Analysis of Students' Visual Mathematical Thinking Ability Improvement using Model Learning Contextual Teaching and Learning

Husni Tamrin Hrp[1,*] Edy Surya[2] Mulyono[3]

[1,2,3] *Department of Postgraduate Mathematics Education, State University of Medan, Jl. William Iskandar Ps. V, New Memories, Deli Serdang Regency, North Sumatra 20371*
[*] *Corresponding author. Email: husnitamrinhrp@gmail.com*

ABSTRACT

This study aims to determine: 1) the improvement of students' visual thinking skills after being taught using the *Contextual Teaching and Learning* learning model, 2) To find out the difficulties of students with visual thinking abilities in solving problems. This research is included in the type of descriptive qualitative research. The subjects of this study were students of class IX MTs Negeri 0 3 Labuhan Batu. The instruments used in this study were validation sheets, implementation observation sheets, and tests. The results of this study indicate that: 1) There is an increase in the N-Gain of students' mathematical visual thinking skills using the *Contextual Teaching and Learning* learning model , in the trial experiment grade of 0.63 in the category of being , while the control class 0,45 with category 2) difficulties experienced by students is a weakness in the count, difficulty in transferring knowledge students understanding of mathematical language that are less and difficulties in visual perception.

***Keywords**: Improvement Analysis, Visual Thinking Ability, Contextual Teaching and Learning.*

1. INTRODUCTION

Mathematics is a compulsory subject that is taught at all levels of education ranging from basic education to higher education levels. Mathematics has become the basic capital of life, especially to solve everyday problems. Mathematics has systematic logic, follows a regular order, and is specific. Mathematics is the mother of all branches of science and the basis of all scientific research, because most scientific and engineering problems require mathematics to solve [1] . It involves the use of abstraction and logical reasoning, calculating numbers, and observing how objects move. Mathematics can be described as a formal science that uses symbolic language to study concepts such as numbers, structure, variation, and space. Today, mathematics is used in a wide variety of fields, from engineering to medicine, and is taught as a compulsory primary school subject in many countries.

There are many reasons why students need to learn mathematics. As stated by Cockroft said that mathematics needs to be taught to students because: 1) It is always used in all aspects of life, 2) All fields of study require appropriate mathematical skills, 3) It is a means of strong, concise and clear communication, 4) Can be used to present information in various ways, 5) Improve the ability to think logically, thoroughness and spatial awareness, 6) Give satisfaction to the effort to solve challenging problems [2] .

In the teaching and learning process, the teacher has the task of choosing the right learning model and media according to the material presented in order to achieve the learning objectives. To achieve success in learning mathematics, it makes teachers to continue to try to develop and determine the most effective and efficient learning strategies to assist students in achieving the goals that have been formulated [3].

But the fact happens to students in schools MTs 03 Labuhan that visual thinking abilities of students still in fair category, that is based on a matter of visual thinking given to the 2 3 students MTs 03 Labuhan Batu with the material similarity and congruence. Of the 23 students, none got a score in the very good category, 7 people scored in the good category

(28.00%), who got a score in the moderate category 14 people (56.00%), and those who got a score in the poor category 4 people (16.00%). Observation results show the average value of students is 64.36%. This shows that the visual thinking ability of students to the questions given is in the sufficient category.

Based on the description above, the cause of students' visual thinking abilities in the sufficient category is because students are not given the opportunity by the teacher to appreciate the skills they have. The results of these observations are relevant to Sumarmo's research [4] which shows that the level of formal thinking of students is still not optimally developed, and problem solving abilities are still low. In line with that, Wardani stated that classically, students' mathematical problem solving abilities have not yet reached the level of complete learning. Furthermore, research conducted by Garofalo and states that the lack of mathematical knowledge is not caused by failures in problem solving , but is not effective in utilizing the knowledge that has been possessed by previous students. In this case, students have mathematical knowledge, it's just that they are not careful and skilled in utilizing that knowledge [5] .

Solving problems is not only a goal but is the main target that must be done in learning. In solving problems, there is an ability, namely the ability to think visually or think visually. Modelminds said there are 10 reasons why visual thinking is important in solving complex problems, they are: (1) Visual thinking helps to understand complex problems more easily, (2) Visualize complex problems, it becomes easier to communicate and to others until final, (3) Visual thinking helps people communicate across cultures and languages, (4) Visual thinking makes communication from the emotional side better, (5) Visualization helps facilitate non-linear problem solving, (6) visualization of problems allows people to think together with each other's ideas by creating a common language; (7) visual mapping of problems can help to see gaps from which solutions can be found; (8) Visualization helps people to memorize, make concrete ideas and thus create more accurate results in the end; (9) Visual thinking can give you the necessary picture to learn from your mistakes; (10) Visualization serves as a great motivation to achieve a goal [6] .

The lack of students' understanding of the problems presented is due to abstract mathematics and the need for visualization to make it easier for students to understand the problem. The difficulty in learning mathematics proposed by Surya [7] in Indonesia, that students have difficulty learning mathematics, especially in understanding problems, presenting what is in their minds (visual thinking) and solving mathematical problems which are the mathematical heart of mathematics and visualization is the core of mathematics.

To overcome the problems as above, an educator will choose the right learning model so that learning objectives can be achieved effectively, efficiently and economically. The *Contextual Teaching Learning (CTL)* learning model is an appropriate learning model to overcome problems in the research class, especially in an effort to improve visual thinking and student motivation in solving students' mathematical problems. Based on research that has been conducted by Mulhamah & Putrawangsa (2016) [8] stated that the application of a contextual learning approach can improve students' problem solving abilities in mathematics subjects. Students who are taught using a contextual approach have better problem solving skills than students who are taught using conventional learning models.

The advantage of the contextual learning model is that students are not required to memorize facts but a strategy that encourages constructing knowledge in their own minds. Through contextual learning students are expected to learn through "experiencing" not "memorizing" [9] .

Based on the formulation of the problem above, the research objectives are: 1) analyzing the improvement of students' visual thinking skills and motivation to learn mathematics after implementing the *Contextual Teaching and Learning (CTL)* learning model 2) analyzing and finding the difficulties experienced by students in completing the visual thinking ability test. students after implementing the *Contextual Teaching and Learning (CTL)* learning model

2. LITERATURE REVIEW

2.1. Mathematical Visual Thinking Ability

According to Solso [10] " Thinking is a process in which new mental representations are formed through the transformation of information with complex interactions of mental attributes such as judgment, abstraction, logic, imagination, and problem solving " . Thinking involves the brain's manipulation of information, such as when we form concepts, engage in problem solving, reason, and make decisions.

According to Arcavi [11] “Visualization is the ability, the process and the product of creation, interpretation, use of and reflection upon pictures, images, diagrams, in our minds, on paper or with technological tools, with the purpose of depicting and communicating information, thinking about and developing previously unknown ideas and advancing understandings”.

Visualization plays a different function or role in students using it to solve problems. Presmeg [12] explains that there are 7 roles of visualization, namely: 1) To understand the problem,

by visually representing the problem, students can understand how the elements in the problem relate to each other, 2) To simplify the problem, visualization allows students to identify simpler versions of the problem. problem solving, problem solving and then formalizing the understanding of the given problem and identifying the method used for all such problems, 3) To see the connection (connection) to related problems, this involves related problems given earlier in the problem solving experience, 4) To fulfill individual learning style, each student has their own preference when using visual representations, when solving problems, 5) As a substitute for computation/calculation, problem answers can be obtained directly from the visual representation itself, without the need for computation, 6) As a tool to check solutions , represent Visual i can be used to check the correctness of the answers obtained, 7) To convert the problem into mathematical form, mathematical forms can be obtained from visual representations to solve problems.

Sword KL [13] describes several advantages of *visual thinking*, namely: 1) By *visual thinking* , the information obtained is processed instantly just by looking at pictures, 2) *Visual thinking* can help to convey problems and how to solve problems, 3) By using *visual thinking* , Objects or images can be seen from a clearer and more creative point of view than other thinkers, this is because the creative process combines awareness of problems, gathers information, develops ideas, plans and produces problem solving.

From several researchers who reveal the importance of visual skills, it can be concluded that the importance of visual skills in learning include : 1) Helping to represent abstract thoughts into scientific forms of thinking and is a cognitive bridge between verbal thinking and practical activities between words and activities, 2) Helping students in understanding mathematical concepts, 3) Helping students in solving math problems, 4) Helping students in seeing mathematics in a different way, 5) Helping students to simplify complex problems, 6) Helping students communicate what they think students in the form of pictures, symbols, diagrams, graphs, 7) Alternative sources for students working with mathematics a resource that can open up the emergence of various ways of thinking about mathematics and the development of mathematical resources.

According to Novrini [14] the indicators of Visual Thinking ability are as follows:

Table 1. Indicators of *Visual Thinking* Ability

Aspects of Visual Thinking Ability	Measured Indicator
Seeing and Imagining	Presenting problems in visual form (diagrams, pictures, tables and patterns)
Describe	Presenting problems in the form of mathematical equations (mathematical expressions) or mathematical models
Communicating	Representing a problem in a form that can help connect and communicate information to solve the problem
Represent	Presenting problems in visual form such as pictures, graphs, diagrams or words that can help to relate and communicate to solve problems.

Meanwhile, according to Chi, M [15], *visual thinking* skills can be seen from the ability to: 1) understand algebra and geometry as alternative languages, 2) extract certain information from diagrams, 3) represent and interpret problems (or concepts) graphically, 4) drawing and using diagrams as an aid in problem solving, 5) visually understanding mathematical transformations, 6) to have in mind a representation of a visual image.

2.2. Contextual Teaching and Learning (CTL) Learning Model

Trianto [16] wrote that learning CTL is not a new concept. Planning for CTL lessons in American classrooms was first proposed by John Dewey. In 1916, Dewey proposed a curriculum and teaching methodology that was linked to student interests and experiences.

The Department of Mathmatics Education, University of Georgia put forward a number of definitions of *Contextual Teaching and Learning*, among them it was stated that CTL connected the knowledge possessed by students from school with practical use in society [17] .

CTL as a model, in its implementation, of course requires a learning plan that reflects the concepts and principles of CTL. Each learning model, in addition to having elements of similarities, there are also certain differences. This is because each model has certain distinctive characteristics, which of course has implications for certain differences in making designs/scenarios that are adapted to the model to be applied. The characteristics of CTL that distinguish it from other learning models [16] , are: (1) Cooperation, (2) Mutual support, (3) Fun, exciting, (4) Not boring *(joyfull, comfortable)* , (5) Learning with passion , (6) Integrated learning, and (7) Using various sources of active students.

The advantages of the *Contextual Teaching and Learning (CTL)* learning model:

a) Can strengthen the sense of responsibility, because the results that are done are accounted for in front of the teacher.
b) Cultivating students so that they can be independent without expecting the help of others.
c) Encouraging students to be enthusiastic about pursuing achievements.
d) Increase the activity and skills of students, as well as the meaning of each material presented.
e) Learners know the real application in everyday life.

Disadvantages of *Contextual Teaching and Learning (CTL)* learning model:

a) It is possible that in each group there are students who do not play a role, only join in.
b) Difficult tasks can affect students' mental calm.
c) It is difficult to give assignments that are in accordance with the abilities of students.

Ways to anticipate shortages include:

a) Each student must look for answers independently then the results of the search are discussed with the group. Individual and group search results were collected as evidence.
b) Educators provide questions or conduct questions and answers to students.
c) The teacher monitors the discussion, while providing solutions for groups that find it difficult.

2.3. Difficulty learning

Mahmud [18] suggests that "learning is a change in a person that occurs because of experience". Learning difficulties can be interpreted as a condition and a learning process marked by certain obstacles to achieve learning outcomes. These learning barriers are not only instructional or pedagogical problems, but refer to psychological problems. Students who experience obstacles in the learning process will get less than optimal learning outcomes.

According to Shah [19] "External factors of students include all situations and conditions of the surrounding environment that do not support student learning activities". These factors are divided into three types, namely: 1) The school environment, for example the poor condition and location of school buildings such as near the market, the condition of teachers and low-quality learning tools. 2) The family environment, for example disharmony in the relationship between father and mother, and the low economic life of the family. 3) Community environment, for example slum areas and playmates.

Students who have learning difficulties are students who cannot learn properly because of a disturbance and obstacles experienced so that they cannot achieve optimal learning outcomes. According to Zainal Arifin [20] "several indicators to determine students' learning difficulties are as follows": 1) Students cannot master the subject matter in accordance with the allotted time. 2) Students get low learning outcomes compared to other students in one group. 3) Students cannot achieve learning achievement in accordance with their abilities.

3. RESEARCH METHODS

This research uses descriptive qualitative research using case study method. This type of research is qualitative, meaning that this type of research aims to describe students' visual thinking skills in the application of the Contextual Teaching and Learning Learning Model. The data generated in the form of words or utterances obtained from the results of interviews and writings or numbers obtained from the results of interviews.

According to Moleong [21] that "Qualitative research is research that intends to understand what phenomena are experienced by research subjects such as behavior, perception, motivation, action, etc., holistically, and by way of description in the form of words and language, in a particular natural context and by utilizing various natural methods ". Strauss & Corbin [22] stated that "Qualitative research is research whose findings are not obtained through statistical procedures or forms of calculation". This means that even if there is the use of statistical procedures it is only a tool to collect data so that it can be described.

The subject of this study involved class IX of MTs Negeri 03 Labuhan Batu who was treated with the application of the Contextual Teaching Learning Model for the 2020/2021 school year, totalling 23 students. While the learning material given is similarity and congruence material. The object of this research is the visual thinking ability of students who are given the Contextual Teaching Learning Model on the subject of Cubes and Blocks. The object of this research was obtained from the results of the student's visual thinking ability test and through interviews and transcripts of voice or video recordings of the subject.

4. RESULTS AND DISCUSSION

4.1. Research result

4.1.1. Description of Research Data

The research was conducted at MTs N 3 Labuhan Batu. The implementation of learning uses the *Contextual Teaching and Learning (CTL)* learning

model for 4 (four) meetings. After that, a visual thinking ability test was given which was followed by 23 students. In this study used data analysis method Miles and Huberman. In collecting data in qualitative research, it is divided into: visual thinking ability tests, interviews, triangulation, and questionnaires. In the implementation of triangulation, the validity of the research results can be obtained so that conclusions can be determined.

4.1.2. Data analysis

The presentation of the data is done by organizing the reduced data in the form of a narrative in the form of a description of the student's answer process. The data is interpreted and evaluated to be able to plan further actions combined with the results of interviews in the form of brief descriptions, charts, pictures and relationships between categories. Next, the conclusions are followed by checking the validity of the results of the analysis or interpretation of the data by conducting discussions with colleagues as research partners, reviewing field notes and rethinking important written parts. While verification is a validation of the data concluded where the activities carried out are testing the truth, robustness, and suitability of the meanings that emerge from the data.

4.2. Students' Visual Thinking Ability Level

After carrying out learning for 4 (four) meetings, it was continued with tests on students to see students' visual thinking abilities. Corrected answer sheets based on scoring guidelines are assessed based on the principles of valid, objective, fair, integrated, comprehensive and sustainable, systematic, toxic criteria, accountable (Permendikbud No. 23 CHAPTER IV article 5 of 2016). From the corrected test results (attachment to the problem solving ability test results are presented in the table below, namely the grouping of students' visual thinking ability levels as follows:

Table 2. Grouping of Students' Visual Thinking Ability Levels

Student Ability Category		Ability Level	The number of students	Percentage (%) Overall
Number	Letter			
3.85 – 4.00	A	Tall	2	8.7%
3.51 – 3.84	A -			
3.18 – 3.50	B +	Currently	10	43.5%
2.85 – 3.17	B			
2.51 – 2.84	B -			
2.18 – 2.50	C +	Low	8	34.8%
1.85 – 2.17	C			
1.51 – 1.84	C -	Very low	3	13.0%
1.18 – 1.50	D +			
1.00 – 1.17	D			
Amount				100%

Based on the results of the visual thinking ability test of 23 students, the students' visual thinking ability level was obtained into four levels, namely high, medium, low, and very low.

From the 23 students, it can be seen that the level of visual thinking ability of "moderate" students has the highest number, namely 10 students with a percentage value of 43.5%. As for the level of visual thinking ability of students with "high" ability as many as 2 students with a percentage value of 8.7%, for the level of visual thinking ability of students with "low" ability as many as 8 students with a percentage of 34.8%, for the level of thinking ability visual ability students "very low" as many as 3 students with a percentage value of 13.0%.

4.3. Students' Visual Thinking Ability Each Indicator

The visual thinking ability of students with the highest average percentage value is the ability to see and imagine with a percentage value of 73.9%, while the visual thinking ability of students with the lowest average percentage value is the ability to represent with a percentage value of 17.4% . The average value of the percentage value for the ability to describe is 60.8% and the ability to communicate is 43.5%. The average percentage of each indicator of students' visual thinking skills is presented in the following table:

Table 3. Average Percentage of Each Indicator of Students' Visual Thinking Ability

Stage	Visual Thinking Ability Indicator	Percentage (%)
1	Seeing and Imagining	60 , 8 %
2	Describe	73 , 9 %
3	Communicating	43.5%
4	Represent	17.4%

Based on table 4. 11 percentage of students' visual thinking ability, it was obtained that the level of students' visual thinking ability at the indicator stage of understanding the problem was higher. For the percentage, the level of visual thinking ability at the indicator stage of seeing and imagining reached 60.8 %. At the stage of describing indicators, which reached 73.9 %. Meanwhile, the communicating stage indicator reached 43.5%, and the representative stage indicator reached 17.4%.

4.4. Gain Index Calculation

To see the improvement in visual thinking skills between students who receive learning with a realistic mathematics approach and students who receive ordinary learning is to calculate the gain of both classes. The data from the normalized gain test results can be seen in the following table:

Table 4. Results of Improving Visual Thinking Ability Test I

Experiment Class				Control Class			
X min	X max		s	X min	X max		s
0.39	0 .89	.62	.10	0.23	0. 56	.33	.06

Table 5. Average Normalized Gain Results of I increase in Visual Thinking Ability Test I

Experiment Class		Control Class	
Normalized Average Gain Nilai	Category	Normalized Average Gain Nilai	Category
0.62	Currently	0.33	Currently

From table 4 and figure 5 it can be seen that the average increase in problem solving abilities in the experimental class is different from the control class. However, to know for sure the difference in the increase needs to be tested with statistical tests. The prerequisite for performing parametric statistical analysis is the fulfillment of the criteria for the normality of the data distribution and the homogeneity of the analyzed data.

4.5. Subject Pick-up

Criteria for taking subjects who are subject to interviews using criteria, namely based on indicators of student abilities. Subjects taken based on indicators of student ability are grouped into four categories, namely (1) High, (2) Medium, (3) Low, and (4) Very Low. Each of the four categories of students was analyzed (observed) to determine the patterns of student answers. Then, based on the dominant pattern of answers, students were selected as subjects who were subjected to interviews. The errors of all student answer sheets were analyzed (observed), then the student answer sheets were selected in which there were many errors, then errors were analyzed based on the answer sheets and interviews so that the difficulties in the visual thinking ability process of students were triangulated based on students' answers on the ability test. students' visual thinking.

Based on the results of the student's visual thinking ability test that had been corrected according to the designed visual thinking ability scoring guidelines, 23 students were selected 8 subjects to be interviewed according to the students' visual thinking ability level. The selected research subjects who were interviewed based on the level of students' visual thinking abilities can be seen in the table below, as follows:

Table 6. Selected Subjects for Students' Visual Thinking Ability Interview

No.	Student Code	Subject Appointment Viewed From Aspects
1.	S2 and S7	High Ability
2.	S4 and S20	Medium Ability
3.	S13 and S22	Low Ability
4.	S8 and S10	Very Low Ability

4.6. Interview Conduct

Interviews with subjects were carried out in each grouping of answer patterns raised through indicators (high, medium, low, and very low). Analysis of the data from the results of the students' visual thinking ability test was triangulated by identifying the questions that the students were working on.

Analysis of the ability to think visually difficulty sisw a determined in accordance with the level of students' ability to think with visual.

a). Analysis of the Difficulty of the Process of Visual Thinking Ability of High-Ability Students
b). Analysis of Difficulty in the Process of Visual Thinking Ability of Medium- Ability Students
c). Analysis of Difficulty in the Process of Visual Thinking Ability of Low- Ability Students

4.7. Analysis of Difficulties and Factors Causing Difficulties

Based on the results of the analysis of errors on the students' visual thinking ability test and the results of interviews conducted, the difficulties experienced by students from each number of questions based on the theory proposed by Martini [10] are as follows:

a. Weaknesses in Counting

The difficulties experienced by students can be seen in the completion process, namely the difficulty of students in performing arithmetic operations. Judging from all student answers, at this stage 57% of students experienced weakness in counting and 43% of students were able to count well.

b. Students' Difficulties in Transferring Knowledge

The difficulty of students in transferring knowledge is the difficulty of students in determining the formula to solve the problem, the location of the difficulty in the problem is that the student is not able to write the formula that must be used to determine the formula

with the information contained in the problem. Judging from all student answers, at this stage 64% of students had difficulty in transferring knowledge and 36% of students were able to transfer knowledge well.

Student error due to students are less rigorous in scrutinizing what is known of the problem or the given problem. This is in line with the research conducted by Fakhrul [24] which concluded that the difficulties experienced by students were the lack of conceptual understanding, incorrect use of formulas, and lack of student interest in learning mathematics.

c. Poor Mathematical Understanding

The difficulty of students in transferring knowledge is the difficulty of students in determining the formula to solve the problem, the location of the difficulty in the problem is that the student is not able to write the formula that must be used to determine the formula with the information contained in the question. One of them can be seen from all student answers, at this stage 48% of students have difficulty in understanding the language of mathematics and 52% of students are able to understand the language of mathematics well.

Student errors are caused by students' lack of understanding of the mathematical language of students in observing what is known from the problem or problem given.

d. Difficulty in Visual Perception

The difficulty of students in transferring knowledge is the difficulty of students in determining the formula to solve the problem, the location of the difficulty in the problem is that the student is not able to write the formula that must be used to determine the formula with the information contained in the problem. Judging from all students' answers, at this stage 61% of students had difficulty in visual perception and 39% of students were able to understand visual perception well.

The errors of students because students do not understand the story problems in monitoring what is known of the problem or the given problem.

The factors that cause students to have difficulty in solving visual thinking questions are as follows:

a. The factor that causes students to have difficulty in solving problems is the difficulty experienced by students in arithmetic operations. The cause of this difficulty is that they do not understand too much about the operation of counting decimal numbers and students lack practice questions and students' motivation to learn is still low. This is in line with research conducted by Puspitasari [25] which stated that the cause of the difficulties experienced by students was performing addition and subtraction arithmetic operations, and lack of practice in working on questions.

b. Factors that cause students to have difficulty in transformation are the way students learn which only memorizes formulas which result in forgetting quickly, and lack of practice working on questions, this is in line with research conducted by Asfi Yanti [26] which states that the factor causing student difficulties is the ability of students who low and low understanding of the concept of congruence and similarity, lack of attention and seriousness in learning, lack of practice in answering questions, lack of appreciation in reading questions, and inability to analyze story questions.

4.2. Research Discussion

From 23 students, it was found that the level of visual thinking ability in moderately capable students was more, followed by low-ability students and then high-ability students. In detail, the results obtained from the level of visual thinking skills of students with very low abilities as much as 13.0%, low abilities as much as 34.8%, moderate abilities as much as 43.5%, and high abilities as much as 8.7%.

Based on the level of visual thinking ability, more students have moderate ability. Besides that, only two people were highly capable. In addition, the results of students' answers related to the overall visual thinking ability test answers were not good. This is because students are still not used to working on questions that lead to visual thinking.

5. CONCLUSION

Based on the analysis of the research data and the discussion that has been described in this study, several findings were obtained, namely the achievement of the research objectives that have been set. The conclusions obtained are:

1) Students' visual thinking skills have improved quite well. This can be seen from the percentage of the highest level of visual thinking ability of students in class IX-1 MTs N 3 Labuhan Batu in the medium category. High ability level there are 2 students. Medium ability level there are 10 students. Low ability level there are 8 students. The ability level is very low, there are 3 students. There was an increase in the N-Gain of students' mathematical visual thinking skills using the *Contextual Teaching and Learning* learning model, in the experimental class trial of 0.63 in the medium category , while the control class was 0.45 in the medium category.
2) Difficulties that are often experienced by students are:
   - High-ability students: students have little difficulty at the stage of representing, namely students find it difficult to find other ways to prove that the answer is correct
   - Moderately capable students: students have difficulty at the communicating stage, namely

students are wrong in mathematical arithmetic operations and at the representing stage, namely students find it difficult to find other ways to prove that the answer is correct.

- Low-ability students: students have difficulty at the communicating stage, namely students are wrong in determining the formula to be used, mathematical arithmetic operations and at the representing stage, namely students find it difficult to find other ways to prove that the answer is correct.
- S ISWA capable of very low: students have difficulty at the stage of seeing and imagining that difficult students menulisan what is known and asked of the matter, the stage of communicating that students erred in determining the formula to be used, arithmetic operations of mathematics and at this stage represents that the student is difficult to find a way another to prove that the answer is correct.

Based on the results achieved in this study, it was concluded that the biggest difficulty of students in completing the visual thinking ability test was in the fourth stage, namely representing. This is because students are less able to represent the results obtained by substituting the results obtained with what is known by the question.

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