Improving Learning Outcomes Of Class X Students In Mathematics Learning At SMA Negeri 2 Medan Through The Group Investigation (GI) Type Cooperative Model

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Abstract. This study aims to improve student learning outcomes in mathematics class X MIPA 2 at SMA Negeri 2 Medan using the Group Investigation learning model.
This research is a class action research. The subjects of this study were students of class X MIPA 2 with a total of 36 students.
This research consisted of two cycles with two meetings in each cycle. Each meeting carried out a test of learning outcomes. Data collection techniques used learning achievement tests, observation sheets and student response questionnaires. Data analysis techniques use data reduction and data exposure.
The results of this study indicate that the application of the Group Investigation learning model in mathematics learning can improve student learning outcomes in class X MIPA 2. This increase in learning outcomes can be seen from student contributions during the learning process in the form of student learning outcomes tests, students pay attention to the teacher's explanation, students express opinions , students work with groups, student responses to the use of learning models and the results of observations. The increase in classical completeness on the learning outcomes test I cycle I was 19.44%. Meanwhile, learning outcomes II in cycle I increased to 44.44%. In cycle II, the classical completeness test III of 86.11% increased to 94.44% in the fourth learning achievement test. The observation results showed that in the first cycle it increased from 3.54 to 3.73 in the very good category and the student response to learning using the Group Investigation model in the first cycle was 85% increasing to 90% in the second cycle. It can be concluded that almost all students in class X MIPA 2 gave a positive response and accepted the implementation of the Group Investigation learning model in class X MIPA 2. Based on the results of this study it can be concluded that the Group Investigation Learning Model can improve student learning outcomes in Mathematics Learning at SMA Negeri 2 Medan.

Keywords: Group Investigation, Learning Outcomes, Learning Mathematics

Abstrak*. Penelitian ini bertujuan untuk meningkatkan hasil belajar siswa pada pembelajaran matematika kelas X MIPA 2 di SMA Negeri 2 Medan menggunakan model pembelajaran Group Investigation.*

Penelitian ini adalah penelitian Tindakan kelas. Subjek penelitian ini adalah siswa kelas X MIPA 2 dengan jumlah 36 siswa. Penelitian ini terdiri dari dua siklus dengan dua kali pertemuan di setiap siklusnya. Setiap pertemuan dilakukan tes hasil belajar. Teknik pengumpulan data menggunakan tes hasil belajar, lembar observasi dan angket respons siswa. Teknik analisis data menggunakan reduksi data dan paparan data.

Hasil penelitian ini menunjukkan bahwa penerapan model pembelajaran Group Investigation pada pembelajaran matematika dapat meningkatkan hasil belajar siswa kelas X MIPA 2. Peningkatan hasil belajar ini dapat diketahui dari kontribusi siswa selama proses pembelajaran berupa tes hasil belajar siswa, siswa dalam memperhatikan penjelasan guru, siswa mengemukakan pendapat, siswa bekerjasama dengan kelompok, respon siswa terhadap penggunaan model pembelajaran dan hasil observasi. Peningkatan ketuntasan klasikal pada tes hasil belajar I siklus I adalah 19,44%. Sedangkan untuk hasil belajar II pada siklus I meningkat menjadi 44,44%. Pada siklus II, tes hasil belajar III ketuntasan klasikal 86,11% meningkat menjadi 94,44% pada tes hasil belajar IV. Hasil observasi menunjukkan bahwa pada siklus I meningkat dari 3,54 menjadi 3,73 dalam kategori sangat baik dan respon siswa terhadap pembelajaran menggunakan model Group Investigation pada siklus I adalah 85% meningkat menjadi 90% pada siklus II. Dapat disimpulkan bahwa hampir seluruh siswa di kelas X MIPA 2 memberikan respons yang positif dan menerima pelaksanaan model pembelajaran Group Investigation di kelas X MIPA 2. Berdasarkan hasil penelitian ini dapat disimpulkan bahwa Model Pembelajaran Group Investigation dapat meningkatkan hasil belajar siswa pada Pembelajaran Matematika di SMA Negeri 2 Medan.

Kata kunci*: Group Invstigation, Hasil Belajar, Pembelajaran Matematika*

INTRODUCTION

Education is a necessity for every human being, because education plays an important role in preparing quality human resources. Purwanto (2011: 18) says: "Education is a process of intentional activity on student input to produce results in accordance with the expected goals". In its development education is no longer natural, the process can be developed using more innovative learning models so as to optimize learning outcomes. As a deliberate process, education must be seen from the results achieved, whether it is in accordance with the desired goals and whether the process is carried out effectively to achieve the desired results.

Education can be obtained formally at school as stated by Winkel (2014:212). Education in schools directs student learning to acquire knowledge, understanding, skills, attitudes and values which all support their development. Therefore, learning in schools

must be created with a conducive and pleasant atmosphere in order to achieve all the learning objectives that have been set.

Muzzilawati, Aeni and Hanifah (2017:1) mention learning is a teaching and learning process in which it consists of teachers and students. Sulfemi (2017:1897) state that learning outcomes are the abilities students have after receiving their learning experiences. Meanwhile, according to Nurrita (2018:174) learning is a change in behavior carried out by individuals so that there is an addition of knowledge, attitudes, and skills as a series of activities towards the development of learning. According to Syafi'I, Marfiyanto and Rodiyah (2018), learning outcomes have three aspects, namely aspects of knowledge, aspects of attitudes and aspects of skills and all three must maximize their potential for achievement.

Learning achievement achieved by students can be influenced by several factors, both from students (internal factors) and from outside students (external factors). Internal factors include interest, talent, motivation, level of intelligence. While external factors include the teacher's factor in applying the learning method and learning environment.

The *Group Investigation* (GI) Learning Model is a cooperative learning model where teachers and students work together to build learning. Students must be active in several aspects during the teaching and learning process, while the group functions as a means of interaction in forming a learning concept. The *Group Investigation* (GI) cooperative model can train students to develop the ability to think independently. Where students are actively involved from the first stage to the final stage of learning. In short, the advantages of *Group Investigation* can provide opportunities for students to further sharpen their ideas and the teacher will know the possibility of student ideas being wrong so that the teacher can correct these mistakes.

The privilege of using GI allows for the creation of interesting learning conditions. Mathematics learning which is considered difficult to understand and boring will become more varied, because students will study in groups which can stimulate student activity in learning mathematics. Besides being easy to apply to learning mathematics, GI will enable students to look for problems and solve problems in learning mathematics together with their friends, so that they are able to produce active and meaningful learning. An active learning process is able to make it easy for students to take part in learning without a burden, which then will not cause boredom. GI in mathematics aims to make it easier

for students to understand the concept of learning together with their friends in groups. In the investigative learning process, students are required to be active, always thinking about the problems encountered and looking for solutions so that students are trained in developing attitudes and knowledge about mathematical concepts according to the abilities of each student.

Therefore, through the *Group Investigation* learning model, it is hoped that it can provide solutions and a new, interesting atmosphere that is conducive to learning. The *Group Investigation* learning model brings innovative understanding concepts, and emphasizes student activity. It is expected to improve student learning outcomes. Students work with fellow students in a mutual cooperation atmosphere and have many opportunities to process information and improve communication skills.

LITERATURE REVIEW

Learning

Learning is essentially a process of interaction with all situations that exist around the individual. According to Sudjana (Rusman, 2016: 1), learning can be seen as a process that is directed to goals and a process of doing through various experiences. Learning is also a process of seeing, observing, and understanding something.

In the teaching process, learning activities play a very important role. Learning is not just gathering knowledge but learning is more emphasis on changes in individual learning. Someone is said to learn if in that person there is a process of activity that results in changes in behavior.

Rusman (2014: 134) states that: "Learning is a process of changing individual behavior as a result of experience in interacting with the environment. Learning is not just memorizing, but a mental process that occurs within a person." Rusman (2017: 76) adds that: "Learning is a factor that influences and plays an important role in the formation of personality and individual behavior. Most of individual development takes place through learning activities."

According to Sumiati and Asra (2018: 40) based on cognitive-gestalt learning theory, learning is an integrated process that takes place within a person in an effort to gain new understanding and cognitive structures or to change old understandings and cognitive structures.

In Slameto (2017:2) the notion of learning can be defined as follows:

"Learning is a process of effort by a person to obtain a new change in behavior as a whole, as a result of his own experience in interaction with his environment".

Meanwhile, Brunner (in Trianto, 2018: 15) argues that: "Learning is an active process in which students build new knowledge based on the experience/knowledge they already have".

Based on the description above, it can be concluded that learning is a process of changing behavior where students build new knowledge based on experience/knowledge they already have as a form of interaction between students and their environment.

Mathematics Learning Theory

Dienes' Learning Theory

Dienes views mathematics as a structured subject, classifying structures, relations within structures, and classifying relations between structures. Mathematical concepts will be well understood by students if they are presented in concrete and various forms.

Sriraman and Lesh (2007:61) reveal the following regarding Dienes' learning theory that:

Children do not need to reach a certain stage of development to experience the excitement or thrill of thinking mathematically and experiencing the processes of mathematics. Unfortunately, we don't give them the opportunity to think this way. The first thing to do in trying to teach math is to think about different concrete situations with the same core.

Based on his observations and experiences, generally children enjoy mathematics only at the beginning when they are acquainted with simple mathematics, although many do not understand or many concepts are used. Furthermore, Dienes uses the term concept, meaning a mathematical structure which has a broader meaning. Dienes states that a concept is a mathematical structure that includes pure concepts, notational concepts, and applied concepts. Hamdani (2011: 287) conveys that in order for children to understand mathematical concepts, they must be taught sequentially starting from pure concepts, notational concepts, and ending with applied concepts. With the principle referred to in various presentations, students' readiness to learn mathematical concepts is accelerated.

Dienes' learning theory emphasizes the importance for teachers to present mathematical concepts in a concrete and structured form so that students can understand mathematical concepts, because basically mathematics is considered a study of structure.

If each concept or principle in mathematics is presented in a concrete form, students can understand it well.

Brownell and Van Engen's Learning Theory

Brownell states that learning is essentially a meaningful process. Meaning must be sought in structure, organization, relationships from within the subject itself. Without meaningful understanding, exercises will encourage students to view mathematics as a collection of independent, unrelated ideas and facts. He argued that mathematics should be a meaningful and understanding learning.

Especially in learning mathematics in elementary schools, Brownell put forward meaning theory as an alternative to drill theory (memory or test theory). Drill theory in teaching mathematics is based on association learning theory, better known as stimulus response learning theory, developed by Edward L. Thorndike. Budiningsih (2012:21) states that: "Response is a reaction that is raised by students when learning, which can also be in the form of thoughts, feelings, movements/actions".

This learning theory states that in essence, learning is a process of establishing a relationship between stimulus and response. Learning will be more successful if the student's response to a stimulus is followed by a feeling of pleasure or satisfaction. A feeling of pleasure or satisfaction can arise as a result of students getting praise or rewards so that they feel satisfied from the success they have achieved. This will lead him to the next level of success.

Gagne's Learning Theory

Botty and Shahrill (2014: 100) reveal that Gagne's learning theory considers human learning as an activity that involves three components at once, namely the learner, stimulus and response. The learner represents an internal state in the form of prior knowledge: the learning situation provides the stimulus and the interaction of these two results in a learning response, which is part of human behavior.

This is in line with Chahine (2013: 3) which explains in Gagne's learning theory, the occurrence of learning is inferred from differences in human performance as shown before and after being placed in a learning situation. Gagne cites five categories of abilities which he defines as internal states for the learner. These abilities include intellectual, cognitive, verbal, motor, and attitude.

Gagne's learning theory emphasizes the importance of stimulus and response in learning mathematics. This learning theory expects active students to respond to stimuli with all kinds of actions.

Learning Outcomes

Learning outcomes consist of two words, namely results and learning. Results are the consequences that arise after carrying out an activity. While learning is a process of changing behavior as a result of one's experience and interaction with the environment and is permanent. That is, the learning process will produce learning outcomes, so the essence of learning outcomes is a change in behavior.

Istarani and Pulungan (2015:17) state that: "Learning outcomes are a statement expressed in behavior and appearance which is manifested in written form to describe the expected learning outcomes". According to Abdurrahman (2012:29) "learning outcomes are abilities that children acquire after going through learning activities". Children who are successful in learning are those who succeed in achieving learning goals or instructional goals. Meanwhile, Susanto (2013: 5) emphasizes that learning outcomes can be interpreted as the level of success of students in learning subject matter at school which is expressed in scores obtained from test results regarding a number of certain subject matter.

Mathematics Learning

Learning is a two-way communication, teaching is carried out by the teacher as an educator, while learning is carried out by students. Learning is a teaching and learning activity. These two aspects will collaborate in an integrated manner to become an activity when there is interaction between teachers and students, as well as between students and students in ongoing mathematics learning.

Mathematics is a compulsory subject at all levels of education from elementary to high school and even at the tertiary level where mathematics is a basic subject.

Learning is a system consisting of various components that are interconnected with one another. These components include objectives, materials, methods, and evaluation. Each of these components is interrelated and influences one another (Rusman, 2016:1).

According to Cockroft (in Abdurrahman, 2018: 204) suggests 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 strong communication target, short and clear, (4) can be used to present information in various ways, (5) improves logical thinking skills, accuracy, and spatial awareness and (6) gives satisfaction to efforts to solve challenging problems.

The most important thing in learning mathematics is understanding knowledge about concepts, followed by knowledge about procedures and knowledge about how to relate concepts and procedures in solving mathematical problems, and mathematical communication.

From the description above, it can be concluded that learning mathematics is an effort or action taken to gain understanding and reasoning and patterns of relationships about a mathematical problem and then solve the mathematical problem by relating it to real life.

Learning Model

In general, a model is defined as an object or concept that is used to represent something. Something that is real and converted to a more comprehensive form according to Meyer (Trianto, 2018:21). In the learning process, appropriate methods, approaches, techniques or learning models are needed. It is intended that the expected learning objectives can be achieved properly. One of the things that support the achievement of learning objectives is the use of learning models.

According to Gurning and Aswita (2017: 14) argue that: "The learning model is the entire design or delivery design of learning materials covering all aspects and facilities used in the teaching and learning process."

Based on this explanation, it can be concluded that the learning model is a series of learning activities that are presented specifically by the teacher to create a more conducive learning process in achieving certain learning objectives. And in the process of learning mathematics, teachers must be able to choose the right learning model and in accordance with the material to be taught in class.

Cooperative Learning Model

The cooperative learning model is a learning model that is widely used and is a concern and is recommended by experts. education. This is because based on the results of research conducted by Slavin (Rusman, 2016: 205) it is stated that:

"(1) the use of cooperative learning can improve student achievement and at the same time can improve social relations, foster an attitude of tolerance and respect for the opinions of others, (2) cooperative learning can meet students' needs in critical thinking, solving problems, and integrating knowledge with experience. For this reason, cooperative learning strategies are expected to improve the quality of learning."

Isjoni (2013: 14) says cooperative learning is a form of learning based on constructivist understanding. In cooperative learning learning strategies are applied with a number of students as small members with different levels of ability. In completing their group assignments, each group member must work together and help each other to understand the lesson material. In this learning, learning is said to be incomplete if one of the group mates has not mastered the lesson material.

According to Slavin (Isjoni, 2013: 15), cooperative learning is a learning model in which students learn and work in small groups collaboratively with 4-6 members with a heterogeneous group structure. Meanwhile, according to Sunal and Hans cooperative learning is an approach or a series of strategies specifically designed to encourage students to work together during the learning process.

Group Investigation

Sadiq (2014: 113) reveals that the term investigation (investigation) began to appear in the discussion of teachers since the publication of the Cockroft report in 1982 which stated that teaching mathematics must involve the following activities: 1) exposition or teacher exposure (exposition); 2) discussions among students themselves, or between students and teachers (discussion); 3) practical work; 4) consolidation and practice of problem solving (consolidation); 5) problem solving (problem solving); and 6) investigation (investigation).

Investigation is a divergent activity in which students are more given the opportunity to think about, develop and investigate interesting things that pique their curiosity. Bastow, et al (in Shadiq. 2014: 115) states: "Investigating is not just getting the right answer but asking the right questions". In investigations, the command is only to investigate', meaning that it is the student himself who must raise questions and determine

one or more aspects to be investigated. During the learning process in class, students must learn ways to find simple theories while sitting. in school which is expected to be useful in the future.

One of the learning models that apply investigative activities in the learning process is the *Group Investigation* cooperative learning model. *Group Investigation*, a form of cooperative learning that dates back to the time of John Dewey, but has been updated and researched in recent years by Shlomo Sharan and Yael Sharan, and Rachel-Lazarowitz in Israel.

RESEARCH METODOLOGY

This research was conducted at SMA Negeri 2 Medan, located at Jalan Karangsari No. 435 Medan Polonia, North Sumatra. The subjects in this study were 36 students of class X MIPA 2 SMA Negeri 2 Medan T.A 2022/2023. The object of this study is the Improvement of Class X Student Learning Outcomes in Learning Mathematics at SMA Negeri 2 Medan through the GI Type Cooperative Model (*Group Investigation*).

The time of this research was carried out in the even semester of the 2022/2023 Academic Year. This type of research is classroom action research. This study aims to determine learning outcomes and efforts made to improve students' learning outcomes in mathematics, to find out students' responses in learning mathematics by applying the *Group Investigation* (GI) learning model to fractional material, and to find out how the *Group Investigation* learning model is applied in learning mathematics. by researchers in class.
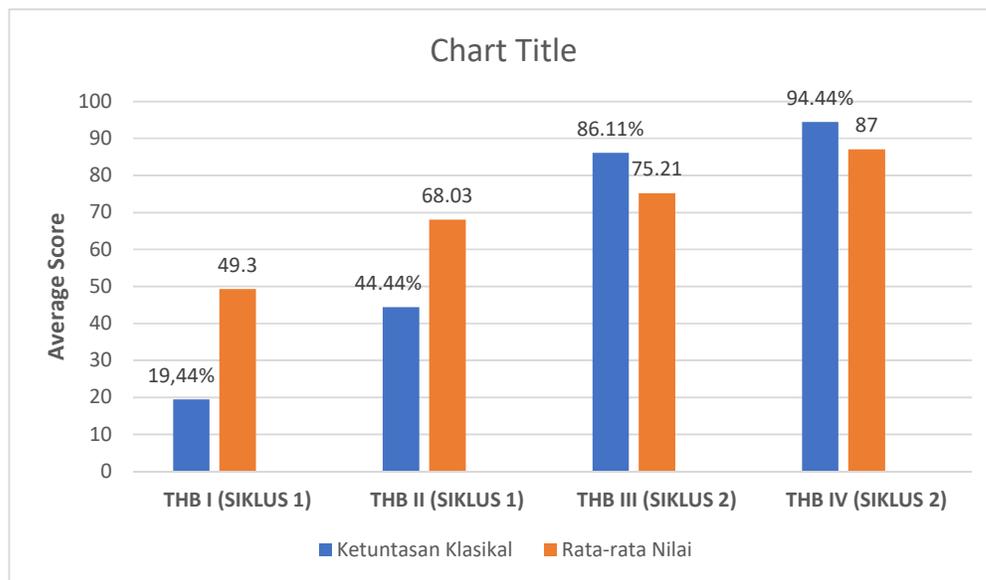
RESULTS

The results of the research conducted by the teacher from the beginning to the end of cycle II can be seen in Table 1.

Table 1. Description of Research Results for Each Cycle

Mastery Level	Criteria	Cycle I		Cycle II	
		THB I	THB II	THB III	THB IV
90%-100%	Very high ability	1	8	4	20
80%-89%	High ability	6	2	9	9
70%-79%	Enough ability	0	6	18	5
< 70%	Low ability	29	20	5	2
Classical Mastery		19,44%	44,44%	86,11%	94,44%
Average		49,3	68,03	75,21	87,00
Average N-Gain		0,139897		0,481446	
Student Response		85%		90%	
Observation Results		3,54		3,73	

Based on the data above, a diagram of the description of the research results can be obtained as follows:

Figure 1. Description of Research Results for Each Cycle

Based on table 1, it was found that the level of mastery of students in class X MIPA 2 for the material composition of functions and inverse functions on the Learning Outcomes Test I in cycle I was as many as 29 students had a low mastery level, 6 students had a high mastery level, and 1 student have a very high mastery level. Learning Outcomes Test I consists of three essay questions about function composition. Learning Outcomes Test I was carried out at the end of the first meeting in cycle II. This test is carried out for 25 minutes and aims to measure the level of students' understanding of the material that has been discussed.

In the Learning Outcomes Test II in cycle I, it was found that 20 students had a low mastery level, 6 students had a sufficient mastery level, 2 students had a high mastery level, and 8 students had a very high mastery level. The Learning Outcomes Test consists of 3 essay questions about inverse functions. In contrast to the Learning Outcomes Test I which is given at the end of the first meeting, the Learning Outcomes Test II is given after the second cycle ends, namely at the same meeting. The results obtained in the Learning Outcomes Test II showed better results when compared to the Learning Outcomes Test I because students were better at. solve the given problem..

The test results in cycle I did not meet the indicators of cycle success. Therefore, it is necessary to carry out corrective actions in cycle II. Based on the data for the level of mastery of students in the Learning Outcomes Test III in cycle II, there were 5 students who had a low level of mastery, 18 students had a sufficient level of mastery, 9 students had a high level of mastery and there were 4 students who had a very high level of ability. Learning Outcomes Test III consists of three questions about function composition. The time given to students in class X MIPA 2 to work on the Learning Outcomes Test III is 25 minutes. This test is given at the end of the first meeting in cycle II. So, students' memory of the material to be tested is still good and this certainly helps students in answering the Learning Outcomes Test III questions.

In the Learning Outcomes Test IV, it was found that 2 students had a low mastery level, 5 students had a moderate mastery level, 9 students had a high mastery level, and 20 students had a very high mastery level. This test consists of 3 essay questions about inverse functions. Learning Outcomes Test IV is given to students after cycle II ends, namely at the same meeting.

Overall the results of the III Learning Outcomes Test and the IV Learning Outcomes Test show that students' ability to solve problems is better. Because, there have been 85% of the total number of students who have completed studying individually, so that classical learning mastery in cycle II is achieved.

This increase occurred because in cycle II the activity and cooperation in groups was higher, so that students were able to solve the problems given properly and showed good group cooperation.

Student learning outcomes are influenced by several factors, one of which is the teacher's ability to teach in class. The average result of the observer's observations of researchers in the first cycle was 3.54. This value increased to 3.73 in cycle II with a very good value. In ideal learning there will always be interaction between teachers and students. Because teachers and students are two elements that are in the learning environment and utilize learning resources.

Regarding the interaction between teachers and students, student perceptions of the teacher's ability to teach and use learning resources, such as learning media can be used as feedback material on the quality of teaching teachers and the ability of teachers to use learning media. Teachers in their teaching activities need help from teaching aids such as learning media that can support their success in teaching.

Based on the description above, it can be concluded that if the teacher's ability to teach in class is not good, the teacher can use learning media, one of which is teaching materials used to convey the desired message to students so that student learning outcomes can increase as desired.

Based on the average obtained from student responses to the implementation of the *Group Investigation* learning model in cycle II in class, a value of 90% was obtained. These results indicate that almost all students have a positive response to the implementation of the *Group Investigation* learning model in class X MIPA 2 SMA Negeri 2 Medan. These results state that the implementation of the *Group Investigation* learning model in class X MIPA 2 was successful. Conversely, a negative response to the implementation of the *Group Investigation* learning model stated that the implementation of the *Group Investigation* learning model in class X MIPA 2 failed. Responses manifest in the form of feelings of pleasure or displeasure, agree or disagree, like or dislike. Responses like this will affect the process and learning outcomes achieved by students.

Students who give positive responses in learning mathematics using the *Group Investigation* learning model show that their interest and interest in learning is good.

Improvement in student learning outcomes is measured by using a learning achievement test. Before the teacher applies the *Group Investigation* learning model in class X MIPA 2, the teacher gives an Initial Ability Test to determine students' initial abilities before being given treatment. Before being given any action on students in class X MIPA 2, it was discovered that there were 5 students who achieved individual learning mastery on the Initial Ability Test and the remaining 31 students did not achieve individual mastery. The class average is low, namely 45.41. So that the classical completeness of students in class X MIPA 2 is 13.89%.

After the actions in cycle I were given, the class average on the Learning Outcomes Test I was 49.3. There are 7 students (19.44%) who have achieved individual learning mastery. While 29 students (80.55%) have not achieved individual learning mastery. Classical learning completeness based on the Learning Outcomes Test I was 19.44%. The average Learning Outcome Test II increased to 68.03. In the Learning Outcomes Test II there were 16 students (44.44%) who had achieved individual learning mastery while 20 students (55.56%) had not achieved individual learning mastery. Based on this data, it was obtained that the classical learning mastery increased to 44.44%.

After the action in cycle I was carried out, the average student ability, seen from the N-Gain data, increased by 0.139897. This increase is included in the low criteria. Because it has not achieved success, the action is continued to cycle II.

After the actions in cycle II were carried out, the class average on the Learning Outcomes Test III was 75.21. The data obtained were that 31 students (86.11%) had achieved individual learning mastery, while 5 students (13.89%) had not achieved individual learning mastery. In the Learning Outcomes Test III the classical learning completeness was 86.11%.

In the IV Learning Outcomes Test the class average value is 87.00. As many as 34 students (94.44%) have achieved individual learning mastery, while 2 students (5.56%) have not achieved individual learning mastery. In the Learning Outcomes Test IV the classical learning completeness was 94.44%. The number of students who completed individual learning had reached 85% of the total students in class X MIPA 2. After the action in cycle II ended, the average student ability as seen from the learning

outcomes test based on N-Gain data increased to 0.481446. This increase is included in the criteria of moderate improvement. Because the results of the research were in accordance with the criteria for the success of the cycle, the cycle was not continued.

Based on the description above, the researcher concluded that the problems faced by researchers were solved by applying the *Group Investigation* cooperative learning model, because it can improve student learning outcomes in class X MIPA 2 SMA Negeri 2 Medan on the material composition of functions and inverse functions T.A 2022/2023.

CONCLUSIONS

Based on the research results, the conclusions obtained are:

1. Student learning outcomes in class X MIPA 2 SMA Negeri 2 Medan experienced an increase from cycle I to cycle II after the *Group Investigation* (GI) learning model was applied. Based on the results of the learning outcomes test in cycle I, the data obtained on the Learning Outcomes Test I class average value was 49.3 with classical completeness of 19.44%. Whereas in the Learning Outcomes Test II, the class average value was 68.03 with classical completeness of 44.44%. In cycle I the average student increased by 18.73. Then in cycle II the data obtained on the Learning Outcomes Test III class average value was 75.21 with classical completeness of 86.11%. Whereas in the IV Learning Outcomes Test, the class average value was 87.00 with a classical completeness of 94.44%. In cycle II the average student increased by 11.79.

2. Student responses to the implementation of the *Group Investigation* learning model in class X MIPA 2 showed positive results. Based on student answers, the average percentage of student answers in cycle I was 85% and the average percentage of student answers in cycle II increased to 90%. This means that almost all students gave a positive assessment of the implementation of this activity.

3. The results of teacher observations of researchers who applied the *Group Investigation* learning model in class VII-7 experienced an increase from cycle I to cycle II. Observations in cycle I obtained an average of 3.54 and increased to 3.73 in cycle II with a very good value.

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