

CHAPTER I

INTRODUCTION

1.1. Background

Modern era faced by Indonesia at this time requires quality human resources were able to compete with other countries and have the maximum advantage. One factor in achieving this is education, so that the quality of education in Indonesia must have improvement in all aspects. Since according by Undang-Undang Number 20 Year 2003 about National Education System (in Trianto, 2009: 1) state that national education serves to develop of ability and character formation also civilization which dignity in order to educate life of nation.

Therefore, the education in Indonesia must be increased so that the function of national education that have been implemented in Undang-Undang can be done well so that Indonesian education has good quality and able to compete with other countries. Increasing of education in Indonesia can be done by improving the educational system, especially of learning strategies in the classroom so that to create learning process maximally. This situation can be realized if the educational atmosphere in Indonesia have adequate access such as the use of learning tools, the quality of teaching and learning models and strategies are applied.

National education system put mathematics as compulsory subject given to students from elementary to secondary school. This situation caused since mathematics as a subject has important rule in countries progress. Santosa, (in Hudojo, 2005: 25) state that mathematics has important rule on progress countries namely 60% - 80% while Slameto (2010: 45) state that if the success of country can be seen from mathematics progress since mathematics as a way to represent all of science.

Hutagaol (2013) state that mathematics learning objectives at every level of education is developing mathematical thinking ability of students which this ability is needed so that the students better understand about mathematical

concept and apply it in various situation. Therefore, the students must be able to develop their mathematical thinking ability in mathematics learning since the situation is important to understanding of students in mathematics learning.

In learning mathematics, students must have comprehension, skills, and knowledge which is this aspects are known and can be done by teachers and students on learning mathematics in a school. National Council Teacher of Mathematics or NCTM (in Effendi: 2012) states that the expected goals in learning mathematics are to set of five process standard that must be owned by students namely problem solving ability, communication ability, connection ability, reasoning ability, and representation ability. As stated by Fadillah (2011) that besides solving problem ability, reasoning, communication, and connection, entering representation as component of standard process in *Principles and Standards for School Mathematics* is very exact since for mathematical thinking and communicating of mathematical ideas, the students needs to represent on various form of mathematical representation. Moreover can't be denied that mathematic objects are abstract so that to learn and understanding of abstract ideas require representation.

Meanwhile, Jones (in Fadillah: 2011) also explain three reason why representation as a standard process, namely (1) basic ability must be owned of students to build a concept and mathematical thinking is doing translation on various representation type smoothly; (2) the teacher should be provide mathematical ideas through various representation since the situation can provide enormous influence to students in learning mathematics; and (3) teacher should provide various exercise to students since the students really need these exercise to build their representation so that have ability and good understanding of concept and flexible can be used on provlem solving.

This is consistent with the opinions expressed by Yuniawatika (2011) said that students can be encouraged to find and create various representations that could be used as a thinking way in expressing of students' knowledge from abstract to concrete and the situation can be conclude that mathematical

representation ability as a way to increase and expressing of mathematical thinking ability of students.

Rahmi (in Hutagaol: 2013) said that diagram, picture, table, chart, mathematical statement, written text, also combination of all as representation variety can be used of students in expressing mathematical ideas of students. Variety of representation like as table, picture, graph, and another symbol are part of mathematics that can't be separated since mathematical representation as a part of mathematics.

But based on last situation, mathematical representation ability of students in school less attention since many student who dont understand to mathematical representation ability. Though mathematical representation ability is very important in learning mathematics since facilitating the students to represent problem in form of mathematical visual object which is more interesting.

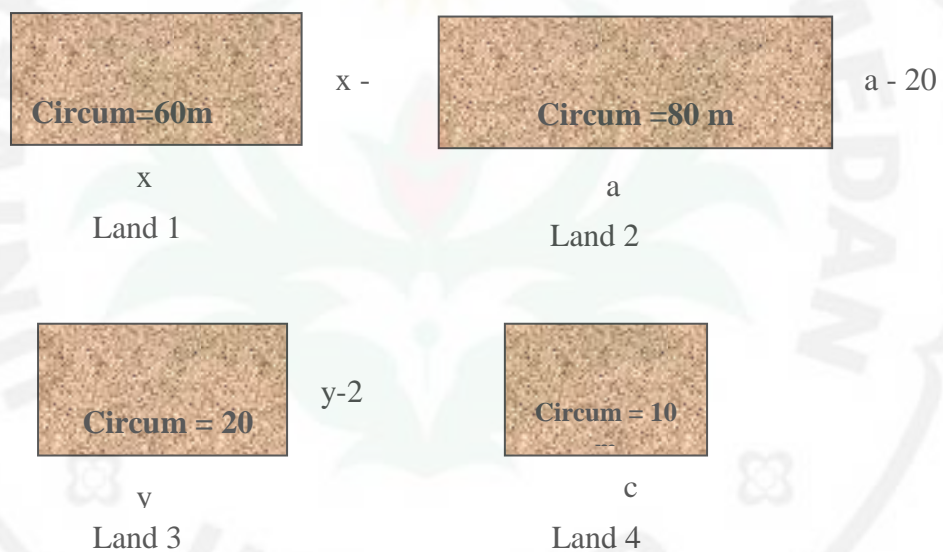
As stated by Hudiono, (in Fadillah: 2011) is in his research on learning mathematics at Junior High School conclude that the lack of teacher's knowledge and learning habits of students using conventional learning has not been possible to develop representation power of students maximally. Accordingly, NCTM (in Fadillah: 2011) also said that mathematical representation ability of students is very limited since seen from ability of students in solving mathematical problem which students tend to see critical elements of mathematical problem that dominated in symbolic representation so don't pay attention to other representation. As'ari (in Fatayati: 2012) also said that the students did not just understand abstract ideas contained in mathematics but the abstract idea must be expressed in different forms of representation and easily understood of students such as in the form of images, symbols, and words since the representation is one of alternative forms can be used to solve problems in mathematics.

From problem result which addressed to some students in grade VIII at SMP Negeri 1 Tanjung Morawa, it was found that the mathematical representation ability of students is still less, since can be seen from some of students' answers, many of them have not been able to classify the picture

representation to table representation, making the mathematical model from other representations are given, also solving problems involving mathematical expressions and the students have not been exact in answering questions using a written text.

Here are question and student's answer which are given in order to know the mathematical representation ability of students, namely:

1. A farmer has 4 rectangular land as shown below:



From the picture above, fill in the table below:

Land	Length	Wide	Equation of Circumference $2(p+l) = C$
1			
2			
3			
4			

2. Known that the price of a shoes pair is twice the price of a sandals pair. The trader must pray as Rp275.000,00 . Determine the price of 3 pairs of shoes and 5 pairs of sandals and first determine the mathematical model from problem above.

3. Based on these equations, which one the linear equations of two variable?
Give your reason!

The result of student's answer:

1.

Tanah	Panjang	Lebar	Persamaan Keliling $2(p+l) = K$
1	12	-6	
2			
3			
4			

Figure 1.1. Observation Result of Student's Answer Number One

Based on above student's answer can be seen that mathematical representation ability on visual aspect not so good, this situation shown by the lack of student's ability to classify the data from picture representation to table representation. From the question, the students can't to classify the picture's information namely length, wide and equation of circumference to the table since lack of students' visual representation ability.

2.

Jawaban no.2

$$5x + 3y = 17.000$$

$$2x + y = 6.000$$

Figure 1.2. Observation Result of Student's Answer Number Two

Based on above student's answer can be seen that mathematical representation ability on equation or mathematical expression aspects is not satisfactory, this situation shown from student's answer that student have not been able to make equation, mathematical model, and using mathematical expression.

- 3.
- a. Ya, karna memiliki satu variabel.
 - b. Tidak, karna memiliki lebih dari satu variabel.
 - c. Ya, karna memiliki satu variabel.
 - d. Tidak, karna memiliki variabel berpangkat.

Figure 1.3. Observation result of student's answer number three

The purpose given the question number 3 is to expect the students able to represent their reason or ideas from question representation given into written text, but from above student's answer can be seen that mathematical representation ability on written text aspect is also not satisfactory since student have not been able to express the ideas or their reason into written text.

From 31 students who answer the question, can be seen 51.61% of students have not been able to build of their visual representation in drawing right triangle exactly, while 86.29% of students also have not been able to build their mathematical representation ability on equation or mathematical expression aspects especialt to make equation, mathematical model from initial representation is given and 75.81% of students have not been able to represent their idea or knowledge to written text form.

Based on observation's result, can be conclude that mathematical representation ability of students still not satisfactory. This situation cause since lack of their understand about linear equation of one variable and also since they have not been accustomed to represent something from abstract to concrete.

Maulia, (2009) also state that especially of students at SMP, many of problems that occur when teachers delivering learning material such as

representation ability of students and students were never given the opportunity to express their representation ability.

This is consistent with fact that occur lately where learning used is conventional learning, which is conventional learning as a learning that provide all learning activity to teachers. Based on observation's result of mathematics value to one of mathematics teacher at SMP Negeri 1 Tanjung Morawa on May 15th 2014, they use conventional learning but depends on material to be taught. On the same occasion, teacher also state that mathematics value still not satisfactory namely only 65% of students in grade VIII at SMP Negeri 1 Tanjung Morawa whose get mathematics value according to predetermined minimum criteria (KKM).

Based on information above, can be conclude that mathematical representation ability is very important ability for representation power development especially of students at Junior High School. Accordingly, Piaget (in Hutagaol: 2013) said that at age of Junior High School strongly encouraged to provide many opportunities to manipulate and representing concrete objects and diagrams, where it can be used of student to help them when formulating abstract concepts.

Therefore, in an effort to maximize of mathematical representation ability of students in learning activities in the classroom, teacher must be able to plan all the activities that will be implemented in the classroom as a model, strategy, and evaluation of planned can help the learning activities process carried out effectively so that learning goals agreed can be achieved by maximal. Djamarah dan Zain (2010: 109) states the factors that influence of success of learning goals are goals, teachers, students, teaching activities, evaluation tools, and atmosphere evaluation. Brunner (in Hudiono: 2010) state that process of development representation and cognition development of child can be affected by activities and environment. Based on this insight, in this research to chose cooperative learning model type Teams Games Tournament.

Slavin (in Trianto, 2009: 56) state that cooperative learning is learning model which provide of students to work together in mastering the material by forming groups of 4 or 5 students. Then Trianto (2009: 58) also state in an effort to increase student participation and facilitate students with leadership in a group and provide the opportunity for students to work together is an arrangement of the cooperative learning model. This can be done on cooperative learning model Teams Games Tournament.

Cooperative learning model type Teams Games Tournament is learning model initiated by teacher's explanation of learning material that will be taught to students. Then learning activities provide practice and concludes with questions to students in a game form. Accordingly, Teams Games Tournament is a learning initiated by teacher's explanation about learning material. While Rusman, (in Yuliana: 2012) said that Teams Games Tournament is one type of cooperative learning that puts students in the study group consisted of 5 to 6 students who have the ability, gender and ethnicity or a different race.

The advantages of cooperative learning type Teams Games Tournament, namely:

1. Teams Games Tournament model not only make students intelligent (academically capable high) is more prominent in learning, but the students are capable academy also less active and have an important role in group
2. With this learning model, will foster a sense of togetherness and mutual respect among members of the group.
3. In this learning, making students more enthusiastic about the course. Because in this learning, the teacher promises a tribute to the best students or groups.
4. In this learning, the learners become more fun in the class because there is games tournament.

Thus, cooperative learning model type Teams Games Tournament is one of alternative which is appropriate and effective to develop mathematical representation ability of students.

Based on the background above, researchers interested in conducting research entitled: **“The difference of Students’ Mathematical Representation Ability by using Cooperative Learning Model Type Teams Games Tournament and Conventional Learning in Grade VIII SMP Negeri 1 Tanjung Morawa Academic Year 2014/2015”**

1.2. Problem Identification

Based on background above, so problem identification in this research are:

1. Mathematical representation ability of students is still low
2. Students still have difficulty in solving mathematical representation test
3. Mathematics value still not satisfactory namely only 65% of students in grade VIII at SMP Negeri 1 Tanjung Morawa whose get mathematics value according to predetermined minimum criteria (KKM).
4. Cooperative learning model type Teams Games Tournament still not implemented since still using conventional learning.

1.3. Problem Limitation

Since limitation of researcher ability, time and fund so that problem limitation in this research is The difference of Students’ Mathematical Representation Ability by using Cooperative Learning Model Type Teams Games Tournament and Conventional Learning in Grade VIII SMP Negeri 1 Tanjung Morawa Academic Year 2014/2015

1.4. Problem Formulation

Problem formulation in this research is: "Whether students' mathematical representation ability by using cooperative learning model type Teams Games Tournament better than conventional learning in grade VIII SMP Negeri 1 Tanjung Morawa Academic Year 2014/2015?"

1.5. Research Objective

Research objective in this research are: To know whether students' mathematical representation ability by using cooperative learning model type Teams Games Tournament better than conventional learning in grade VIII SMP Negeri 1 Tanjung Morawa Academic Year 2014/2015

1.6. Research Benefit

The expected benefits of this research are:

1. For teachers, especially for teachers of mathematics, can be used as a material consideration and input in choosing one of alternative mathematics learning models in learning activities at school.
2. For prospective teachers, can be used as considered appropriate to solving problems and difficulties that often arise in school so that can be a professional teacher.
3. For students, can be used as referenced and encouragement to improve the mathematical representation of students in learning mathematics.
4. For researchers, can be used to increase the knowledge and insights of researchers about problems and difficulties arise in school
5. For schools, can be used as consideration and input to school in improving the quality of teachers and classroom learning system and improvement of education quality

1.7. Operational Definitions

To avoid differences of meaning clarity about important terms contained in this research, it will be noted of operational definition namely:

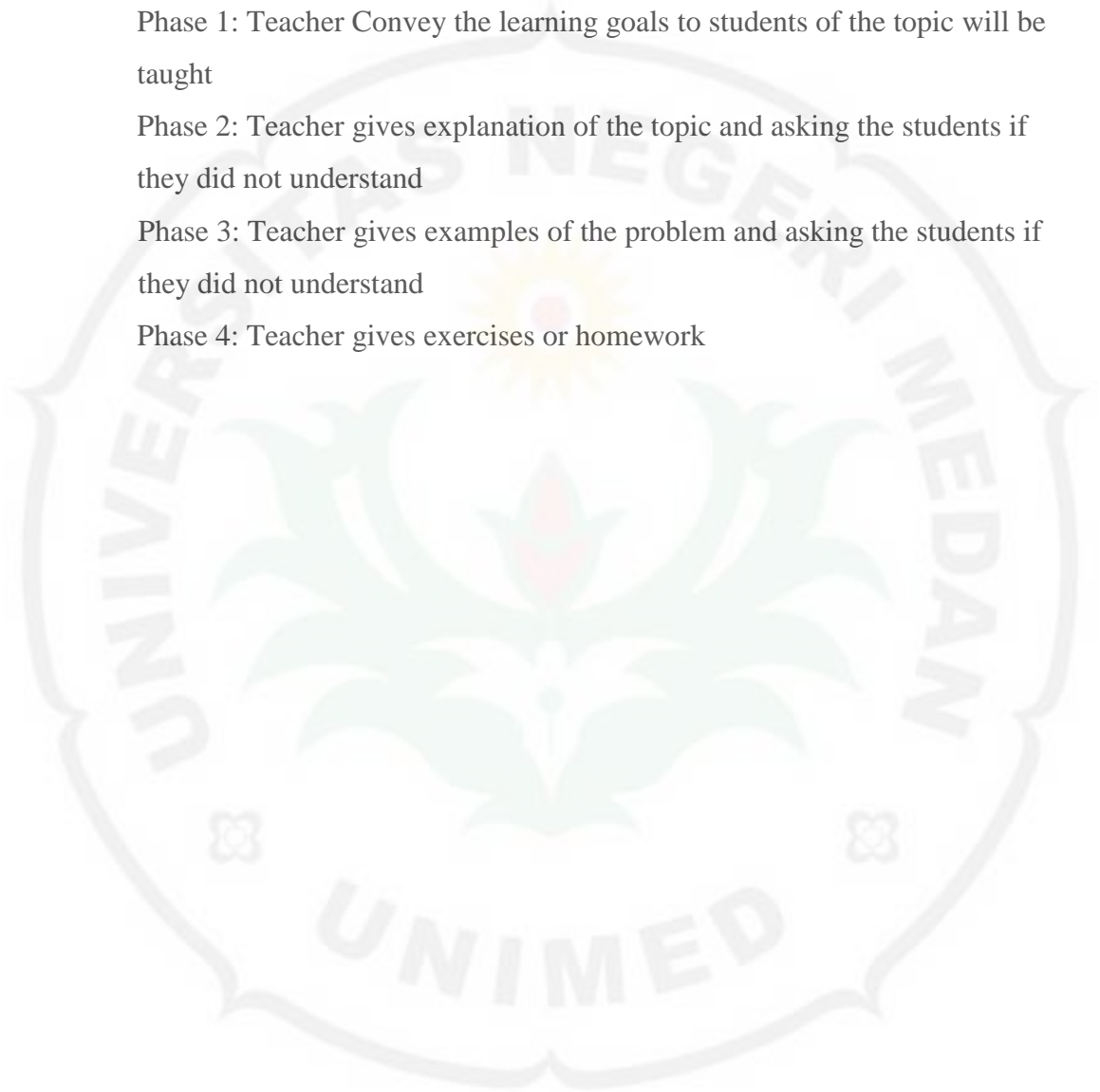
1. Mathematical representation ability is ability of students to express mathematical ideas (problem, statement, definition, and soon) into form: (1) Picture, diagram, graph, or table; (2) Mathematical notation, numerical/algebra symbol; (3) Written text/ words as interpretation of their mind
2. Cooperative learning model type teams games tournament is one type of cooperative learning model that promotes learning in heterogeneous group as well contain elements of the game and reinforcement. The syntaxes of cooperative learning model type teams games tournament are:
 - Phase 1: Presenting learning goals and set
Teacher explain the learning goal and preparing students ready to learn
 - Phase 2: Present Information (Class Presentation)
Teacher explain the material in a class, usually using direct teaching or lecture and discussion with teacher as a leading.
 - Phase 3: Organize students into learning teams (Teams)
Teacher steer students to make the teams by heterogeneous based on based on pretest value, academic value, gender, ethnic.
 - Phase 4: Assist team work and study (Teams)
Teacher guide the students when doing students activity sheets
 - Phase 5: Test on the materials (Games Tournament)
Teacher as a leading when students doing games tournament
 - Phase 6: Provide recognition (Team Recognize)
Teacher announce the winning teams
3. Conventional learning is a learning where teacher as a learning center in a class and also in this learning occur two way communication namely communication from teacher to students. The syntaxes of conventional learning are:

Phase 1: Teacher Convey the learning goals to students of the topic will be taught

Phase 2: Teacher gives explanation of the topic and asking the students if they did not understand

Phase 3: Teacher gives examples of the problem and asking the students if they did not understand

Phase 4: Teacher gives exercises or homework



THE
Character Building
UNIVERSITY