

EFFORTS TO IMPROVE STUDENT LEARNING OUTCOMES IN MATHEMATICS BY SUBJECT HEURISTIC LEARNING STRATEGY IN CLASS VIII SMP CRC. MEDAN DAHLAN TP. 2014/2015

Winda Suci Lestari Nasution,¹ Edy Surya², Edi Syahputra³

¹ Colledge Student, Graduate Program School in Matematis Education, State University of Medan, Indonesia

² Lecturer, Graduate Program School in Matematis Education, State University of Medan, Indonesia

³ Head, Graduate Program School in Matematis Education, State University of Medan, Indonesia

⁴ Head, Graduate Program School in Matematis Education, State University of Medan, Indonesia

ABSTRACT

This research aims to : 1) How the implementation of learning mathematics in junior high school "KH. A. Dahlan Medan" the year of learning 2014-2015, 2) How the application of the strategy of learning a heuristic in which work is done a mathematics in Class VIII Junior High School K.H. Ahmad Dahlan Medan, the year of learning 2014-2015. 3) Whether the results of learning mathematics increase after learning a heuristic strategy applied in Class VIII Junior High School K.H. Ahmad Dahlan Medan, the year of learning 2014-2015?The act of class research is conducted by 2 cycles which includes the planning activities ,implementation, observation and reflection . And to know the ability of students before treatment and after treatment used the test results learn in individual. A subject in this research was a Class VIII Junior High School K.H. Ahmad Dahlan Medan which consisted of 25 people. Research shows that to use learning heuristic strategy has acquired exhaustiveness with percentage who has not reached of 85%. There are 14 students were completed settled rate 56,00%. While students not being completed that totaled 11 students with percentage 44,00% and the average class 73,20 so classical percentage in Class VIII Junior High School K.H. Ahmad Dahlan Medan has not been completed. And after researcher gave Treatment improvements (cycle II) acquired a classical percentage reached 85%. The students was completed totaled 23 people with percentage 92,00%. While students who have not been completed totaled 2 people with classical percentage 8,00% and the average class 81,00% so with the classical percentage then Class VIII Junior High School K.H. Ahmad Dahlan Medan can be said to be completed and research not continued in subsequent cycles.

Keywords: *Mathematics Learning Outcomes, heuristic Learning Strategy*

1. BACKGROUND

Law on National Education System confirms that education is a conscious and deliberate effort to create an atmosphere of learning and the learning process so that learners are actively developing the potential

for him to have the spiritual power of religion, self-control, intelligence, noble character, and skills needed him, society, nation and state (Act No. 20 of 2003)

The subjects of mathematics in general has always been a subject dreaded by many students at each school because they are subjects that require serious thought, centered and boring. As a result, these subjects are often avoided karena students apart from the bore also generally have a less varied teachers in choosing the right method in the right circumstances which make belajarnya motivated students improve results.

Abdurrahman stressed learning outcomes is an acquired ability of children after going through the learning activities, the acquisition in the form of a relatively sedentary behavior, behavior as a result of the knowledge, attitudes and capabilities of the learners.

Heuristic Learning Strategy is a learning strategy where the teacher acts as a facilitator and supervisor of student learning activities. Through this strategy the student is more active than the teacher. The teacher not be in front and the task is to attract students to follow, but the students were told to be in front, the teacher directing, encouraging, helping students when experiencing difficulties.

Junior Kyai Haji Ahmad Dahlan as one of the first advanced-level education unit in Medan is a junior who had relatively good facilities, but in terms of the quality of junior high school graduates is still classed in the category of lower middle. The situation is seen from the results of the National Examination showed that the UN Mathematics in the last three years is still an average of 72, while indeed should exceed a predetermined KKM is 75.

Based on the results of the grand tour conducted shows that the average value of each semester mathematics are also still under KKM. This state is assumed to be caused by several things such as: 1) lack of varied methods used by teachers in particular subjects, especially math teachers teaching methods that match the topics that; 2) lack of interest of students to learn mathematics more deeply because it considers the matter of not too exciting in his life; 3) lack of availability of textbooks students and books to members of motivation for students to pursue math; 4) less precisely applied learning strategies associated with the subjects taught and the time provided for a particular subject is not sufficient as a result of the number of hours of religious instruction are relatively large.

This situation raises the thought that sought appropriate measures in order to improve student learning outcomes, especially in mathematics. One alternative that is allegedly able to improve the results of students' mathematics learning is to use a strategy other than the one commonly used in schools are learning strategies heuristics, so that through this study, researchers submitted the title as follows: *"Efforts to Improve Learning Outcomes At Subject Mathematics Through Strategy Heuristic learning In Class VIII SMP KH. A. Dahlan Terrain TP. 2014-2015"*

2. THEORETICAL BASIS

2.1. Theoretical framework

2.1.1 Nature of Learning

Learning is a term that is familiar in the world of education. Learning outcomes make man can follow his journey throughout their lives. With human learning can make changes, improvements and corrections on self, family, and even the environment. Changes could include the development of knowledge, attitudes, skills or abilities that might be expected to solve a variety of problems in his life. Therefore, a person is said to be learning when it can be assumed in that person going on a process that results in a change in behavior. The activities and efforts to achieve behavior change is a process of learning, while the change in behavior is the result of learning.

Furthermore Hamalik regard, "learns as modification or reinforce behavior through experience". This means that learning is a process, an activity and not a result or goal. Learning to not only remember, but more than that, the experience. The same thing also expressed Slameto: "Learning is a process attempts carried out a person to obtain a new behavior as a whole, as a result of his own experience in the interaction of the environment.

Based on some of the above opinion can be seen that the study is the change in someone's behavior because of the experience that has gone before in the form of skills, or skills and interaction with the environment, through three stages: (1) the information stage or phase of receipt of the information, (2) the stage of transformation or phase conversion of the material, (3) the evaluation phase or stage of assessment material, in order to gain knowledge.

2.1.2. Itself Learning Outcomes

Results of study consists of two words "results" and "learning". The results is a gain as a result of forming an activity or process that result in changes of individual functional. While learning is the process to make changes in the way people interact with the environment to get a change in the cognitive, affective and psychomotor.

The learning result is the ability gained after the child through the learning activities. Learning itself is a process of someone who diligently trying to obtain a form of relatively permanent change in behavior. In learning activities programmed and controlled the so-called learning activities or instructional activities, learning objectives have been set in advance by the teacher. Children who succeed in learning is successfully achieving the goals of learning or instructional purposes. success or failure in learning can be determined by the results of the study itself and of the meaning of what has been learned. For example, there is an increase in students such as increased intelligence, skilled, has a good attitude, responsible and able to live independently.

Somewhat different from the above opinion, Hamalik said that, "The study is the change in student behavior that can be observed and measured in terms of changes in knowledge, attitudes, and skills". The change means an increase and a better development than ever before, for example, not knowing to knowing, irreverence become courteous.

One of the purposes of assessment of learning outcomes is to determine the extent to which the students have achieved learning outcomes. Muhibbin Shah said that the purpose of the evaluation is to: (a) determine the level of progress made by students in a certain period of the learning process. (B) determine the position or the position of a student in her class group. (C) determine the level of effort for students to learn. (D) determine the extent to which students have to utilize their cognitive capacity (its intelligence capability) for the purposes of learning. (E) determine the level of efficiency and effectiveness of teaching methods that have been used by teachers in the teaching-learning process.

In the formulation of the national education system of educational goals, whether the purpose of curricular and instructional purposes, using the classification of Benyamin Bloom learning outcomes are broadly divided it into three domains, namely cognitive, affective and psychomotor domains. Cognitive domain with respect to the development of knowledge which originate in the brain or intellectual intelligence that consists of six aspects, namely: (1) Knowledge / Memory (Knowledge / C1), defined as the ability to remember what they have learned. (2) Understanding (Comprehension / C2), defined as the ability to grasp the meaning of the material being studied. (3) Application / application (Application / C3), is the ability to use what has been learned into new concrete situations. (4) Analysis (Analysis / C4), is the ability to specify the lessons learned into its elements so that its organizational structure can be understood. (5) Synthesis (Synthesis / C5), is the ability to collect the parts to form a new unity. Synthesis capabilities are part of the process of scientific thinking skills. For MTs need more levels developed according to the cognitive development of the students as well as the evaluation / assessment (Evaluation / C6) is the ability to determine the value of something that I learned a certain aim. The ability of the above nature hierarchical, meaning the ability of the first to be mastered first before mastering the second, the ability of both to be mastered first before mastering the third, and so on.

Affective is the realm with regard to objectives related to the attitudes, feelings, values, interests and appreciation, which consists of five aspects, namely: (1) Revenue (Receiving), a willingness to take notice. (2) responsiveness (Responding), is the ability to actively participate. (3) award (Valuing), is awarded to the object, phenomenon, certain acts. (4) Management (Organization), is the ability to combine different values and form a consistent value system and internal. And (5) impersonal (characterization by a Value of Value Complex), has a value system that controls actions to foster a "life style" steady. While the psychomotor domain with respect to categories of capabilities related to muscle activity and physical activity. So the pressure capability regarding coordination of brain neurons, involving mastery of body and movement. Briefly psychomotor abilities can be said that this concerns the psychomotor abilities of physical activity that involves running, jumping, throwing and so forth. Mastering capabilities include body movements that require a simple neuromuscular coordination and abusive towards the movement that demands better neuromuscular coordination complex and smooth.

Everyone learning activities will want to know the results of study conducted. Students and teachers are the people who are directly involved in the learning process. After the learning process, the teacher always conduct an evaluation of the student in order to determine the level of student mastery of the material being studied. The evaluation results are the result of learning for students in the learning process.

To measure the learning outcomes that have been achieved mathematics students, generally use the test. Test as an assessment tool were questions given to students to get answers from the student in oral form (oral test), in writing (written test), or in the form of action (test action).

Based on the above description referred to the learning outcomes in this study is the ability of the students obtained after a learning activity in certain subjects. As for how to measure learning outcomes achieved by students who have used the test. For in addition be able to assess and measure the cognitive learning, tests can assess and measure the results of the field of affective and psychomotor learning. The purpose of this study is the assessment results to determine the success of the learning process in schools, namely the extent to which its effectiveness in achieving predetermined indicators.

2.1.3. Mathematics Learning Outcomes

Mathematics learning outcomes based on the formula above can be seen as an acquired ability students after experiencing learning activities, and ways in which to measure the learning outcomes of students of mathematics that has been achieved in this research is to use the test

2.1.4 Heuristic Strategies Definitions

Strategy is a term commonly spoken, especially in relation to learning and warfare. Often disamaucapkan term strategy with tactics by saying tactics and strategy. According to Wikipedia, the strategy is an overall approach with regard to the implementation of the idea, planning, and execution of an activity within a certain time. According to Karl Von Clausewitz, the strategy is knowing how to use the battle to win the war. While the war itself is a continuation of politics. According to Stephanie K.Marrus, strategy is a process of determining the plan's top leaders that focuses on long-term goals of the organization, along with the preparation of a means or remedy how to keep these objectives can be achieved. According A.Halim, the strategy is a way in which the organization / agency will achieve its objectives, in accordance with the opportunities and threats facing the external environment, as well as resources and capabilities.

2.1.5 Heuristic Definitions

The word heuristic comes from the same roots in the Greek word "eureka", meaning "to find" or I find. Heuristics relating to problem-solving is a way of showing one's thoughts in the process of solving until the problem is solved. This is different from the algorithm in which only used as a rule or guideline, contrary to the procedure invariant. Therefore, heuristics are often considered an art and science that is associated with discovery

This heuristic method popularized by Professor Armstrong in the 19th century According to this method learners who have to find a scientific fact. The term heuristic is often used to mean looking for something like the guided discovery activities and seek solutions to problems. Therefore, the notion of heuristics is also very close to the understanding of the invention (discovery). Heuristics is a step thought and effort to find and solve a math problem or issue. In this way the math is growing and then applied to solve practical problems. Here are some basic heuristic (generic) in mathematics according to Sickafus, namely:

- a. Finding patterns (Search for Pattern) • Create Image (Draw a Figure)
- b. Formulated an equivalent problem (Formulate an equivalent problem)
- c. Modifying problem (Modify the problem)
- d. Choosing an effective notation (choose effective notation)
- e. Using the symmetry of the problem (Exploit symmetry)
- f. Break the problem into cases (Divide into cases)
- g. Working backwards (Work backward)
- h. Asking contradiction (argue by contradiction)
- i. Examine problems that have in common (Check for parity)
- j. Menemukan extreme cases / special (Consider the extreme case)
- k. Generalize (Generalize)

In addition to the above basic heuristic eleven, there are still many basic heuristics in mathematics such as: simplification, ambiguity, contrarian view, and extreme focus.

It was based on research Teoh Hoon Sian, Parmjit Singh, Tau Cheong Han, Cor Liew Kee (2013) who argued: "Students who have strong belief of applying heuristics approach well show experience in their discovery of mathematical problems. They also show inclination in the progress of mathematical understanding the which is developed through multiple strategies employed in solving mathematical. Thus, Reviews their effort of Employing heuristics fosters strong belief on their ability in solving mathematical problems. On the other hand, heuristic approaches are included Easily through teachers' systematic planning in high-engagement environment. Heuristic approaches are Involved in problem solving or some other environment roomates needs high order thinking, "which means that students who have a strong belief of applying heuristic approach shows a good experience in their discovery of a mathematical problem. They also showed a trend in the advancement of mathematical understanding developed through several strategies used in solving mathematical problems. Thus heuristics foster a strong belief in their ability to solve mathematical problems. This heuristic approach initiated through systematic planning in high-involvement environment so that the heuristic approach requires higher order thinking.

3. Framework

When there is a gap between das sollen (ought) and das science (fact) means there have been no problems. The subjects of mathematics is a subject that is indispensable at any time wherever located. Mathematics courses students often regarded as a problem. In case of problems, however, remains no solution.

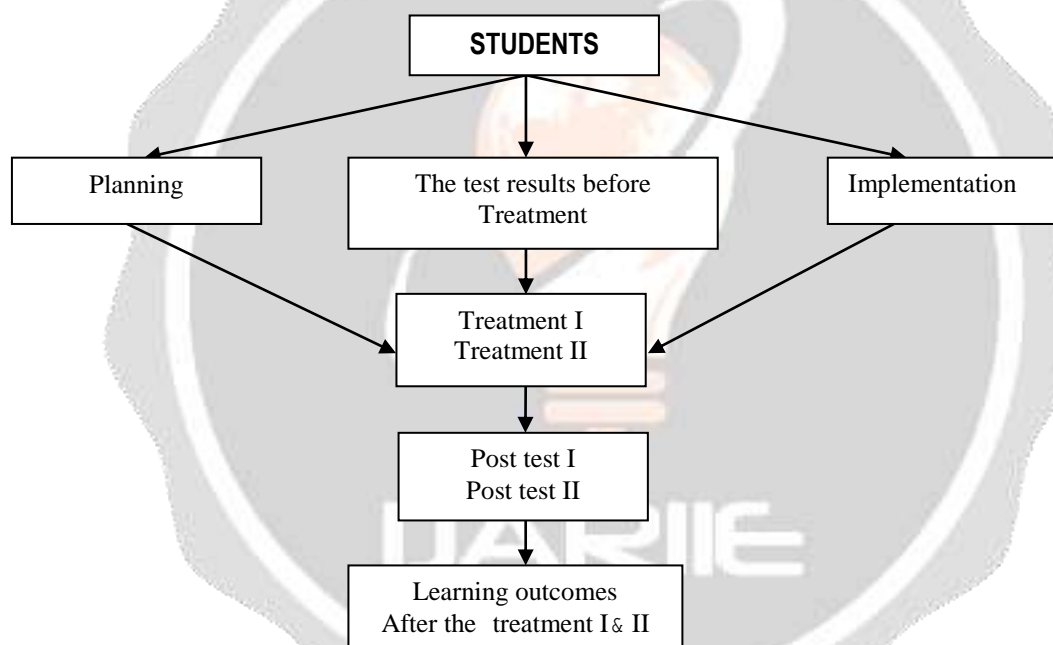
It is very important problem-solving in every lesson, especially the lessons and learning of mathematics. Therefore, the process of solving the problem will make the students better understanding and more easily which will eventually remove the boredom and distaste towards mathematics itself.

Mathematics learning is learning which has its own characteristics compared to learning other subjects and its presence is indispensable as supporting other sciences. Therefore, the mastery of mathematical concepts and material well indispensable. Because students still many assume that mathematics is difficult, exhausting all at once boring.

Teachers should be able to find solutions to overcome them and one of the strategies that researchers have to offer for solving math problems is to provide a guide-a guide that can steer students towards solving the problem itself is a heuristic learning strategies. Heuristic learning strategy is a learning strategy relies on the efforts of an understanding of what is asked questions of the students, what students already know and how that knowledge can be used to overcome the difficulties of what is unknown. That is, with heruristik strategy, the students will be easy to solve problems that ultimately mathematics courses later regarded as an easy and fun lessons.

Through learning approach heuristics, expected that students will be more confident, both in learning to solve the problem of learning, especially math and can even direct them to get to work systematically in solving mathematical problems, so that students skilled define and identify conditions and data that are relevant, generalize, formulate, and organize the skills that have been held in iuris mainly on mathematical problem solving.

Framework of mind are as shown below.



**Figure 2.1. Thinking Implementation Framework Class Action Research
By conducting the treatment (heuristic learning strategies)**

4. PROCEDURE CLASS ACTION RESEARCH

The procedures performed in implementing the Action Research (PTK) in order to find the data of this study are in accordance with the following steps:

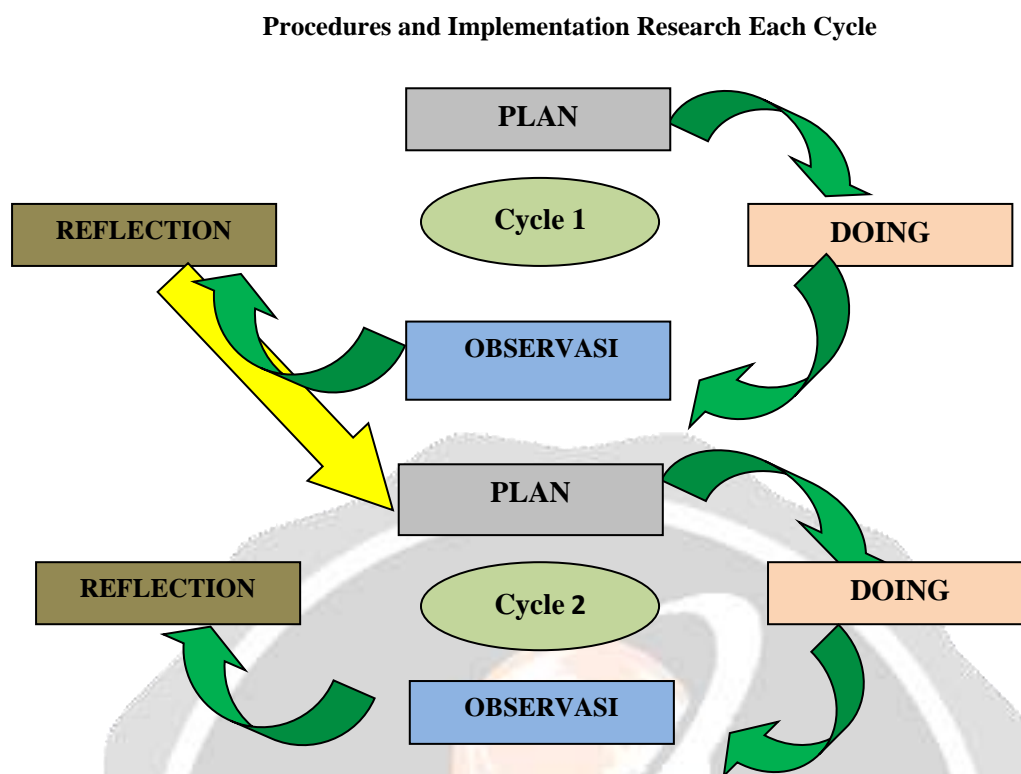


Figure 3.1 Steps in Planning, Implementing, Meng-observed, and Reflecting Actions

5. Discussion of Results

5.1. Before Treatment

Through learning by using heuristic strategies, capabilities and student learning outcomes can be improved. Based on the results of the study concluded that there is an increase in student learning outcomes through heuristic learning strategies. From the results of the initial test (pre-test) in class VIII SMP K.H.Ahmad Dahlan classical graduation percentages obtained 8.00% (2 students), while the percentage of incomplete 92.00% (23 students) with an average grade 45.80. After being given treatment through heuristic learning strategies the percentage of classical completeness in learning the test results I obtained 56.00% (14 students), while the percentage of incomplete obtained 44.00% (11 students) with an average grade 73.2

After repairs the treatment of the first cycle in the second cycle test results obtained studying II (post-test) the percentage of classical completeness obtained 92.00% (23 students), while the percentage of incomplete 8.00% (2 students) with an average grade 81.00.

This is supported by a variety of factors including the factors that influence learning by Mardianto consists of two factors, namely:

- a. Factors that come from outside the student. Like the weather, the state of air, air temperature, and the tools used for learning, as well as the state of the environment around the place of learning
- b. Factors that comes from within the student. As medical students, potential, and the circumstances and the ability of students

Based on the problems described earlier that there are weaknesses of students both from within and from outside the student. One of them is the mental development of the students did not dare ask the teacher and student interaction with teachers are still lacking.

To overcome this problem, according to Gagne teachers should have the following functions:

- a. Designer of Instruction (designer of teaching), namely: the teacher is always ready and able to design teaching and learning activities are managed effectively and efficiently. The design of learning at least include the following matters:
 1. Have and determine teaching materials
 2. Formulate a presentation purposes of lessons
 3. Having a method of presenting the material right lessons
 4. Organizing evaluation study presentation

- b. Manager Of Instruction (teaching managers), namely: requires the ability of teachers to manage or organize and control all stages of the learning process as well as create conditions and situations as well as possible so as to enable the students learn efficient and effective manner.
- c. Evaluation of learning (Assessor student achievement), namely: assessor of student learning outcomes, teacher constantly keep abreast of the level of advancement of learning achievement or academic performance of students in each of the learning time. So the presence of the teacher is crucial to hail a good student learning.

Prior conducted the first cycle and proceed to the next cycle is the second cycle, the researchers first providing the initial test (pretest) were solved through each student. Initial tests carried out to compare the results of the initial test with instructional strategies used. Then at the next meeting (first cycle) researchers add treatment using heuristic learning strategies as well as to determine whether, after administration of treatment can improve learning outcomes Math students.

5.2 After Treatment

CYCLE I

Cycle I rendered using heuristic learning strategy that is delivering the material, giving the example problems, and provide opportunities for students to ask questions, and provide motivation to the students interests and learning outcomes is still lacking. I learned of the test results obtained 56.00% (14 students), while the percentage of incomplete obtained 44.00% (11 students) with an average grade 73.20. It is claimed that these results are not as expected so that necessary repairs can maximize learning enables student learning outcomes in solving problems on the material provided. So the research is still continuing on the next cycle.

CYCLE II

The second cycle of the development cycle implemented I. II achievement test can be said to be completed because the percentage of completeness klasikalnya already reached 85%. Students who completed amounting to 23 students with a percentage of 92.00% klasikalnya completeness. While the students who did not complete the percentage amounts to two students with 8.00% with an average grade 81.00. This means the ability of teachers to manage learning has increased.

After treatment using heuristic learning strategy in the first cycle and the second cycle turns learning outcomes of students has increased significantly. This suggests that learning by using heuristic learning strategies can improve student learning outcomes in class VIII SMP K.H.Ahmad Dahlan in academic year 2014-2015. This means that by using heuristic learning strategy in mathematic can improve student learning outcomes. Comparison of student learning outcomes in prasiklus, the first cycle and the second cycle can be seen in the following table:

Table 4.11
List Earned Earned Value Students On
Pre-Cycle, Cycle I and Cycle II

Number	The Names of Students	M/W	Score Pre-cycle	Score in Cycle 1	Score in Cycle II
1	Abdullah	M	20	65	65
2	Abriansyah Chan	M	25	75	80
3	Agung Ardiansyah	M	25	75	78
4	Ajeng Ramadhani	W	25	65	78
5	Asyifa Nurul Qalbiah	W	25	80	85
6	Chairun Arrasyid	M	25	80	85
7	Edo Pradana	M	60	65	70
8	Elisa Puspita Lubis	W	70	80	80
9	Jenny Adytya Putri	W	70	85	90
10	Mahrani	W	70	85	85
11	Mayang Nurjannah	W	75	90	85
12	M.Irwansyah	M	40	60	90
13	Nazly Aprillia Fani H	W	70	70	85
14	Nurhidayanti	W	60	75	78
15	Novita Sari	W	75	75	86

16	Rika Nopita Sari	W	65	80	80
17	Riska Amalliyah	W	70	80	80
18	Rudi Fahmi Lubis	M	35	75	85
19	Septi Selfira	W	20	70	85
20	Siti Nurhaliza	W	40	60	75
21	Vicky Satria Putra	M	20	60	78
22	Wira Heri Tama	M	35	65	78
23	Ikhwan Mufid Apriliansyah	M	25	70	80
24	Ridwan Arifin	M	50	70	78
25	Dandi Fahrozy Sinuhaji	M	50	75	86
AMOUNT			1.145	1.830	2.025
AVERAGE			45,8	73,20	81,00

6. CONCLUSION

Based on the research that has been done and is associated with the research objectives defined, it can put forward some conclusions as follows:

1. That the implementation of learning mathematics in Class VIII SMP KH. A. Dahlan Terrain TP. 2014-2015 not used heuristic learning strategies included in the subjects of mathematics.
2. That application has not used heuristic learning strategies in mathematics in Grade VIII Junior KH. A. Dahlan Terrain TP. 2014-2015, giving the impression of less developed teaching and learning activities and student learning outcomes showed no significant improvement.
3. That the results of learning mathematics in Class VIII SMP KH. A. Dahlan Terrain TP. 2014-2015 increased after heuristic learning strategies are applied. This can be seen in the following description
 - a. Student learning outcomes before treatment Heuristic Learning Strategy in understanding the material shows that the percentage of completeness klasikalnya not yet reached 85%. Students who completed amounted to 2 students with klasikalnya percentage of 8.00%. While the students who did not complete were 23 students with klasikalnya percentage of 92.00% and an average grade 45.80 so with the classical percentage K.H.Ahmad class VIII SMP can not be said Dahlan Terrain completed.
 - b. Learning Outcomes After Treatment
 - 1). Achievement test data from the first, after the researchers gave the treatment (first cycle) using heuristic learning strategy obtained by percentage of classical completeness that have not reached 85%. Students who complete amount to 14 students with a percentage of 56.00%. While the students who did not complete a total of 11 students with klasikalnya percentage of 44.00% and an average grade 73.20 so with the classical percentage K.H.Ahmad class VIII SMP can not be said Dahlan Terrain completed.
 - 2). Achievement test data from the second, after the researchers gave equal treatment (cycle II) obtained by percentage of classical completeness which has reached 85%. Students who completed amounting to 23 students with a percentage of 92.00%. While the students who did not complete amount to 2 students with klasikalnya percentage of 8.00% and an average grade 81.00 so with the classical percentage of class VIII SMP K.H.Ahmad Dahlan Terrain can be said due diligence and research is not continued on the next cycle.

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