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(Research Article)

Student Team attainment Division of Cooperative Learning Model on Mathematics Learning Outcomes towards Underachiever Students

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Abstract:
The OECD Program for International Student Assessment (PISA) in 2018 shows that reading, science and mathematics skills of Indonesia students rank 75th out of 81 countries in the World. The decline in reading, science and mathematics skills of students in Indonesia can be minimized by providing meaningful learning using the STAD (Student Team Achievement Division) of cooperative learning model. This model can increase the meaning of the student learning process which can increase the ability of student learning outcomes. The research objective was to examine the differences in learning outcomes of gifted students with less achievement using the STAD cooperative learning strategy and the students utilizing the conventional learning model in mathematics. This study was a True Experimental with the design of *The randomize pre-test and post-test control group design*. The number of samples in this study were 60 students who were divided into 2 groups, namely the experimental group was given the treatment of the learning model amounting to 30 students and the control group with the treatment of the conventional learning model amounted to 30 students. The instrument used to measure learning outcomes was the essay test with the *corrected total correlation index* of 0.573 to 0.789. The data were analyzed using T-test. The results showed that the use of the STAD learning model could improve students mathematics learning outcomes and increase students activity compared to groups given conventional learning treatment.

Keywords: STAD, Mathematics learning outcomes, Underachiever Students

1. Introduction

The OECD Program for International Student Assessment (PISA) in 2018 shows that reading, science and mathematics skills of Indonesia students rank 75th out of 81 countries in the World. This is of course a special note and concern for education in Indonesia due to its position with other countries like Panama, Morocco, Lebanon, Kosovo and Philippines. (https://www.cnnindonesia.com/gayahidup/20191204122003-284-454012/per_Rank-membaca-dan-matematika-indonesia-terendah-di-dunia accessed 28/08/2020). Apart from PISA, the TIMSS (*Trend in International Mathematic and Science Study*) institute in 2011 shows that the mathematics and science sector of junior high school students in more than 95% of grade 2 students only have mid-level abilities, while in other countries 50% of students are at the highest level (Asri et al., 2017). Reading, science and mathematics skills have an important role for the development of science and technology being

echoed by the government today. This decline is also accompanied by a decrease in human resources in Indonesia. Mathematics and science skills can be enhanced by meaning in the learning process

Underachiever is defined as gifted children with less achievement, namely gifted children having high potential but show lower achievement (Wahab, 2007). During childhood, these students showed excellent learning abilities but low achievement. This decrease can be seen in the evaluation scores, test scores and low report cards, or even not being able to reach the minimum passing grade.

Pringle defines gifted students with less achievement as students having the same IQ as over 120 but have difficulties in education and/or gifted students with less achievement behaviour. In addition, these students have the ability of 25% of the upper part based on test results. Underachiever condition is caused by a combination of factors at home and school. Problems faced by individuals at home can interfere the learning process (Chukwu-Etu, 2009., Eva, 2018). Distraction to learning can be exacerbated by the emergence of boredom, poor learning process, bad environment, personality, and peers. Underachiever students studying mathematics and science experience many problems that underachiever students must face.

For underachiever students, learning mathematics and science is difficult, there are many obstacles that must be faced, including the nature of mathematics itself, language problems, lack of ability to process information about lessons and low motivation to learn accompanied by high math anxiety (Yee & Ee, 2002). Problems faced by underachiever students can be minimized by implementing an appropriate learning model and a conducive and comfortable learning environment.

Learning is a change in behaviour that lasts a long time, this change is formed based on the experiences experienced by individuals (Schuck, 2012). Learning is composed of several interconnected components, including the objectives of the materials, appropriate methods and evaluation. All of these components must be considered by the teacher to determine the learning models used in the learning process with appropriate models and strategies that will improve learning outcomes and meaning in the learning process (Rusman, 2012., Akintunde & Olukemi, 2014).

STAD (Student Team Achievement Division) cooperative learning type is a type of learning model oriented to the constructivism approach using heterogeneous small groups (Trianto, 2011). The STAD (Student Team Achievement Division) of cooperative learning process is to provide complex problems to students which will then seek solutions by students through the discussion process, while the teacher only acts as a facilitator, so that students can get solutions and be able to build relevant knowledge (Rusman, 2012). STAD (Student Team Achievement Division) Learning has three main concepts that influence the success of the learning process, including group rewards, responsibilities and opportunities, and equal opportunities. These three concepts play a role in increasing student motivation to be active during the learning process. The process (Student Team Achievement Division) is said to be incomplete if one of the camp members does not or has not mastered the subject matter. STAD (Student Team Achievement Division) Learning students will be divided into several groups. A group formed during learning consists of four or five people, who have various achievements, gender and ethnicity. The teacher will provide a stimulus, while students will discuss the stimulus and work together to ensure that all members understand the material, and achieve learning objectives, that can be seen after being given the test (Hanurawan & Soetjipto, 2009). STAD (Student Team Achievement Division) learning has a main characteristic, namely teamwork. During the collaboration, all team members emphasize giving their best for the success of their team, as well as helping each other among team members (Hariadi, 2011). A team provides peer support for academic performance, shows mutual care and respect, inter-group relationships, self-esteem and acceptance of most students, those which have a meaningful influence on students and learning outcomes. STAD Type Cooperative Learning Steps are: (1) delivery of goals and motivation, by doing apperception or writing learning themes/sub-themes, (2) a presentation from the teacher, namely providing stimulus by delivering material, (3) group division, every group consisting of 4-5 students with different achievements, abilities, gender, and ethnicity (4) learning activities in team (teamwork), at at this stage the teacher acts as a facilitator, (5) quizzes or evaluations in the form of individual or group test. (Slavin, 2012).

2. Research Method

This research was conducted on underachiever students at a senior high school in Surabaya (SMA Negeri 5 Surabaya), East Java Province. This research was conducted in the odd semester of the 2019/2020 school year, on October 15th to October 30th, 2019. The sampling technique was random sampling. This type of research was True Experimental, which showed the law of cause and effect by manipulating one or more variables in one or more experimental groups.

The research instrument used was divided into 2, including (1) treatment instruments consisting of a Learning Implementation Plan, syllabus, and student activity sheets. (2) Measuring Instruments consisting of tests used to measure students' abilities in the pre-test and post-test and validated learning outcomes instruments. The research design used was The Randomize pre-test and post-test control group design. Each group was selected randomly. The first group was given treatment using the STAD type learning model and the other group was not treated (conventional learning). The following is a table of the research sample distribution

No.	Group	Treatment Group	M	F	The Number of Students
1.	A	STAD Cooperative Learning	9	21	30
2.	B	Conventional Learning	6	24	30
The Number of Students			15	45	60

To Avoid the preparation of research instruments deviating from the predetermined dimensions and indicators, it was necessary to make an instrument grid, so that learning outcomes could be measured properly. The instrument used to measure learning outcomes was an essay test. The learning outcome test was compiled based on the basic competency standards and indicators contained in the syllabus of mathematics subjects, the topic of statistics that had been determined in the 2013 curriculum. Before using the test, the validity and reliability tests were conducted first.

The dependent variable was the student's mathematics learning outcomes after being given a treatment. Students' mathematics learning outcomes were the test scores obtained from the post-test, while the independent variable was the STAD type learning model. The data obtained through the research results were the data about the learning outcomes of the STAD cooperative learning method, those which were analyzed with quantitative descriptive analysis. This analysis looked for the mean, mode, median, standard deviation of each variable studied, then looked for variances, looked for the requirements of analysis, and tested the hypothesis using the T-test.

3. Research Results

The measurement results of the experimental group based on the mathematical tests before and after treatment are shown by the following table below:

	Pretest	*Post-test*	Total	Margin
Total	1419	4567	4027	1189
Average	47	87	134	40
Minimum	25	50	75	25
Maximum	57	100	175	43

From the results above, it can be seen that the total pre-test score was 1419 and the total post-test score was 2608, and the margin of score between pre-test and post-test was 1189. Therefore, it can be interpreted that there was an increase in the number of mathematics test scores after being given treatment. For the total average score, at the time of the pre-test there was a value of 47; and at the time of the post-test, the mean

value was 87 and the difference in the average score was 40 points. The students' pre-test scores in the experimental group were in the sufficient category. In the post-test mean, the scores of students were in the very high category. Thus, it can be interpreted that there was an increase in the average total score after the treatment was given. For the minimum total score, at the pre-test, there was a value of 25 and at the post-test, there was a value of 50 and the difference in the minimum score was 25 points. Therefore, it can be interpreted that there was an increase in the minimum value in the total score after the treatment was given. For the maximum total score, at the pre-test, there was a value of 57; and at the post-test, there was a value of 100 and the difference in the minimum value was of 43 points. Therefore, it can be interpreted that there was an increase in the maximum value in the total score after the treatment was given.

The measurement results of the control group based on the mathematics tests before and after treatment are shown by the following table below:

	Pretest	*Post-test*	Total	Margin
Total	1320	2136	3456	816
Average	44	71,2	115,2	27,2
Minimum	25	43	68	18
Maximum	80	98	178	18

From the results of the measurement above, it can be seen that the total pre-test score was 1320 and the total post-test score was 2136, and the difference in the number of scores between pre-test and post-test was 816. Therefore, it can be interpreted that there was an increase in the number of mathematics test scores after being given treatment. For the total average score, at the pre-test there was a value of 44; and at the time of the post-test, there was a value of 71.2 and the difference in the average score was of 27.2 points. Students' pre-test scores in the control group were in the sufficient category. On the mean, the post-test score of students was in the high category. Thus, it can be interpreted that there was an increase in the average total score after the treatment was given. For the minimum total score, at the time

In the pre-test, there was a value of 25; and at the time of the post-test there was a value of 43 and the difference in the minimum value was 18 points. In other words, it can be interpreted that there was an increase in the minimum value in the total score after the treatment was given. For the maximum total score, at the pre-test, there was a value of 80; and at the post-test, there was a value of 98 and the difference in the minimum value was 18 points. Therefore, it can be interpreted that there was an increase in the maximum value in the total score after the treatment was given.

In the Normality Test in this study, the analytical technique used to meet the prerequisites for the homogeneity test was the Levene's Test analysis technique. The conclusion regarding the assumption of similarity in data variants between the experimental group and the control group was if the significance result showed a value of smaller than 0.01 (sig. < 0.01).

4. Discussion

The results of this study were in accordance with students' responses to the application of the STAD Model. Students felt a different learning atmosphere, an active class atmosphere, the existence of cooperation in carrying out assignments in groups. Collaborative activities fostered collaboration and communication skills in groups. In Collaborating, there is a division of roles, tasks and responsibilities for each group in solving problems. Each group member respected each other and contributed ideas or opinions. Students could feel the benefits of STAD as scaffolding, even though at first they were not used to it. Overall, students positively supported the learning environment and highly rated experiences on a scale of communication and interaction, reflection, perceived learning, and individual satisfaction. Learning using the conventional method has the characteristics of the absence of opportunities for students to compile their own knowledge, and in conventional learning the teacher acts as a source of knowledge (Purwoto, 2004). Students only memorize the material being taught instead of understanding the material (Purwoto, 2004).

Montgomery, 2009 (in Sutriningsih, 2017) states that the causes of students experience underachieving are divided into two factors, namely: 1). Internal factors which include; (a) low motivation, meaning that students are not aware of their potential; besides, the target is too low and the fear of failure is one of the factors students experiencing underachieving state, and it is exacerbated by the assessment of other people tending to reduce student interest. (b) limited physical condition, in which students have deficiencies or disabilities that hinder their achievements. (c) individual personalities such as perfectionism, students who have this personality tend to be sensitive to be helpless in social skills, be low self-esteem and too confident, those which make students forget about their shortcomings (d) the learning load, namely the amount of material in school accompanied by a lot many hours of study, which tends to be ineffective as well as the many extracurricular activities, making it difficult to manage time. 2) External factors include; (a) lack of respect from the family environment, as well as low family concern for children's achievement and lack of concern from the family environment regarding student potential (b) family economic status, students with lower economic status tend to have learning facilities and infrastructure. (c) school environment, inadequate school components, for example the support for infrastructure, curriculum not suitable for student conditions, low variation and non-conducive in learning models applied by teachers and a school environment. (d) a less conducive environment and low demand on student achievement.

In the STAD cooperative learning model, students are invited to discuss by forming small group, and given quizzes and rewards to provoke student motivation in doing their assignments, so that the learning process can take place dynamically and pleasantly. From the explanation above, the STAD type cooperative learning model is very appropriate to be used to improve learning outcomes for students with special needs or underachievers. In addition to the studies described above, it is necessary to carry out other research on the STAD type cooperative learning model, which has had a positive effect on improving mathematics learning outcomes in underachiever students. Researchers in the field of education, both lecturers and teachers, can examine different variables, so that more in-depth research results are obtained. The application of the STAD-type cooperative learning model can be integrated with other strategies utilizing, so that they be complemented each other. As the result, the pedagogical implications are useful for increasing students' body of knowledge information and practical benefits of other educational theories.

5. Conclusion

1. The STAD (Student Team Achievement Division) learning model was a cooperative learning model that could improve the mathematics learning outcomes of underachiever students. This can be proven by the initial average value before being given STAD (Student Team Achievement Division) treatment in the experimental group, which was 47; then after being given STAD (Student Team Achievement Division) treatment, the average was 87. On the other hand, the pre-test and post-test score of control group were 47 and 71.2, respectively.
2. The STAD (Student Team Achievement Division) learning model was effective for improving mathematics learning outcomes of underachiever students. This can be seen from the value of t = 7,380 with a value of sig = 0.00.
3. The STAD (Student Team Achievement Division) learning model could provide students with opportunities to build information, so that learning became meaningful. This can be seen on the learning process, the students became more active.

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