EFFORTS TO IMPROVE STUDENT LEARNING OUTCOMES BY APPLYING THE STAD-TYPE COOPERATIVE LEARNING MODEL

by
Jonni Mardizal[1)], Muhammad Tarmizi[2)]
[1,2]Universitas Negeri Padang
Email: [1]jonni.mardizal@ft.unp.ac.id

Abstrak

This study is a study that applies the STAD *(Student Teams Achievement Division)* cooperative learning model to improve student learning outcomes in Construction Cost Estimation subjects. The method used in this study is classroom action research (CAR). Research takes the form of cycles that last twice the cycle, depending on the success rate of the target achieved. The research subject in this study was a student of class XI Design Modeling and Building Information (DPIB) Vocational High School (SMK) Negeri 5 Sungaipenuh. The number of students in this class is 14 students. Data analysis techniques are carried out by assessing the activeness of students' learning and assessment of learning outcomes. Student learning outcomes in the first cycle with a total of 14 students, with an average score of 72.86, and students who achieved the completion of 8 people's learning, which is 57.14%. In the second cycle with the number of students was 14 people, with an average score of 79.29, and students who achieved the completion of learning 11 people, namely 78.57%. In this second cycle, the average grade of students has reached above the Minimum Completion Criteria (MCC).

Keywords: Learning Outcomes, Cooperative Learning, STAD, CAR

INTRODUCTION

Based on observations conducted in the July-December 2020 semester in class XI DPIB SMK Negeri 5 Sungaipenuh, there is a problem faced by the school that is seen students are less active in the learning process in the subjects of Construction Cost Estimation. One of the causes is that during the learning process, it is still centered on teachers and less interactively involved in the learning process so that it makes students feel saturated and less able to develop optimal learning skills. Teachers dominate the learning process as if there is only one-way communication between students and teachers.

In addition to this, another problem encountered is the lack of adequate learning ools, resource books, and other learning media, so that the learning process becomes more passive for students and the role of teachers is very dominant. With these limitations, it is increasingly difficult to achieve the Minimum Completion Criteria required, especially for the subjects of Construction Cost Estimation in SMK Negeri 5 Sungaipenuh.

Based on the problems that have been outlined above, as well as the results of observations of the teaching and learning process in SMK Negeri 5 Sungaipenuh. Making the learning results obtained by students to be low and less satisfactory, this is indicated by the acquisition of the average grade of the Final School Examination (UAS) as in the following table:

Table 1. Average Grade of Student Exam Results on Subjects Estimated Construction Cost in SMK N 5 2019/2020

No	Final Test Scores	Student	%	Remarks
1	81-100	3	21,42	Very Competence
2	75-80	5	35,71	Competent
3	< 75	6	42,85	Less competent
Sum		14	100	

Source: Teacher Subjects Estimated Construction Cost of SMK Negeri 5 Sungaipenuh)

THEORETICAL FOUNDATION

STAD or *Student Team Achievement Divisions*, which is a collaborative learning strategy between small groups of learners with varying levels of ability to work together to achieve common learning goals. Designed by Robert Slavin and his colleagues at Johns Hopkins University, [1] students are assigned to four or five-member learning teams mixed in performance levels, gender, and ethnicity. The teacher presents the lesson, and then the students work together in their team to ensure that all team members have mastered the lesson. [2]

Cooperative learning methods can also be chosen as instructional methods, this is due to their effectiveness in educational settings. According to Doymus, Karacop, and Simsek (2010), cooperative learning methods are based on learning approaches where students can learn from each other through small mixed groups to achieve common goals in academic subjects not only in the classroom but also in other environments. They state that through cooperative learning, learners' confidence, communication skills, problem-solving skills, and critical thinking are enhanced and students engage in the educational process strongly. Cooperative learning requires students to collaborate in groups to get simple goals; Thus, the opportunities for student-student interaction in a supportive and safe environment are expanded (Johnson &Johnson, 2005; Richards and Rodgers, 2001). In addition, cooperative learning as an alternative to instructional strategies is valued in educational media at all levels simply because students learn from each other while making decisions and collaborating on problem-solving methods (Koç, 2014). Johnson and Johnson (1999) describe cooperative learning as "one of the growing areas of theory, research, and education practice". All cooperative learning methods are based on the same five elements (principles) that aim to facilitate communication in learners by placing them in small communities, i.e. groups, where they must communicate and work together to master the course. Learning to colocation causes learners to have smooth communication as well. [3]

STAD is one type of cooperative learning, where the team works in learning and allows students as team members to express and communicate between team members. They will share knowledge, so it will make them express and communicate with fellow team members who are in one group.

This atmosphere will create more interaction between group members. Using STAD's teaching methods, students engage in discussing common issues, sharing difficulties in writing, and providing them with knowledge. [4]

Cooperative learning in a particular subject is an instructional method in which students work together in small groups to learn with psychomotor, cognitive, and affective domains.[5] At this time, cooperative learning plays an important role in helping students to gain the desired skills. Cooperative learning can also be defined as a method of learning in which students with common goals and work together in small groups so that each member of the group is responsible for the learning of other members.[6]

Nevertheless, the effectiveness of cooperative learning on learning outcomes will be discussed further. From several studies that have been done, some show that cooperative learning has not provided significant cognitive, social, and affective benefits for students.[5]

RESEARCH METHODS

The method used in this study is *classroom action research* (CAR), CAR is a form of self-*reflective* research conducted by participants in social situations to improve rationality and truth.

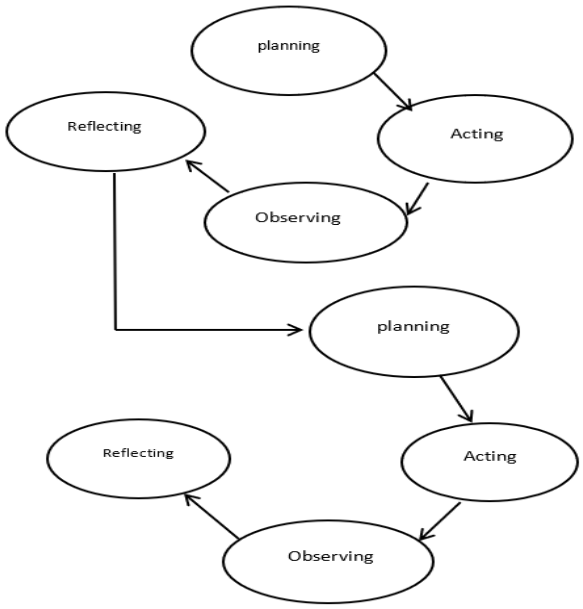
ISSN 2722-9475 (Cetak)
ISSN 2722-9467 (Online)

CAR is a study conducted by researchers in their classrooms by (1) planning, (2) implementing, and (3) reflecting actions in an active and participatory manner to improve their performance as researchers, so that students' learning outcomes can improve.[7]

Classroom action research is an innovation that is expected to be used by many from various sectors including educators, researchers, school administrators, and teachers as a strategy to develop the science of the teaching profession to be better, because this classroom action research includes a reason and methods that can be used. Facilitate instructional development. As a result, teachers can play their part in finding problem-solving techniques in the classroom on their own.[4]

This Class Action research model, using *Stephen Kemmis and robbin mc Taggart. Kemmis and mc Taggart* suggest that action research is a spiral cycle. This study takes the form of a cycle that lasts twice the cycle, depending on the success rate of the target achieved, where each cycle consists of 1 meeting. Each cycle consists of, (1) design (planning), (2) action (acting), (3) observation (observing), (4) reflection (reflecting). The cycle can be described in the image below.

Figure 1. Kemmis and Mc. Taggart Research Model Chart



This class action research was conducted at SMKN 5 Sungaipenuh, Jambi province. The timing of the implementation of the research in the odd semester of the 2020/2021 school year and the research subjects in this study were students of class XI DPIB, with 14 students.

1. Data Collection and Research Instruments
   1.1. Data
      1.1.1. Data test
      The tests given to students in the study are intended to find out the extent to which students master the subject matter after applying the STAD-type cooperative learning model. The test questions used are in the form of multiple-choice questions and descriptions done by the group.
      1.1.2. Non-test data
      1.1.2.1. Observation
      Observation is carried out by observing and recording about researchers
      Documentation is in the form of taking photos carried out on every observation action, researcher's activities, and student activities.
      and student learning activities during RAB learning using STAD-type learning models.
      1.1.2.2. Documentation
      Documentation is in the form of taking photos carried out at every observation action, researcher's activities, and student activities.
   1.2. Research Instruments
      1.2.1. Non-test,
      Student observation instruments,
      This observation is carried out during the learning process, by making observations directly with a checklist (√) on the observation sheet.
      1.2.2. Test
      1.2.2.1. Pretest
      A pre-test is a test that is carried out at the beginning of the research, intending to find out the level of understanding of students about the

material to be taught. The implementation of this pretest is simplified with tables.

Table 2. Pretest Material

No	Cycle	Pretest Material	Question	Number of questions
1	**I**	Calculation of volume on preparatory work and foundation	Multiple choice	20
2	**II**	Volume calculation on reinforced concrete work	Multiple choice	20

1.2.2.2. Post-test

A post-test is a test that is carried out at the end of each action, intending to know the improvement of students' understanding and learning outcomes to the material taught by applying the STAD-type Cooperative learning

$$P = \frac{F}{N} \times 100\ \%$$

model.

2. Research Procedure

In this research procedure, a pretest is carried out on students first before the study of this class action is carried out. Class action research is carried out in two cycles, each cycle consisting of four stages, including 1) planning stage, 2) stage of execution of the action, 3) stage of observation or observation, 4) reflex stage.

3. Data Analysus Techniqeu

3.1. Student Liveliness Assessment

Assessment of the activeness of learning students by calculating percentages is used to see the process and development of liveliness that occurs during the learning process. The formula used is as follows: [8]

$$P\% = \frac{\text{The number of students Doing Indikator}}{\text{Number of students}} \times 100$$

Note:

P% = Percentage of students who perform student activity assessment inactor

1% - 25 % = Very Little

26% - 50 %= Little

51% - 75 %= Many

76% - 100%= A lot of

3.2. Student Livelines Aseement

Test scores evaluation of learning results are obtained through pretest and postest, generally calculated using formulas:[9]

3.2.2. Completion Learning

To calculate the percentage of cycle results, a percentage calculation is performed using the following formula:

Note:

P = Completion of learning

F = Number of completed students

N = Number of all students

100% = Percentage Numbers

Source: [9]

3.2.3. Calculate the average test result

The formula calculates the average test results are as follows:

$$\bar{X} = \frac{\sum n}{\sum x}$$

Information:

X = average

$\sum x$ = total amount of value obtained

$\sum n$ = Number of students

Source:[9]

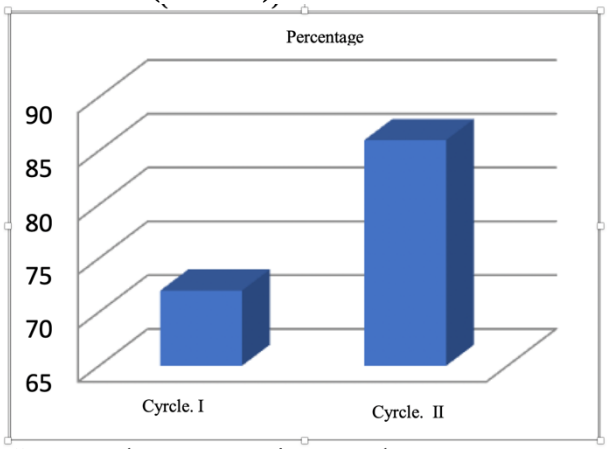
ISSN 2722-9475 (Cetak)
ISSN 2722-9467 (Online)

RESULTS AND DISCUSSIONS

1. Student activeness in learning

The percentage of student learning activity on average improved each cycle, from cycle I to cycle II. Learning with the STAD-type cooperative learning model can improve students' learning activity in a better direction. This can be seen to increase the activeness of students' learning every indicator.

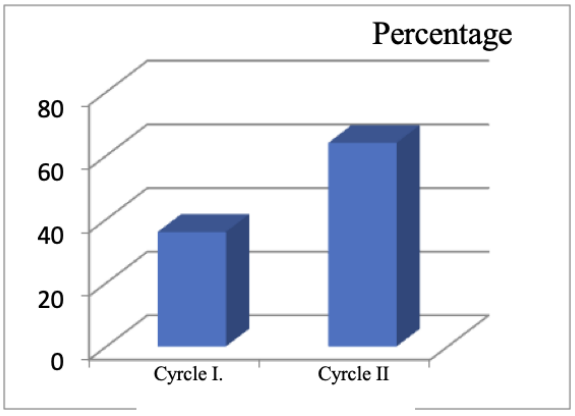
Figure2. Percentages active student learning on indicator **A (attention)**



Source: data processing results

Based on the picture, you can see a comparison of students' learning activity on indicator A, namely paying attention, obtained in cycle I with a percentage of 72%. While the percentage of learning activity in cycle II increased by 86%. Thus, it can be concluded that the activeness of student learning on indicator A by using the STAD-type cooperative learning model is increasing.

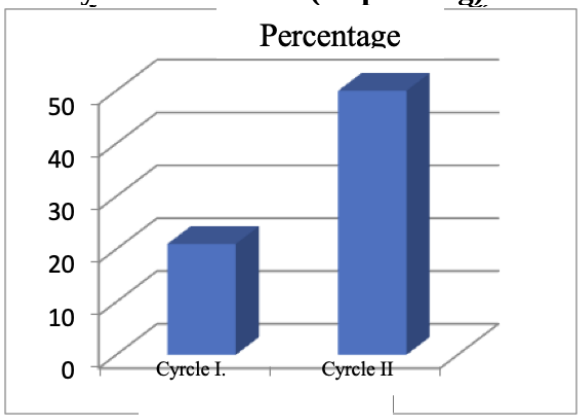
Gambar 3. Percentage of student learning activity on indicator B (ask)



Source: data processing results

Based on figure 3 above, it can be seen that the comparison of student learning activity on indicator B i.e. asking, was obtained in cycle I with a percentage of 36%. While the percentage of learning activity in cycle II increased by 64%. Thus, it can be concluded that the activeness of students' learning on indicator B by using the STAD type cooperative learning model is increased.

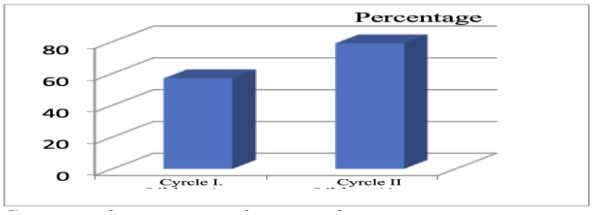
Gambar 4. Percentage of student learning activity on indicator C (responding)



Source: data processing results

Based on figure 4 above, you can see a comparison of the activeness of learning students on indicator C i.e responding, obtained in cycle I with a percentage of 21%. While the percentage of learning activity in cycle II increased by 50%. Thus, it can be concluded that the activeness of students' learning on indicator C using the STAD-type cooperative learning model is increased.

Figure5. Percentage of student learning activity on indicator D (Cooperation)



Source: data processing results

Based on figure 5 above, you can see a comparison of the activeness of learning students on indicator D i.e. responding, obtained in cycle I with a percentage of 57%.

While the percentage of learning activity in cycle II increased by 79%. Thus, it can be concluded that the activeness of students' learning on indicator D by using the STAD-type cooperative learning model is increasing.

2. Learning Outcome

Tests of student learning outcomes are obtained through post-tests at the end of the cycle I and the end of cycle II. For student learning results cycle I and II there are results of learning pre-test and post-test. Where pre-test student learning results with current learning methods and post-test learning outcomes on the STAD type cooperative learning model.

The final results of student learning are seen from the results of increased learning Post-Test cycle I with Post-test cycle II. This is seen as an increase in the quality of learning outcomes from cycle one to cycle two. The results can be seen in the table below.

Table 3. Percentage completion of Learning Outcomes Cycle I and II Student Learning

Post-Test	Number of Completed Students	Number of Students Who Are Not Complete	Percentage of Completion (%)
Cycle I	8	6	57.14
Cycle II	11	3	78.57

Table 4. Grade Point Average, Cycle Learning

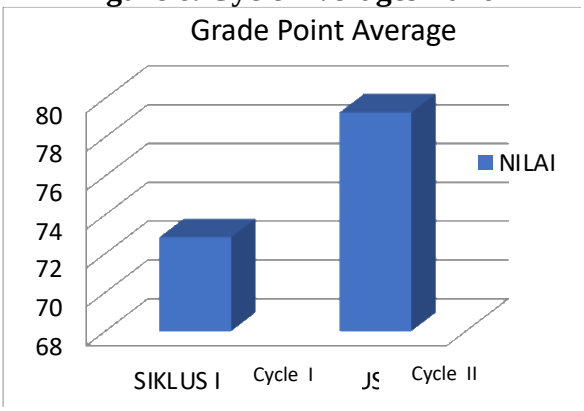
Post-Test	Average Value	Highest Score	Lowest Value
Cycle I	72.86	85	55
Cycle II	79.29	90	60

Outcomes I and II Student Learning

Based on tables 2 and 4 above, it can be seen that learning outcomes in cycle I obtained an average score of 72.86. The highest value is 85 and the lowest value is 55. The number of students completed in cycle I as many as 8 students and the incomplete 6 students. with a completion percentage of 57.14%. Thus the learning of the STAD-type cooperative model in cycle I have not been achieved. all observations as reflective material to continue on cycle II.

The cycle II analysis obtained a student grade point average of 79.29. The highest value in the cycle is 90 and the lowest value is 60. While the completion of learning is as many as 11 students, and the incomplete as many as 3 students, the percentage of completion of student learning is 78.57%. Thus the STAD type cooperative learning model in cycle II in cost budget plan subjects has increased compared to the previous cycle.

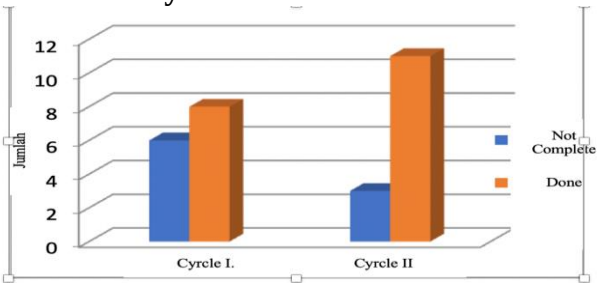
Figure 6. Cycle Averages I and II



Source: data processing results

Based on figure 6, in cycle I obtained the average score of the final test results of students is72.86, while in cycle II the acquisition of the average score of the final test of students is 79.29, thus the average value of the final test results of students in cycle II has increased compared to cycle I. The grades in cycle II have met the Minimum Completion Criteria (MCC), where cycle value II >MCC (79.29 >75)

Figure 7. Completion of Student Learning Outcomes Cycles I and II

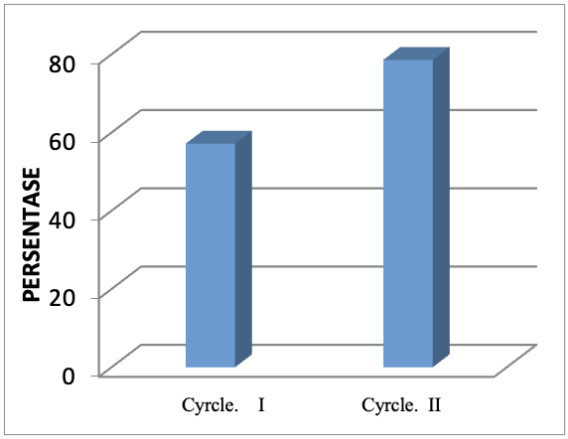


Source: data processing results

ISSN 2722-9475 (Cetak)
ISSN 2722-9467 (Online)

Figure 7, above illustrated that the number of students who are not completed in cycle I as many as 6 people and completed as many as 8 people. In cycle II the number of students who are not completed as many as 3 people and completed as many as 11 people.

Figure 8. Percentage of student learning completion cycles I and II

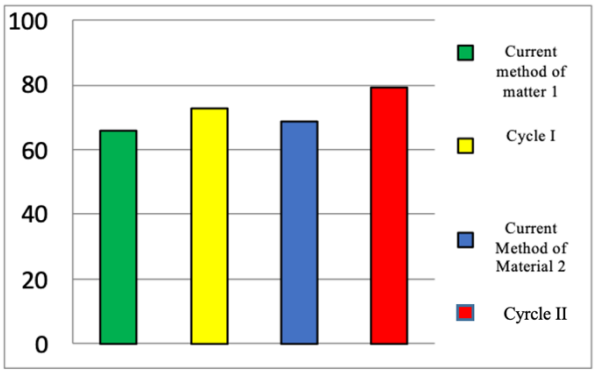


Source: data processing results

Based on the picture above, obtained the percentage of student learning completion for the cost budget plan subjects in cycle I is 57.14%, and there is cycle II the percentage completion of student learning outcomes increased to 78.57%.

The comparison between the average grades of students before using the STAD type cooperative learning model with the average value after using the STAD type cooperative learning model can be seen in the figure below:

Figure 9. Comparison of average grades of students of class XII DPIB



Source: data processing results

Based on figure 9 above, the average student value in the current learning method on material 1 is 66.07 while the average grade of the cycle I material 1 is 72.86. In the current study method in material 2, the average value is 68.57 and in cycle II the average value in material 2 is 79.29. Then it can be concluded that the average value of students after using the STAD-type cooperative learning model increased. This can be seen from the comparison between the average grades of students after using the STAD-type cooperative learning model using the current method

CLOSING

Conclusion

Based on the results of research and discussions that have been outlined above, the researchers concluded that the application of *a student teams achievement division* (STAD) cooperative learning model in the subjects of construction cost estimation can improve the learning outcomes of students of class XII DPIB SMKN 5 Sungaipenuh. This can be proven from the results of student learning in cycle I with the number of 14 students who obtained an average score of 72.86 and students who achieved learning completion as many as 8 people, namely 57.14%.

In cycle II with a total of 14 students, with an average score of 79.29, and students who achieved the completion of learning 11 people, which is 78.57%. So in cycle II, the average score of students has reached above MCC.

Recommendations

Although the application of the STAD-type cooperative learning model used in conjunction with the CAR method in this study can increase MCC to a small number of students (14 people), it is recommended that further research needs to be applied to an even larger population to better illustrate the effectiveness of implementing the STAD-type cooperative learning model with the CAR method.

REFERENCES

[1] A. A. Jahanbakhsh, M. AliAsgariZamani, and Z. Garman, "CIRC and STAD in Iranian context: Through the five elements to cooperative learning of lexical collocations," *Cogent Arts Humanit.*, vol. 6, no. 1, 2019, DOI: 10.1080/23311983.2019.1692469.

[2] M. Tiantong and S. Teemuangsai, "Student team achievement divisions (STAD) technique through the moodle to enhance learning achievement," *Int. Educ. Stud.*, vol. 6, no. 4, pp. 85–92, 2013, DOI: 10.5539/ies.v6n4p85.

[3] N. Kunlasomboon, S. Wongwanich, and S. Suwanmonkha, "Research and Development of Classroom Action Research Process to Enhance School Learning," *Procedia - Soc. Behav. Sci.*, vol. 171, pp. 1315–1324, 2015, DOI: 10.1016/j.sbspro.2015.01.248.

[4] S. Boonchom, L. Nuchwana, and M. Amorn, "The Development of Standards, Factors, and Indicators for Evaluating the Quality of Classroom Action Research," *Procedia - Soc. Behav. Sci.*, vol. 69, no. Iceepsy, pp. 220–226, 2012, DOI: 10.1016/j.sbspro.2012.11.402.

[5] M. Y. Huang, H. Y. Tu, W. Y. Wang, J. F. Chen, Y. T. Yu, and C. C. Chou, "Effects of cooperative learning and concept mapping intervention on critical thinking and basketball skills in elementary school," *Think. Ski. Creat.*, vol. 23, pp. 207–216, 2017, DOI: 10.1016/j.tsc.2017.01.002.

[6] F. Erdogan, "Effect of cooperative learning supported by reflective thinking activities on students' critical thinking skills," *Eurasian J. Educ. Res.*, vol. 2019, no. 80, pp. 89–112, 2019, DOI: 10.14689/ejer.2019.80.5.

[7] S. Anas, *Penelitian Tindakan Kelas*. Bandung: Pustaka Setia, 2015.

[8] N. Sudjana, *Penilaian Hasil Proses Belajar Mengajar*. Bandung: PT Remaja Rosdakarya, 2012.

[9] S. Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rijeka Cipta, 2007.