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IMPROVING STUDENT LEARNING AND ACTIVITIES PARTICIPATION WITH COOPERATIVE JIGSAW LEARNING METHODS ON LEARNING PRODUCTION PROCESS AND MACHINERY CONSTRUCTION IN VOCATIONAL SCHOOL

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ABSTRACT

This research is a classroom action research that aims to provide solutions on how to solve learning difficulties faced by class XI students of Industrial Mechanical Engineering, SMK Negeri 4 Cilegon, which are related to the subject of machine production and construction processes. At this time the learning method uses the Student Teams-Achievement Divisions (STAD) model which is packaged modularly, in the hope that students can develop their own potential independently so that they can complete the learning material thoroughly (mastery learning) but student achievement still does not show the expected results. The implementation of this class action research was conducted in two cycles using JIGSAW cooperative learning methods that can improve student achievement and student activity participation. This result can be seen from the first formative test, where the class average value is 4.05, and through observing the percentage of student activity participation of 50.92%. After classroom action research (CAR) was held the student learning outcomes showed a significant increase. In the first cycle, the formative test results obtained a mean grade value of 5.54 and student activity participation of 52.38% (very good). In the second cycle, the formative test results obtained a mean grade value of 6.20 and student activity participation of 66.67% (very good). As for the learning completeness criteria, the first cycle was obtained 52.38%, the second cycle was 66.67%.

Keywords: *JIGSAW cooperative learning methods, learning achievement, and student activity participation.*

INTRODUCTION

At the beginning of the subject learning machine production and construction process in class XI Industrial Mechanical Engineering with basic competencies, that is : 3.1. Implement manufacturing workshop management; 3.2. Implement the process of cutting metals and non-metals; 3.3. Apply turning work; dan 3.4. Implement milling work. The learning outcomes of class XI Industrial Mechanical Engineering of SMK Negeri 4 Cilegon with the group learning method Student Teams - Achievement Divisions (STAD) model have not shown the expected results. Data from the first formative test results from 21 students showed that the completion was 8 students or 38.09% and the grade average value was 5.65 with complete limits if each student had mastered the learning material of each competency base 70% or scored minimum of 4.50.

To improve student learning outcomes there needs to be a change in learning methods used by students in the learning process. Student activity in the learning process is very influential in student learning outcomes themselves. Therefore, during the learning process active involvement of students in completing tasks and group discussions will support the achievement of learning outcomes as expected.

Based on the description, encourage researchers to further improve student learning outcomes by applying Jigsaw cooperative learning methods, and in the learning process motivates students to play an active and creative role in completing tasks and discussing groups. By applying the JIGSAW cooperative learning method in the learning process it is expected that the difficulties faced by students in completing tasks or test questions are eliminated so that student learning outcomes can be optimal.

Based on the background description of the problem, a problem can be formulated as follows: How to improve learning outcomes of students of class XI Industrial Mechanical Engineering SMK Negeri 4 Cilegon in completing the subject of identifying lathes using Cooperative JIGSAW learning methods.

Learning Theory

Learning is a process, where people change their behavior as experience (Gage:11). Learning is a process of changing oneself that is displayed in the form of increasing quantity and quality of behavior such as increasing knowledge, skills, thinking power, habits, etc. (2004:10). Based on the two definitions above, then learning is an activity that takes place to produce changes in a person's behavior in behaving, thinking and acting.

Learning achievement

Achievement is proof of the success of the business achieved, achievement is also called the results of individual student learning in the form of numbers because it

has succeeded in completing learning material in accordance with the Minimum Completion Criteria (KKM) that has been set.

Learning achievement is defined as the level of success achieved after participating in learning activities that are marked by a scale of values or letters or symbols (Dimyati and Mudjiono in Nurtanto 2016:204). Learning achievement covers a variety of domains, namely knowledge, skills, and attitudes as tangible manifestations that show the level or level of mastery of the learning that the teacher has given.

The role of learning achievement revealed by Zaenal Arifin in Nurtanto (2016:204) that is: (1) indicators of the quality and quality of knowledge that has been mastered, (2) symbol of curiosity's satisfaction, (3) information material and educational innovation, (4) internal and external indicators of an educational institution, (5) absorption indicator (intelligence).

The existence of the role of achievement makes grouping students based on "high", "moderate" and "low" levels. This makes new jobs for teachers and students especially at the "low" category in order to increase the grade of achievement. So that many ways are needed to support activities or student involvement in learning.

Active Participation

Learning is a manifestation of student activity even though the degree is not the same between students with one another in a learning process in class. The meaning of the word "active" can be in forms such as: listening, writing, making, discussing. But there are many activities that are not visible to the eye or cannot be observed, for example: using the repertoire of knowledge to solve problems, choosing theorems to prove propositions, conducting assimilation and or accommodation to obtain new knowledge. All of that according to Mc Keachie (1954) was repatriated to intellectual-emotional involvement. So, active participation of students is a way of learning students by involving the intellectual activity of intellectuality even though in many cases physical activity is needed.

JIGSAW Cooperative Learning Method

Cooperative Learning Jigsaw is a learning model that prioritizes cooperation, namely work between students in groups to achieve learning goals (Johnson & Johnson, 1987). The students are divided into small groups and directed to study the subject matter that has been determined.

The purpose of Jigsaw cooperative learning is to generate effective interactions among group members through discussion. In this case most learning activities are centered on students/ students, namely learning subject matter, discussing to solve problems (assignments). With effective interaction it is possible for all group members to master the material at a level

that is relatively parallel. According to Ismail SM, The purpose of the jigsaw learning method is to train students to be accustomed to discussing and respond individually to help understand learning material to classmates.

The Jigsaw learning method adheres to Jean Piaget's cognitive theory and constructivism theory. The theory of constructivism is defined as generative learning, namely, action creates meaning from what is learned. Constructivism is actually not a new idea, what has been traversed in our lives so far has been a set and coaching experience that causes a person to have the knowledge and be dynamic.

The characteristics of Jigsaw cooperative learning according to Johnson are: (1) positive interdependence; (2) can be accounted for individually; (3) heterogeneous; (4) share leadership; (5) share responsibility; (6) emphasized on duty and togetherness; (7) have skills in social relations; (8) the teacher observes; dan (9) effective depending on the group.

According to Elliot Aronson in Trianto (2010:73) the steps of Jigsaw learning are as follows: (a) Classes are divided into several teams or heterogeneous groups whose numbers are equal to the number of subjects at that time and the number of members of each group equal or more with the subject should not be less; (b) The material of the subject matter is presented to students in the form of text, and each member student is responsible for learning all the learning material or topics that the group is discussing; (c) Members of different groups, have the responsibility to study an academic section or the same learning material, and then gather to help each other study the parts of the material; (d) Next the students are in expert groups (experts) back to the original group (home team) to teach other group members about the subject matter that has been learned in the expert group (experts); (e) After meeting and discussion "home team", the members were evaluated on the subject matter that had been learned.

The benefits of the Jigsaw method that the author can conclude from the description of the Jigsaw learning model are: (1) Improve the ability of each individual; (2) Saling menerima kekurangan terhadap pebedaan individu lebih besar; (3) Interpersonal conflict decreases; (4) Apathy is reduced; (5) Understanding of learning material more deeply; (6) Greater motivation; (7) Higher learning outcomes; (8) Longer retention or storage; (9) Increases kindness, sensitivity and tolerance; (10) *Cooperative Learning can prevent aggressiveness in competition and alienation in individual systems without sacrificing cognitive aspects*.

RESEARCH METHODS

The type of research used is Classroom Action Research (CAR) with the aim of improving the quality of learning practices (Kunandar in Nurtanto, 2016:208). Repairs are carried out continuously during learning.

Class action research consists of several patterns, namely: (1). Planning; (2) Implementation of actions; (3) Observation; and (4) Reflection.

The research design was carried out in several cycles. Each cycle is implemented in the same basic competencies in different time frames or each meeting according to planning. Cycle I and Cycle II take about 4 Basic Competencies, namely: 3.1. Implement manufacturing workshop management; 3.2. Implement the process of cutting metals and non-metals; 3.3. Implement turning work (turning); and 3.4. Implement milling work. The cycle is terminated if there is an increase in student achievement and active participation. This means that the achievement of the learning process towards the variables of student achievement and active participation.

The study was carried out during the even semester of the school year 2016/2016 in class XI TMI SMK Negeri 4 Cilegon Jalan Yos Sudarso Link. Only II Lebak Gede, Pulomerak, Cilegon Banten. In this study using primary data sources and secondary data. Primary data is taken from student learning outcomes in the form of test scores (test techniques). Secondary data is obtained from observation data during the action (observation technique). Data collection tools include test items and observation sheets. Test items are used as a tool to collect data in measuring student learning outcomes after the action. While the observation sheet in this study contains records of events during the learning process. The first data analysis is an analysis of primary data, namely learning outcomes which are the results of formative tests. Student learning outcomes were analyzed by descriptive comparative, namely comparing the value of the initial data formative tests between cycles with pre-determined performance indicators. While the second data analysis is secondary data analysis. Data from the results of action observations were analyzed in a qualitative descriptive way and carried out a reflection of the results of several events in the learning process. In this study, the indicator of success (performance indicators) is stated if there is an increase in learning outcomes and active student participation, this can be seen from the test scores and observations obtained by students when compared with the test scores and the results of previous observations.

RESULTS AND DISCUSSION

Results

The results of the study are the application of Jigsaw cooperative learning methods based on each cycle or class action as follows:

At the stage of action I, the steps carried out have been described in order, namely: (a) Planning; (b) Implementation of Actions; (c) Observations, and (d) Reflections, McTaggart (1991) and Kemmis & McTaggart (1998) in Nurtanto (2016: 210).

(a) Planning is carried out based on learning planning. Learning planning is preparation for teaching that contains things that need and must be done before implementing learning activities to facilitate the implementation of the learning process activities. These preparations include a selection of learning materials, learning methods, learning media, and evaluation instruments, as well as observation format instruments to be used. These elements must refer to the existing syllabus and cover various aspects as follows: 1). The description of the contents contained in a special guidebook for the preparation of syllabus; 2). Adjustment of approaches and methods, use of facilities in the learning process, and time; 3). Management of learning; 4). Implementation of the learning process; and 5). how to determine the achievement of goals and assessment of the learning process.

(b) Implementation of actions and observations, the learning process is carried out in accordance with the Learning Implementation Plan prepared ones to include: 1). Give an explanation of the mechanism of group discussion; 2). Dividing students into 4 groups, where each group consists of 5-6 students, each of whom already knows the task that can be used to evaluate the results of group work; 3). Conduct guidance and monitoring; 4). Each end of the cycle evaluates where students work on formative test questions. Observation is done by using observation instruments that have been provided during the implementation of the activities carried out. Observations include the involvement or activity of students in learning. The implementation begins with the teacher's explanation of learning processes and procedures and motivates the entire class. The tasks of each group are as follows: Group A discusses KD. 3.1 Implement manufacturing workshop management; Group B discusses KD. 3.2 Applying the process of cutting metal and non-metals; Group C discusses KD. 3.3. Implement turning work; Group D discusses KD. 3.4. Implement milling work.

(c) Reflection is carried out to determine the effectiveness of the steps that have been carried out previously in the form of activities, learning outcomes and active participation of students and the role of the teacher which is still limited to the learning process in the first cycle. , it was found that: students feel happy with the learning activities carried out because it is not boring but fun and students feel they better understand the learning material better. However, students still feel burdened by the individual tasks given. As for teachers, the learning activities carried out are enough to make the role of the teacher as the facilitator work well because the classroom atmosphere becomes more active, conducive and effective. However, this learning activity feels very much in need of considerable teacher

creativity and more time, especially in conducting results assessment activities.

Cycle II is the decision stage of the stages of each cycle carried out. Continued or dismissed if it is considered sufficient is a recommendation from cycle II. Continued if it has not been fulfilled and dismissed if it is considered sufficient and has fulfilled. The results of cycle II are in the following stages:

(a) Planning, learning activities in the second cycle are carried out referring to learning planning that has been arranged before learning activities begin. However, there are various changes to the learning activities that are carried out remembering and considering various inputs from the implementation of the first cycle. The changes are mainly carried out on improving the method and atmosphere of learning, such as more interesting discussion activities, increasing the number of exercises especially related to school final exams and without reducing the achievement of competency standards that students must achieve and giving assignments more proportionally.

(b) The implementation of the action, the second cycle of learning activities carried out by researchers in two meetings with the end of the second meeting is the second day's execution. The activity in the second cycle was also carried out by researchers by utilizing several places besides classrooms, such as libraries, workshops, and the internet.

(c) Reflection, as in cycle I, reflection activities in cycle II are carried out by teachers and students as soon as the learning activities are carried out. Based on the results of reflection on learning activities during the second cycle, it was found that: students feel very happy and comfortable with the learning activities carried out because it is not boring and students feel they better understand the learning material better. In addition, students do not feel burdened with the various tasks given because they are accustomed to and made more proportional. The students also expect that the learning atmosphere and learning methods of group discussion are applied again for the next learning. As for the teacher, the learning activities carried out felt quite effective and efficient both in terms of time, and the achievement of competency standards. In addition, the role of the teacher as a facilitator can be done better and more real, because the entire learning process is really student-centered rather than the teacher. The need for better teacher creativity in managing classes actually makes teachers more motivated to improve the learning process carried out especially given the excellent student response. The assessment of student learning outcomes covering various cognitive aspects, affective aspects, and psychomotor aspects as well as observations of active participation, also feels increasingly humane and comprehensive in expressing the competencies that have been achieved by the students.

The acquisition of the first cycle and second cycle based on the acquisition of learning outcomes and active participation of students through test items and observations are presented as follows:

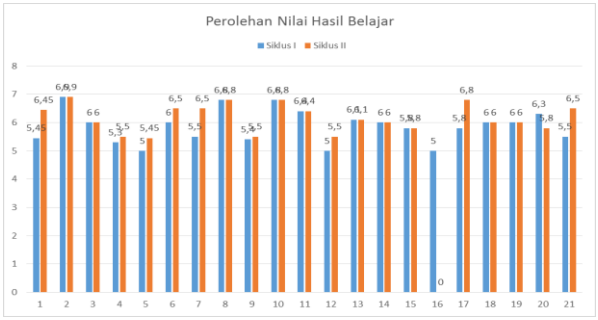

Figure 1. Obtaining Learning Outcomes (Cognitive Aspects)

Discussion

In the first cycle, student learning outcomes on the cognitive aspects obtained an average value of 5.54 with the completion criteria of 11 students (52.38%) and incomplete 10 students (47.61%); In the affective aspect with criteria (A) there were 12 students (57.14%) and criteria (B) there were 9 students (42.90%); In the psychomotor aspect with criteria (A) there were 11 students (52.38%) and criteria (B) 10 students (47.61%); and the aspect of active participation with very good criteria there are 11 students (52.38%) and Good criteria there are 10 students (47.61%). Based on all findings in the first cycle, there are several entries that need to be considered and considered to be better in learning activities in cycle II. The various entries included: more discussion activities, more practice questions such as the final semester exam and, not giving too many assignments that will aggravate students.

In the second cycle, student learning outcomes in the cognitive aspects obtained an average value of 6.147, with criteria completed 14 students (66.66%) and not completed 7 students (33.34%); In the affective aspect with criteria (A) there are 14 students (66.66%) and criteria (B) there are 7 (33.34%); In the psychomotor aspect with criteria (A) there were 13 students (61.90%) and criteria (B) there were 8 students (38.09%); and aspects of active participation (life skills) with the criteria of very good there are 14 students (66.66%), and good criteria there are 7 students (33.33%).

The increase in the acquisition of learning outcomes and active participation of students in the second cycle above indicates that the use of Jigsaw cooperative learning methods in learning the process of production and construction of machines is very effective and learning activities are really student-centered.

CONCLUSION

The conclusions of this study include:

(1) The implementation of learning by using the Jigsaw Cooperative Method is able to improve student achievement and active participation and the role of the teacher as a facilitator is carried out very well.

(2) The use of the Cooperative Jigsaw Method in the learning process feels more fun, conducive, and not monotonous. The existence of various tasks and aspects of overall assessment makes students and teachers able to increase their creativity and learning achievement.

(3) Cooperative Learning Methods Jigsaw gives freedom to students to explore learning material and elaborate on the information that has been collected. Students confirm through discussion with fellow friends or with the teacher to be able to conclude the learning material and finally reflect. This makes it easier for students to understand more about the concepts of production and construction processes and are more skilled at solving real problems that exist around students.

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