Application of Type Cooperative Learning Models Group Investigation (GI) in Improving Competence Learning Biology Student School

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*Abstract –*The problem of biology learning is learning activities centered on the teacher; the students only listen without stimulus, so that the activity and competence of student learning outcomes is low. Learning model that can encourage students to interact actively is cooperative learning type Group Investigation (GI). The purpose of this research is to know the process of improving students' biology learning competence through the application of cooperative type GI learning. This research is a classroom action research conducted 3 cycles. The data of the research results were collected through the evaluation of cognitive competence, affective observation sheet, and psychomotor students. The result of the research shows that cooperative learning of GI type can increase the competence of student cognitive aspect that is in cycle I is: 63,33, cycle II: 83,33 and cycle III: 86,67. Result of observation of affective competence, cycle I is: 60,32, cycle II: 70,13 and cycle III: 75,60 and result of competency psychomotor aspect of cycle I is: 76,67, cycle II: 83,37 and cycle III: 87.80. Of the three cycles, students' learning competencies are categorized well. Based on the result of the research, it can be concluded that there is improvement of students' biology learning competence through the application of cooperative learning model of Group Investigation (GI) type.

Keywords – **Group Investigation; Competence Learning Biology.**

I. INTRODUCTION

Learning process is an interaction between teachers and students in order to achieve learning objectives (Sudjana, 1995: 9). Biology learning is a learning that emphasizes the provision of direct learning experiences through the use and development of process skills and scientific attitudes (BNSP, 2006).

In the learning process should teachers be able to manage the classroom atmosphere conducive. Providing variations of teaching methods by teachers, enables students to acquire knowledge and experience on how to acquire knowledge, skills and attitudes with their own business so that it will also affect students' learning competencies, which can be seen from three aspects: cognitive, psychomotor and affective aspects (Mulyasa, 2006; 107).

Based on experience as one of the educators on biology subjects in class XI IPA SMA Negei 14 Padang, the reality that occurred in the field during the learning process is not in accordance with the expected. Low student learning activities that cause student learning outcomes have not been as expected.

Student learning outcomes are influenced by several aspects of students as learners, teaching materials used by students, the media used by teachers and learning strategies used by teachers while teaching.

Judging from the aspect of the students the cause of the low learning outcomes of students is the willingness to learn and low student interest reading. Students are not enthusiastic about following the learning; the desire to submit an opinion or ask questions is still low. This shows

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the ability of students to express many ideas, answers and problem solving is still low.

Furthermore, if viewed from the aspect of the teacher, the learning that lasted as long as it can be described as follows: (1) The teacher still dominates the lesson so that learning tends to be verbal-oriented cognitive ability, (2) Teachers have not been accustomed to provide opportunities to students to know their own knowledge, (3) In the group discussion the teacher is less facilitate and motivate the students so that the active students are dominated by a certain group of students.

All the problems the researcher discloses have an impact on the still low student learning outcomes. Cognitively the students' learning outcomes are still below the average of the expected, affective and psychomotor students have not dared to express ideas, ideas or respond to what the teacher said, students are not used to discuss, not dare to express his opinions and present the results of discussion in front of the class.

Based on these statements, the researcher feels needed an innovation in learning in the form of applying interactive learning model and can assist students in the mastery of process skills. A model that invites students to conduct a knowledge-seeking process in relation to the subject matter through various process activities so that students are directed to discover for themselves the facts, build concepts, and new values necessary for their lives. Skills of the process is closely related to student learning outcomes include cognitive, affective, and psychomotor aspects. One of the innovations towards the learning process is by using cooperative learning model.

Cooperative learning model is one of the learning models based on the view of kontruktivisme. The view of constructivism requires students to build their own knowledge (Pitoyo, et al 2014: 17). According to the theory of constructivism, the teacher is only a facilitator so that students are able to construct their own knowledge optimally and usually manifested through group work. In accordance with the characteristics of cooperative learning, students learn in groups that are heterogeneous (Siddiqui, 2013: 132)

Cooperative learning more concerned with student cooperation in groups to achieve learning objectives. The success of each group member contributes to the success of the group (Kumaladewi, et al 2015: 73).

Many cooperative learning models can be applied, but in this study the cooperative learning model that the researcher chooses is cooperative learning model of Group Investigation

(GI) type. GI type cooperative learning is one of the most complex types of cooperative learning. This model is designed to guide students defining problems, exploring on the issue, collecting relevant data, developing and testing hypotheses (March, 2009: 92). The GI model was developed to build all aspects of students' abilities in both the cognitive, psychomotor, and affective fields. In GI type cooperative learning, students are not only required to develop their individual abilities but are also required to share with members of their group (Irnan, 2010: 62).

According to Dewi, et al (2012: 5) GI learning has six learning steps: (1) identifying topics and dividing students into heterogeneous groups (2) planning investigative tasks, (3) conducting investigations, (4) preparing tasks end, (5) present the final project, and end with (6) evaluation

With the steps of study Group Investigation method above then the students will do the cooperation in their respective groups. Students will do a very long learning because, this method not only use thinking that only memorize or remember it but students will use kemampun independent and creative thinking. Students are given the freedom to convey the results of their group investigations (Haningsih, 2008: 28)

Researchers are increasingly compelled to apply this Group Investigation model again after it has been proven in research conducted by Dewi Ratna Sinta (2015), "that from the data analysis using Group Investigation type cooperative study is increasing, it is proven on the cognitive aspect of the comparison of pre-test and Critical post-test cycle 1 of 73.34% is 26.66% and in addition, the GI model also directs students to construct their own knowledge based on their activities and learning experiences. " Students choose topics; make inquiries to draw conclusions, and criticize the results of their inquiry so that students are trained to be diligent, thorough, honest, and open and curiosity to obtain accurate data.

Based on the description that has been presented, so that learning can increase student activity and learning competence, in accordance with the planned learning objectives, teachers need to use effective learning model. Therefore it is necessary to conduct a class action research with the title "Application of Cooperative Learning Model Type Group Investigation (GI) In Improving the Competence of Biology Learning High School Students"

II. RESEARCH METHODS

This research type is Classroom Action Research (Classroom Action Research). The subjects of the study were students of class XI IPA.5 which amounted to 30 people consisting of 8 men and 22 women. This research was conducted in SMA Negeri 14 Padang.

The classroom action research is using a model developed by Kemmis & Taggart in Arikunto (2010: 137). Each cycle consists of four stages: planning, acting, observing, and reflecting).

This action research procedure is carried out in three cycles. The first step begins with the pre-cycle activity, followed by the next stage of cycle 1, cycle 2 and cycle 3. Prasiklus activity is done with the aim to know the initial situation in learning. Learning process in pre cycles using lecture method, question and answer and discussion, and using affective observation sheet and student psychomotor.

The learning process in cycles I, II and III is carried out continuously following GI syntax, i.e. (1) Identifying Topics, (a) Teacher asks students to sit in designated group with assigned seating plan, (b) (c) Teacher distributes Student Worksheet (LKS) on topic, (d) Students have various topics in a common problem area as well as how investigations work whether investigation of literature study or field investigation will be done; (2) Planning Tasks, (a) The group chairperson with the members reads the workings attached to the LKS, the chairman divides the duties of each member responsible for the investigation of literature studies and field investigations, (b) will be investigated, how the process of investigation of literature studies carried out include what sources will be used, books / learning materials used and media to be used and how the field investigation process will be conducted either the institution to be visited whether the puskesmas / hospital / midwife or other agencies , questions to be used in the interview later, as well as members assigned to the investigation activities later: (3) Conducting Investigations; (a) Students collect, analyze and evaluate information, from each group member then make conclusions, (b) Each group member contributes to applying their parts into new knowledge, (c) Students exchange, discuss, clarify and synthesize all ideas in achieving solutions to group problems, (d) Teachers provide services to students as resource persons and facilitators as long as students carry out investigations; (4) Preparing the Final Assignment, (a) Group members determine the essential messages of their activities, (b) Group members determine what they will report and how they will make their presentations, (c) The group prepares the final assignment (d)

The teacher asks the group to form a small committee to coordinate the final report presentation plans, including moderators, operators, presenters, notaries and others; (5) Present the Final Project, with the process: (a) The teacher summons random group representatives to collect a numbered card. The group that gets the smallest serial number is assigned to present its report, (b) all group members are standing in front of the class, (c) Student representative represents his / her work in the form of PPT, (d) other groups follow, and the presenter groups are responses to the presentation view of the presenter group. (e) Other groups are given the opportunity to ask and be addressed by the presenter group, (f) The presentation group incorporates input from other groups, and refines the final report, (g) Notulis conveys the conclusions of the present presentation, (h) Ends the presentation of the teacher emphasizes the most correct answers and also emphasizes the substance of the material according to the learning objectives, the final stage of the GI syntax is (6) Evaluation, Evaluation is done at the end of the cycle with the evaluation question covering all topics that have been investigated and presented.

The sources and tools of research data collection are observation sheets, test sheets, field notes, and electronic documentation in the form of photos and video recordings.

1) Data of Cognitive Competence

Data cognitive competence of students is measured by seeing mastery in mastering the cognitive aspects. Students are categorized completely if they have reached the minimum threshold (KKM) = 80. Learners are declared thorough when obtaining learning outcomes ≥ 80.

The number of students who are thoroughly completed individually will affect mastery in a classical way. Classical completeness means students who have completed individually amounted to or equal to 85% of the total number of students.

2) Data of Affective Affairs

The affective learning result data is derived from students' affective assessment sheets. Observation attitude guidelines observed are responsibility, curiosity, communication and creativity skills, with the highest score 4 and lowest 1 Affective student are said to be complete when it reaches the good category.

3) Psychomotor Domains Competence Data

Psychomotor domain learning result data come from student psychomotor assessment sheet. The indicators

guidelines observed are the ability to prepare reports, display reports and activities in the presentation. Psychomotor aspect of students is said to be complete when it reaches good category.

III. RESULTS AND DISCUSSION

A. RESULTS

Based on data analysis from prasiklus, cycle I, cycle II and cycle III, the results achieved during the study can be seen in Table 4.

Table 4. Cognitive Competence of Students during the Study.

Cycle	Average value of evaluation results	Completed (%)
Prasiklus	67,67	43,33
Siklus I	79,17	63,33
Siklus II	83,17	83,33
Siklus III	83,33	86,67

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Comparison of the average percentage of students' cognitive competence during research increased from pre-cycle to cycle I: 20.0%, from cycle I to cycle II: 20.0% and from cycle II to cycle III: 13,34%. Meanwhile, the average percentage of unresolved students' cognitive competence during the research is decreasing.

This increase in cognitive competence occurs due to the implementation of GI type cooperative learning model which has provided more opportunities for students to develop their knowledge competence through teacher-led discovery and investigation activities and teamwork. Similarly, the material subjects of food digestion system in humans and the respiratory system in humans is a subject matter that is close to daily life and students can be directly involved in field investigation at a particular institution. Thus, when the cognitive competence evaluation students get a better value than the previous evaluation.

Analysis of student affective competence improvement from prasiklus, cycle I, cycle II and cycle III can be seen comparing the results achieved during the research in Table 5.

Table 5. Results of Student Affective Competencies during the Study, through the Observation Sheet

Observation Indicators	Average Percentage (%) Every Cycle			
	Prasiklus	Cycle I	Cycle II	Cycle III
Responsible	60,00	76,66	78,10	81,45
Curiosity	36,70	62,85	68,32	70,49
Ability to communicate	32,50	45,93	62,50	77,96
Creativity	39,20	55,83	71,60	72,50
Average	42,10	60,32	70,13	75,60
Category	Enough	Enough	Good	Good

Based on the data in Table 5, it can be seen that the improvement of students affective competence from cycle I to cycle III with sufficient to good criteria. The affective competence of students in each indicator increases although the increase is not significant but the improvement has already shown the process of change in the affective ability of the students to be better.

Analysis of students' psychomotor competence improvement from prasiklus, cycle I, cycle II and cycle III can be seen comparison of results achieved during the study, as in 6

Table 6. Results of Psychomotor Competence of Students during Research

No	Observation indicators	Average Percentage (%) Every Cycle			
		Prasiklus	Cycle I	Cycle II	Cycle III
1	Setting up a report	-	70,83	79,20	87,50
2	The ability to display reports	60,00	87,50	91,70	95,80
3	Activities in the presentation	39,20	71,67	79,20	80,81
	Average	49,6	76,67	83,37	87,80
	Category	Enough	Good	Good	Very good

Table 6 shows an increase in student psychomotor competence from the observation sheets in each cycle, with very good criteria. Comparison of percentage of students' psychomotor competence during the highest research is indicator of ability to display report. In prasiklus activities of students do not do preparatory activities report, but they only fill the LKS and then displays to the front of the class, Values for both activities were put together in the assessment

of the ability to display reports in this case LKS. The average increase in reporting in the first cycle of 8.37% in cycle II. The average increase in cycle II to cycle III is 8.30%. The average increase in the indicator of the ability to display the first cycle report of 4.2% of cycle II, and the average increase of 4.1% cycle II to cycle III. While the indicator activity in the presentation occurred an average increase of 7.53% cycle I to cycle II, and only 0.7% average increase from cycle II to cycle III.

IV. Discussion

Based on the results of the study, learning by applying GI type cooperative learning model can improve the learning process that involves the students as a whole, motivate students to move and later continue with the increase of student learning competence. Competence of student learning outcomes that have been observed consists of three components of cognitive learning outcomes, affective learning outcomes and psychomotor learning outcomes.

A. Cognitive Competence Of Students

Data analysis on the achievement of KKM obtained facts on cognitive learning outcomes after the first cycle implemented that is the number of students who completed increased by 19 students (63.33%) with an average value of 79.17. In cycle II the number of completed students as many as 25 students (83.33%) with average scores of 83.17. In the third cycle obtained a complete student score of 26 students (86.7%) with an average score of 83.33. Based on the completeness of a minimum of classical completeness of 85% then it can be concluded that there are changes in student learning outcomes in a better direction.

Thus, it can be said that the application of GI type cooperative learning can improve students' cognitive learning outcomes, because with this type of GI cooperative learning, students will try to find information from various supporting sources related to learning, which ultimately the students will try to evaluate and synthesize the truth of information which he got together.

In addition, GI type cooperative learning involves students actively from the planning stage to the final presentation of the task, thus this GI learning model can improve students' self-concept of thinking, help students learn by themselves, work together in groups and dare to express ideas or ideas. In addition, also cannot be separated from the role of teachers as facilitators and motivators in the learning process. This is in accordance with the opinion of Anita, et al (2013: 150) as a motivator teacher should give encouragement to all students to focus on the task and

confident. Teachers should give confidence to students that they individually or in groups must be able to complete the task successfully if done with a solid cooperation.
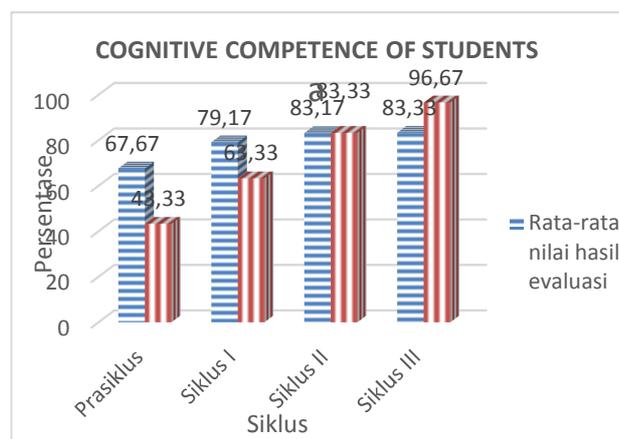

In line with the opinion of Suryudana, et al (2012) that the right model of learning will encourage student's pleasure towards learning, grow and increase motivation in doing the tasks and make it easier for students to understand the lesson so as to enable the students to achieve better learning outcomes. It is also emphasized by Dewi et al. (2012) that the presentation of the material will be more meaningful if the learning activity is investigated as a learning resource so that the students' learning result can be improved and the students are able to understand the material well.

With the Group Investigation (GI) model students will also be trained to solve problems through the steps that have been prepared with the investigative group so as to increase students' independence in learning which will ultimately improve learning outcomes. This situation is also in accordance with the results of Sumanik (2015: 186) research that the students' learning outcomes by applying GI learning model on formative evaluation results describes mastery of 100% classical learning completeness of 25 students.

B. Student Affective Competence

Increased cognitive learning outcomes gradually also relate to students' affective learning outcomes during the learning process. Student affective learning outcomes in cycle I to cycle III with affective indicators sense of responsibility, curiosity, communication skills and creativity of students, also increased. The highest percentage occurs in the indicator of responsibility in each cycle that is 76.66% in the cycle I, 78.10% in cycle II and 81.45% in cycle III . This is due to the indicator students are able to do the report completely and correctly. All the groups demonstrated that ability, even the investigations they carried out both through literature studies and field studies were complete. In the

indicator the students were able to prepare the reports on time, all groups submitted the report a week after they presented the final assignment, and on the student indicator was able to perform the assigned individual tasks, after observation through the observation sheet almost all students played the role they had set together.
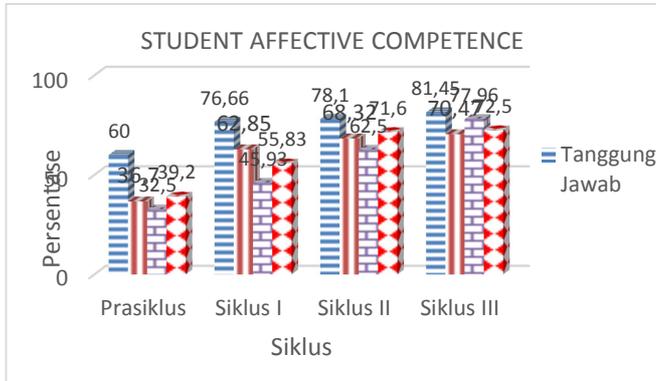

While affective curiosity shows the lowest percentage of the other affective, this is very likely to occur because with the student indicator asking, students give an opinion, not all students get a chance to ask and give an opinion. This is because when the group presents the final project, the group conveys the material for too long and takes a long time, so activities are limited by time. In addition there are some topics that are less likely to appeal to students so that students are less interested to ask and give opinions, whereas in the indicators of students bringing various sources of information, not always students bring books as a source of information, but they are enough with the final task and data connection to the handphonenya. But the curiosity aspect also increases every cycle that is cycle I (62,85%), cycle II (68,32%) and cycle III (70,47%). In communication ability aspect, with indicator of student able to communicate with easy to understand language, student able to communicate correctly and substance and student able to communicate report with confidence. Almost all indicators on this aspect are played by different students in each cycle; students also show more confidence when performing in front of the class. The increase in each cycle occurs with the cycle I, 45.95%, cycle II of 62.50% and the third cycle about 77.96%. In the aspect of creativity with indicators of students able to solve problems, students are able to develop ideas and students are able to display interesting material. Increased in every cycle that is 55,83% in cycle I, 71,60% in cycle II and 72,50% in cycle III. Students demonstrate good cooperation, both in discussion and in preparing for the final task from cycle to cycle; they are also able to develop their ideas in groups.

From the affective aspect of students in all aspects, the increase of the cycle is in the good category. This greatly demonstrates cooperative learning processes such as cooperation where students in groups carry out their personal responsibilities because of individual accountability, critical attitude and increased student communication skills. This is in line with Sumanik's (2015: 158) study that by applying the GI learning model provides opportunities for students to develop group activism skills, appreciate friends' opinions, express ideas, question and interact with other groups in the good category.

C. PSYCHOMOTOR COMPETENCE STUDENTS

The average result of observation of competency psychomotorsiswa cycle I, cycle II and cycle III also increased, including psychomotor aspect: preparing report, reporting ability, and ability of activity in presentation. In the aspect of preparing the report there was an increase from 70.83% in cycle I, 79.20% cycle II and 87.50 on cycle III with very good category. This increase is greatly influenced by the interaction between students in groups and teachers as facilitators are well established so that students are increasingly interested in investigating both the investigation of literature studies and field investigations. Furthermore students also plan activities by mutual agreement and be guided by the teacher about the steps they will do either while doing literature study through books or surfing the internet and visiting institutions / hospitals / puskesmas or to midwife. The students 'habits of work add to the students' insights in preparing reports that are the result of their invention during the investigation. The trust of fellow members to carry out the contributions of each student adds to his confidence in demonstrating his abilities. In the aspect of the ability to display reports, in every cycle also increased with very large categories.
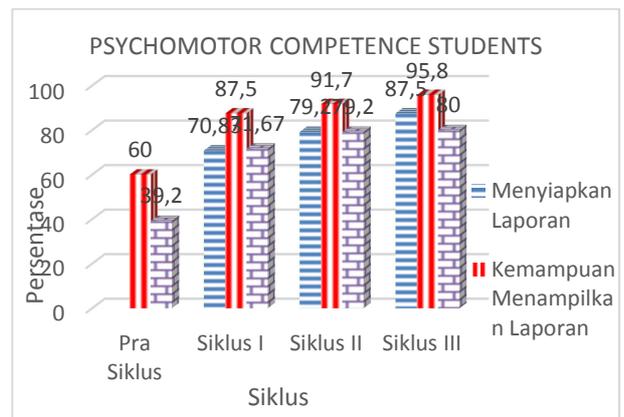
This is because students feel a new challenge to their skills. Usually students only see and observe the presentation

displayed by teachers with PPT media, but in the learning process using this GI model students are required to create, use and communicate material with Power Point Text (PPT). All students feel challenged, as evidenced by each student playing his role in group discussions with different roles in each cycle. In the first cycle, certain students play the role of the presentation, then in cycle II the student acts as a moderator and in the cycle III display the student acts as the operator. This has proved that almost all students want to be involved in the learning process. In the aspect of activity in the presentation, there is also a good category improvement. This increase occurs because students are increasingly interested to display their abilities by taking turns playing the role of the presentation, to convey the material results of his findings with good mastery. Students also attempt to provide answers to questions from other groups with correct answers and easy-to-understand language. This is in accordance with the opinion expressed Simpson in Sudijono (2008: 57) that the results of psychomotor learning appears in the form of ability to act individually.

Psychomotor learning results are actually a continuation of cognitive and affective learning outcomes. The results of cognitive and affective learning into psychomotor learning outcomes when students have shown certain behaviors or actions in accordance with the meaning tersadung in the realm of cognitive and affective. This is reinforced by Sumanik's (2015: 186) study that the psychomotor domain by applying GI learning model provides direct experience to students such as presentation, questioning, questioning, and giving feedback to answer questions from other groups so that psychomotor ability is in the qualification very good and kind.

V. CONCLUSION

From the results of this study, it can be concluded that the learning of biology by applying cooperative learning model type Group Investigation (GI) can improve the cognitive, affective, and psychomotor competence of students in class XI IPA 5 SMA Negeri 14 Padang. This can be seen from the improvement of cognitive competence of students from 63.33 in cycle 1, 83.33% in cycle II to 86.67% in cycle III. Increased student affective competence increased from 60,32% in cycle I, 70,13% in cycle II to 75,60% in cycle III, and increase of psychomotor competence increased from 76.67% in cycle I, 83,37% in cycle II become 87,80% in cycle III

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