

Jigsaw-Type Cooperative Learning in Improving Basic Electrical Learning Outcomes of Students of SMKN 2 Bitung

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Received: December 10th, 2023. Accepted: April 12th, 2024. Revised: April 12th, 2024

Available online: April 22nd, 2024. Published: April 22nd, 2024

Abstract— This research is classroom action research that aims to improve the learning process by applying the jigsaw-type cooperative learning model to improve Basic Electrical learning outcomes for Class X TITL students at SMK Negeri 2 Bitung, carried out in March 2022. Techniques and data collection tools in this research used descriptive statistical analysis of the data in student test results from documents and a list of scores. This study uses two stages of the cycle where the first cycle consists of IV meetings and the second cycle consists of IV meetings. Cycle I students achieve 55% incomplete and 45% complete learning outcomes. Cycle II students achieve 0% incomplete and 100% complete learning outcomes. The increase in learning outcomes was seen in the second cycle, namely the results of student learning achievement of 100% complete from the number of 20 students. Thus, learning using the jigsaw-type cooperative learning model can improve the learning outcomes of class X TITL students at SMK Negeri 2 Bitung.

Keywords: jigsaw cooperative model, learning outcomes

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I. INTRODUCTION

The teaching and learning process in class for students only sometimes takes place. Sometimes smooth, sometimes sluggish. Sometimes it is fun; sometimes, it is boring (Tomlinson, 2001). In this case, students can have a high enthusiasm for learning, but sometimes it can also be low. Such is the reality that teachers often face during the teaching and learning process in the classroom (Brophy, 1983). Gradually the curriculum underwent improvements aimed at improving the quality of education oriented towards the progress of the national education system (Sari, 2019). However, the improvement of the curriculum is different from the implementation of the curriculum in schools in the form of a learning process (Rosmana et al., 2022).

To improve student learning achievement, the teacher must be creative, which can make the learning process more enjoyable and liked by students (Siegle et al., 2013). In this case, a teacher must be creative in planning learning so that students become active, which, in the end, is a student's understanding of the material being studied (Rahman, 2021). The learning process will work well if it involves students choosing, arranging and participating in learning situations (Nicholls, 2017). By involving students in

learning, they will be responsible for carrying out the plans they have compiled (Wayan et al., 2020).

The cooperative learning model is essential in supporting interactions between students and students, between students and teachers (Kaendler et al., 2015; Yania et al., 2023). Conditions like this are expected so that the interaction goes well for smooth learning. There are several cooperative learning models, including the Jigsaw cooperative learning model (Akçay, 2016).

From observations made by researchers, it was found that the learning outcomes and abilities of students in the Basic Electricity subject at SMK Negeri 2 Bitung were still not as expected; there were still many students who were shown to have not completed these subjects, and the minimum completeness criteria (KKM) that the school had set, i.e. 75 for class XI. Students who get a score of 75 are included, while students who are shown to be less than 75 are included and still need to be completed (Mardapi et al., 2015).

Several factors also cause low student learning outcomes in Basic Electricity subjects; based on information obtained from Basic Electricity subject teachers that students are lazy in learning, then environmental factors at school also affect the



learning process, which includes teaching methods, curriculum, relationships students with student, teaching and school time (C. J. Mamahit, 2021). This situation results in students needing more knowledge and ability in these subjects. If this condition is left unchecked, the longer the student learning outcomes will be lower and will disrupt the quality of education (Lembong & Tatali, 2023; Mokaluk et al., 2021).

Learning outcomes are behaviour patterns, values, notions, attitudes, appreciation and skills (C. E. J. Mamahit et al., 2023; Roczen et al., 2013). The learning outcomes that are the object of class assessment are the new abilities students acquire after they follow the teaching and learning process on specific subjects (Daly et al., 2014). In the national education system, the formulation of educational objectives refers to the classification of learning outcomes from Bloom, which are cognitive, affective and psychomotor aspects (Adams, 2015). Learning outcomes are abilities that students already have after experiencing the learning process (Brinson, 2015; Mohammad Saleh et al., 2023). In the teaching and learning process, the teacher performs his duties by conveying material to students and is also required to assist success in conveying subject matter by evaluating teaching and learning outcomes (Koloway & Kattie, 2023; Stronge, 2018).

Teaching methods are a means of teacher interaction with students in teaching and learning activities (Fernando & Marikar, 2017). The chosen teaching method must follow the purpose, type and nature of the subject matter (Dixon et al., 2014). The teacher's ability to understand and implement these methods dramatically influences the results (Gess-Newsome et al., 2019). Mistakes using a method can lead to boredom, and lack of understanding, resulting in a neglectful attitude towards learning (Montero-Marín et al., 2013). Based on this, the coaching of the learning process must be high quality and effective so that all students can master the material the teacher provides. This situation can be achieved by applying the Jigsaw Cooperative Type model (Soedimardjono & P., 2021).

Cooperative Learning is a learning model with a small group grouping system, namely between four to six people with different backgrounds of academic ability, gender, race or ethnicity (Silalahi & Hutaaruk, 2020). This strategy is now a concern and is recommended by educational experts for use. Cooperative Learning refers to learning methods in which students work together in small groups and help each other in learning (Slavin, 2013). Based on some of the definitions above, cooperative learning is a learning model that divides students into several groups to work together and discuss learning.

The Jigsaw-Type Cooperative Learning Model divides students into small groups with 4-6 members who are heterogeneous and have positive interdependence and are independently responsible for the completeness of the teaching material that must be learned and conveyed to members of the original group (Juhri, 2021). The Jigsaw-Type Cooperative Learning Model is a strategy that can encourage active students and achieve maximum achievement.

Jigsaw is one of the most flexible cooperative methods. From the various definitions above, the Jigsaw Cooperative Learning Model is a cooperative learning model that places students in groups of 4-6 students, and each student is responsible for mastering one sub-chapter to be taught to other members (Berger & Hänze, 2015). The Jigsaw-Type Cooperative Learning Model can be used to build research skills in working with data or material that students must collect and then collect data that is analyzed and transformed into a common understanding.

Based on the descriptions above and the problems that arise in the learning process, the researcher will conduct a Jigsaw-type activity. Elliot Aronson developed this Jigsaw-type cooperative (Pratiwi et al., 2013). This type of Jigsaw cooperative is designed to increase students' sense of responsibility towards their learning as well as the learning of others. Students not only learn the material provided, but they are also ready to provide and teach the material to their group members. Thus, students are interdependent with one another and must work cooperatively to learn the assigned material. This learning model requires teachers to form small groups to make it easier for students to learn the topic of discussion where students help each other so that learning outcomes, especially in subjects, will increase. From the learning theories studied about the learning model, the researcher chose the Jigsaw cooperative learning model. Because this learning model prioritizes students by learning together/in groups and helping each other so that students can learn from friends who understand first, thus, this model requires students to be active and creative in achieving learning outcomes.

Based on the background above, the authors are interested in conducting research titled "Jigsaw-Type Cooperative Learning in Improving Basic Electrical Learning Outcomes of Students of SMKN 2 Bitung". This study aims to improve the learning process by applying a jigsaw cooperative learning model to improve learning outcomes for Basic Electricity students of class X TITL SMK Negeri 2 Bitung.

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II. METHOD

This research was conducted at SMK Negeri 2 Bitung on Basic Electrical Class X TITL. The research was carried out for two months. The type of research used is classroom action research (CAR). This research was conducted collaboratively and participatory. This means that in conducting this research, researchers worked closely with teachers who teach in class X SMK N 2 Bitung. Classroom action research occurs in at least two cycles, including four steps: planning, implementing, observing, and reflecting (Meesuk et al., 2020; Mettetal, 2012). The procedures carried out in this study are as follows:

A. Action planning (Meesuk et al., 2020; Mettetal, 2012)

- 1) Make a Learning Implementation Plan (RPP in Indonesian)
- 2) Make a Learning Implementation Plan (RPP) for the Basic Subject of Electricity in the Basic Competencies of Adjustment Journals with the Jigsaw Type Cooperative Learning Model, which will be used by the teacher as a guide for the implementation of learning so that it becomes more directed and better.
- 3) Arrange subject matter in Electronic Component Adjustment Journal.
- 4) Preparation for making original groups and expert groups carried out with the teacher.
- 5) Preparation for the division of task groups for each individual in the home group so that it is easier to condition students when carrying out activities.

B. Action Implementation (Meesuk et al., 2020; Mettetal, 2012)

At this stage, the teacher carries out learning activities as previously planned, namely learning activities using the Jigsaw Cooperative Learning Model. Implementing the action is flexible and open to changes during the learning process. Activities carried out include:

- 1) Preliminary Activities
 - a) The teacher opens the lesson by greeting and praying.
 - b) The teacher presents students, conditions the class, informs them that learning activities will use the Jigsaw Cooperative Learning Model, and explains the learning steps.

- c) The teacher informs the students of the topics, objectives, and benefits of the competencies to be learned and how the assessment will relate to the competencies being studied.

2) Core activities

- a) The teacher divides students into home groups and expert groups
- b) Students gather with the original group, and the group leader divides the members into the groups the teacher has determined.
- c) Students gather in expert groups with the same material.
- d) Students discuss in expert groups.
- e) Students return to discuss in their home groups. Each student is tasked with explaining the material studied in the expert group.
- f) The teacher evaluates by giving questions to the whole group.
- g) Students answer or respond to questions posed by the teacher.

3) Closing Activities

- a) The teacher and students together conclude the material being studied.
- b) The teacher gives a reward to the best group.
- c) The teacher conveys the subject matter for the next meeting.
- d) The teacher closes the lesson by praying and greeting.

C. Observation (Meesuk et al., 2020; Mettetal, 2012)

The researcher carried out observations with two fellow observers, where the researcher became the primary observer. This observation was made using the Jigsaw Type Cooperative Learning Model during the learning process. This took place using observation sheets and field notes.

D. Reflection (Meesuk et al., 2020; Mettetal, 2012)

At this stage, the researcher analyzed the data obtained during the observation. At this reflection stage, the researcher and the accounting teacher discussed the implementation results and observed the learning process using the Jigsaw Cooperative Learning Model that had been carried out. The results of this reflection become material for researchers to plan the following learning process.

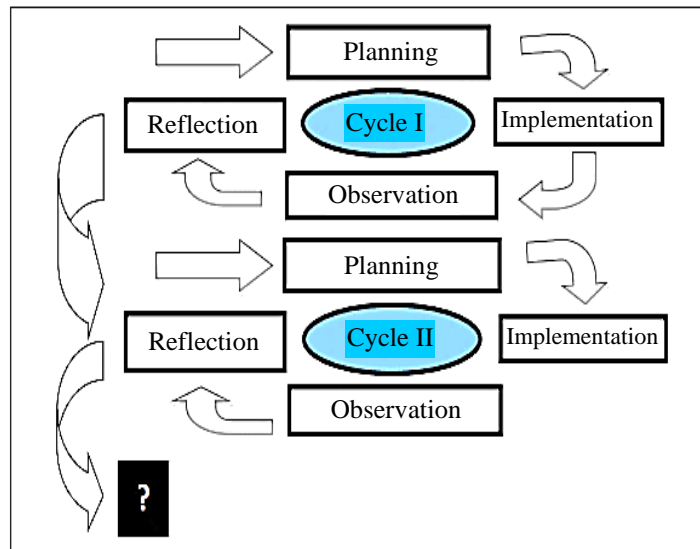


Figure 1. Classroom Action Research cycle design

The data analysis technique used in this study is a quantitative descriptive data analysis technique with percentages. The data obtained from the observation sheet in the form of a rating scale was then analyzed using quantitative data analysis in the form of a percentage to determine the percentage score of Basic Electrical Learning Outcomes. Based on the analysis, it will be known to what extent the Basic Electrical Learning Outcomes have increased.

The following steps are used to analyze Basic Electrical Learning Outcomes:

1. Calculating the Score of Basic Electrical Learning Outcomes
 - a. Determine the scoring criteria for each descriptor on each indicator of Basic Electrical Learning Outcomes.
 - b. Add up the scores for each indicator of Basic Electrical Learning Outcomes.
 - c. Percentage of the score of Basic Electrical Learning Outcomes on each indicator with the formula:

$$\frac{\text{Total Score of Each Indicator}}{\text{Maximum Score for Each Indicator}} \times 100\% \quad (1)$$

Quantitative analysis techniques to calculate the increase in Learning Outcomes in the Class Basic Electrical Subject use the following formula:

$$\text{Formula Means (Me)}: \frac{\sum Fx}{N} \quad (2)$$

Description:

Me : Mean

$\sum Fx$: Sum of all values

N : The number of students

2. Presenting Data on Basic Electrical Learning Outcomes

The processed Basic Electricity Learning Outcomes data is presented in simple tables and graphs to make it easier to understand.

3. Making Conclusions

Making conclusions is done to answer the formulation of the problem. After the data is processed and presented in tables and graphs, conclusions are made by describing the data in the form of statements.

III. RESULT AND DISCUSSIONS

The results of this study were obtained through two cycles. The results of learning Basic Electricity have increased significantly, and of course, it is an excellent contribution to the learning process using the Jigsaw learning method.

A. Implementation (Cycle I)

The implementation was not according to plan at the beginning of the first cycle because most students needed to become more familiar with the Jigsaw learning method's learning conditions. Thus, these students have not been able to complete the task within the allotted time; this is because students need to be more serious about the learning process and lack student activity in the learning process. So, the learning outcomes that still need to be improved in student completeness only reach 69.28%. This happens because there still needs to be more application of the Jigsaw learning method. After all, only conventional learning is often applied, so most students are passive. In contrast, the Jigsaw learning

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method is a very effective model because it helps students be more independent and active in understanding the material.

This type of Jigsaw cooperative is designed to increase students' sense of responsibility towards their learning as well as the learning of others. Students not only learn the material provided, but they are also ready to provide and teach the material to their group members. Thus, students are interdependent with one another and must work cooperatively to learn the assigned material.

B. Implementation (Cycle II)

In the second cycle, the learning atmosphere is more towards the Jigsaw learning model; the teacher guides students toward thinking the same way in the same channel of thought. So that students focus on things that are considered necessary by the teacher and those critical things can be observed. In addition, it is easier for students to focus on the teaching and learning process and not on anything else. Furthermore, directly observing students may compare theory and reality to create a realistic and enjoyable learning environment in which these students can finish projects on time. In order to obtain satisfactory learning outcomes, students' completeness has reached 100% graduation, which means that $\geq 75\%$ of students have achieved KKM scores. This happens because researchers provide understanding to students and focus on things considered necessary by the teacher and essential things that can be adequately observed.

IV. CONCLUSION

Based on the research results, applying the simulation method through several stages can improve student learning outcomes in class XI SMK Negeri 2 Bitung. With the application of the simulation method, students who play an active role and active observers can develop imagination and form group cohesiveness; students are not ashamed and hesitant to develop imagination and are not ashamed to develop their potential. Increased learning outcomes can be proven by improving the quality of student learning outcomes from the first cycle test by 69.28%, which increased to 85.5% in the second cycle.

Teachers should pay attention to factors that affect interest in learning and the quality of student learning outcomes. Teachers should be able to create and present self-motivated lessons for students so that students are stimulated and have seriousness in accepting the lessons given by the teacher. Teachers are also expected to be able to choose practical and

efficient ways to motivate students to apply them when teaching according to the personal characteristics of vocational students. Thus, the desire to learn among students will grow and be well maintained to support the optimal quality of learning outcomes.

It is hoped that students will increase their interest in learning and be diligent in going to the library to read; when learning in class, students should be more active in class discussions, be more courageous in defending opinions if their opinions are correct, and dare to express or ask the wrong teacher things. Cause students to experience learning difficulties. When the break ends, students should immediately go to class and start studying independently.

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