

THE IMPLEMENTATION OF COOPERATIVE LEARNING USING STAD TECHNIQUES IN IMPROVING LEARNING OUTCOMES TOWARD CULINARY STUDENTS

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Abstract

The learning method is one of the elements of learning that determines how well a teacher delivers learning materials so that learning objectives are attained. Unattractive learning methods can affect student learning outcomes. Therefore, this study aimed to determine and analyze the application of the learning method, namely the Cooperative Learning (CL) with the Student Teams Achievement Division (STAD) technique to improve learning outcomes for the subject matter of Milk and Its Processed Products for students at Jakarta State Vocational Highschool 38. Research method of the study used a quasi-experimental method. The research sample were students of 1st grade of Culinary in Jakarta State Vocational Highschool 38 who were taking the subject of Foodstuffs Knowledge. The results showed that the class which was applied CL method with STAD technique had an average score of improvement (delta pre-test and post-test) of 7.80, while the class that was applied the conventional method was 4.35. It was concluded that there is an increase in student learning outcomes in the subject of Foodstuffs Knowledge, especially the subject matter of milk and its processed products with the application of Cooperative Learning (CL) Student Teams Achievement Division (STAD) technique which is significantly better than conventional methods.

Keywords: Cooperative Learning (CL), Student Teams Achievement Division (STAD), learning outcomes

INTRODUCTION

A teacher has a very strategic task, role, and position in national development, especially in education field. To do their job, the teacher must possess and be expert in their field (Anggraeni et al., 2019). The primary responsibility of teacher, as stated in Article 1, Item 1 of Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers, is to educate, teach, guide, direct, train, assess, and evaluate students. According to Isjoni (2013), certain approaches are necessary for teaching and learning. The approach is divided into steps for learning activities, methods, media, and tools, along with time, all of which are used to deliver learning content to fulfill the specified learning objectives. The learning process is very dependent on the creation of teachers who pay attention to the condition of students and the environmental conditions in which the learning process occurs.

Study and learning activities are two aspects of activities that demand various strategies. Study activities are behavioral changes in student because of experience in interacting with the environment and descriptive Dewi et al. (2020). While teacher engages in learning activities that create the condition for student to be stimulated and directed to acquire the knowledge, skills, attitudes, and values that lead to behavioural changes. Learning activities are prescriptive (determining what must be provided or done). Saiful and Aswan (2010) explained that learning activities are the core activities in education. Therefore, learning activities will involve all learning components which are also characteristics of learning strategies, namely objectives, procedures, teaching materials, interactions, methods, learning tools, learning resources, and

evaluations. Learning method is one of the elements that determines how well a teacher delivers learning materials so that the objectives are attained. The method is a way that has been well considered and structured to accomplish a goal, according to Poerwadarminta in the Big Indonesian Dictionary (2008). Teachers employ learning strategies to impart information to students in a way that promotes learning and advances their goals. One of the learning methods that can be applied is Cooperative Learning (CL).

According to the Republic of Indonesia Law no. 20 of 2003 concerning the National Education System, Cooperative Learning is a learning method through small groups of students who work together in maximizing learning conditions to achieve learning goals. CL arises because of development in the existing learning system. CL replaces an individualized learning system where the teacher continues to provide information (the teacher is the center) and the students is only listener (Huda, 2014). When student engages in CL, they interact and use one and another resources. Compared to traditional teacher-centred instruction, learners now have more access to understanding. Peer involvement makes assignment more interesting and offers excellent learning opportunities. Cooperative Learning is divided into eight types, namely: (1) Student Teams-Achievement Divisions (STAD), (2) Team Assisted Individualization (TAI), (3) Jigsaw Techniques, (4) Learning Together, (5) Academic Debate Management, (6) Complex Assignments, (7) Group Investigations in Cooperative Classrooms, and (8) Structural Approaches (Sharan, 2012). Other than that, according to Isjoni (2013), there are several variations of models or techniques that can be applied in the CL method, namely Student Team Achievement Division (STAD), Jigsaw, Teams-Games-Tournaments (TGT), Group Investigation (GI), Rotating Trio Exchange, and Resume Groups. Of these learning techniques, the most widely developed is the Student Team Achievement Divisions (STAD) technique.

Student Teams-Achievement Divisions (STAD) is commonly known as student study group (Huda, 2014). This method is predicated on the notion that students should learn in cooperative learning groups to comprehend the material. According to Anggraeni et al., (2019), students collaborate to learn and are accountable for both their own learning and that of their classmates in STAD technique. The main goal of STAD is to accelerate the understanding of all students. STAD places a strong emphasis on the utilization of group objectives and group success, which can only be attained if all group members comprehend the material being taught.

In STAD technique, group projects are completed until each student in the group has a thorough understanding of the subject topic. STAD is the most studied cooperative learning method. This method is also very easy to adapt (Slavin, 2015). Cooperative Learning method with STAD technique would be applied in this research. According to Sharan (2012), STAD technique is the first developed successful cooperative learning technique. This technique is easy to adapt and has been tested in several subjects such as mathematics, science, social science, English, engineering, and many other subjects at the high school to college level (Sharan, 2012). Therefore, it was hoped that STAD can also be used in learning students of Culinary Department at Vocational High Schools.

The subject matter of milk and its processed products is the subject matter of the Culinary Department at VHS, namely Foodstuffs Knowledge. In this subject, there is no cooking practice like other majors. Thus, many students, especially at VHS 38 Jakarta, are less interested in this major because it has more theory than practice (producing products). Therefore, the lack of interest of students in this subject will affect student learning outcomes. Based on the explanation above, it is necessary to conduct research on the application of Cooperative Learning using the STAD technique to see the improvement of student learning outcomes in Culinary at Vocational High School 38 Jakarta learning.

Hypothesis 1: There is an improvement in the learning outcomes of students at State VHS 38 Jakarta on the subject matter of milk and its processed products by applying the STAD technique of Cooperative Learning.

RESEARCH METHODS

This research was conducted at State Vocational High School (SVHS) 38 Jakarta, which is located at Jalan Kebon Sirih No. 98, Central Jakarta. The research methodology used in this study is a quasi-experimental method, which involves conducting research to ascertain the impact of an experiment or treatment on the desired subject characteristics or to apply an action or treatment in the form of a new strategy, method, or work procedure in order to increase productivity and effectiveness at work. (Mulyatiningsih, 2012). Students that received treatment using the STAD (Student Teams Achievement Division) cooperative learning method are the subjects of this study. For other students in the class using conventional methods. The students who are subjected to the cooperative learning method with STAD technique are referred to as the experimental class, and the students who are subjected to the learning techniques that are typically used on a daily basis by the teacher, also known as the conventional method, are referred to as the control class. Additionally, evaluations of the experimental class and the control class were conducted. This is carried out to observe how the STAD Cooperative Learning technique affects learning outcomes.

Research variables are basically characteristics found in research subjects that can be measured and assessed or scored (Mulyatiningsih, 2012). This study discusses two variables, namely the independent variable and the dependent variable. The independent variable (X) in this study is the learning method (ie Cooperative Learning method with STAD technique and conventional method). Meanwhile, the dependent variable (Y) in this study is the value of the learning outcomes of the Culinary students in 10th grade at State Vocational High School 38 Jakarta on the Main Material of Milk and its Processed Products. The following is a grid and items of instruments used in the study. The research instrument is a written test in the form of a description. The description of the grid and questions is presented in Table 1.

Table 1 Grid of Research Instruments

No	Basic Competencies	Component Aspects Assessed						Number of Question
		Knowledge (C1)	Comprehension (C2)	Practice (C3)	Analysis (C4)	Synthesis (C5)	Evaluation (C6)	
1	Analyzing food ingredients from milk and its processed products	*1,4,5, 11	2,3,6, 12,15	30,9, 14	8,10, 13	-	-	15
2	Evaluating the quality of milk and processed products	17,21, 23,24	16,18, 19,22	20,25,26	25,27, 28	29	7	15
Total								30

**instrument item number*

Other than that, Table 2 presented the attitude observation assessment rubric in the learning process for the students. The researcher also conduct an assessment of attitude observations for individual students.

Table 2 The Attitude Observation Assessment Rubric in the Learning Process

No	Aspect	Indicators
1	Thoroughness	a. Systematically follow the instructions. b. Handle the task with caution. c. Do not perform unsolicited activities. d. Avoid creating unfavorable conditions in the classroom.
2	Honesty	a. Convey something based on the actual situation. b. Do not disguise the made mistake. c. Do not examine or copy the data or work of others. d. Incorporate study materials from the sources listed or examined.
3	Responsibility	a. Consider the circumstances of the class. b. Active participation in events including group discussions. c. Completing the tasks as directed. d. Reorganizing the workspace, used tools, and educational equipment.
4	Courtesy	a. Interact with friends in a friendly manner. b. Communicate in non-offensive language. c. Use friendly body language. d. Behave politely

Research design

Research design includes the process of planning and implementing research. The preparation of this research design used pre-test and post-test. In the control class, the students were given a pre-test (Y1) on the subject matter of Milk and its Processed Products, applied the conventional method (X), then was given a post-test (Y2) on the subject matter of Milk and its Processed Products. While in the class that was given treatment, the students were given a pre-test (Y1) regarding the subject matter of Milk and its Processed Products, the STAD technique CL method (X) was applied, then a post-test (Y2) was given regarding the subject matter of Milk and its Processed Products. Learning outcome data is indicated by the difference (delta) of the scores obtained from the pre-test scores (Y1) and the post-test scores (Y2) of the students. This design can be described in Table 3.

Table 3 Research Design

Class	Knowledge Aspect		Score difference (Delta)
	Pre-Test	Post-Test	
CL method with STAD technique (X)	Y ₁	Y ₂	Y ₂ -Y ₁
Conventional method (X)	Y ₁	Y ₂	Y ₂ -Y ₁

Sampling and data collection technique

The sampling technique in this study was done randomly (Random Sampling) to determine the experimental class and the control class. The sample in this study is the same as the population, because there are only two study groups in 10th grade of Culinary class in State Vocational High School 38 Jakarta. Collecting data in this study using tests. Tests are assessment tools in the form of questions in the form of assignments that must be answered to measure a sample of the behaviour of students (Kusaeri and Suprananto, 2012).

Meanwhile, according to Purwanto (2013), the test is an instrument or measuring tool to collect data where in responding to questions, students are encouraged to bring out all their abilities. Thus, the data obtained in this study are in the form of learning outcomes data from tests given at the beginning of learning (pre-test) and tests given after learning activities (post-

test). Learning outcomes data are indicated by the difference (delta) of values obtained from the post-test scores and the students' pre-test scores. In this case learning with the main material of milk and its processed products.

Research procedure

Following is a description of the procedure used in this study. State Vocational High School 38 in Jakarta is chosen by the researchers as the site. In Jakarta, it is one of the most favourite vocational high schools. Apart from that, both the school and the culinary program in VHS 38 are nationally accredited. Next, selecting research subjects randomly, which is obtained by the class in 10th grade of Culinary department. The first class for the experimental class and the second class for the control class at State VHS 38. Then, develop a grid of research instruments (questions for pre-test and post-test). The research instruments are reviewed by the subject teachers under study.

Pre-tests should then be given to students in the experimental class and the control class. A pre-test—a test given before learning—is completed by each participant at this level. The students utilize the STAD Cooperative Learning approach in the first class and the conventional method in the second class. In the conventional method, the teacher solely discusses the topic of study in front of the class while the pupils are attentively listening. On the other hand, the teacher conducts the group activity stage while using the STAD technique.

The teacher divides five groups for students at random, then each group is given a task by the teacher. A representative from each group then presents in front of the class, and the group that does not advance pays attention to the students who are presenting. The task takes the form of a discussion of the primary topics of discussion regarding milk material (types of milk, benefits of milk, requirements for good milk, dairy products, and handling and storage of milk). Students who become group representatives for presentation are chosen randomly by the teacher, so that each student is required to understand the subject of the discussion. To encourage students to participate more actively, a question-and-answer period will be opened after each presentation.

After that, material presentation stage. At this stage, the teacher explains the outline of the main material studied, namely Milk and its Processed Products. Next, the individual test stage which is about a post-test is carried out (test at the end of individual learning). Other than that, individual development score calculation stage. At this stage, the calculation of the score is obtained from the difference between the results of the post-test and pre-test of group participants. Then, the group award stage. At this stage the group award is obtained from the group's average score. The group mean value is obtained from the total difference (delta) of the pre-test and post-test scores of group participants divided by the number of group participants. The group that gets the award is the group that has the highest group average score. Afterwards, analyze the data from the pre-test and post-test results.

Validity and reliability test

The results of the instrument requirements test were carried out using two tests, namely the validity test and the reliability test. The validity test of the instrument in this study using content validity. Content validity in this study was obtained from the results of expert judgments conducted by expert lecturers of education and material expert lecturers at the State University of Jakarta and the results of professional judgments conducted by teachers of Foodstuffs Knowledge subjects at SVHS 38 Jakarta. The validation results indicate that the instrument used in this study is feasible or can measure what should be measured as an instrument in this study. After the content validity is done, the validity test is then carried out with an empirical validity test to find out each item of the instrument is valid or invalid (drop). From 30 instruments, there

are 10 instruments that are not valid in this research instrument. Therefore, the 10 items of the instrument were not considered for the calculation of the final score (omitted). In addition, the reliability test in this study was carried out using the Cronbach Alpha formula. Based on the results of the analysis, the reliability coefficient (α) is 0.96. These results indicate that the questions on the research instrument are reliable (very high reliability).

RESULT AND DISCUSSION

The experimental class in this study is a class that applies the Cooperative Learning (CL) method with the Student Teams Achievement Divisions (STAD) technique, while the control class in this study is a class that applies conventional methods (learning methods that run normally, without any treatment) in the process. The following is the average score of the pre-test and post-test results of students in the experimental class and control class.

Table 4. Average Pre-Test and Post-Test Scores of Experimental Class and Control Class

Class	Average Score		
	Pre-Test	Post-Test	Delta (Δ)
Experiment (CL method-STAD technique)	71.20	79.00	7.80
Control (Conventional Method)	70.43	74.78	4.35

Based on Table 4.2. it can be described that the average pre-test score of the experimental class is 71.20. The average post-test score was 79.00. The average pre-test and post-test delta scores were 7.80. Meanwhile, the average pre-test score for the control class was 70.43. The average post-test score was 74.78. The average pre-test and post-test delta scores were 4.35.

Mann-Whitney Test

The statistical test of this study uses Mann-Whitney test to determine whether the Cooperative Learning method with STAD technique can significantly improve student learning outcomes compared to conventional methods or not. Figure 1 shows the Mann Whitney test for this study by calculating the value of U with the formula.

$$U_2 = n_1 \cdot n_2 + \frac{n_1(n_1 + 1)}{2} - \sum R_1$$

$$U_1 = n_1 \cdot n_2 + \frac{n_2(n_2 + 1)}{2} - \sum R_2$$

Figure 1 Mann-Whitney Formula

U_1 is U for the experimental group, while U_2 is for the control group. The U used is the smallest $U = U_1 = 183.5$. Calculating the Mann Whitney test in this study uses the large sample U

formula because the sample size is larger than 20, then the sampling distribution U will approach the normal distribution with the mean and standard error.

$$\begin{aligned}
 U_1 &= n_1.n_2 + \frac{n_1(n_1+1)}{2} - R_1 & U_2 &= n_1.n_2 + \frac{n_2(n_2+1)}{2} - R_2 \\
 &= 25 \cdot 23 + \frac{25(25+1)}{2} - 716,5 & &= 25 \cdot 23 + \frac{23(23+1)}{2} - 459,5 \\
 &= 575 + 325 - 716,5 & &= 575 + 276 - 459,5 \\
 &= 183,5 & &= 391,5
 \end{aligned}$$

Figure 2 The Application Mann-Whitney formula

It is known that the U used is the smallest U = U₁ = 183,5. So, Figure 3 explains formulated the standard normal variable.

$$\begin{aligned}
 \mu U &= \frac{n_A.n_B}{2} \text{ dan } \sigma U = \sqrt{n_A.n_B \frac{(n_A+n_B+1)}{12}} \\
 z &= \frac{U - \mu U}{\sigma U} = \frac{U - \frac{n_A.n_B}{2}}{\sqrt{n_A.n_B \frac{(n_A+n_B+1)}{12}}} \\
 z &= \frac{U - \frac{n_A.n_B}{2}}{\sqrt{n_A.n_B \frac{(n_A+n_B+1)}{12}}} = \frac{183,5 - 287,5}{\sqrt{575 \frac{49}{12}}} \\
 &= -\frac{104}{\sqrt{2347,9}} = -\frac{97}{48,45} = -2,14
 \end{aligned}$$

Figure 3 Formulated the Standard Normal Variable

Because the Z value is the area (absolute value) then -2.14 has the same meaning as 2.14. Thus, the price of z = 2.14. Mann-Whitney test criteria if z > z table then the hypothesis 1 is accepted. z = 2.14 > z table = z (α = 0.05 = 5%) = 1.96. This means that the hypothesis 1 is accepted. In other words, the application of cooperative learning STAD techniques can improve student learning outcomes which are significantly better than conventional methods at State VHS 38 Jakarta on the subject matter of milk and its processed products. Based on Table 4, the average delta score of the experimental group was 7.80. Meanwhile, the average delta score of the control group was 4.78. Based on this explanation, the average score of students who are given the CL method of the STAD technique was higher than the average score of students who are given the conventional method.

Table 4 shows that the pre-test scores of the experimental class and the control class are relatively not different. In the experimental class, namely the class using the Cooperative Learning (CL) method with the Student Teams Achievement Division (STAD) technique, the average pre-test score was 71.20, while the average pre-test score for the control class was the class with the conventional method. of 70.43. It means that students in both classes have the

same initial ability. If both or one of the classes is given treatment and there is a change in ability, it can be said that the change is due to the treatment.

The post-test score of the experimental class is 79.00 and the average delta score was 7.80. Meanwhile, the average post-test score for the control class was 74.78 and the average delta score was 4.78. Based on this explanation, the average score of students who are given the CL method of the STAD technique was higher than the average score of students who are given the conventional method. Therefore, it is necessary to carry out statistical tests to find out whether the sample data can be used to generalize population data.

Based on statistical tests, it can be concluded that the score of student learning outcomes in the Foodstuffs Knowledge subject, especially the subject matter of milk and its processed products, which are given the application of the STAD CL method, is higher than the scores of students who are given the conventional method. In other words, the application of the CL method with the STAD technique can improve student learning outcomes significantly better than the conventional method in 10th grade Culinary student in SVHS 38 Jakarta.

The results of this study are also in line with the results of previous studies which stated that CL model with STAD type is effective for lecturing and improving learning outcomes for students (Sarifah, 2011). In addition, Putri (2012) also explained that the use Student Teams Achievement Division (STAD) method can improve the learning outcomes in vocational high school students. The results of this study are strengthened by the theory, the CL method of the STAD technique can increase the activeness and learning outcomes of students. This is because the basic tenet of STAD technique is that students should collaborate to learn and be accountable for both their own and other students' learning. In addition, it can increase students' self-confidence (Apriayani, Sowiyah, & Rapani, 2015).

The advantages of cooperative learning are students, positive interdependence, namely the teacher creates an atmosphere that encourages students to feel mutual need. The occurrence of face-to-face interaction because with this it can force students to meet each other face to face so that they will have a dialogue and make students more flexible, easier to learn with their peers. The existence of personal responsibility, namely students are responsible for the subject matter in group members so that students are motivated to help their friends (Bennett, 1995). Cooperative learning can improve the skills of working together in solving problems (group process). The main goal of STAD is to accelerate the understanding of all students (Slavin, 2015). Thus, the method affects student learning outcomes (Sulinda, Ngatiyo, and Nursyamsiar, 2013). In this case, the application of the CL STAD technique in student learning does not work or understand the lessons individually, but students do this together and each student is responsible for what other students do and learn.

However, when the learning process takes place, especially when students start to discuss in groups, the class condition will be crowded. The researcher will reprimand the students who are busy due to talking outside the main topics being discussed. In addition, researchers also assessed attitude observations for individual students. Based on this, the weakness in this study is a mild weakness, so that in general this study did not find significant research weaknesses.

CONCLUSION

Based on the results of the study, it was found that the application of Cooperative Learning (CL) of the Student Teams Achievement Division (STAD) technique on the subject of Foodstuffs Knowledge, especially the subject matter of milk and its processed products, had an average increase (delta pre and post-test) 7.80 while the class that was given the conventional application had an average increase of 4.35. The results of statistical tests using the Mann-

Whitney test obtained a significantly higher difference in the improvement of learning outcomes in the group that applied the STAD technique CL method compared to the group that applied the conventional method. This is also supported by an assessment of attitude observations during learning which includes aspects of thoroughness, honesty, responsibility, and courtesy.

The results of this study are expected to be used by teachers or prospective teachers in applying cooperative learning methods in the classroom. The application of this method in groups can increase students' self-confidence and a sense of responsibility towards themselves and other students to achieve a learning goal. The results showed that the STAD technique CL method can improve student learning outcomes significantly better than conventional methods in Foodstuffs Knowledge subjects, especially the subject matter of milk and its processed products. Therefore, it is recommended for teachers of other subjects, especially theoretical subjects in the Catering department to apply the STAD technique CL method in learning. In addition, it is also recommended for teachers or prospective teachers to conduct further research on the culinary department by using other learning methods that can improve student learning outcomes. Other than that, it is necessary to conduct research on student satisfaction with the CL method and the STAD technique to determine the effect of these methods on students from the student's perception.

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