THE EFFECT OF COOPERATIVE LEARNING MODEL TYPE OF JIGSAW BASED ON MIND MAPPING ON STUDENT'S LEARNING OUTCOMES IN THE TEMPERATURE AND HEAT SUBJECT MATTER IN CLASS X EVEN SEMESTER SMA NEGERI 3 MEDAN LEARNING YEAR 2013/2014

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ABSTRACT

The objectives of this research are: (1) To know the student's learning outcomes in physics subject taught by cooperative learning model type of jigsaw based on mind mapping. (2) To know the student's learning outcomes in physics subject taught by conventional learning based on mind mapping. (3) To know the effect of cooperative learning model type of jigsaw based on mind mapping on student's learning outcomes in the temperature and heat subject matter. The type of research was quasi experiment with the population all of student in class X even semester in SMA N 3 Medan which consits of 14 classes. Sample of this research was obtained by technique of cluster random sampling. The sample is X MIA 12 as the experiment class and X MIA 14 as the control class. Experiment class taught by cooperative learning model type of jigsw based on mind mapping and control class taught by direct instruction model. The research instrument has 20 questions in multiple choice forms with 5 options, the instrument tested validated. In this research obtained the mean of pre-test in experiment class is 41.41 and in control class is 41.25. After that do the treatment in experiment class taught by cooperative learning model type of jigsaw based on mind mapping and in control class taught by direct instruction model, and then done the post-test. The mean of post-test in experiment class is 80.16 and in control class was 68.90. In hypothesis testing obtained $t_{count} > t_{table}$ that was 5.18 > 1.669 at significant level $\alpha = 0.05$ and n = 32. So, can be concluded that the student's learning outcomes in experiment class differ with control class. Can be concluded that there is effect of cooperative learning model type on student's learning outcomes in the temperature and heat subject matter in class x even semester SMA N 3 Medan academic year 2013/2014.

Key words: jigsaw, mind mapping, student's learning outcomes

INTRODUCTION

Learning is not an automatic consequence of the delivery of information to students, but learning requires mental engagement and action from the students themselves. That liveliness which is the study measures designed to keep the students happy to support the process and to engage interest.

Enabling student learning in learning activities is one way to turn on and train students to working memory and develop optimally. Teachers should provide opportunities for students to optimize their memory work optimally

with the language and perform with his own creativity.

Model of teaching is one of the model that used in conducting teacher student relationship at the time of the study . Therefore , the role model of teaching as a tool for teaching and learning process to create the liveliness of the learning process .

Appropriate learning models can provide high motivation to learn, which is very influential in the formation of the child psyche. Generate motivation to learn and give direction to the impulse that causes the individual acts of learning.

Base on interview with some physics' teacher in SMA N 3 Medan, the conclusion is teacher in SMA N 3 medan often used conventional learning. That is why many students who are less interested in learn physics and assume that physics is hard. The consequence, most student cannot reach KKM. The fact shown by student's test score in class X only 20% students graduate KKM. In class XI only 15% students graduate KKM.

From the problems discussed above, teachers need to varied learning model to make students more interest in learning and students must comply with the competence to be achieved from these lessons. One alternative that can be done by a teacher in order to better enable student learning in the cooperative, because cooperative learning is a learning approach that focuses on the use of small groups of students to work together in maximizing learning conditions to achieve learning objectives. This Learning Model can be helping students acquire the learning content and skills to address important social and human relations goals and objectives (Arends, 2009).

Because don't know the right way to learn, learn become a burden for some students. Though a great value needed for the next grade or to pass the exam. With Mind Mapping technique, learning can be very effective and well targeted. Mind Mapping technique can facilitate students to understand more clearly the learning. Mind Mapping technique was first popularized by a psychologist named Tony Buzzan in 1970 and became known in Indonesia since the early 1990s. Mind Mapping technique relies on image and relationships with each other by using pictures, words, numbers, logic and color into an unique way. Principles of Mind Mapping is a way to summarize the lessons learned are not linear (top to bottom) but branched. With the summary it easier for people to memorize and understand.

Based on the existence of these problems the researcher tries to do research in an effort to improve student learning outcomes by applying the cooperative learning model type of jigsaw based on mind mapping. This model can be applied to the teaching of physics to achieve the competencies that have been defined and known to students by distributing teaching materials are complete . In this model, students are divided in groups , students are able to discuss in small groups . Each member of a small group trying to make a resume in order to achieve a predetermined competencies . Form of a new group at random and each member of the group to share their resumes to fellow members of the new group in order to obtain a full understanding.

With this learning model, students can work or think for themselves not only rely on only one student in the group . Because each student is required to resume and be

present in the new group .With mind mapping also students can be more innovative and creative in learning the full creation. Students are also able to express their understanding of physics with mind mapping.

Researcher realizes that cooperative learning had reviewed by student. The research results that review before is done by Febriani (2011) that uses kind of cooperative models jigsaw obtained that study result of the student with average 74,38. Dyan (2012) declaring that there was significant effect of jigsaw cooperative learning model on learning outcomes.

The difference in general previous research with this study is that previous research, to provide the required media while learning so that the learning process less attractive. In this study to determine the effect of cooperative learning model type jigsaw as well as to make the learning process interesting, so students can understand physics and have good achievement especially in physics.

Based on the above, the researcher conducted a study using cooperative learning model type of jigsaw based on mind mapping on learning outcomes of students in the Temperature and Heat subject matter in class X which will be held in SMA Negeri 3 Medan. The title is taken the researcher is: **"The Effect of Cooperative Learning Model Type of Jigsaw Based on Mind Mapping on Learning Outcomes of Students in The Temperature and Heat Subject Matter in Class X Even Semester SMA Negeri 3 Medan Learning Year 2013/2014"**.

RESEARCH METHOD
The research conducted at SMA N 3 Medan, located on Jln. Budi Kemasyarakatan No.3 in class X learning year 2013-2014 which were do

during the taught material without disturbing the process of teaching and learning in the school Population in this research are all students of grade X in SMA Negeri 3 Medan learning year 2013/2014 consist of 14 class. The sample in this school are divided into two classes consisting of one class as a class experiment using cooperative model type of jigsaw based on mind mapping and the other class as class control using conventional learning. Samples will be taken selected cluster random sampling, where each group / class representing a population with the same characteristics have the same opportunity to be sampled.

The design of this research is experimental and divided into two groups: the experimental class using cooperative learning model type of jigsaw based on mind mapping and control class using conventional learning. Pre-test and post-test given to both the control group and the experimental group before and after treatment. The research design can be shown in Table 3.1.

Table 3.1 Research Design

Group	Pre test	Treatment	Post test
Experiment class	T	X	T
Control Class	T	O	T

Note :
T = Student's learning instrument
X= Teaching with jigsaw model based on mind mapping
O= Teaching with Conventional model based on mind mapping

To test the homogeneity of the used formula (Sudjana, 2005)

$$F = \frac{S_1{}^2}{S_2{}^2}$$

$S_1{}^2$ = Variance data biggest
S^2 = Variance data smallest

The test criteria are received Ho: the data come from a homogeneous population $_{count}$ if F <F $_{table,}$ where the F $_{table}$ obtained from the distribution list F with α = 0.1. Here α is a real level for testing.
If the data were normally distributed and homogeneous then used the t test with the formula (Sudjana, 2005)

RESULT OF RESEARCH

The result of analysis research data showed that have the effect of Cooperative Learning Model type of Jigsaw Based on Mind Mapping on student's learning outcomes on temperature and heat topic in class X SMA N 3 Medan. At the beginning of the research are given a pretest to experiment and control class, obtained the average of pretest of experiment class is 41.41 with standard deviation 7.32 and the average of control class is 41.25 with standard deviation is 7.73. In the normality testing for pretest obtained in experiments with $L_{calculate}=$ 0.1112 and L_{table} = 0.156, so obtained $L_{calculate} < L_{table}$, then both of classes are normally distributed (the calculation is attached in appendix). In the test homogeneity is obtained $F_{calculate}$ = 1.11 and F_{table} = 1.83 so that $F_{calculate} < F_{table}$ (1.11 < 1.83), then both of sample come from homogeneous group calculation results attached in appendix). Then the result of initial ability test (pretest) between experiment class and control class with similarity test two parties is obtained $-t_{table} < t_{calculate} < t_{table}$ (-1.99 < 0.088 < 1.99) which means that the initial ability both of sample groups are similar.

Having given a different treatment, then students is given the test again (posttest), the average value of posttest in experiment class using Cooperative Learning Model type of Jigsaw based on Mind Mapping is 80.16 with standard deviation 8.08, while the average value posttest in control class with Direct Instruction is 68.90 with standard deviation is 10.13. N-gain test in experimental class obtained 66% it means and in control class obtained 47%.

This research used the t test one tailed to determine learning outcomes when treated with Cooperative Learning Model type of Jigsaw based on Mind Mapping in experiment class greater than Direct Instruction in control class. The results of hypothesis testing from the data obtained $t_{calculate}>$ t_{table} or 5.18 >1.669. At significant level α = 0.05

The use of mind maps allows the students to express themselves freely and, therefore, this tool permits us to look for external influences in the process of subsumer development, such as, for instance, issues that are treated by the media, contributions that come from previous years of schooling, or from school contents students have already studied. On the other hand, concept maps, because of their own structure, do not enable students to have the same freedom they have with mind maps and, thus, it might be more difficult for the teacher to verify the external influences in the development of subsumers and in the grasping of meanings derived from the subject matter studied. In this study, we expected the external influences upon physics to become spontaneously extinct. However, the students did not receive any guidance towards the choice of concepts they should use, though they were instructed to follow the rules for concept mapping and to relate to the concept maps their knowledge.

In this study, the are several advantages that make Cooperative Learning Model type of Jigsaw based on Mind Mapping can contribute to student learning outcomes are: (1) students are more active during the learning process, (2) students will better mastery in the material provided, (3) improve the student communication skill to each other, (4) learning process will be more attractive and the last (5) improving the teaching quality.(6) student's will more remember about their study by using mind mapping.

CONCLUSION

Based on result research and data collection, can be concluded that:

1. Average value of pretest of experiment class is 41.41 with standard deviation 7.32, after given by treatment, then students is given the test again (posttest), the average value of posttest in experiment class using Cooperative Learning Model type of Jigsaw based on Mind Mapping increase become 80.16 with standard deviation 8.08 and gain 66%.
2. Average value pretest of control class is 41.25 with standard deviation is 7.73,after given by treatment, then students is given the test again (postest) the average value posttest in control class with Direct Instruction is 68.90 with standard deviation is 10.13 and gain 47%.
3. Student's learning outcomes in experimental class higher than in control class, so can be concluded that there is effect of cooperative learning model type of jigsaw based on mind mapping to student's learning outcomes on temperature and heat topic in class X SMA N 3 Medan learning year 2013-2014. The learning outcomes in experiment class by using Guided Inquiry Learning Model greater than the learning outcomes in control class by using Conventional Learning.

SUGGESTION

Based on discussion of research result and conclusion above, researcher give suggestions as below:

1. For further researcher who wants to observe using Cooperative Learning Model type of Jigsaw Based on Mind Mapping, observer must make students more active in discussion process.
2. For further researcher who wants to observe using Cooperative Learning Model type of Jigsaw Based on Mind Mapping to do more effeciently time when do discussion.
3. For further researcher who wants to observe more using Cooperative Learning Model type of Jigsaw Based on Mind Mapping to do more efficiently may using a media in learning process, so can increased of student's learning outcomes.

REFERENCES

Arends. R. I. 2009. *Learning to Teach*. New York: McGraw-Hill.

Arikunto, S, 2005. *Prosedur Penelitian Suatu Pendekatan Praktek*. Jakarta: Rineka Cipta

Dyan 2013. *Effectiveness of jigsaw cooperative learning models in Quantity and Units on learning outcome grade X SMA N 7 Medan*. Medan: FMIPA UNIMED

Joyce, B, 2004. *Models of Teaching*. New Jersey: Prentice/Hall International. Ing.

Lie, A., (2008), *Cooperative Learning Mempraktikkan Cooperative Learning Di Ruang-Ruang Kelas*, Penerbit PT Grasindo, Jakarta.

Slavin, R. E, 2005. *Cooperative Learning: (theory, research and practice).* London: Allymand Bascon.

Slavin, Robert E., *Cooperative Learning Teori, Riset dan Praktik*, Bandung: Nusa Media, 2008, Cet 1.

Sudjana. 2005. *Metode Statistika*. Tarsito: Bndung.

Sudjana, 2009. *Penilaian Hasil Proses Belajar Mengajar.* Bandung: Remaja Rosdakarya.

Trianto, 2009. *Mendesain Model Pembelajaran Inovatif-Progresif.* Jakarta: Kencana.