AloES : AL'ADZKIYA INTERNATIONAL OF EDUCATION AND SOSIAL
ISSN : 2721 - 8716 (ONLINE)

THE APPLICATION OF JIGSAW TYPE OF COOPERATIVE LEARNING MODEL IN LEARNING MATHEMATICS AT SMP SWASTA PEMBDA 2 GUNUNG SITOLI 2018/2019 ACADEMIC YEAR

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ABSTRACT

Jigsaw cooperative learning model is a learning model that shapes students' knowledge by means of discussion. However, what distinguishes this model from other models is that there is a group of experts whose knowledge is obtained from the results of discussions in one group about one material that is different from other groups. After this group of experts gets enough knowledge, they will form a new group where the members come from different expert groups.
The objectives of the study: (1) describing the quality of the mathematics learning process through the application of the jigsaw type cooperative learning model at the Pembda 2 Gunungsitoli Private Junior High School. (2) Describing student learning outcomes in mathematics subjects through the application of the jigsaw type cooperative learning model at the Pembda 2 Gunungsitoli Private Junior High School. (3) Significantly proving the quality of the mathematics learning process is good by applying the jigsaw type cooperative learning model. (4) Significantly proving that the average mathematics learning outcomes are good by using the jigsaw type of cooperative learning model.
This research was carried out at the SMP Swasta Pembda 2 Gunungsitoli with the research subjects was class VIII students of the 2018/2019 academic year in even semester with a total of 34 people, consisting of 18 boys and 16 girls. The research conducted was classroom action research (CAR) which consisted of two cycles with the main material being Statistics. The material for the first cycle is the Mean, Median and Mode, while the material for the second cycle is the Range and Quartile

Keywords:
Jigsaw, Cooperative learning

1. INTRODUCTION

Education is one of the tools that can prove the progress and development of a nation. Whether or not the education of a nation will provide an overview of the progress and development of the nation. The level of progress and development of a nation can be seen from the quality of its human resources. The human resources (HR) owned by our country are still unable to compete with the human resources owned by other countries in the world. This

is illustrated by the large number of goods in our country that are imported from other countries, including clothing and food. From the above, it shows that our country is still not developed and has not developed optimally.

To overcome this, education in our country must be improved again. Education in our country is regulated in the Law of the Republic of Indonesia No. 20 of 2003 concerning the National Education System. The goals of national education as stated in the National Education System (2003:7) state that:

National education functions to develop capabilities and shape the character and civilization of a dignified nation in the context of educating the nation's life, aiming at developing the potential of students to become human beings who believe and are devoted to God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen.

In realizing the goals of national education, the government makes various efforts, one of which is to improve the education curriculum. The education curriculum that used to be subject-based is now replaced with a competency-based curriculum. This is considered to be able to equip students in responding to the demands of the times and the flow of globalization as well as being able to compete and be efficient in society.

The curriculum currently being implemented in Indonesia is the 2013 Curriculum (K-13). In this curriculum, students are expected to be able to learn independently and creatively to maximize competence in themselves. In addition, K-13 also requires students to cooperate with the people around them cooperatively, while the teacher acts as a facilitator and motivator to their students.

Based on K-13, the appropriate learning model to use is the cooperative learning model. Examples of cooperative learning models include Think Pair and Share, STAD, Jigsaw, Numbered Heads Together, Group Investigation, and others. However, in fact, subject teachers, especially mathematics subject teachers, still use conventional learning models. This is certainly not in line with what K-13 expected. Besides, from the results of observations made in schools, it turns out that there are several problems that arise in the learning process including students tending to be passive in learning activities, students' learning interest is less, and the average student learning outcomes are less.

To overcome this problem, one of the efforts made is to improve the learning process, one of which is by applying the cooperative learning model. Through the application of this cooperative learning model, it is considered that it will provide opportunities for students to be more active in learning and be able to cooperate with their friends in structured tasks. The application of cooperative learning models is also expected to improve the learning process and provide good learning outcomes.

From several existing cooperative learning models, researchers assess the jigsaw cooperative model that can be used in learning mathematics, which is then used by researchers as a learning model in conducting Classroom Action Research (CAR).

Discussion

A. The Nature of Learning

1. The Definition of Learning

The word "learning" must be familiar in our thinking. Every day we see students,college students, or even people going to school to study. But what does learning reallymean? Briefly, Suprijono (2009:3) said that "learning is a process of gaining knowledge". Learning

occurs when there is a response in a person to respond to a stimulus or stimulation that occurs in him that comes from the environment in which he is located so that it causes changes in him. As stated by Roziqin in Ahmad (2012:6):

Learning is a process of effort by individuals to obtain a permanent change in behavior, both observable and not directly observable, which occurs as a result of training or experience in interaction with the environment.

According to Morgan in Suprijono (2009:3) "learning is a permanent change in behavior as a result of experience". Meanwhile, according to Ahmad (2012:7) "Learning is a business process, meaning that it takes a certain time". In line with that Bigge in Ahmad (2012: 6) explains that "Learning is a continuous change in an individual's life that is not obtained from heredity or does not occur genetically".

Furthermore, Lufri in Harefa (2012:1) describes several formulations aboutlearning that are commonly used:

1) Learning is defined as the modification or strengthening of behavior through experience. Based on this understanding, learning is neither an outcome nor a goal but a process or an activity.
2) Learning is a process of changing individual behavior that occurs as a result of interaction with the environment.
3) Learning is a combination of the two understandings above, which is a process or individual activity in the form of interaction with the environment so that a learning experience occurs.

Based on some of the opinions above, researchers can conclude that learning is a process of changing individual behavior that occurs due to interactions with the environment that are not inherited but require a certain time.

2. Mathematics Learning

Mathematics is a science that is very important for human life. Learning mathematics means studying all the intricacies of mathematics to understand every meaning contained in it. Syahrir argues that:

"Mathematics functions to develop the ability to calculate, measure, derive, and use mathematical formulas needed in everyday life through measurement, geometry, social arithmetic, probability, and statistics materials."

Learning mathematics should not be done just like that, it must go through step by step, starting from basic to higher. Hudoyo (1988: 4) argues that "intermittent learning of mathematics will interfere with the learning process". A similar opinion was expressed by Russeffendi (1988: 25) that learning mathematics for a child is a continuous process so a good basic knowledge and understanding of mathematics are needed for further learning. According to Daryanto and Raharjo (2012:240) "mathematics needs to be given to students starting from elementary school to equip them with the ability to think logically, analytically, systematically, critically and creatively as well as the ability to work together".

Based on the explanation of the definition of learning and mathematics above, it can be said that learning mathematics is a process in students whose results are in the form of changes in knowledge, attitudes, skills and to apply concepts, structures, and patterns in mathematics so as to make students think logically, creatively, systematically in daily life. Learning mathematics will be more successful if it leads to the development of thinking, the development of previous concepts or ideas that are prepared to learn and master new concepts.

B. The Nature of Learning

1. The Definition of Learning

Learning is an activity of interaction between teachers and students and among each student. Learning can also be interpreted as an activity that conditions a person to learn. This is in line with what Suherman put forward in Jihad, et al (2013:11) that "learning is essentially a communication process between students and educators and between students in the context of changing attitudes." Meanwhile, Mulyasa in Ahmad (2012: 8) formulates "learning as a process of interaction between students and their environment, so that there is a change in behavior for the better".

The term learning is the same as teaching but there are slight differences that make the term learning different from teaching or teaching, as stated by Sanjaya in Harefa (2012:1) that:

The term teaching shifts to the term learning because teaching is only limited to conveying knowledge, while learning is a process of environmental setting directed at changing student behavior in a positive and better direction according to the potential and differences of students.

In line with Sanjaya's opinion, Suprijono (2009:13) also suggests that:

In teaching, teachers teach, students learn, while in teacher learning, teaching is defined as the teacher's efforts to organize an environment where learning occurs. Teachers teaching from a learning perspective are teachers who provide learning facilities for their students to learn. So, the subject of learning is students.

From some of the opinions above, the researcher can conclude that learning is a situation that is systematically conditioned that sets a person (student) in achieving a change and that change is the existence of new knowledge and actions that students have after learning activities.

2. The Characteristics of Learning

As a regulatory process, learning has certain characteristics, as stated by Hamalik (2001: 66), which are:

1) The plan is the arrangement of manpower, material, and procedural which is an element of the learning system, in a special plan.
2) Interdependence between elements of a harmonious learning system in a whole. Each element is essential, and each contributes to the learning system.
3) Objectives, the learning system has certain goals to be achieved such as transportation systems, communication systems, and government systems.

3. Teacher's Role in Learning Process

The role of the teacher in learning is very important because it is the teacher who carries out the intended learning activities, such as carrying out teaching and learning activities, guiding, directing and training, and optimizing activities in learning. According to James B. Brow in Suryosubroto, the duties and roles of teachers include: mastering and developing subject matter, planning and preparing daily lessons, controlling and evaluating student activities. The modern view as put forward by Adam & Dickey in Hamalik that the teacher's role is very broad includes:

1. The teacher as a teacher (teacher as an instructor),
2. Teachers as mentors (teacher as a counselor),
3. The teacher as a scientist, and
4. The teacher as a person.

Meanwhile, Subini, et al. (2012:109-111) explained further the role of teachers in the learning process, which are as teachers, educators, mentors, correctors, facilitators, mediators, supervisors, and evaluators.

4. The Standard of Learning Process

Process standards are national education standards related to the implementation of learning in an educational unit to achieve graduate competency standards. Process standards, both related to planning, implementation, assessment, and supervision by BNSP, and are stipulated by ministerial regulations. The regulation of the national education minister regarding process standards for primary and secondary education units, in article 1 states that:

Process standards for primary and secondary education units include planning the learning process, implementing the learning process, assessing learning outcomes, and supervising the learning process.

5. The Successful of Learning Process Criteria

The learning process is said to be successful if most of the students have experienced changes in behavior that are visible or can be proven by using learning outcomes tests. Mulyasa (2009:210-211) describes the criteria for the success of the learning process as follows:

1) Short Term Criteria
   a. At least 75% of the content and principles of learning can be understood, accepted and applied by students in class.
   b. At least 75% of students feel that they are easy, happy and have a high willingness to learn.
   c. The students participate actively in the learning process.
   d. The material presented is in accordance with the needs of students, and they view that it is very useful for later life.
   e. The learning that is developed can foster interest in learning for students to learn further.
2) Medium Term Criteria.
   a. There is feedback to teachers about the learning they do with students.
   b. Students become creative people and are able to deal with various problems they face.
   c. Students do not have a negative influence on society, and the environment in any way.
3) Long Term Criteria.
   a. There is an increase in the quality of education, which is achieved by schools through the independence and initiative of school principals, teachers in managing and utilizing available resources.
   b. There is an increase in the efficiency and effectiveness of the management and use of educational resources, through a clear, transparent, and democratic division of responsibilities.
   c. There is an increase in the responsibility of schools to the government, parents of students in general related to the quality of schools, both intra and extracurricular.
   d. There is a healthy competition between schools in improving the quality of education through innovative efforts with the support of parents, students, the community, and the local government.

e. Growing independence and reducing dependence among school members, being adaptive and productive, and having a high entrepreneurial spirit (tenacious, innovative, and willing to take risks).
f. The realization of an effective learning process that emphasizes learning to know (learning to know), learning to do (learning to do), and learning to live together (learning to live together).
g. The realization of a safe, comfortable, and orderly school climate so that the learning process can take place.
h. There is a continuous evaluation and improvement process.
i. Furthermore, Djamarah, et al. (2006:107) divide the success of the learning process into four levels as follows:
   1) Excellent/maximum
      If the entire subject matter being taught can be mastered by the students
   2) Very Good/optimal
      If most (76% to 99%) of the subject matter delivered can be mastered by students.
   3) Good/minimum
      If the subject matter taught is only 60% to 75% that is mastered by students.
   4) Less
      If the subject matter taught is less than 60% mastered by students.

6. The Nature of the Learning Quality

The quality of learning is one of the most important things in carrying out the learning process. According to Glaser in Uno (2009:153) states that "quality is more directed to something good while learning is an effort to teach students". So, it can be concluded that the quality of learning is in an effort to improve the learning activities carried out by the teacher during the learning process so that it can run well and produce good results.

In order to realize a quality learning process, the Government issued government regulation no. 19 of 2005 concerning National Education Standards (SNP) as a further elaboration of the National Education System Law, which contains process standards. Regarding quality learning, Muljono in Daeli (2010:30) states that: "the concept of learning quality contains five references, which are (1) suitability, (2) attractiveness, (3) effectiveness, (4) efficiency, (5) learning productivity".

Based on the explanation above, it can be concluded that the quality of the learning process is an effort to improve the quality and learning outcomes of students through the ongoing learning process, so as to produce a good quality learning process.

Improving the quality of the learning process leads to three dimensions of learning strategies, including learning delivery strategies, learning organizing strategies, and learning management strategies. These three dimensions are the main activities of improving the quality of learning. Uno (2011:158) provides indicators of the three dimensions, described in the following table:

Table 1
Dimensions and Quality Indicators of the Learning Process

Dimensions of Learning Quality Improvement	Learning Quality Improvement Indicators

Learning Organizing Strategy	- Arranging teaching materials to be given during one cycle. - Providing the main points of the material to students who will be taught. - Making a summary of the material taught at each meeting. - Determining the materials to be discussed together. - Giving assignments to students on certain materials that will be discussed independently. - Making an assessment format for the mastery of each material.
Learning Delivery Strategy	- Using various methods in the delivery of learning. - Using various media in learning. - Using various techniques in learning.
Learning Management Strategy	- Motivating or attracting attention. - Explaining learning objectives to students. - Provide stimulus. - Bringing up the appearance of student participants. - Providing feedback. - Assessing appearance. - Summing up

7. Learning Model

The learning model is very influential on the achievement of the competencies expected in a lesson. One of the objectives of the learning model is to improve students' abilities during learning. Lufri in Harefa (2012:94) states that:

Learning models are patterns or examples of learning that have been designed using other approaches or methods or learning strategies and are equipped with steps (syntax) and learning tools.

Joyce stated that:

The learning model is a pattern that is used as a guide in planning learning in class or learning in tutorials and to determine learning tools including books, films, computers, curriculum, and any else.

Soekanto, et al emphasized that:

The learning model is a conceptual framework that describes a systematic procedure in organizing learning experiences to achieve certain goals and serves as a guide for learning designers and teachers in planning teaching and learning activities.

However, not all of the above learning models can be used in learning mathematics. One of the learning models used is the cooperative learning model.

From some of the opinions above, the authors conclude that the learning model is a plan or pattern designed by the teacher in such a way by using approaches, strategies, and learning methods and is equipped with learning steps and tools.

Types of Learning Models

Learning models have many forms or certain patterns depending on class conditions and suitability with teaching materials. The learning model has its own characteristics, as Ahmad (2012:64-71) suggests 4 learning models, which are:

1) Kemp Model learning design
2) Dick & Carey Model learning design
3) 4-D Model learning design
4) PPSI Model learning design

Meanwhile, according to Jihad and Haris (2013:27-51) there are several learning models, such as:

1) Direct teaching model
2) Cooperative learning model
3) Problem-based learning model
4) Thematic learning model
5) Contextual learning model

In line with the opinion above, Harefa (2012:94) also describes several learning models, such as:

1) Cooperative learning model
2) Learning model with a science approach
3) Learning model with a constructivist approach
4) Learning model with the contextual approach
5) Problem-based learning model
6) Expository learning model

From some of the descriptions above, it can be concluded that there are so many learning models that can be used in the learning process.

8. Cooperative Learning Model

In simple terms, cooperative means doing something together by helping each other as a team. According to Bern and Erickson (2001:5) states that:

Cooperative learning is a learning strategy that organizes learning using small study groups where students work together to achieve learning goals.

Furthermore, Slavin in Isjoni states that:

"In cooperative learning methods, students work together in four member teams to master material initially presented by the teacher".

This means that cooperative learning is a learning model in which the system learns and works in small groups of 4-6 people collaboratively so that it can stimulate students to be more passionate about learning.

The cooperative learning model is different from other learning models. These differences can be seen from the learning process which takes more emphasis on cooperative processes in groups. The goal to be achieved is not only ability in terms of mastery of the subject matter, but also the existence of an element of cooperation for mastery of the material. This collaboration is the hallmark of the cooperative learning model. In addition, Jihad and Haris (2013:30) suggested the characteristics of the cooperative learning model, which are:

1) To complete the learning material, students study in groups cooperatively;
2) Groups are formed from students who have high, medium, and low abilities;
3) If in a class, there are students consisting of several different races, ethnicities, cultures, genders, it strives that each group consists of different races, ethnicities, cultures, genders;
4) Rewards are prioritized for group work rather than individual work.

5) Jihad and Haris (2013:33) also added several types in the cooperative learning model, which is STAD type (Student Teams Achievement Divisions), jigsaw type, group investigation type, and structural approach type.

In line with that Lufri in Harefa (2012: 98) also describes several variations of cooperative learning models, such as:

1) Student Teams Acievement Devisions(STAD)
2) Jigsaw
3) Group Investigation (GI)
4) Think Pair and Share
5) Numbered Head Together

From some of the opinions above, the researcher can conclude that the cooperative learning model is a learning model that places several students learn and work together in a small group to achieve learning objectives.

9. The Cooperative Learning Model Types of Jigsaw

The jigsaw-type cooperative learning model is one of the cooperative models that form students' knowledge by means of discussion. It is the same with various other cooperative models in which the way of implementation is group work. However, what distinguishes this model from other models is the existence of a group of experts whose knowledge is obtained from the results of discussions in one group about one material that is different from other groups. After this expert group gains sufficient knowledge, it will form a new group where the members come from different expert groups.

The jigsaw type of cooperative learning model can be applied using the lecture, discussion, and brainstorming methods. This model also requires students to be active in seeking and obtaining information. For this reason, the teacher must also use approaches in its implementation.

Jigsaw was developed and piloted by Eliot Aronson et al (1978) at the University of Texas and later adapted by Robert Slavin et al at Johns Hopkins University. In Harefa (2012:99) the steps of the Jigsaw learning model are disclosed, such as:

1) Students are divided into several groups, each group consists of 4 heterogeneous members.
2) The teacher provides lesson materials to be discussed in each group. The teacher brainstorms to activate students' schemata so that they are better prepared to face learning.
3) Each member is responsible for studying a certain part or assigned. For example, the material to be discussed is the means of excretion (including the kidneys, liver, lungs, and skin).
4) The first member studied the kidneys, the second member studied the liver, the third member studied the lungs and the fourth member studied the skin of each group.
5) Each group member who gets the same task gathers and discusses the topic. This group is called the expert group. Thus there is a group of experts: kidney, liver, lungs, and skin.
6) Each member of this expert group rejoins the original group and takes turns working on the topics they have learned in the expert group to members of the original group.
7) The teacher gives individual quizzes about all the topics that have been discussed.
8) The points of each member are added up to get a group score.
9) Groups that meet certain criteria can be rewarded.

C. Learning Outcomes

The Education Unit Level Curriculum (K-13) is an operational curriculum that is prepared and implemented by each education unit. In the education unit level curriculum (K-13), learning outcomes consist of 3 (three) aspects, such as understanding concepts, reasoning, communication, and problem-solving. Yustisia in Harefa (2013: 25-26) describes the aspects of assessment in K-13, as follows:

1. Concept understanding

Concept understanding is a competency shown by students in performing procedures (algorithms) in a flexible, efficient, and precise manner. Indicators that show understanding of the concept include:

a. Restating a concept
b. Classifying objects according to certain characteristics (according to competence)
c. Giving examples and non-examples of the concept
d. Presenting concepts in various forms of mathematical representation
e. Developing necessary or sufficient conditions for a concept
f. Using, utilizing, and selecting certain procedures or operations.
g. Applying the concept or problem solving algorithm.

2. Reasoning and communication

Reasoning and communication are competencies shown by students in carrying out reasoning and communicating mathematical ideas. Indicators that show reasoning and communication include:

a. Presenting mathematical statements orally, in writing, pictures, and diagrams
b. Submitting a conjecture
c. Perform mathematical manipulation
d. Drawing conclusions, compiling evidence, giving reasons and evidence for the correctness of the solution
e. Drawing conclusions
f. Checking the validity of an argument
g. Finding patterns or properties of mathematical phenomena to make generalizations.

3. Problem-solving

Problem-solving is a strategic competency shown by students in understanding, choosing approaches and solving strategies, and completing models to solve problems. Indicators that show problem-solving include:

a. Showing understanding of the problem
b. Organizing data and selecting relevant information in problem-solving
c. Presenting problems mathematically in various forms
d. Choosing the right approach and problem-solving method
e. Developing problem-solving strategies
f. Creating and interpreting a mathematical model of a problem
g. Solving non-routine problems.

2. RESEARCH METHOD

The form of this research was Classroom Action Research. This Classroom Action Research (CAR) was conducted with the aim of improving the learning process. Therefore, this classroom action research focused on the learning process in the classroom. The object of

action in this classroom action research was the application of the jigsaw type of cooperative learning model.

This research was conducted at the SMP Swasta PEMBDA 2 Gunung Sitoli with the research subjects of class VIII students in the even semester of the 2018/2019 academic year, with a total of 34 people, consisting of 18 boys and 16 girls. The research conducted was classroom action research (CAR) which consisted of two cycles with the main material was Statistics. The material in the first cycle was the Mean, Median, and Mode, while the material in the second cycle is the Range and Quartile.

Research Instruments

This study used instruments to collect data. Some of the instruments in this study were as follows:

a. Observation Sheet

The observation sheet was used to find out whether students were actively involved or not in the learning process and to find out the learning process was running according to the learning steps as stated in the lesson plans.

b. Interview Guide Sheet

Interview guide sheets were used to find out students' opinions about the learning materials they had learned and the learning models applied during the learning process.

c. Questionnaire

This questionnaire was a learning quality instrument that was arranged in the form of an objective questionnaire, where respondents were given several questions with five alternative answers. Furthermore, respondents were asked to choose an answer that is considered the most appropriate to what they feel. Questionnaires were given to students to obtain information regarding improving the quality of learning in schools.

Learning Outcomes Test

1) Learning Outcomes Test in the First Cycle.

The learning outcome test used by the researcher in the first cycle was in the form of a description test of 5 (five) items and was compiled by the researcher based on the test grid on the three-dimensional space material. Before the test was used as a research instrument, it was first validated by the lecturers/teachers, to investigate the material domain, construction domain, and language domain where each item consists of two columns. The first column was "yes" with a score of 1 and 'no' with a score of 0, and then processed using the Guttman scale.

2) Learning Outcomes Test in the Second Cycle

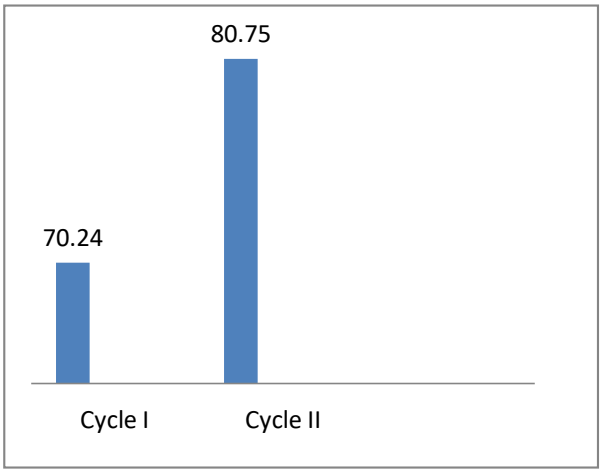
The learning outcomes test used in the second cycle consisted of five test items in the form of a description and arranged based on a test grid on three-dimensional space material. In preparing the learning outcomes test in cycle II there were steps that must be taken:

a. Researchers collaborated with subject teachers. Before the test was used as a research instrument, it was validated by lecturers/teachers who had been certified to investigate content validation, about the realm of material, the realm of construction, and the realm of language. Where each item consists of two columns. The first column was "yes" with a score of 1 and 'no' with a score of 0, and processed using the Guttman scale. While column II with a rating scale: 1 = invalid, 2 = less valid, 3 = quite valid, 4 = valid.
b. Conducted trials in other schools for the purpose of testing the feasibility of the test, such as the validity test, reliability test, difficulty level test, and discriminatory power test.

3. RESULTS AND DISCUSSION

Research Results: (1) The quality of the mathematics learning process was very good by applying the jigsaw-type cooperative learning model. The average result of the questionnaire at the end of the first cycle was 79% classified as a very good category and at the end of the second cycle was 96% classified as a very good category. (2) The average learning outcomes are good by applying the jigsaw-type cooperative learning model. The average learning outcomes in the first cycle was 70.24 classified as a sufficient category and at the end of the second cycle was 80.75 classified as a good category. The percentage of mastery learning in the first cycle reached 50% while in the second cycle, the percentage of learning mastery reached 80%. (3) Based on χ2 test for testing the action hypothesis on the quality of the learning process, it was obtained that χ^2_{count} = 5,00 and then confirmed with the value of χ^2_{table}=3,84 at a significant level of 5%. Because $\chi^2_{count} \geq \chi^2_{table}$, H_o is rejected and H_a is accepted, with the right-hand side test. So it can be concluded that the hypothesis which was: "the quality of the mathematics learning process is very good by applying the jigsaw type cooperative learning model at the SMP Swasta Pembda 2 Gunungsitoli, which reaches 80%" is accepted at a significant level of 5%. (4) Based on the results of χ^2 test for testing the action hypothesis on student learning outcomes, it was obtained χ^2_{count} = 7,20 then confirmed at χ^2_{table} = 3,84 at a significant level of 5%. Because $\chi^2_{count} \geq \chi^2_{table}$,$H_o$ is rejected and H_a is accepted with the right-hand side test. So it was concluded that the hypothesis which was: "the average mathematics learning outcome is good by applying the jigsaw type cooperative learning model at the SMP Swasta Pembda 2 Gunung Sitoli, which is 75" is accepted at a significant level of 5%.

Figure 1
Learning Outcomes



4. CONCLUSION

Feature-Based on the data processing and analysis of research results that have been carried out regarding the application of the jigsaw type cooperative learning model in mathematics learning at Pembda 2 Gunungsitoli Private Junior High School, 2018/2019 Academic Year, the researchers concluded as follows:

A. The quality of the mathematics learning process is very good by applying the jigsaw type cooperative learning model.

B. The average learning outcomes are good by applying the jigsaw-type cooperative learning model. The average learning outcomes in the first cycle was 70.24 classified as a sufficient category and at the end of the second cycle was 80.75 classified as a good category. The percentage of mastery learning in the first cycle reached 50% while in the second cycle the percentage of learning mastery reached 80%.

C. Based on χ^2 test for testing the action hypothesis on the quality of the learning process, it was obtained χ^2_{count}=5,00 then confirmed with the score of χ^2_{table}= 3,84 at a significant level 5%. Because $\chi^2_{count} \geq \chi^2_{table}$ then H_0 is rejected and H_a is accepted with the right-hand side test. So it can be concluded that the hypothesis which is: "the quality of the mathematics learning process is very good by applying the jigsaw type cooperative learning model at SMP Swasta Pembda 2 Gunungsitoli, which reaches 80%" is accepted at a significant level of 5%.

D. Based on the χ^2 test for testing the hypothesis of action on student learning outcomes, it was obtained χ^2_{count}= 7,20 then confirmed at χ^2_{table}= 3,84 at significant level of 5%. Because $\chi^2_{count} \geq \chi^2_{table}$, H_0 is rejected and H_a is accepted with the right-hand side test. So, it was concluded that the hypothesis which is: "the average mathematics learning outcome is good by applying the jigsaw-type cooperative learning model at SMP Swasta PEMBDA 2 Gunung Sitoli, which is 75" is accepted at a significant level of 5%.

5. REFERENCES

Ahmad Zainal Arifin, 2012, Perencanaan Pembelajaran, Pedagogia, Yogyakarta.

Bate'e Integrasi Anugrah, 2013, Penerapan Model Pembelajaran Kooperatif Tipe Group Investigation untuk Meningkatkan Motifasi dan Hasil Belajar Matematika SMP Negeri 4 Idanogawo, skripsi tidak diterbitkan, IKIP Gunungsitoli, Kabupaten Nias.

Daryanto, Raharjo Mulyo, 2012, Model Pembelajaran inovatif, Insan Madani, Yogyakarta.

Daryanto, Raharjo Mulyo, 2012, Psikologi Pembelajaran, Insan Madani, Yogyakarta. Djamarah, dkk., 2006, Strategi Belajar Mengajar, PT Rineka Cipta, Jakarta.

Hamalik Oemar, 2001, Proses Belajar Mengajar, Bumi Aksara, Bandung.

Harefa Amin Otoni, 2012, Diktat Dasar-Dasar dan Proses Pembelajaran Matematika I, Kalangan Pribadi, Prodi Pendidikan Matematika, FPMIPA, IKIP Gunungsitoli, Kabupaten Nias.

Harefa Amin Otoni, 2012, Diktat Evaluasi Proses dan Hasil Pembelajaran Matematika, Kalangan Pribadi, Prodi Pendidikan Matematika, FPMIPA, IKIP Gunungsitoli, Kabupaten Nias.

Hudoyo, 1998, Proses Pembelajaran di Sekolah, Pustaka Belajar, Surabaya.

Jihad Asep, Haris Abdul, 2013, Evaluasi Pembelajaran, Jakarta, Multi Presindo. Joyce, 2013, Kunandar, 2011, Langkah Mudah Penelitian Tindakan Kelas Sebagai Pengembangan Profesi

Guru, PT Rajawali Pers, Jakarta.

Latipah Eva, 2012, Pengantar Psikologi Pendidikan, Pedagogia Yogyakarta.

Mendofa Astrilina, 2014, Penerapan Model Pembelajaran Kooperatif Tipe Jigsaw dalam Pembelajaran Matematika SMP Negeri 1 Gido, skripsi tidak diterbitkan, IKIP Gunungsitoli, Kabupaten Nias

Russeffendi, 1988, Proses Belajar Mengajar, Pedagogia, Yogyakarta.

Subroto Suryo, 2012, Penelitian Tindakan Kelas untuk Tenaga Pendidik Profesional,

Pedagogia, Yogyakarta.
Subini Nini, dkk., 2012, Psikologi Pembelajaran, Mentari Pustaka, Yogyakarta. Sugiyono, 2008, Metode Penelitian Tindakan Kelas, Alfabeta, Bandung.
Sugiyono, 2011, Metode Penelitian Pendidikan, Alfabeta, Bandung. Sukiman, 2011, Pengembangan Sistem Evaluasi, Insan Madani, Yogyakarta.
Sumarni Sri, 2012, Metodologi Penelitian Pendidikan, Insan Madani, Yogyakarta. Supriono Agus, 2009, Cooperatif Learning, Pustaka Belajar, Surabaya.
Surapranata Sumarna, 2006, Analisis, Validitas, Reliabilitas, dan Interprestasi Hasil Tes, PT Remaja Rosdakarya, Bandung.
Telaumbanua Melinus, 2011, Diktat Statistika untuk Penelitian, Kalangan Pribadi, Prodi Pendidikan Matematika, FPMIPA, IKIP Gunungsitoli, Kabupaten Nias.
Telaumbanua Yonata, Pengaruh Model Pembelajaran Take and Give Terhadap Hasil Belajar Matematika SMP Negeri 1 Gunungsitoli Utara Tahun Pelajaran 2012/2013, skripsi tidak diterbitkan, IKIP Gunungsitoli, Kabupaten Nias.
Yuliawati Fitri dkk, 2012, Penelitian Tindakan Kelas untuk Tenga Pendidik Profesional,Pedagogia, Yogyakarta.
Wirodikromo Sartono,2006, Matematika untuk SMA Kelas X, Erlangga, Jakarta.