The Effectiveness Of The Method of *GI* With *Electronic Workbench* Study To Improve Activities and Results Student

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Abstract: Effectiveness of Cooperative Learning Model Gi *(Group Investigation)* with EWB *(Electronic Work bench)* in increasing student activity and learning outcomes is research that aims to know the management of learning, student activities and student learning outcomes during the learning process takes place in class X TAV 1 in SMK Negeri 1 Lengkong. The results showed that the activity of students in each round encounter Improvement. Activities include learning students' *visual activities, writing activities, drawing activities, oral activities, bike activities and emotional* activities. Averages of student activity that arise during the learning process is *Visual Activities* in the 1st round by 59.7% in the 2nd round by 76.9% and amounted to 87.6% 3. *Writing Activities* in rounds 1 53.7% in the 2nd round by 72.7% in the 3rd round of 86.1%. *Drawing activities* in round 1 of 0% in the 2nd round by 84.7% and amounted to 95.1% 3. O*ral activities* in the 1st round of 36.25% in the 2nd round 80.6% and amounted to 86.2% 3. M*otor activities* in the 1st round by 53.5% in the second round of 80.6% in the third round of 85.9%. E*motional activities* in the 1st round by 66.7% in the 2nd round sebesar80,6 3% and amounted to 91.7%. Assessment of student learning outcomes in the study include tests of performance and portfolio assessment using Cooperative Learning GI *(Group Investigation)* With EWB *(Electronic Work bench)* proven effective in increasing student learning outcomes evidenced by the level of mastery learning students is increasing at each revolution is round 1sebesar 69.4% .In second round of 86.1% and by 94.4% to 3.

Keywords: Cooperative Learning Group type Investigations, EWB *(Electronic Work bench),* Student Activities, Student Learning Outcomes

Introduction

Education is one of the important things that cannot be separated from human life, as the development of science and technology. Education is one of the container activities that could be used to develop science and technology. In support the development of science and technology requires an understanding and mastery of the underlying science. Many people who play an important role in the success of education both formal and non-formal. Not only students and teachers but parents, school, education authorities and the cultures, the environment also determines the success of a quality education.

In the learning process, students always get a new information, the information is

continuously into the brain through the senses. Most of the information was stored in short-term memory *(Short Term Memory)* that is easily forgotten, in order to survive long or enter into long-term memory *(Long Term Memory)* it is necessary to process the information and technical repetition innovative delivery of content and attract students.

According to Bruce, Jeff, and Gordon, while studying the field of new material, the most important task is to learn the words and meaning - an important sense, the languages that may related with the field. When studying the chemistry we have to learn the names of the element or elements of its structure and properties. Further, when we studied Basic Electronics, then we need to learn elements that affect the structure of the formation of an electric field to avoid an accident in which every day.[1]

Good sources of academic and popular sources has been agreed that the ability to remember is fundamental to the effectiveness of the intellectual. In stark contrast to other activities that are *trivial* and passive, memorize, understand and keeping in an active activity that is quite challenging. Capacity in obtaining information in a more meaningful and make it easier to eventually get back into action is the result of of learning is good. Most importantly, individuals can improve this capacity to memorize, understand and understand the material so they can be recalled in the future. [2]

There are several kinds of learning strategies that can be applied so that the student is given the material they are learning. According to Nur (2000), which is a strategy of memorizing *(Strategic Rehearsal),* elaboration strategies *(Note Taking,* Analogy, PQ4R Methods), the organization's strategy (Making the frame *(outlining),*mapping *(Mapping)),* and metacognitive strategies. In addition there are several strategies that can be applied to increase the activity of students in learning that is cooperative. And many types of cooperative were: Jigsaw, STAD, GI and much more.[3]

Several kinds of learning strategies mentioned above, the most frequently performed elaboration strategies that students are *Taking Note* (record-keeping). That is because without notes and repeating the material that has been taught, most people are only capable of small bits of material that they read or hear on the previous day. Recording an

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[1]Bruce, S., Jeff, H., and Gordon, R. Digital Video in the Classroom: Communication Skills for future Resources Profesionals. (*Journal of Forestry,* 2005), *103,1. Pg 41-46.*

[2] Ibid.

[3]Mohamad Nu, *Strategi – strategi Belajar (*Surabaya : Unipress, 2000), 31.

effective and assisted by the appropriate methods and media can formed easily store information and recall it when needed.

Based on observations, some many students have a notebook and write down what the teacher taught. Most note that the students are not effective because they are trying to write down what the teacher says. They were not able to identify important ideas that need to be noted. This condition is the result of weak students remember the material they have learned in class and will ultimately affect student learning outcomes.

The average results of study on competence "Electronics Engineering" reached 60. This value includes still far from the minimum completeness criteria that has been set is 75. Based on interviews conducted in class X SMK 1 Lengkong TAV obtained information that a lot of students who are less understand the basic concepts of electrical AC or DC. In addition, students are also difficult to distinguish between AC and DC current and is hard to remember the lesson that has been done and not be afraid to practice directly to the rectifier circuit electronics. Therefore, there should be innovations in learning that is able to raise the students' understanding (mastery of the material) and the learning process so that it can be remembered for a long time or *Long Term* Memory.

Teachers are still many who use the lecture method, resulting in a monotonous and tedious learning. And rarely teachers to innovate to learning more fun so that students are motivated to study harder. Mastery of the competency of teachers in general are still limited, and there are some teachers who concurrently two or more subjects that do not focus on developing competence. Therefore, it results in student learning outcomes.

According to Buzan and Barry, there are four shortcomings of system standards make a note or notes that during this time the students, namely: 1) obscure keywords, as keywords are often listed in a different page and obscured by the words that are less important, 2) making it difficult to remember, because the record monotone (one color) visually boring, 3) a waste of time, because it requires rereading the notes unnecessary and should look for key words, 4) failed to stimulate the creativity of the brain.[4]

A student has the ability to think comparatively high, but on the other hand they have several disadvantages, among others: (a) the class atmosphere and motivation are impressed not live so that learning takes place in one direction. (b) The method used

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[4]Buzan, E., Tony, K., & Barry, H. *The Mind Map Book: Memahami Peta Pikiran. Drs.Alexander Sindoro,Trans. (British: BBC Wordnide Limited.* 2004.), 50-59.

monotone creations with instructional media that seem boring. (c) Students pay less attention to the teacher's explanation at the time for learning. (d) The concentration of poor students focus on learning as a rectifier diode. (e) Students are less proficient in making decisions that affect the learning unsatisfactory learning outcomes. (f) Lack of awareness of student learning as a rectifier diode subjects.

To improve and overcome the deficiencies in remembering and learning materials in the long term and effective activity of students in the learning process then can we use the GI cooperative learning model *(Group Investigation)* with EWB*(Electronic workbench)*to enhance the activity and student learning outcomes, This makes the students were able to see the whole picture briefly, simulate, practice materials, and creates a mental link that helps to understand and remember.

Discussion

According to Slavin (2005) study is the change in individual behavior caused by experience. Learning is a process of interaction of learners with educators and learning resources in a learning environment. Learning is the assistance provided educators to be a process of knowledge acquisition and knowledge, mastery of skills as well as the formation of attitudes and beliefs on learners. In other words, is a process to help students to learn well.[5]

Quality and effective learning depends on student motivation and creativity of teachers. Learners are motivated and supported by teachers who are able to facilitate these motivations will lead to the successful achievement of learning targets. Learning target can be measured through changes in attitudes and abilities of students through the learning process. Good instructional design supported by adequate facilities, appropriate and effective methods, coupled with the creativity of teachers will make learners more easily reach the target of learning in effective learning.

a. **Aspects of Learning**

aspects - aspects involved in learning that includes attitudes of teachers, instructional materials, instructional media, learning methods greatly affect the interest,

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[5]Robert E, Slavin. *Cooperative Learning : theory, reserach and practice*. London : Allymand Bacon. Terjemahan Narulita Ysron. (Bandung : Nusa Media. 2005). 57.

motivation and student learning outcomes. Learning is a process conducted by an individual to obtain a behavior change balls Retained Earnings, as a result of individual experiences in interaction with the environment. Aspects - aspects which form the basis of the understanding is:

1) Learning as a an attempt to achieve a change of behavior. This principle means that the learning process is the change in the behavior of the individual.

2) Learning outcomes characterized by changes in overall behavior.

3) The learning process happens because of something that encourages and there is something of interest to be achieved.

4) Learning is an experience.

According Soetarno, a learning process will take place with effective if the information learned can be remembered well. With an effective learning behavior with the appropriate and effective teaching and the learning process is expected to produce humans - humans who have the characteristics: (1) an independent person, (2) an effective learner, (3) a productive worker. For this to happen, there are four quality of learning in the learning that must be developed in learners, namely: (1) *learning to do,* (2) *learning to learn,* (3) *learning to do,* (4) *learning to live together.*[6]

Effective learning is learning that lesson planner can achieve the target that has been determined. Therefore, effective planning of learning which are set criteria in accordance with the target of achieving a degree of contextual and environmental measurement by teachers. So effective learning that can be viewed in terms of process and outcome. In terms of process, learning is considered effective if students are involved actively carry out the stages of the learning procedure. And that, on the effective if mastered by students as indicated by the value of student evaluations. Forms of learning changes can be observed through three aspects,

1. cognitive aspects of

   aspects that include mental activity (brain), namely: knowledge *(knowledge),* understanding *(comprehension),* Application *(application),* analysis (analysis).

2. Effective Aspects

   Aspects related to attitudes and values. Affective aspects include character

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[6]Soetarno, Joyoatmojo.*Pembelajaran Efektif: Pembelajaran yang membelajarkan.*(Surakarta: UNS Presss. 2011). 47.

behaviors such as feelings, interests, attitudes, emotions, and values. The characteristics of affective learning results will appear on the learner in a variety of behaviors, including: *Receiving or attending (receive or of the notice),* Responding (respond / liveliness) *Valuing*(Value), *Organization*(arrange or organize).

3. Psychomotor aspects.

    Psychomotor remains the domain associated with the skills (skills) ability to act after someone accepts a particular learning experience. Psychomotor learning outcomes is actually a continuation of the cognitive learning (know something) and affective learning outcomes (which had appeared in the form of tendencies to behave). Psychomotor is associated with physical activity, such as running, jumping, painting, dancing, and laboratory productive activities.

Cooperative learning is the formation of small groups that students can work together to maximize their learning process and learning from each other. Cooperative learning is an alternative to something that is believed to be the over-emphasis on competition that is commonly practiced in education in general. In cooperative learning, students have a dual role as an expert on the subject being taught at the same time the authorities in the classroom. In this case, teachers design and deliver the learning task group, manage time and resources, and to monitor the students' learning.

Cooperative learning means that learners cooperate in pairs or small groups to share their role in achieving the learning objectives. Learners are more concerned with learning through working groups than to learn on their own. According Fatt, design assessment for each model of student learning, for students visually using tests that require visual interpretation of the diagram, the students appropriate auditory test is an oral examination, while students kinesthetic better use of test-oriented tasks.[7]

Johnson and Johnson stated that cooperative learning will be successful if students work together to complete the learning objectives together. Every student achievement can learn if other group members also have reached their learning achievement. Three factors make popular cooperative learning, among others: (a) cooperative learning is based firmly in various theories. (b) More than 900 research studies that validate the effectiveness of cooperative learning than competition and individual effort. (c) Various cooperative model

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[7]Fatt. JPT Understanding the Learning Style of Students : Implication for Educators. *The International Journal of Sociology and Social Polic.* 2000. 31-45.

can be used by teachers, its use ranging from concrete and certainly arrive at the concept and flexible.[8]

According to Anderson student should have the ability to use resources from the textbook or from the library to learn more about the lesson topic and then share with other students in the group. So that the cooperative learning activity of students is absolutely necessary to obtain the learning outcomes they want.[9]

According to Ibrahim dkk, learning of cooperative model developed to achieve at least three important learning objective, which is the result of academic learning, acceptance of diversity, and the development of social skills. (a) The results of an academic study, namely: Some experts argue that this model excels in the development of understanding difficult concepts by students. The developers indicate that the structural model of cooperative awards have been able to improve research students on academic learning related learning outcomes. (b) Acceptance of diversity, namely: important effect in cooperative learning model is the widespread acceptance of the different people according to their race, culture, gender, social class, ability or lack of ability. Cooperative learning provide opportunities for students of different backgrounds and working conditions sati interdependent to each other on joint tasks. And through the use of cooperative reward structure, learn to appreciate one another. (c) The development of social skills, namely: The purpose of the third reel cooperative learning is to teach students the skills of cooperation and collaboration. This skill is very important to have in the community because most of the work being done in organizations depend on each other and the community culturally diverse. [10]

1. **Cooperative Learning type *Group Investigation* (GI)**

type group investigation is one type of selection in cooperative learning approach. More specifically, Slavin suggested that investigation as the investigation step by notes or record the fact - a fact subject to review in order to obtain answers to questions - questions about an event or character. [11]

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[8]Johnson, DW, and Johnson, RT Cooperative Larning Method : A-Meta Analysis. *Journal of Research in Education Fall 2002, Vol.12, No.1*

[9]Rodney P, Anderson. Team Disease presentation : A Cooperative Learning Activity for Large Classroom. *The American Biology Teacher.* 2001. Vol. 63,1. Pg 40 - 43

[10]Ibrahim, dkk. Pembelajaran Kooperatif. (Surabaya :unesa University Press. 2000). 7.

[11]Robert E, Slavin. *Cooperative Learning : theory, reserach and practice*. London : Allymand Bacon. Terjemahan Narulita Ysron. (Bandung : Nusa Media. 2005). 77.

Investigation or inquiry as a learning activity that gives students the possibility to develop students' understanding through various activities and the correct results in accordance traversed by students. Investigations relating to the activity observed in detail and assess systematically. So the investigation is the investigation carried out by someone or the person's next student to communicate the results of placement, can compare with the acquisition of another person, because in an investigation can be obtained by one or more results. Thus will be familiarized to further develop the curiosity to know. This will make students more active thinking and sparked the idea - or ideas and can draw conclusions based on the discussion in the classroom.

2. **Syntax Cooperative Learning type *Group Investigation* (GI)**

type group investigation is one type of selection in cooperative learning approach. More specifically, Slavin (2005) suggested the stages in implementing cooperative learning investigated following groups are syntax or steps cooperative learning model type group investigation are:

1) Stage grouping*(Grouping)*

That stage of identifying the topics to be investigated and to form groups of investigation by members each group of 4-5 members.

   a) Students observe the source, choose the topics, determine the categories of subject matter.

   b) Students join in learning groups based on their chosen topic or interesting to investigate.

   c) Teacher limit the number of members of each group between 4-5 students.

   d) Teachers help in gathering information and facilitating the setting.

2) Stage Planning*(Planning)*

Planning stage learning tasks. At this stage the students plan together about:

   a) What did they learn?

   b) How do they learn?

   c) Who and do what?

   d) For what purpose they studied the topic?

3) Stage Research(Investigation)

investigation phase is the implementation phase of the investigation the students. At this stage the student performs the following tasks:

     a) Students gather information to analyze the data and make inferences related to the issues under investigation.

     b) Each member of the group to give feedback on each activity group.

     c) Student exchange, discuss, clarify and unify ideas and opinions.

4) Phase Organizing(Organizing)

That final report preparation stage. At this stage activities of students as follows:

     a) Students analyze and evaluate the information that has been obtained in the third stage is the investigation stage.

     b) Each student in the group to plan how the information is summarized and presented in the form of interesting about the project they like the material to be presented to all students.

     c) Representative of the group formed a committee in charge of coordinating the plans presentation.

5) Stage Presentation(Presenting)

stages: stage presentation. Class learning activities at this stage are as follows:

     a) Presentation of the whole class group in the form of variations in the presentation.

     b) The group that was not involved as a presenter actively engaged as a listener.

     c) Listeners evaluate, clarify and ask questions or responses topics.

6) Stage Evaluation(Evaluating)

In the process of evaluation of teachers and students in learning are as follows:

     a) Students combine inputs and the topic of the work they do and about the experience.

     b) Teachers and students collaborated, evaluation of learning has been implemented.

     c) Assessment of learning outcomes should evaluate students' level of understanding.[12]

3. **Cooperative Learning Strengths and Weaknesses of type *Group Investigation* (GI)**

     Some of the advantages of cooperative learning type of GI *(Group Investigation)* is as

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[12] Ibid. 78

follows:

1) In the ongoing process of learning students can work freely.

2) Giving students the spirit of initiative, express their ideas - or ideas, creative and active.

3) Improve the confidence of students learning in collaboration between groups.

4) Students can learn to solve and deal with a problem.

5) Learning to communicate with either systematically both with teachers and students.

6) Learn to respect the opinions of others.

7) Improving students' active participation in making a decision.

In addition there is an excess in the learning process using a model of cooperative-type *Group Investigation* but also a weakness - the weakness of some of them:

1) At least the material conveyed on one meetings

2) provide an assessment of personal difficulty

3) Not all topics suitable for Cooperative learning model types *Group* investigation.

In the context of learning, innovation carried out by the researchers aim to develop student activity during the process so that the value of increased student learning outcomes. With increasing student activity makes thinking students are higher than ever.

Learning activities are activities that are both physical and mental. Piaget (in Sardiman, 2001) explains that one child was thinking all he did. Without action means the child is not thinking. Therefore, in order children to think for themselves then it should be given the opportunity to do their own. [13]

Classification of activity indicates that school activities are complex and varied. If a wide range of these activities can be created in schools of the school will be more dynamic, not boring and really become the center of maximum learning activity. In learning to note how the involvement of students in the organization of knowledge, whether they are active or passive. Characters students in general do not distinguish between men and women in terms of feminine or masculine character. Character boys and girls portrayed in the likeness of involvement in either of science activity or practice. Many types of activities that can be done by the students during the lesson.

In this regard, Paul B. Dierich (in Sardiman, 2004) classifies students in learning

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[13]Sardirman AM *Interaksi dan Motivasi Belajar Mengajar*. (Jakarta : PT Raja Grafindo Persada. 2001). 55.

activities are as follows.

1) *Learning activities* include: hearing the explanation, discussion and so on.

2) *Visual* activities, including: reading, watching images, demonstrations, experiments, observing the trial of others, and so on.

3) *Writing* activities, including: notes, write reports, do the problems, and so on.

4) *Drawing activities* include: drawing, graphics, diagrams and etc.

5) *Oral* activities, including: ask, advise, expression, and so on.

6) *Motor activities* include: conducting experiments, making construction or models, and more.

7) *Emotional activities* include: interest, bored, happy, brave, calm, and so on.[14]

In this study, the activity of which is used in this study include: (1) Listen / observe and try learning software that is aired by the teacher. (2) Students are active discussions about the material and practice in learning software that has been provided by the teacher. (3) The students work together in *groups* that have been created by teachers in learning *Group* Investigation.(4) Discuss / ask with fellow students in the *group* to answer questions in *an* investigationcarried out. (5) Students are actively involved in *the investigation.*(6) students present their report about main ideas and conclusions of the *investigation*carried out.

4.   Pebelajaran EWB(Electronic Work bench)

EWB *(Electronic Work bench)*is one type of *software* electronicused to simulate the workings of an electrical circuit.[15] The need for electrical circuit simulation is to test whether the electrical circuit that can be run properly and in accordance with the theoretical approach used in electronic books, without having to make it a real electric circuit. Keep in mind, simulations were done using EWB is a simulation that produces output that is ideal. The point output is not affected by factors such as interference (known as *noise* in electronics) as well as the disruption that often occurs in the electrical circuit that actual (real).

Benefits EWB is helping students to visualize concepts fully and clearly, then ensure effective education and ongoing usability.

Feature - Learning feature EWB *Electronics workbench*

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[14]Ibid. 76.

[15]   Irwan,A. Electronic Workbench. Tersedia. (http://artikel-komputer1.blogsport.in/2011/07/electronic-workbench-512-software.html.15 Oktober 2014).

Electronics workbench (EWB) is a software used for testing and experimental electronic circuits. *Electronics workbench* (EWB) consists of a Menu *Reference, Sources, Basic, Diodes, Transistors, Analog ICs, Mixed ICs, DigitalICs,* Indicators, and many more menu contained on EWB *software* interactive simulation-based *research* and licensed free *(free*software).

On the menu *sources* thesedescribing *sources* such as *Including battery,* AC *voltage source,* Vcc *source, and FM source.* menu *Basic* describe component *Electronics work bench* (EWB). Example: resistors, *capacitors, relays, switches,* and transformers.menu *DigitalICs* describes the logic gates such as AND, OR, NAND and others - others.

In designing electronic circuits sometimes - sometimes we have to try a series of circuits that we have made, it is certainly very menguntungkn and very important if we try use simulation software. *Electronics workbench* (EWB) is specially designed for assembling electronic circuits and schematics that can be tested in a virtual (simulated). Which provided a fairly complete menu of active and passive components, analog and digital components. In addition *Electronics workbench* (EWB) is also equipped with a fairly complete measuring instrument that is Ossiloscope, Digital Avo Meter, Digital Tester and multiple output devices.

Based on the results of research on the activities of the student in the application of Effectiveness of Cooperative Learning Model Gi*(Group Investigation)*With EWB *(Electronic Work bench),* obtained six categories of activity studied.

Visual activities are student activity in reading diode components, read Avometer and measuring *Ossiloscop e*tools, see the power point and video broadcast and listen / pay attention to teacher's explanation. Reading activities and reading component measuring instrument can be observed at the meeting four, five, seven and eight. While the video showing the activities look and listen / pay attention to the teacher's explanations could be observed at the meeting of the first, third and sixth. And the activity in each cycle is always increasing, evidenced by the results of the first round by 59.7% in the 2nd round by 76.9% and by 87.6% to 3 prove that it is a cooperative method GI *(Group Investigation)* with EWB *(Electronic Work bench)*give students experience a good visualization of the teaching on the subject of applying the semiconductor diode as a rectifier.

Writing activities, include noted explanations teacher, work on the problems, write *job sheet*/ reports. Take note of the teacher's explanation can be observed during the first

meeting in the cycle of the Effectiveness of Cooperative Learning Model GI *(Group Investigation)*With EWB *(Electronic Work bench)* during teacher presentation to the class, while the activity of writing reports and doing about post-test can be observed at any the end of the study persiklus meeting. And *writing activities* in the cycle or the 1st round 53.7% in the 2nd round by 72.7% in the 3rd round of 86.1%. This shows that the effectiveness of Cooperative Learning Model GI*(Group Investigation)*With EWB *(Electronic Work bench)* proved to be effective to increase the activity of *writing activities* in teaching on the subject of applying the semiconductor diode as a rectifier. This is reinforced by the theory suggested by Anderson (2001) that the team learning requires the active involvement of learners as well as to develop the ability to work dala team or group.

Drawing activities include drawing components and layout of the circuit. Activities draw components and layout of the circuit can be observed during the first phase of cycle 2 and 3 of the application of the Effectiveness of Cooperative Learning Model GI*(Group Investigation)*With EWB *(Electronic Work bench)* is planning practices make rectifier circuit half-wave, full wave and automatic headlights. At cycle 1 at 0% or yet to appear this activity, in the 2nd round by 84.7% and amounted to 95.1% 3.

Oral activities include the ability of students to ask, argue and presentations in class. A student activity that needs to be often trained to do the presentation to the class in order to create confidence. Results of round 1 at 36.25% in the 2nd round 80.6% and amounted to 86.2% 3. This suggests that the Cooperative Learning Model GI *(Group Investigation)*With EWB *(Electronic Work bench)* effectively improve students' ability to speak, argue and discuss in learning.

Motor activities is the activity of the students doing the measuring and Assembly of a series that has already determined the teacher. This activity can be observed at the meeting to four to eight with the application of the Cooperative Learning Model GI Type (Group Investigation) with EWB (Electronic Work bench). On cycle to one motor activities results of 53.5%, in round 2 of 80,6%, in round 3 of 85,9%.

Emotional activities is activities that illustrate the emotions of students seen with passion and enthusiasm in following the instruction. Cycle or round 1 of 66,7% in round 2 .6% and sebesar80 to 3 of 91,7%.

Based on the results of the research study results of students on the effectiveness of Cooperative Learning Model GI Type (Group Investigation) with EWB (Electronic Work

bench) student learning outcomes obtained in the 1sebesar round of 69.4%. in round 2 of 86.1% and 94.4% of 3rd cycle, this one hasn't been categorized has been completed, because the value of obtained is still low and have not exceeded the prescribed standards researcher, that is because the classical > 88%. This is because there are some students who have yet to understand the material that has been explained by the teacher. In the second cycle of classical thoroughly percentage of students increased and improved. This percentage can be said to be "Completely" because it is said to be complete if the percentage of classical thoroughly > 85% reach (in accordance with the indicators of success established by the researcher). On this second cycle students are able to understand the material being taught the teacher and follow the instruction in the learning set by the teacher. Though the result has exceeded a percentage of thoroughly of classical set by researchers but researchers still feel less and still much to be improved so the researchers decided to proceed to the third cycle. On the third cycle of thoroughly of classical learning results have already exceeded the standard expected by researchers. Percentage has increased from cycles two and can be categorized "Discharging", because it had already reached 85%, increase > results of student learning of the cycle one, two, and three with the application of the Cooperative Learning Model GI Type (Group Investigation) with EWB (Electronic Work bench) proved to be effective at increasing the activity of students and Student Learning Outcomes in electronics engineering competence on the subject of Applying Semiconductor Diode As Rectifier.

Conclusion

Based on the results of the study entitled the effectiveness of Cooperative Learning Model GI Type (Group Investigation) with EWB (Electronic Work bench) to enhance student learning Outcomes And Activities can be said to be effective, because the activity of the students in the learning process has increased, with Cooperative Learning model GI Type (Group Investigation) with EWB (Electronic Work bench) the activity of the students observed include visual activities, writing activities, drawing activities, oral activities , motor activities, emotional activities. From this it can be argued that the application of the Cooperative Learning Model GI Type (Group Investigation) with EWB (Electronic Work bench) can make students more active in following the process of learning.

Assessment of student learning outcomes in this study by using Cooperative Learning Type GI (Group Investigation) with EWB (Electronic Work bench) proved to be effective to improve the

results of student learning is evidenced by the level of thoroughly studying students who achieve 85%, increased from before the menggunkaan method.

Based on the conclusions above, the implications can be drawn from this study is a Cooperative Learning Type GI (Group Investigation) with EWB (Electronic Work bench) needs to be done for other subjects in order to increase the activities of students in learning and improve student learning outcomes.

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