

Applying Student Team Achievement Divisions (STAD) Model on Material of Basic Programme Branch Control Structure to Increase Activity and Student Result

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Abstract. Based on my experience of teaching the material of branch control structure, it is found that the condition of the students is less active causing the low activity of the students on the attitude assessment during the learning process on the material of the branch control structure i.e. 2 students 6.45% percentage of good activity and 29 students percentage 93.55% enough and less activity. Then from the low activity resulted in low student learning outcomes based on a daily re-examination of branch control material, only 8 students 26% percentage reached KKM and 23 students 74% percent did not reach KKM. The purpose of this research is to increase the activity and learning outcomes of students of class X TKJ B SMK Muhammadiyah 1 Banjarmasin after applying STAD type cooperative learning model on the material of branch control structure. The research method used is Classroom Action Research. The study was conducted two cycles with six meetings. The subjects of this study were students of class X TKJ B with a total of 31 students consisting of 23 men and 8 women. The object of this study is the activity and student learning outcomes. Data collection techniques used are test and observation techniques. Data analysis technique used is a percentage and mean. The results of this study indicate that: an increase in activity and learning outcomes of students on the basic programming learning material branch control structure after applying STAD type cooperative learning model.

1. Introduction

1.1. Background Information and Problem Statement

Based on my experience teaching the material of branch control structure, students are less active in responding to the material delivery of the branch control structure provided by the teacher. Students are less able to understand the subject matter and students are not enthusiastic about the delivery of material done by the teacher or the implementation of the task. Students feel the task given by the teacher is a heavy burden. Often the tasks assigned by the teacher cannot be solved well. In fact, teachers tend to be the center of all learning resources; it should be in the application of Curriculum 2013 students who should be more active. This condition leads to low student activity on attitude assessment during learning process on branch control material that is 2 students with the percentage of 6.45% good activity and 29 students with the percentage of 93.55% activity enough and less. The next reason is the result of student learning which is reviewed on the daily test result of branch control material, only 8 students with the percentage of 26% that reach the minimum completeness criteria and 23 students with 74% percent do not reach the minimum mastery criteria. Therefore it is necessary to change the way of learning, there are several factors that affect student learning outcomes, one of them is caused by teachers who tend to use the learning model that does not vary, has not been much-motivating students' activities to interact, and learning also tends to be still focused on the teacher both in terms of delivery material or settlement tasks. This situation makes the students cannot free to express what occurred in his mind, the emergence of mistrust in conveying ideas, reluctant to ask,



afraid of being wrong, embarrassed to ask, so that the learning process seemed to be a student reinforcement to develop and can lead to student saturation, material branch control structure.

A student who is in saturation, his wits system cannot work as expected in processing information items, so that learning achievement may decrease. Learning model that tends to minimize the involvement of students in the learning process resulted in the students become less active, less independent, did not have the courage to express their own opinions and also students are less able to think creatively so that student achievement is low. To attract liveliness and interest in student learning then the teacher must use learning model other than conventional learning model. Therefore, teachers are required to choose appropriate models of learning that are active, creative, effective, innovative, and effective. So in the learning process students can actively understand the material and their learning achievement increases. Vocational High School is one of the educational institutions that have the responsibility to create human resources (HR) that has the skills, abilities, and skills so that graduates can develop performance while in the workplace. In accordance with the Regulation of the Ministry of Education and Culture No. 70 of 2013 on the Basic Framework and Structure of the Vocational High School Curriculum, the objective of the Curriculum 2013 is to prepare Indonesian people to have the ability to live as individuals and citizens who are faithful, productive, creative, innovative and effective able to contribute to the life of society, nation, state, and world civilization. One of the vocational schools in Banjarmasin City that still apply the Curriculum 2013 is SMK Muhammadiyah 1 Banjarmasin. Currently, SMK Muhammadiyah 1 Banjarmasin has three skill programs, one of which is Computer and Network Engineering. In the program Computer and Network Engineering expertise, there are relatively new productive subjects in the Curriculum 2013 is Basic Programming. The Basic Programming Course is contained in the curriculum structure of Computer and Network Engineering skills program. These subjects belong to the C1 group of specialists in the area of expertise. The purpose of these Basic Programming subjects is as basic understanding for learners in a programming language which later becomes the basis for other subjects as well as train students' logic and creativity.

1.2. Basic Programming Subject

The program is an algorithm written in computer language. The programming language is the computer language used in writing programs. The programmer is the person who created the computer program. Programming is the activity of designing and writing programs. In programming there is the activity of writing program code, this activity is called coding [11]. The subject of Basic Programming in Vocational High Schools is a productive subject in the structure of the Computer and Network Engineering (TKJ) programming curriculum, the subject of specialization C1 is the area of fundamental expertise. Basic Programming teaches and trains students to understand and apply programming languages whose functions can also be applied in other programming languages, as a reinforcement of logic, and student creativity. The supporting application used in Basic Programming learning is Turbo Pascal 7.0 which uses the famous Pascal programming language with structured programming.

1.2.1. Student activity according to Diedrich, can be classified as follows: Visual activities, Oral activities, Listening activities, Writing activities, Drawing activities, Motor activities, Mental activities, and Emotional activities.

1.2.2. Learning outcomes are the changes that occur in students, both those involving cognitive, effective, and psychomotor aspects as a result of learning activities [22].

1.2.3. Student Team Achievement Divisions (STAD)

According to Slavin (The steps to be taken in applying STAD type cooperative learning model consists of six stages, as follows: the First step of delivery of goals and motivation Second step of group division Teacher's third presentation step Fourth step of team learning activities teamwork) with LKS, teamwork is STAD's most important image The fifth step of the quiz (evaluation) The sixth step

of the team achievement award, then awarding the certificate or other prize for the group's success [16].

1.3. The Branch Control Structure

The branching control structure of programming generally uses IF (if), THEN (then), and ELSE (besides) keywords. There are several types of branch control structures based on the number of conditions encountered, below is the type of branching control structure that is as follows: Branching one condition, Branching two conditions, Branching more than two conditions, and Nested branching. The condition itself is a Boolean type expression, meaning it can only be true or false.

2. Research Methodology

2.1. Research Design

References [1] illustrate that: Classroom Action Research consists of four steps in one cycle and its repetition, presented in Figure 1.

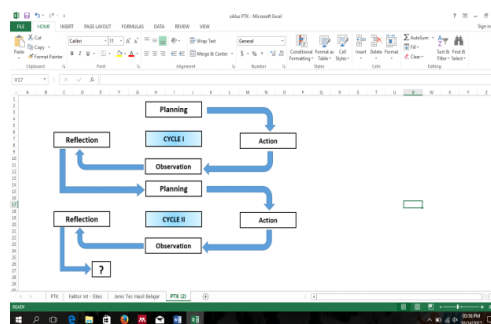


Figure 1. Class Action Cycle Research Chart

This Classroom Action Research will be carried out with the following stages: Cycle I preparation of the plan as follows: Prepare the implementation schedule of cycle I action., prepare the Learning Implementation Plan (RPP) of the subject of the branch control structure at each meeting, preparing the student activity sheets cycle I, preparing the ultimate evaluation sheet evaluation cycle instrument is an objective test, preparing the observation sheet instrument to observe the student activity in the learning process takes place. Action: Implementation of class actions carried out as many as three meetings. The first and second meetings are held in teaching and learning process with 2 x 35 minute time allocation, while for third meeting evaluation is done with 75 minutes time allocation. Teaching and learning process is done in accordance with the RPP that has been made at the stage of preparation of the plan. For evaluation, students are given objective tests in the form of multiple choice questions implemented at the end of the cycle. Observation: Observations made during the learning process took place conducted by two observers to observe student learning activities. Reflection: Reflection is done to examine what has been produced or what has not been completed at the stage of action based on the evaluation results at the end of the cycle and the results of observation. Cycle II: The stages performed in cycle II follow the stages in cycle I. In this second cycle, the preparation of plans prepared based on the results of reflection in cycle I. Activities undertaken in cycle II is intended to improve or improve the implementation of learning in cycle I.

2.2. Research Instruments

In the process of evaluating the learning or assessment process and learning outcomes, teachers often use measuring instruments in the form of certain instruments, both test, and non-test. This instrument has a function and role that is very important in order to know the effectiveness of the learning process in school [2]. Test: a good test instrument criterion needs to be tested in the following way: Validity, Level of Difficulty, Distinguishing Power, and Reliability. Non-test instruments can be used if we

want to know the quality of processes and products of a job as well as matters pertaining to effective domains, such as attitudes, interests, talents, and motivations. Each measured dimension and aspect requires different tools or instruments. In principle, whenever conducting a learning evaluation, we can use test and non-test techniques. Learning outcomes can be in the form of theoretical knowledge, skills, and attitudes. Theoretical knowledge can be measured using test techniques. Skills can be measured using action tests. The changes in attitude and growth of children in psychology can only be measured by non-test techniques, such as observation, interviews, attitude scales, and others [2]. To obtain data on learning activity of student in the learning process and implementation of STAD type cooperative learning model, hence in this research used the non-test instrument of observation type with a tool used is observation sheet/guidance. Before the non-test instrument, the observation sheet is used in advance the validity of the content through the experts' judgment is the assessment performed by the experts.

3. Data Collection Techniques

Observation is often interpreted as a narrow asset, i.e. pay attention to something by using the eyes. In the sense of psychology, observation is the activity of loading attention to an object by using all the senses. Thus, observation can be done through sight, smell, hearing, touch, and taste [1]. The test is a series of questions or exercises as well as other tools used to measure skills, knowledge of intelligence, abilities or talents possessed by individuals or groups. In this research, the test is done to know the result of student learning after learning model of cooperative learning type STAD applied [1]. Based on the number of learners, the test results of learning there are two types of group tests and individual tests. Group test is a group test. The teacher will deal with a group of learners. The individual test is a test conducted individually. The teacher will deal with a learner. To obtain data on student learning result in a final evaluation of cycle and implementation of STAD type cooperative learning model, this research use objective type test instrument in the form of multiple choice problem. Problems are made in accordance with the procedure of making multiple choice questions. Problems used also have done the validity of the content and validity of constructs in the form validity test, the level of difficulty, distinguishing power, and reliability.

4. Research Results and Discussion

4.1. Implementation of STAD

Implementation of the learning process by applying STAD type cooperative learning model, shown in the Figure 2a-d.



Figure 2. Implementation of the learning process by applying STAD type cooperative learning model

STAD type cooperative learning is one type of cooperative learning model using small groups with the number of members every four to five students in a heterogeneous way. In the beginning, we deliver learning objectives, materials, group activities, quizzes, and group awards. The main idea behind STAD is to encourage students to encourage and help each other to master the skills that teachers teach. If students want a group to get a reward, they should help their group's friends learn the lesson. They should encourage group mates to do their best, show the norms that learning is important, valuable, and fun. Based on the observations made during the research conducted, the things that make

students active in basic programming learning material branch control structure, among others: Submission of objectives and motivation, in this step the researchers convey the lesson objectives to be achieved on learning STAD and motivate students to learn actively and creatively. Motivation in the form of invitations to learn and the benefits of learning the material and at the end of the meeting will be awarded a certificate. Division of the group, in this step the students are divided into seven groups, each group consisting of four to five students prioritizing class heterogeneity in academic achievement and gender. So it gives the stimulus for each student to work together, encourage each other, help each other to collect scores, and discuss them to become the best group. Presentation, in this step the researcher submits the subject matter by first explaining the lesson objectives to be achieved at the meeting and the importance of the material is learned. In the learning process, the researcher is assisted by Turbo Pascal 7.0, learning media based on PowerPoint and Flash, and ties it to real problems that occur in everyday life. Also explained about the skills and abilities those are expected to be mastered by students, and the work to be done as well as ways of doing it. Teaching activities in the team (teamwork), in these step students, learn in groups that have been formed. The researcher prepares the LKS as a guideline for group work, so all members master and each contributes. This LKS aims to stimulate students to understand the materials learned, in constructivist theory, students learn to build their own knowledge. As long as the team works, researchers are assisted by observers making observations, providing guidance, encouragement, and assistance when needed. Teamwork is the most important image of STAD. Individual quiz, in this step the researcher, evaluates the learning outcomes through the quiz about the material being studied and also evaluates the presence of the work of each group. Students are given seats individually and are not allowed to cooperate. This is done to ensure that individual students are accountable to themselves in understanding the material. Researchers set a score for each problem. Individual quiz questioning is given to lure students to understand the material and to know the students' mastery of the material they have learned during the lesson. The team achievement award, in this step after the quiz implementation, the researcher examines the student work and is given a number ranging from 0-100. Furthermore, the award of a certificate or other prizes for the success of the group in accordance with the scores of group development obtained. Comparison of inter-group rewards at each cycle is presented in Table 1.

Table 1. Comparison of Predicates of Inter-Group Appreciation in Each Cycle

Cycl e	Meetin g	Team Predicate						
		A	B	C	D	E	F	G
I	1	Super Team	Super Team	Super Team	Super Team	Good Team	Super Team	Super Team
I	2	Super Team	Great Team	Super Team	Great Team	Great Team	Super Team	Super Team
II	1	Super Team	Super Team	Super Team	Super Team	Super Team	Super Team	Super Team
II	2	Super Team	Super Team	Super Team	Super Team	Super Team	Super Team	Super Team

4.2. Student Activity

By applying STAD type cooperative learning model to basic programming subject material of branch control structure, student activity becomes increasing. A comparison of the increased student activity in cycle I and cycle II is presented in Table 2.

Table 2. Comparison of Student Activity Enhancement in Cycle I and Cycle II

Activity Indicators	Statement	Statemen t	Average Cycle I	Average Cycle II
		Number	K (%)	K (%)

Visual Activities	Students pay attention to demonstration experiments of others' work	1	96.77	AB	100	A B
	Students pay attention to drawings	2	96.77	AB	100	A B
Oral Activities	Students express opinions on discussion groups	3	59.68	K	82.26	B
	Students ask the discussion group	4	48.39	K	74.19	B
Listening Activities	Students listen to the teacher's description	5	100	AB	100	A B
	Students discuss with the teacher about the material that has not been understood	6	46.77	K	67.74	C
Motor Activities	Students are experimenting	7	69.35	C	82.26	B
	Students solve the problem	8	69.35	C	80.65	B
Emotional Activities	Students are interested in studying	9	96.77	AB	98.39	A B
	Students are eager to attend lessons	10	95.16	AB	100	A B
Average Cycle I and II			77.90	B	88.55	B

Based on Table 2 it can be seen that the average of student activity on statement number 1, 2, 3, 4, 6, 7, 8, 9, 10 has increased from cycle I to cycle II. At the first meeting, inactivity is considered reasonable because students have not been able to adapt to the applied learning situations and conditions. But at the next meeting, the students are getting used to the situation and condition and understand the rules/learning norms applied to STAD type cooperative learning model. So, all students experience increased activity at each meeting. The increase occurs because the students are already familiar and passionate about the application of the STAD model, so that the discussion and teamwork run smoothly, the students have started to feel confident to express their opinions, the students have started daring to ask, either between groups or with teachers, students are very passionate in doing experiments, students are very passionate in solving problems, students are very interested and eager to follow the lesson. However, from the observed activity, there is one activity that does not increase that is in statement number 5, this is because the score of activity of cycle I maximum is 100% so that in cycle II also have activity score 100%. The increase is also based on the advantage of applying the STAD model as follows: Students work together to achieve the goals by enforcing group norms, Students actively assist and motivate the spirit to succeed together, actively acting as peer group to further improve Group success, interaction among students in line with their increasing ability in opinion, enhancing individual abilities, enhancing group skills, not competitive, not taking vengeance [18]. All the advantages have been felt when applying STAD model to increase student activity. Average of student activity in cycle I with average percentage 77.90% with good qualification have fulfilled indicator of the success of research, but because hold on theory from Kemmis and Taggart hence researcher continue cycle II. The average activity of cycle II with a percentage of 88.55% with good qualification has also met the success indicators in this study.

4.3. Student Learning Outcomes

By applying STAD type cooperative learning model on the basic programming subjects of branch control material, student learning outcomes become increasing. Comparison of improvement of student learning outcomes at the end of the cycle I evaluation and final evaluation of cycle II is presented in Table 3.

Table 3. Comparison of Improved Student Learning Outcomes in the Evaluation of End of Cycle I and Cycle II

No.	Value	Alphabet	Predicate	Cycle I		Cycle II	
				F	%	F	%
1	97 – 100	A	Expert	-	-	1	3.23
2	88 – 96	A-	Expert	22	70.97	20	64.52
3	80 – 87	B+	Dominate	6	19.35	9	29.03
4	72 – 79	B	Dominate	2	6.45	1	3.23
5	63 – 71	B-	Dominate	-	-	-	-
6	55 – 62	C+	Less Mastery	1	3.23	-	-
7	47 – 54	C	Less Mastery	-	-	-	-
8	38 – 46	C-	Less Mastery	-	-	-	-
9	30 – 37	D+	Not Mastering	-	-	-	-
10	0 – 29	D	Not Mastering	-	-	-	-
The number of students				31	100	31	100
Average Student Results Based on Individual Completeness				89.25		90.32	
Student Learning Outcomes Based on Classical Mastery				97%		100%	

Based on Table 3 it can be seen that there is an increase in both the frequency, the average percentage of student learning outcomes based on individual completeness, and the average percentage of student learning outcomes based on individual completeness in each cycle. For students who scored between 97-100 with the letter A category Expert in the first cycle there has not been a single person and on the 2nd cycle increased marked by 1 person obtaining a value between 97-100 with the letter A category Expert with a percentage of 3.23%. Students who scored between 88-96 with the A- category Expert in cycle I amounted to 22 people with percentage 70.9% and in cycle II amounted to 20 people with a percentage of 64.52% decreased the number of students because 1 person increased to the value 97-100 and 1 person decreased to the value of 80-87. Students who scored between 80-87 with the letter B+ category Dominate in cycle I amounted to 6 people with percentage of 19.35% and in cycle II amounted to 9 people with a percentage of 29.03% increase in the number of students as much as 3 people because 1 person of value between 88-96 and 2 people of the value 72-79. Students who scored between 72 and 79 is categorized by letter B. Dominate in cycle I amounted to 2 people with percentage of 6.45% and in cycle II amounted to 1 person with percentage 3.23%, there was a decrease in the number of students because 2 people increased to the value between 80-87 and 1 person increase from the value between 55-62. Student learning outcomes consisting of classical completeness and individual completeness increased in each cycle. The first cycle of classical completeness with a percentage of 97% with an average score based on the individual completeness is 89.25 with the letter A- the predicate is Expert have fulfilled the indicator of success of the research, but because the researcher is shaped by the theory of Kemmis and Taggart in [2] proceed to cycle II. In the second cycle of classical completeness with 100% percent with the average value based on the individual completeness is 90.32 with the letter A- predicate Expert also has met the success indicator in this research.

5. Conclusion

Based on the results of research and discussion in Classroom Action Research conducted, it can be concluded as follows: Student learning activities increase in each cycle that is on the first cycle with the average percentage of 77.90%, and on the second cycle with an average percentage of 88.55%. This shows that by applying STAD type cooperative learning model can increase student activity on branching control material. Student learning outcomes consisting of mastery of classical and individual learning occurs in every cycle that is in the cycle I classical completeness with a percentage of 97% with an average value based on individual completeness is 89.25, and on cycle II with the classical completeness 100% percentage with average value based on individual completeness is 90.32. This shows that by applying STAD type cooperative learning model can improve student learning outcomes on the material of branch control structure.

5.1. Future Work

This research is limited to the basic programming subjects of branch control structural material, so there is a need for further research by applying STAD type cooperative learning model on other subject or material, and also as study material for the next researcher.

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