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Student Learning Outcome Difference on Salt Hydrolysis Between Student Taught Using STAD Model and Student Taught Using TAI model

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This research aimed to know difference between students learning outcome taught using STAD model and students learning outcome taught using TAI model on the subject of salt hydrolysis. This research was conducted at SMA N 2 Majenne, Indonesia. This research was categorized as quasi-experimental with post-test only control design. Population in this research was three groups of 11th grade student of natural science consist of 60 students. Samples were a group student namely XI MIA 1 (1st experimental group, taught using TAI type cooperative learning model) and a group students namely XI MIA 3 (2nd experimental group, taught using STAD type cooperative learning model). They were taken by random sampling. Each group consisted of 20 students. Data was collected by administering a posttest, a multiple choice test, consisted of 20 valid items. The data obtained was analyzed using descriptive and inferential statistics. The result of the descriptive analysis showed the average score of the 1st experimental group posttest was 84.1 ± 8.5 and the 2nd experimental group was 76 ± 13.08. The percentages of completeness were 80% and 35% for the first and second experimental group, respectively. Data was not distributed normally and not homogeneous. The results showed that the learning outcome of students taught using the TAI type cooperative learning model was better than the learning outcome of students taught using the STAD type cooperative learning model.

Keywords: cooperative learning model, TAI, STAD, learning outcomes

I. INTRODUCTION

Cooperative learning is a learning model that actively engages students in learning process. In this model, teacher is a facilitator in helping students solves problems. Student Team Achievement Division (STAD) and Team Assisted Individualization (TAI) models are examples of cooperative learning models.

There are some differences and similarities between STAD and TAI models [1,2,3]. The implementation stages of STAD and TAI models are listed in table 1. STAD models consists of five main components namely class presentation, teamwork, quizzes, individual improvement scores, and team rewards [4]. STAD is easy to implement and suitable for almost all subjects [5]. A research results showed that there were differences between student learning outcomes before taught using STAD model and after taught using STAD model [6]. On the other hand, TAI model improves student problem solving skills [7]. TAI model improves studens intensity to discuss and to interact each other [8]. TAI model elements are almost similar as the STAD models [9,10]. The difference lies in grouping students in the TAI model; students are given a test before learning, then they are grouped based on their result, members of each group are heterogeneous, where all students with a level of ability exist in one group, so that students ability between one group and another homogeneous [11].

According to the background above and the strengths of the two models, this study was designed to investigated the students learning outcomes differences on the subject of salt hydrolysis between students who taught using STAD model and students who taught using TAI model.

II. METHOD

This research was a quasi-experimental research with post-test only controls design. A group student was taught using TAI model (1st experimental group) and a group student was taught using STAD model (2nd experimental group) on the subject of hydrolysis. At the end of the learning, students understanding was evaluated using post-test. This research was conducted at SMA N 2 Majenne, Indonesia and population of this research was 60 eleventh-grade student that divided into three groups. Samples were a group student namely XI MIA 1 (1st experimental group) and a group students namely XI MIA 3 (2nd experimental group). Both of the samples were taken by random sampling technique [12]. Each group consisted of 20 students. Student learning outcomes were collected by administering a post-test, multiple choice tests, consisted of 20 valid items. The data obtained was analyzed using descriptive statistic to describe student learning outcome as highest, lowest and average score, and complete and incomplete categories based on minimum criteria called *Kriteria Ketuntasan Minimum* (KKM), and inferential statistics to analyzed the difference of the student learning outcome. KKM in this research was 80, so student who has score lower than 80 is categorize as incomplete and student who has score equal or higher than 80 was categorized as complete. Normality and homogeneity was analyzed using chi-square and F-test, and the difference of student learning outcomes was measured using Mann-Whittney test (U-test) [13]. The inferential statistic was measured using SPSS 16.0 for windows.

TABLE I. THE IMPLEMENTATION STAGE OF LEARNING ACTIVITIES IN EXPERIMENT CLASS 1 (TAI) AND EXPERIMENT CLASS 2 (STAD)

TAI model [1,2]	STAD model [3]
Initial Activity (10 minutes) Stage 1: Conveying goals and motivating students - The teacher greets, greets, and checks student attendance - The teacher conveys the learning objectives to be achieved. - The teacher gives motivation to students. Core Activities (70 minutes) Stage 2: Present information - The teacher guides students to look for information about the subject matter. - The teacher explains the subject matter Stage 3: Individual learning - The teacher gives assignments to students to learn individually Stage 4: Quizzes - The teacher gives a quiz individually to get a basic score or initial score Stage 5: Division of groups - Teachers form groups, consisting of 4-5 students of different abilities. - The teacher provides guidance to groups that are experiencing difficulties. Stage 6: Group discussion regarding learning outcomes Stage 7: Conclude the material Students with teacher guidance make conclusions Stage 8: Individual quizzes Stage 9: Give awards Final Activity (10 minutes) - Guiding students to conclude - Delivering further material. - Close the meeting with greetings	Initial Activity (10 minutes) Stage 1: Conveying goals and motivating students - The teacher greets, greets, and checks student attendance - The teacher conveys the learning objectives to be achieved. - The teacher gives motivation to students. Core Activities (70 minutes) Stage 2: Present information - The teacher guides students to look for information about the subject matter. - The teacher explains the subject matter Stage 3: Division of groups - Students are divided into several groups, consisting of 4-5 students who prioritize class heterogeneity (diversity) in academic presentations, gender / gender, ethnic sense. Stage 4: Learning activities in teams (Team work) - Students study in groups, the teacher prepares worksheets. - The teacher makes observations, provides guidance, encouragement and assistance when needed Stage 5: Evaluation - The teacher can evaluate learning outcomes by giving quizzes. Stage 6: Appreciation for team presentations. - After the quiz, the teacher checks the students work given a range of values from 0-100. Furthermore, giving awards for the success of the group. Final Activity (10 minutes) - Guiding students to conclude - Delivering further material. - Close the meeting with greetings

TABLE II. DESCRIPTIVE STATISTICS OF STUDENTS' LEARNING OUTCOMES ON THE SUBJECT OF SALT HYDROLYSIS

Statistics	Value/Score	
	1st Experimental Group	*2nd Experimental Group*
Number of sample	20	20
Highest score	95	95
Lowest score	65	50
Average score	84.25	74.00
Standard Deviation	8.63	13.24

TABLE III. CATEGORIES, FREQUENCIES, AND PERCENTAGES OF STUDENT LEARNING OUTCOMES ON THE SUBJECT OF SALT HYDROLYSIS

Category	Value	*1st Experimental Group*		*2nd Experimental Group*	
		Freq.	*(%)*	*Freq.*	*(%)*
Complete	≥ 80	16	80	7	35
Incomplete	< 80	4	20	13	65
Total		20	100	20	100

III. RESULTS AND DISCUSSION

Descriptive analysis results of student learning outcomes on the subject of salt hydrolysis of the first experimental group, a group student that taught using TAI model, and second experimental group, a group student that taught using STAD model, are shown in table 2. According to the table 2, it is clear that both of the student group has same the highest score (95). The lowest score of the 1st experimental group (65) is higher than that of the 2nd experimental group (50). It seems that the average score of the 1st experimental group (84.25±8.63) is much higher than that of the 2nd experimental group (74.00±13.24). According to the KKM, the completeness of the 1st experimental group (80% of students) is much higher than that of the 2nd experimental group (35% of students) (see table 3). According to inferential analysis, the students in 1st and 2nd experimental groups were homogeny (significance value were 0.2 and higher than significance level (α), 0.05). U-test showed that significant value (α = 0.006) much lower than significance level (α = 0.05), and is indicated that student learning outcome on the subject of the salt hydrolysis between students of the 1st experimental group and students of the 2nd experimental group was significantly difference.

The phenomenon mentioned above is caused by the combination of cooperative learning and individual learning in TAI model (1st experimental group). In the group, there were students who have good academic and understanding, so the students could help other students in the group who have weak understanding. Students activities mentioned above did not exist in the STAD model. TAI model train students how to work in a team, how to take a responsibility for their group and themselves, so the students more motivated to learn and to be active in learning [2].

IV. CONCLUSION

Based on the discussion above, it can be concluded that there is a significant difference between the students learning outcomes on the salt hydrolysis subject of students taught using TAI model and STAD model.

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