics to class VI students, which was then followed by an interview session to find out the students' obstacles in solving the HOTS questions. Based on this discussion, the aim of this research is to determine students' high-level thinking abilities and determine students' obstacles in answering HOTS questions in mathematics subjects.

B. Method

This research is classified as a descriptive type of research. The descriptive research carried out does not aim to find relationships between variables or test hypotheses. This research only has one independent variable, namely high-level thinking ability. The sampling technique used in this research is the saturated sampling technique, which is a sample determination technique using the entire population as research subjects. So this research sample has the same size as the population, namely 90 class VI students at SD Markus Medan 2022/2023. Data collection on the entire population was carried out through descriptive test instruments and interviews. The test instrument used is HOTS questions in mathematics, which consists of 10 questions. Student answer sheets are assessed using an assessment rubric with the highest score being 60 and the lowest score being 0. The final score results are then analyzed using the PAP (Benchmark Assessment) analysis technique, according to the essence of PAP is the pass standard (pass – fail limit) which has been determined as benchmarks from the beginning when the assessment will be carried out (Yusuf, 2017: 251). So, based on the assessment guide for elementary school students, PAP scores can be obtained, in table 2.

Table 2. Elementary School Student Assessment Guide

Value Interval	Category
88 – 100	Very good
74 – 87	Good
60 – 73	Enough
0 – 59	Lacks/needs guidance

Then converted using the following formula:

$$\text{Score} = \text{x maximum score} \frac{interval\ nilai}{100}$$

So the Benchmark Assessment Score is obtained in table 3.

Table 3. PAP Category of Higher Order Thinking Ability (HOTS)

Score	Category
53-60	High HOTS Thinking Ability
45-52	HOTS Thinking Ability
36-44	HOTS Thinking Ability Sufficient
0-35	Low HOTS Thinking Ability

Knowing that the requirements for a good instrument are valid and reliable, respectively, the types of validity and reliability used are construct validity and kappa reliability. Through the construct validity of HOTS questions, mathematics has been declared valid by 3 expert judgments. Meanwhile, how kappa reliability works is explained by Widhiarso (2011:2) who says that kappa reliability is carried out by assessing individual performance through a checklist, involving the consistency of the scores of two raters. If there are more similarities in the assessment results between one rater and another, the resulting reliability coefficient will be higher. On the other hand, if there is less similarity in the assessment results between raters and other raters, the reliability coefficient will be small. Based on the results of the checklist presented above, a table of the results of the assessment between raters for this research can be created, described in table 4 below.

Table 4. Inter-rater assessment results

Appraiser B	Appraiser A	Total	Decimal Form	Percent Yield
Thinking Ability	Thinking Ability			

	HOTS High	HOTS	HOTS Enough	HOTS Low			
HOTS High	19	0	0	0	19	0.211	21.11
HOTS	0	25	0	0	25	0.277	27.77
HOTS Enough	0	0	42	1	43	0.477	47.77
HOTS Low	0	0	0	3	3	0.033	3.33
Total	19	25	42	4	90		
Decimal Form	0.211	0.277	0.466	0.044			
Percent yield	21.11%	27.77%	46.66%	4.44%			

From the results of calculations between raters described in table 4 above, it was found that the assessment of high HOTS questions reached 19, equivalent to 21.11%, HOTS reached 25, equivalent to 27.77%, fair HOTS reached 42, equivalent to 46.66% and low HOTS reached 4. equivalent to 4.44%.

In the next section, the interview instrument used is an interview guide with an unstructured interview type to obtain data on student obstacles. In the interview guide there are 3 questions that represent each obstacle topic: 1) grammar questions, 2) making/forming mathematical sentences, and 3) understanding the material. The aim of giving interviews was to find out students' obstacles in solving previously completed HOTS questions and the factors causing them. The results of the interviews were analyzed using content analysis techniques, in essence content analysis techniques are a method used to summarize the messages conveyed in text or media (Kimberly, 2002: 10)

C. Finding and Discussion

1. Result

Data Results on Students Higher Level Thinking Abilities

Data on high-level thinking abilities was obtained from the final scores of students answering HOTS questions in mathematics. This question consists of 6 mathematics questions covering fractions, speed, distance and time. Student answer sheets are analyzed using an assessment rubric with the rater to obtain the student's final score. The student's final score is analyzed using the Benchmark Assessment (PAP) that was created previously. Students' final scores are also analyzed using descriptive statistics to obtain centralization of scores represented by mean, median, mode and spread of scores represented by standard deviation.

From the results of the PAP analysis of students' critical thinking abilities in Figure 2, out of 85 students, the results obtained were that 19 students (21%) had high HOTS thinking abilities, 25 students (28%) had HOTS thinking abilities, 43 students (48%) had high HOTS thinking abilities. have sufficient HOTS thinking ability, and 3 students (3%) have low HOTS thinking ability. Meanwhile, the concentration and distribution of student score data is described in table 5 below:

Table 5. Analysis of student scores

Highest Score	60
Lowest Score	24
Mean	46,859
Mode	44
Median	44
Standard Deviation	7,788

From the results of the analysis of student scores in table 5, the mode value is 44. If converted to PAP assessors, HOTS thinking ability is considered sufficient. This section also shows that the student's score was able to achieve the highest score, namely 60, while the lowest score was 24. So based on the PAP analysis, it shows that class VI students at SD

Markus Medan tend to have sufficient HOTS thinking abilities. Then, to determine student achievement in the HOTS cognitive domain, a score analysis was immediately carried out on each question in table 6.

Table 6. Score Achievement on Each Question

Question Number	1	2	3	4	5	6
Maximum Score	10	10	10	10	10	10
Maximum Total Score	900	900	900	900	900	900
Total score	743	573	668	698	584	717
Percentage	88%	67%	79%	82%	69%	84%
The highest score	10	10	10	10	10	10
Lowest Value	7	0	6	6	4	0
Mean	8,741	6,741	7,859	8,212	6,872	8,435
Mode	8	6	7	8	7	8
Median	8	6	7	8	7	8
Standard Deviation	1,135	1,800	1,311	1,124	1,624	1,492

Table 6 shows the percentage of student achievement scores on each question. The maximum score for question number 1 is 10, so if 90 students taking the test get a score of 10 each then the maximum score for that question is 10 times 90 or 900. However, in reality, the maximum score obtained by 90 students is 774, so The percentage score for students' answers to question number 1 from these results is 88%. Recall that questions number 1 and 4 are questions in the C4 cognitive domain, questions number 3 and 6 are in the C5 cognitive domain, while questions number 2 and 5 are in the C6 cognitive domain. In this regard, the percentage results in the table also show that students' abilities are still low in answering questions in the C6 cognitive domain.

Interview Data Results Interview activities were carried out after students completed HOTS questions in mathematics. Interview activities were assisted by a voice recording device, which was then transcribed and then analyzed using content analysis techniques. So, based on interviews

conducted with 90 students, the data obtained regarding obstacles to students solving HOTS questions in mathematics subjects shows the results in table 7.

Table 7. Summary of Class V Students' Obstacles in Working on HOTS Questions

Constraint	Many Students	Percent	Summary of Interview Results
Grammar	26	31%	Students stated that grammar was an obstacle on the grounds that students felt that they wrote too much and had to read a lot which took a long time to answer. Students are also rarely given practice on story questions
Creating/Forming Mathematical Sentences	53	62%	Students stated that forming mathematical sentences was an obstacle for the reason that students were still confused about determining the steps to work on a problem, such as determining how to solve a problem because they had to find out for themselves what problem had to be solved.
Retention of material	6	7%	Students stated that understanding the material was an obstacle for the reason that students forgot about fractions and speed, distance and time.

2. Discussion

Data on students' high-level thinking abilities in working on HOTS questions in mathematics subjects in class VI of SD Markus Medan were obtained from tests prepared based on three HOTS cognitive domains, namely analyzing, evaluating and creating. Based on the results of the analysis, it shows that students tend to have sufficient HOTS thinking abilities and are still low in solving questions in the cognitive domain C6

(creating). The results of a relevant study by Alfiatin & Oktiningrum (2019) found that the high-level thinking abilities of fifth grade students at Imam Bonjol Elementary School were in the sufficient category with the average score obtained being 67.85. These results also show that students' abilities are still low in the cognitive domain C6 (creating). It cannot be denied that these results are a result of students' unfamiliarity with working on HOTS type questions. Students tend to be used to learning and giving LOTS type questions.

Considering that daily test questions, or grade promotion assessment questions are still in the realm of C1 to C3 only (LOTS), there are C4s but not many as stated by the Principal during the observation activity. It is not only the giving of HOTS type questions that are in the spotlight, but also the way students organize or design how to answer questions starting from making them known, asking questions to answer them. HOTS's thinking ability is insufficient and the low ability to answer C6 cognitive domain questions is also a result of the lack of practice in designing steps to solve problems in the questions. Students also acknowledged the obstacle in designing steps to solve these questions in the interview session. It was noted in the results of the analysis of obstacles to solving HOTS questions that students tended to experience difficulties when creating/forming mathematical sentences. The obstacle factor for students is also said to be that students rarely work on problem-based descriptions (story questions) so that students are not used to determine what method to use to answer these questions. In essence, essay questions are questions that are designed to require students to organize their own answers. Students have the opportunity to give answers in different ways but are still open to getting the same value. Questions in the form of descriptions are useful for measuring student

learning outcomes and students' thinking abilities (Murti, 2018: 24). Students are also used to the form of multiple choice questions by answering questions without writing down the method or steps to obtain the answer. The relevant research results were by Hidayanti (2019) who conducted research on 17 class V students of SDN 1 Tulusrejo 3 Malang City.

The research results showed that as many as 70.16% of students experienced difficulties or obstacles in understanding the meaning of the questions and had difficulty translating them into mathematical sentences. Based on Wilson's (2000) theory, the cause of the obstacles experienced by these students is that learning activities are still based only on knowledge transformation, only stemming from the cognitive domains C1, C2 and C3 or LOTS, without criticizing and discovering activities in the C4 to C6 or HOTS domains. So students have difficulty answering questions in the form of applications. Students tend to make mistakes in answering questions because the questions given are different from the procedures given by the teacher. In carrying out research, the HOTS questions that students work on consist of 6 description questions, each of which 2 questions represent the HOTS cognitive domain. Questions with cognitive domain C4 (analyzing) relate to students' ability to parse and identify the information in the question into an organized structure, such as writing what is known, asked and the results of the answer. In questions with cognitive domain C5 (evaluating) it relates to students' ability to make decisions or make judgments about a method in order to be in line with the target. In questions with the cognitive domain C6 (creating) it is related to the student's ability to organize how to work on the problem and create work steps so that they can obtain solutions to problems and create many solutions to the problems in the problem.

According to Yuliati & Lestari (2018:182) questions in the cognitive domain of analysis, evaluation and creation require more complex solutions, because they are the domain of high-level thinking abilities. In line with Nurhasanah's opinion (2018:525) that high-level thinking skills are a thinking process that does not just memorize and convey back known information. High-level thinking ability is the ability to connect, manipulate and transform existing knowledge and experience to think critically and creatively in an effort to determine decisions and solve problems. HOTS according to Arifin and Retnawati (2017:99) is a complex thinking ability that involves all previous aspects to produce a solution. Therefore, if initial knowledge is strong, it will be easier for students to climb the ladder of higher cognitive domains.

This means that to solve questions at a higher level, one level of ability below is needed, such as to solve C6-creating level questions, C4-analyzing and C5-evaluating skills are also needed (Nugroho, 2018: 59). In the previous section, it was explained that HOTS is in the cognitive domain of Bloom's taxonomy, which was later refined by Anderson and Krathwohl (2001) into C1-remembering, C2-understanding, C3-applying, C4-analysis.), C5-evaluating, and C6-creation. Budiarta (2018:103) explains that levels one to three are low-level thinking skills or LOTS (Lower Order Thinking Skill) and levels four to six are HOTS (Higher Order Thinking Skill). LOTS, according to Sani's explanation (2019:41), is a mechanical ability that is limited to routine things, such as memorizing and only repeating previously known information without any activities to criticize and develop new ideas. Learning in the LOTS class is reflected in one-way learning activities which are the domain of the teacher and only provide students with little opportunity to think actively, apart from that it is also reflected in measurement activities which only rely on memory questions

(Yuliati & Lestari, 2018: 182). On the other hand, HOTS, according to Anggraini (2019:2), is an ability that does not just rely on memory, but is a complex thinking effort that involves creative and critical thinking about a problem to find a solution. Learning in the HOTS class is reflected in two-way learning where, between teachers and students, students are given more opportunities to search and find ways to solve problems, as well as in measurement activities prioritizing questions in the form of problems, information search, analytical, evaluative and decision making (Sani, 2019:62). Referring to Brookhart's (2010:3) opinion, HOTS learning is divided into 3, namely HOTS as transfer, HOTS as critical thinking and HOTS as problem solving.

When facing a problem, someone needs to have the skills to apply their knowledge, then make wise judgments and be able to criticize by providing logical and scientific reasons and finally solve the problem using previously created strategies. FJ, King (2006) explains that HOTS cannot be separated from the level of learning, each cognitive level is interdependent. The things learned previously can help optimize high-level thinking abilities. Solving HOTS questions is like climbing stairs. To answer questions at level C5 (evaluating) you need to master the skills C4 (analyze), C3 (apply), C2 (understand) and C1 (remember) and the same goes for other level questions. Responding to this, Retnawati (2018:216) explained that the need to familiarize students with learning activities and HOTS measurements is important for developing ideas or solutions to complex problems. In accordance with the nature of humans being created differently, each student also has different abilities to reach these six cognitive levels. This research specifically discusses the high-level thinking abilities possessed by each student.

The results of this research show: 1) fifth grade students at Markus Medan Elementary School for the 2022/2023 academic year tend to have sufficient HOTS thinking abilities and are still low in solving C6 cognitive domain questions, and 2) fifth grade students at Markus Medan Elementary School tends to experience difficulties when creating/shaping mathematical sentences 4.

D. Conclusion

Conclusions and suggestions Based on the results of the research and discussion, several conclusions can be made, firstly, the results of the PAP analysis show that class VI students at SD Markus Medan tend to have sufficient HOTS thinking abilities and are still low in solving C6 cognitive domain questions. Second, the results of the interview show that six grade students at SD Markus Medan tend to experience difficulties when creating/forming mathematical sentences. The conclusions obtained have implications for improving students' thinking abilities at each level of the cognitive domain through HOTS-based assessments. There are several suggestions that can be given to students and teachers. Students are advised to practice working on HOTS type mathematics questions, especially questions at the creative level (C6) and in the form of contextual questions or questions related to everyday life. This is so that students get used to being able to solve a variety of math problems. Students are expected to get used to solving problems in a coherent manner by understanding the problem, planning the solution, implementing the plan, and reviewing the correctness of the problem solution. For teachers, teachers are advised to know students' abilities in solving HOTS type mathematics problems so they can design and carry out learning that can improve these abilities. Apart from that, teachers

should provide additional assignments or practice HOTS questions more often. Teachers are advised to instill material concepts well and coherently, as well as instilling concepts regarding strategies for solving a mathematics problem. Teachers are expected to familiarize students with working on HOTS-oriented mathematics subject questions in a coherent manner from understanding the problem, planning to solving the problem, implementing the plan, and reviewing the correctness of the problem solution. So that when students encounter various kinds of mathematics problems, students can solve them well and correctly.

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