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STAD Type Cooperative Learning Style to Improve Students' Mathematical Abilities

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Abstract.*The application of the STAD type cooperative learning method (Student Teams-Achievement Divisions) is a relevant strategy in efforts to improve students' mathematical abilities. In this research, we examine the effectiveness of using the STAD type cooperative learning style in improving students' mathematical abilities. This approach involves dividing students into small teams to encourage collaboration, joint problem solving, and knowledge exchange. We evaluated the impact of implementing this learning model on students' mathematical abilities and gained insight into effective learning strategies in the context of improving mathematics achievement.*

Keywords: *Cooperative Learning, STAD, Mathematics Ability, Mathematics Education, Student Collaboration.*

BACKGROUND

Various efforts have been made to improve the quality of education by providing training to teachers, equipping learning facilities in schools such as teaching aids, providing workshops or seminars to teachers or educators and to students, and also developing learning models that can facilitate the learning process. . In reality, all these efforts have not been implemented properly. And also in practice , students do not want to be active when studying, as a result the teacher dominates the class when presenting the material, giving example questions, and also asking students to do exercises in textbooks and worksheets based on observations and reflections made . All of this certainly has an impact on student learning achievement, especially if their Mathematics achievement is relatively low or below the KKM (Minimum Completeness Criteria).

Based on the results of observations and reflections carried out by Komang (2021), it turns out that class IXG students at SMP Negeri 1 Loaddem for the 2019/2020 academic year did not perform optimally in their mathematics lessons. Observations show that when learning mathematics, when the learning process takes place, students seem unwilling to participate in learning activities, and learn only because they see, hear, and remember the teacher's explanation, it shows that you are active. Less effective. There is minimal student participation in taking concepts from the material being studied. Many students do not dare to ask the teacher about questions that will be solved. Additionally, students tend not to chat with their friends . Such learning can be ensured that the learning outcomes of class IXG students in Mathematics

are relatively low and always below the specified KKM. On paper the statistics and student absorption capacity are 70.75 with an academic achievement level of 65.00%. The results obtained are certainly far from expectations and efforts are needed to improve them. Among the many existing learning models, the STAD type cooperative learning model is often tested and proven to be effective. This model was chosen because it is based on the idea that cooperative learning models such as STAD provide opportunities for students to actively participate in learning so that students gain direct experience in learning the concepts of the material being studied.

THEORETICAL STUDY

Learning outcomes

Learning outcomes are also said to be learning achievements, the word achievement comes from the Dutch word, namely *prestatie* which in Indonesian is called achievement, which means the result of an effort. Success is widely used and understood as an individual's ability, skills and attitude to complete something, often used as a measuring tool to determine an individual's understanding of the material being studied . Learning outcomes come from two words, namely "results" and "learning". Results obtained from carrying out activities or processes that cause changes in the input function. Meanwhile, learning is a period of relatively permanent change in all individuals' behavior due to experience and interaction with the environment related to cognitive processes.

Learning Outcome Indicators

In general, learning outcomes can be grouped into three areas, namely: cognitive, psychological and affective

1. Cognitive Domain Assessment, is a domain that is closely related to an individual's level of knowledge demonstrated through tests and non-tests.
2. Affective Domain Assessment is a domain related to an individual's attitude towards achieving learning goals.
3. Psychological Domain Assessment, According to Mardapi, psychokinetics includes: movement, basic motor skills, perceptual motor skills, skill motor skills, and beautiful and creative movements.

Factors that Influence Learning Outcomes

Generally, student learning outcomes can be influenced by internal factors (within oneself) and external factors (outside oneself), namely:

1. Internal factors, including individual physiological or physical factors, both innate and

related to vision, hearing, body structure, disability, etc., genetic psychological factors, intellectual factors are divided into potential factors (talents) and actual factors (skills), non-Intellectual is selected behavioral elements such as actions, interests, habits, enthusiasm, needs, self-concept, adaptability and sentiment.

2. External factors include social factors consisting of family, school and community environmental factors
3. Group factors, including culture, physical environment, spirituality or religion. (MKDP Development Team, 2013)

These various factors are interconnected with each other to influence students' learning outcomes. This factor can influence students' intelligence and anxiety.

STAD Type Cooperative Learning Model

Student Teams Achievement Division (STAD) was developed by Robert E. Slavin and his friends at John Hopkins University as a simple cooperative learning method. STAD learning is a type of cooperative learning model that applies small groups with the same number of members and chosen randomly so that the groups will be heterogeneous. According to Laa (2017), the cooperative model is a learning model that can improve student learning outcomes , help students complete assignments and realize learning goals.

According to Slavin (2005) STAD consists of five steps, including:

a. Class presentations, learning materials are first introduced in internal presentations. The difference between a classroom presentation and regular teaching is that the actual presentation must focus on the STAD unit.
b. Teams, each group has 4-5 heterogeneous students
c. Test, each group member is not allowed to collaborate in answering the test.
d. The results of student abilities, the idea of the results of each student's abilities is so that students know how far their abilities are and whether they have achieved their goals, if not then they have to work even harder .
e. Awards, the team will receive certain rewards if they have achieved average results according to predetermined criteria

According to Trianto, the phases of STAD (*Student Teams Achievement Division*) Cooperative learning

Table 1 . Steps to the STAD Type Cooperative Learning Model

PHASE	TEACHER CONDUCT
Phase-1 Convey goals and motivate students	Convey all the lesson objectives to be achieved in the lesson and motivate students to learn
Phase-2 Presenting information	Teachers convey information to students through demonstrations or through reading materials
Phase-3 Organize students into cooperative groups	The teacher explains to students how to form study groups and helps each group to make the transition efficiently
Phase-4 Guiding group work and study	The teacher guides the study groups as they do their assignments
Phase-5 Evaluation	The teacher evaluates learning outcomes or each group presents the results of their work
Phase-6 Give awards	Teachers value both individual and group learning efforts and results

RESEARCH METHODS

The type of research used is research with a qualitative approach. Qualitative research focuses on non-mathematical data analysis that obtains results through data that has been collected from various methods, including interviews, observations, documents, and experiments. The method used is literature study . Library study is an activity that is closely related to methods of collecting library data, reading and taking notes as well as processing research materials.

The steps taken to conduct this research are as follows:

1. Data reduction is a procedure that focuses on simplifying, abstracting and converting "rough" data formed from data contained in several thesis letters, newspapers and theses. For this reason, the data is summarized and only the most important are selected.
2. Presentation of data, in the form of explanations (descriptive), diagrams, *flowcharts* and relationships between categories with narrative test interpretation.
3. Conclusion, conclusion withdrawn gradually , starting from conclusion beginning. Para researcher Also request consideration from stakeholders Which related with study This.

RESULTS AND DISCUSSION

From the search results, researchers got 4 articles that are relevant to the research topic. The articles are as follows:

Table 2 . Relevant Articles

No	Author Name (Year)	Research Title	Level	Material	Code
1	Dewa Made Jebeg (2020)	Efforts to Improve Mathematics Learning Achievement in Composition Function Material Through Cooperative Model Learning of STAD Type for Tegallalang 1 State High School Students	SENIOR HIGH SCHOOL	Composition Function	J1
2	Hendra (2018)	Improving Mathematics Learning Outcomes of Class Xi Science Students at SMA Negeri 1 Bangkinang Through the STAD Type Cooperative Learning Model	SENIOR HIGH SCHOOL	The probability of an event	J2
3	Marsito (2022)	Improving Student Learning Outcomes Through the STAD Cooperative Model in Arithmetic Series Material in Class	SENIOR HIGH SCHOOL	Arithmetic progression	J3
4	Fiki Puspita Sari, Syafdi Maizora, Dewi Herawaty (2017)	Efforts to Improve Student Mathematics Learning Outcomes by Cooperative Learning Type Student Team Achievement Division (STAD) in Class VII of SMP Negeri 11 Bengkulu City	JUNIOR HIGH SCHOOL	Build flat quadrilaterals and triangles	J4

Table 3 . Summary **of Improving Mathematics Learning Outcomes Using STAD Type Cooperative Model**

No	Code	Research result
1	J1	Before being given the cycle, students' learning completeness only reached 25.71% and this was very far from the requirements for completeness. On this basis, action was taken in cycle I so that learning completeness became 77.14% and further increased by giving action in cycle II to 97.14% and the standard deviation of each cycle decreased to 4.35 and this proves that the learning model used can improve student learning outcomes.
2	J2	From student learning results, it can be seen that student absorption increased from 67.55 (cycle 1) to 73.98 (cycle 2), while student completeness increased from 46% (cycle 1) to 69% (cycle 2). In terms of student activity, observers assessed that there was also an increase from cycle 1 to cycle 2 for each indicator of student activity assessment.
3	J3	There was an increase in the average student learning outcomes in cycle II by 11.98%, students' learning completeness increased by 9.31% and students' critical thinking abilities increased by 2.32%. Even though the percentage of student learning completeness in cycle II is 41.86%, so it is not sufficient for the classical SKBM at SMA Negeri 2 Percut Sei Tuan, which is ≥ 80%, this shows that the use of the STAD learning strategy can be applied in an effort to improve student learning outcomes on arithmetic

		series material for class XII IPA 1 SMA Negeri 2 Percut Sei Tuan.
4	J4	Analysis of the first cycle test showed that the average student score was 72.82 with a classical learning completeness of 55.88%, then in the second cycle the learning results increased with an average student score of 81.24 with a classical learning completeness of 70.59%. An increase also occurred in cycle III with an average student score of 83.88 with classical learning completeness of 82.35%.

From the four articles, improvements were seen after being given 2 cycles. To make it clearer, it can be concluded in Table 4 below

Table 4. Summary of Improving Mathematics Learning Outcomes Each Cycle

Article Code	J1	J2	J3	J 4
Before the Cycle	25.71%			
Cycle I	77.14%	77.5%	9.31 %	55.88 %
Cycle II	97.14%	90%	41.86 %	70.59 %
Cycle II I				82.35%

From Table 4, it can be seen that there is an increase in cognitive indicators on student learning outcomes using the STAD type cooperative learning model. not only in the cognitive domain, the effective and psychomotor domains have also greatly increased. As an illustration, in almost every article in the second cycle students become more active in asking questions, discussing and giving their opinions. From the research results of the six articles, it can be seen that innovation in classroom learning methods is really needed. This article is good evidence and reference in helping teachers to improve the classroom learning process in an active and interesting way. Where all articles found that there was an increase in mathematics learning outcomes using the STAD type cooperative learning model.

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusion

Based on the results of literature studies from various data sources, namely 7 different relevant articles, there is a good improvement using the STAD method. Some are significant, some have experienced a slight increase. So from the discussion that has been carried out it can be concluded that learning outcomes can be improved by using the STAD method.

2. Suggestion

Based on the results of the literature study that has been carried out, the researchers put forward several suggestions:

1. Based on literature studies, it is true that learning outcomes can increase
2. For schools and teachers, it is hoped that they will use the STAD type cooperative learning model because it can improve students' mathematics learning outcomes
3. For researchers, it is hoped that they will find sources of data on the causes of low mathematics subjects

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