
THE COMPARISON OF STUDENTS' LEARNING ACHIEVEMENT TAUGHT BY USING COOPERATIVE LEARNING TYPE GROUP INVESTIGATION AND STUDENT TEAMS ACHIEVEMENT DIVISION IN CLASS X OF SMA JOSUA MEDAN ON THE SUBJECT MATTER OF ENVIRONMENTAL POLLUTION IN 2012/2013

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Abstract

This study aims to investigate the comparison of student learning achievement and activity between concept attainment model with and without flashcards on the topic of cell division. A quasi experimental research with post test only control group design was used in this study. The population of this study was all of grade XII IPA students of SMA Swasta Rakyat Pancurbatu. There were 2 classes chosen as the sample by applying cluster random sampling technique. Experimental class was taught by concept attainment model with flashcards while control class was taught by concept attainment model without flashcards. The instruments used to obtain the data were observation sheet as non-test instrument and cognitive test in form of multiple choices and essay as test instrument. The result of hypothesis test for posttest showed that $t_{\text{count}} = 2.919 > t_{\text{table}} = 1.678$ at the level significance of 0.05, means that H_a was accepted and H_0 was rejected. It can be concluded that there is a significant difference of student learning achievement between concept attainment model with flashcards and without flashcards. Then, t-test of observation results showed that students' activity in both research classes is significantly different. The students in experiment class were more active than students in control class by the average percentage of 61.33% and 49.33% respectively. The result of hypothesis test for student activity showed that $t_{\text{count}} = 2.183 > t_{\text{table}} = 1.678$. It means that students' activity in experimental class is higher than students' activity in control class. On the whole, learning achievement in learning cell division topic that taught by concept attainment model with flashcards media is higher than student learning achievement that taught by concept attainment model without flashcards in SMA Swasta Rakyat Pancurbatu academic year 2013/2014.

Keywords : Concept Attainment Model, Flashcards Media, student' activity, learning achievement.

A. INTRODUCTION

Education is one of the determinants of survival and progress of the nation. In this context, education is not just a medium to convey and pass on culture from generation to generation, but can produce quality human resources in the development progress of the nation. Therefore, it should be the provision of education in Indonesia has sought to be more advanced and qualified.

Efforts to improve the quality of education in Indonesia is carried out by various development programs, among others: the teacher certification program, teacher performance assessment and continuous professional development. The third program boils down to efforts to improve teaching and learning in the classroom, covering all activities related to the provision of learning experiences so that students acquire the skills (competencies) and adequate knowledge. So in the end the students gain a better learning outcomes. In addition, it also repairs the curriculum and the provision of educational facilities.

There are two factors that affect the achievement of learning outcomes ie internal factors and external factors. One of the external factors that affect student achievement is a model or learning methods are applied to the learning process. According to Sudjana [10], the learning method is one way to put teachers into contact with students during the course of teaching. The learning method is part of the instructional core, the learning method has the function as a way of serving, outlining the material, set an example and give training to the students to achieve certain goals.

From the above methods can be interpreted as a way of learning or strategies used to implement a plan that has been prepared in the form of real and practical activity to achieve learning objectives.

The results of a preliminary survey done in class X SMA Josua Terrain learning year 2012/2013 was found learning process is dominated by the lecture method is its only form of information sharing and learning is one way. Ironically, the information submitted is limited to the materials on students' handbook, without any enrichment of new information from textbooks, scientific journals or scientific publications. Learning like this only makes the students as a listener (object) so they tend to be passive and showed no enthusiasm for optimum active learning. Student looks bored when learning activities are being occur. Condition of course will affect student learning outcomes. It can be seen from the average of students who achieve the minimum completeness criteria (KKM = 67) on a daily tests only 40%.

Departing from such facts and circumstances, it is necessary to apply a system of learning that emphasizes active involvement of students to the maximum in the process of teaching and learning activities in order to improve learning achievement. One model of learning that involves students actively role is kooperatif. Cooperative learning model is very suitable to be applied to the study of biology for the study of biology is not enough just to know and memorize concepts but also required an understanding of, and ability to solve biological problems properly. Through this model students can express their

thoughts, exchange ideas, cooperate with each other if there is a group of friends in distress. This can increase the motivation of students to study and master the subject matter so that will improve achievement belajarsiswa. Cooperative learning is one alternative to achieve the objectives in improving students' ability to cooperate with others that have a significant influence on learning outcomes.

Cooperative learning has many types, two of which are Group Investigation (GI) and Student Teams Achievement Division (STAD). In cooperative learning both GI and STAD, students were divided into groups and students are expected to be active, mutual respect, mutual help within groups to solve the problem together. In GI cooperative learning model, students are divided into 5-6 people formed based on common interests or comradeship. While STAD, the students are divided into learning teams consisting of 4-5 people of different levels of ability, gender, and ethnic background.

Cooperative learning model of Group Investigation (GI) from the planning to involve students were able to find the concept of a chosen subject matter [11]. Through cooperative learning model GI (Group Investigation), students are expected to optimize the ability to think critically so that students can solve problems related to topics that have been studied. In addition, students are expected to have the ability to communicate and process skills in groups (group process skills). This model can also increase the responsibility of the students in the discussion so as to encourage learners to think more skilled, active and creative.

Student Teams Achievement Division (STAD) has the main ideas motivate their students to be able to support each other and help each other in mastering the material being taught by the teacher. If the students want the group was awarded the team, they had to help his teammates to be able to do the best, show the norms that learning is important, valuable, and fun [9]. Motivation in STAD is advocating that the gift can create a child be more active in learning and achievement.

Referring to the description of the background issues that have been presented in advance, in the form of comparisons necessary to test the application of cooperative learning model STAD-GI, so it will obtain the most effective type used in particular on learning related to Environmental Pollution.

Pollution or environmental pollution is the introduction of living creatures, substances, energy, and or other components into the environment, or changing the order of the environment by human activities or natural processes so that the quality of the environment down to a certain level which causes the environment becomes less or not

its proper functioning [4]. Environmental pollution can be divided into four, namely air pollution, water, soil and noise [8].

Substance or material that could result in contamination called pollutants. A substance may be called if the pollutants in excess of normal, are at the most inopportune times and are in the wrong place [6].

This study focuses on comparison of students' learning achievement taught by using cooperative learning type group investigation and student teams achievement division in class X of SMA Josua Medan on the subject matter of environmental pollution in 2012/2013

B. RESEARCH METHOD

This study was conducted in April-June 2013. The tests were conducted in private high school Josua, the population of all class X SMA Josua Terrain Learning Year 2012/2013, totaling 94 students consisting of three classes. The samples in this study using a random cluster sampling technique, the class X-1 by the number of students as many as 30 people as STAD classes and class X-3 totaling 30 people as a class GI. Learning was done in two meetings each 2 hour lesson (4x 40 minutes). In this case the researchers acted as a teacher (replacing the teacher), preparing lesson plans, implementing the learning and evaluating learning. Before the act is done pre-test and measurement of learning outcomes obtained through the post-test.

Instrument used in this research was test multiple choice (multiple choice) with the amount of about 40 items, each question has five options (a, b, c, d and e) and each correct answer was given a score of 1 and a wrong answer given a score of 0. to validate the empirical validation of instruments used to perform the test trials on students instead of the study sample. From the test results can be known validity, reliability, different power and level of difficulty of the test.

Learning outcomes data analysis techniques used in this study is a comparative analysis using t-test formula. Before carrying out the t-test first tested the test data requirements of normality and homogeneity test.

C. RESULT DISCUSSION

1. Description of the Posttest Results Students

For the experimental class I (using models GI), before treatment the average score of students' pre-test of 3.933 (39.333 values) and the completeness of 3.33%. Once the material is taught using learning model GI, obtained an average score of post-test students 24.2 (score 80.667) with a value of completeness of 93.33% while for the experimental class II (model STAD), before the treatment is obtained skor rata -rata

pretest students of 3.9 (value 39) with a value of 3.33% completeness. After being treated obtained an average score of post-test students at 22.933 (76.443 values) with a value of 80.67% completeness. To see more clearly the learning outcomes data comparison post test experimental class I (type GI) and learning outcomes data post test experimental class II (Type STAD) is described in the following diagram:

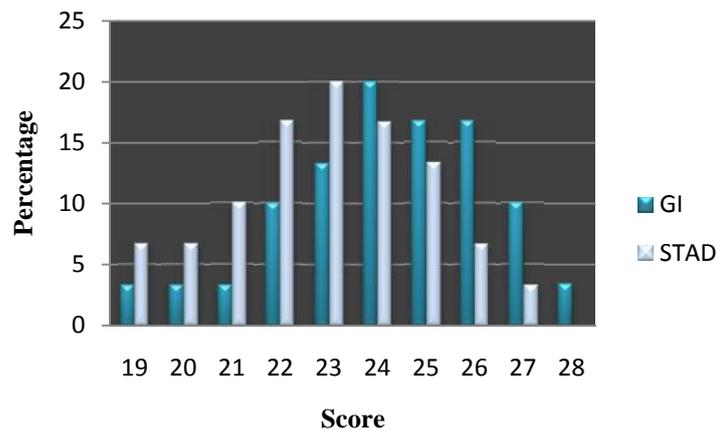


Figure 1. Diagram of comparison of posttest

2. Normality of Post Test

By using Liliefors test, the results obtained in the experimental class I (type GI) with $L_{hitung} = 0.0692$ and the experimental class II (Type STAD) with $L_{count} = 0.088$, and of tables of critical values L to Liliefors with $N = 30$ and the level of significance L_{tabel} obtained $= 0.05 = 0.161$. Then the price obtained $L_{count} < L_{tabel}$ is 0.0692 and $0.088 < 0.161$. Thus the testing of both types of cooperative learning model STAD and GI samples derived from normal distribution.

3. Homogeneity of Post Test

From the homogeneity test calculations obtained $F_{tabel} = 1.8584$ din of $F = 1.09$. It is thus obtained of $F < F_{table}$ ($1.09 < 1.8584$). This indicates that the sample comes from a homogeneous population. It shows that both classes pretest data is derived from a homogeneous population, with the price of $F < F_{table}$.

4. Hypothesis Test

Once it is known that both classes of normally distributed samples and have the same variance (homogeneous), it can be done hypothesis testing using t statistical test. This research was conducted by examining differences in scores of post-test experimental class I (type GI) and the experimental class II (STAD).

In hypothesis testing posttest data is obtained $t = 2.346$ at significance level $= 0.05$ and $df = 58$ with $t_{(0.975)(58)} = 2.0021$. Thus $t = 2.346 > 2.0021$. This means that H_0

rejected and H1 accepted that concluded there are differences in learning outcomes significantly between students taught by cooperative learning model GI (Group Investigation) and STAD (Student Teams Achievement Division) in the subject matter of environmental pollution in the class X SMA Josua Medan year 2012/2013.

5. Discussion

Based on the exposure of the above results, it appears that both models GI and STAD basically alike can improve student learning outcomes supported this opinion of Ellis and Fouts; Harvey; Lord [3] states that the cooperative learning can improve students' academic results. Cooperative learning can provide benefits for both the lower group or groups of students on working together completing academic assignments. Students top group will be tutors for students under the group, so that the lower group will receive special assistance from peers who have the same orientation and language, while the top group of students will increase their academic ability for providing services. As a tutor they require deeper thinking about the relationship of the ideas contained in any subject matter.

According to the theory of cognitive elaboration, on learning with cooperative strategies, smart students will give an explanation to the less intelligent students. As a result, the mastery of the subject matter on a smarter and less intelligent students become better [9]. Lawrence and Haevey [3] find cooperative strategies to improve learning outcomes for the motivation to learn all the members of the group increased thanks to the encouragement of learning of each group member. Weaker students will be motivated because every member of each group was challenged to put forward its ideas.

Improving student learning outcomes in the classroom caused because the GI in GI cooperative model, a group of students faced with the problem, determine their own issues to be discussed, designing investigations, conduct investigations, analyzing data / information resulting from the investigation, and draw conclusions. Each student is actively involved both physically and mentally on every aspect of activity so that students' understanding of the subject matter can be expected to be better. It supported the opinion [9] that in the process of learning cooperative model GI increased ability to do the analysis and synthesis of all the information, so that mastery of the subject matter will be better. By looking at such a learning process, students can construct their own knowledge and directly use the knowledge to discuss the issues raised, so that learning becomes very meaningful.

GI cooperative model encourages intensified cooperation among members of the group in all aspects of activities so that social relations among group members become

very close. It supported the opinion [9] that the learning activities with GI cooperative strategy can improve social skills and academic achievement of students. Increased social skills will lead to better communication between group members. Consequently, there is a very good exchange of knowledge that can ultimately improve the mastery of the material being studied.

Results of previous studies conducted by [3], in his research concluded that the application of cooperative learning model GI (Group Investigation) can strengthen ability of students both academically and socially and improve process quality and student learning outcomes. Similar opinion was also described by [12] in his research concluded that the learning model Cooperative type Group Investigation influential significant effect on cognitive achievement of biology students and Goddess, et al (2012) reported that the application of the learning model of Group Investigation can improve learning outcomes and student activity.

While improving student learning outcomes in the classroom STAD due to the model STAD learning more purposeful because the teacher first presents the material before the task group started and can improve collaboration among students, because in learning students are given the opportunity to discuss in a group [5].

In STAD, a class formed into groups of 4-5 people learn by members, each member of the group has a heterogeneous, composed of men and women, from different tribes, have the capability of high, medium, and low [9]. All members of this group come together for an effective and enjoyable learning and active participation in the learning process will improve learning outcomes.

STAD learning by emphasizing the delivery of content by the teacher followed by group work. Group members work together using sheet activities or other learning tools to accomplish the learning material and then help each other to understand the learning material through tutorials or discussion. This learning has some perspective can be developed, namely the perspective of motivation, social, cognitive, cognitive elaboration, and psychological [9].

Results of previous studies conducted by [7] found in his research the average score of science process skills of students in STAD higher and in the research results Achrudin, et al (2013) stated that through the implementation of STAD can increase social activity of students in biology, Wijayanti research results, et al (2013) also stated that the adoption of SAVI approach through cooperative learning model STAD effect on student learning outcomes.

After the t-test to post-test values obtained $t_{2,346}$ second grade $>$ table = 2.0021, H_0 and H_1 accepted. It can be concluded that there are differences in learning outcomes of students taught by cooperative learning model of Group Investigation and types Student Teams Achievement Division in matter of environmental pollution in the class X SMA Josua academic year 2012/2013.

Based on the explanation above, it can be seen that the average score of student learning outcomes using cooperative learning model type Group Investigation increase is greater than the average score of student learning outcomes using cooperative learning model Student Teams Achievement Division. This is because based on the findings of researchers, in classes taught by using cooperative learning model type GI, all students actively working in each group respectively while in class STAD researchers saw that appears dominant only one or two people, it shows that other group members do not participate actively participate in group work.

On the GI class, students are required to find new things from the working group is doing, whereas in STAD class, students generally only discussed by the existing literature. At the time of the presentation in the classroom GI group, all members of the group take part actively in providing responses and rebuttal, whereas in STAD class, only smart students who give a rebuttal or response, while the other student just enough to hear and be silent.

Thus it can be concluded that the use of cooperative learning model of Group Investigation better and more effective in teaching material environmental pollution compared with cooperative learning model Student Teams Achievement Division.

D. CONCLUSIONS

There is a difference in student learning outcomes significantly taught by cooperative learning model of Group Investigation and types Student Teams Achievement Division in class X SMA Josua in the subject matter of environmental pollution academic year 2012/2013.

E. REFERENCES

- [1] Ahmed, I., Gujjar, A. A., Janjua, S. A., and Bajwa, N. (2012). A Comparative Study of Effectiveness of Concept Attainment Model and Traditional Method in Teaching of English in Teacher Education Course, *Journal of Language in India*. pp 212-227. 1930-2940.
- [2] Achrudin, Sajidan, Meti I., 2013, *Peningkatan Aktivitas Sosial Siswa Dalam Pembelajaran Biologi Melalui Penerapan Model Pembelajaran STAD Disertai Video Di Kelas VII SMP Negeri 1 Jaten*, Jurnal Pendidikan Biologi UNS, Vol 5, Hal 96-103, Surakarta.

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- [3] Aryanta, S., Subali, Y., 2011, *Peningkatan Kualitas Proses Belajar dan Hasil Belajar Sejarah Melalui Model Pembelajaran Kooperatif Tipe Group Investigation Pada Siswa Kelas VIIIH, Semester 2 SMP PGRI 5 Denpasar Tahun Pelajaran 2009-2010*, Jurnal Santiaji Pendidikan, Vol 1: 22-33.
- [4] Aryulina, D., Muslim, C., Manaf, S., Endang, W. W., 2007, *Biologi SMA dan MA untuk Kelas X*, Esis, Jakarta. Dewi, R. P., Retno S. I., Susanti, R., 2012, *Penerapan Model Group Investigation Terhadap Hasil Belajar Materi Bahan Kimia Di Smp*, Unnes Science Education Journal, FMIPA Universitas Negeri Semarang Indonesia, Semarang.
- [5] Istarani, 2012, *58 Model Pembelajaran Inovatif (Referensi Guru Dalam Menentukan Model Pembelajaran)*, Media Persada, Medan.
- [6] Kistinnah, I., Lestari, E.S., 2009. *Biologi Makhluk Hidup dan Lingkungannya SMA/MA Untuk Kelas X Jilid 1*, Pusat Pembukuan Departemen Pendidikan Nasional, Jakarta.
- [7] Muhfahroyin, 2009, *Pengaruh Strategi STAD Pada Pembelajaran Biologi Terhadap Keterampilan Proses Sains Siswa SMA Di Kota Metro*, Jurnal FKIP Universitas Muhammadiyah Metro, Metro.
- [8] Pratiwi, D.A., Maryati, S., Srikini, Suharno, Bambang, S., 2004, *Buku Penuntun Biologi SMA Untuk Kelas X Jilid 1*, Penerbit Erlangga, Jakarta.
- [9] Slavin, 2005. *Cooperative Learning Teori, Riset dan Praktik*, Nusa Media, Bandung.
- [10] Sudjana, N., 2011, *Penilaian Hasil Proses Belajar Mengajar*, PT. Remaja Rosdakarya, Bandung.
- [11] Suprijno, Agus., (2009), *Cooperative Learning Teori dan Aplikasi PAIKEM*, Pustaka Pelajar, Yogyakarta.
- [12] Windiatmojo, V.I., 2012, *Pengaruh Model Pembelajaran Kooperatif Tipe Group Investigation (GI) Terhadap Hasil Belajar Biologi Ditinjau Dari Gaya Belajar Siswa SMA Negeri 5 Surakarta*, Jurnal FKIP Universitas Sebelas Maret, Surakarta.
- [13] Wijayanti, T.F., Baskoro A. P., Marjono, 2013, *Pengaruh Pendekatan SAVI Melalui Model Pembelajaran Kooperatif Tipe STAD Terhadap Hasil Belajar Pada Siswa Kelas VII SMP Negeri 14 Surakarta*, Jurnal Pendidikan Biologi FKIP UNS, Vol 5, Hal 1-14, Surakarta.