



Mathematical Problem Solving Ability in Cooperative Learning Type Student Teams Achievement Division (STAD)

AUTHORS INFO

Chairuddin
Universitas Sembilanbelas November Kolaka
chairuddin.spd@gmail.com
082194299525

Farman
Universitas Sembilanbelas November Kolaka
farman.math@yahoo.co.id

ARTICLE INFO

o-ISSN: 2528-2026
p-ISSN: 2528-2468
Vol. 6, No. 2, December 2021
URL: <http://doi.org/10.31327/jme.v6i2.1669>

© 2021 JME All rights reserved

Sugestion for the Citation and Bibliography

Citation in Text:

Chairuddin & Farman (2021)

Bibliography:

Chairuddin & Farman. (2021). Mathematical Problem Solving Ability in Cooperative Learning Type Student Teams Achievement Division (STAD). *Journal of Mathematics Education*. 6(2). 159-163. <http://doi.org/10.31327/jme.v6i2.1669>

Abstract

This study aims to describe the mathematical problem solving ability of class IX students of SMP Negeri 1 Kolaka. The type of research used in this research is descriptive with a qualitative approach. The subjects of this study consisted of 25 students of class IXD SMP Negeri 1 Kolaka. The instruments in this study were a test of problem-solving skills and an observation sheet. The test questions for the ability to solve mathematical problems are in the form of a description test consisting of 5 questions. The observation sheet consists of teacher and student observation sheets which are arranged based on the application of STAD type cooperative learning. The data analysis technique in this study uses the Miles Huberman model which consists of data reduction, data presentation and conclusion drawing. The results showed that (1) the average mathematical problem solving ability of students taught by the STAD type cooperative learning model consisting of 25 students showed a mean value of 70, variance 82.82, and standard deviation 9.10. The average indicates that the problem-solving ability is in the good category. (2) The average percentage of teacher activity is 79.56% who are in the active category, while the average percentage of student activity is 76.67% who are in the active category. Thus, it can be concluded that STAD learning activities can facilitate the achievement of students' problem solving abilities.

Keywords: Problem solving, math, STAD

A. Introduction

The development of today's world cannot be separated from education. Education is very fundamental for the progress of a nation. Through education, students are expected to develop their potential in the form of abilities, knowledge, expertise, and skills. In the implementation of education a curriculum is needed. The curriculum in schools must follow changes in knowledge,

science and technology abilities. Therefore, the curriculum in schools will undergo changes. The curriculum used by the school today is the 2013 curriculum.

In the 2013 curriculum, mathematics is one of the subjects that must be studied by students. Mathematics as one of the basic sciences has an important role in everyday life, as well as in the advancement of science and technology in general. Therefore, mathematics is one of the main subjects in schools (elementary, junior high, high school) to college. Mathematics needs to be studied by students because mathematics is a means of thinking to develop logical, systematic, objective, critical, and rational thinking patterns. One of the goals of learning mathematics in schools is to make students have problem solving skills.

However, the facts show that students' mathematical problem solving abilities are still low (Rianti, 2018). The results of the 2015 Trends in Mathematics and Sciences Study (TIMSS) survey, Indonesia's student achievement position was ranked 61, 62 and 63 of the 69 participating countries evaluated. The results of the 2012 Program For International Student Assessment (PISA) also showed that Indonesia was ranked 64th out of 65 countries. This fact shows that both on a national and international scale, students' achievement and problem solving abilities at the junior high school level are still very low and not yet optimal.

The results of observations and interviews with mathematics teachers, that there are still many students who are less able to solve routine and non-routine problems. This can be seen from the answers of students who are still wrong in interpreting what is known, asked and the clarity of answering questions. Sahrir (2016) states that problem-solving abilities are very dependent on the previous experience of students in remembering certain rules. The more experiences a student gets through reading, seeing, or hearing, the better the student's ability to choose the right solution to solve problems in accordance with the abilities and experiences gained in life.

One of the efforts that can be done in developing students' problem solving abilities is to apply a learning model (Ariandi, 2016). There are various learning models that can be used, each of which has advantages and disadvantages. Therefore, educators must be good at choosing and sorting out learning models used in different materials, and must be able to adapt effective learning models to use (Farman & Chairuddin, 2020) dan sesuai gaya belajar siswa (Farman et al., 2021). The alternative learning models that allow students to develop thinking skills in solving problems in the 2013 curriculum are: Student Teams Achievement Division (STAD) learning model.

The Student Teams Achievement Division (STAD) learning model is a learning model that groups students into small groups of 4 to 5 people, each group must be heterogeneous in terms of gender, ethnicity and academic ability. The Student Teams Achievement Division (STAD) was developed by Robert Slavin and colleagues at Johns Hopkin University. This type is a simple cooperative type that facilitates students to interact between students, motivate each other and help each other in mastering the subject matter in order to achieve optimal learning outcomes (Farman et al., 2019).

The results of the study show that there is an increase in students' problem solving abilities before and after the implementation of STAD learning (Dewi et al., 2021). The STAD type cooperative learning model will improve students' ability to solve mathematical problems because this learning emphasizes group work so that students more easily accept the material presented by the teacher. In this model students have the opportunity to collaborate and elaborate, exchange answers, discuss inequalities, and help each other, discuss and even ask the teacher if they have difficulty understanding the subject matter. This is very important, because it can foster student creativity in finding solutions to problem solving in learning activities.

The purpose of this study was to determine the problem-solving abilities of SMPN 1 Kolaka students in STAD type cooperative learning.

B. Methodology

The type of research used in this research is descriptive with a qualitative approach. By using this approach, researchers are trying to find out in more detail the ability of concept solving abilities in STAD cooperative learning. This research was conducted at SMP Negeri 1 Kolaka in class IX_D with a total of 25 students.

The instruments in this study were a problem-solving ability test and an observation sheet. The test questions for the ability to solve mathematical problems are in the form of a description test consisting of 5 questions. Observation sheets are arranged based on the application of STAD type cooperative learning. This observation sheet aims to collect data about

the activities of teachers and students in learning. This observation sheet is filled out by an observer appointed by the researcher.

The data analysis technique in this study uses the Miles Huberman model which consists of data reduction, data presentation and conclusion drawing (Sugiyono., 2011). To describe or describe research data about problem solving abilities and learning activities are written in the form of categories. The categories of problem-solving abilities are as presented in Table 1 below (Mawaddah & Anisah, 2015)

Table 1. Categorization of Problem Solving Ability

Score	Category
85 – 100	Very Good
70 – 84,99	Good
55 – 69,99	Enough
40 – 54,99	Less
0 – 39,99	Very Poor

Meanwhile, to describe the criteria for student activity (Alis, 2020) it is presented in Table 2.

Table 2. Categorization of Learning Activities (LA)

Percentage	Category
LA > 80%	Very Active
60% < LA ≤ 80%	Active
40% < LA ≤ 80%	Enough
20% < LA ≤ 40%	Less
LA ≤ 20	Off

C. Findings and Discussion

1. STAD-type Cooperative Learning

STAD cooperative learning is carried out based on the steps, namely: (a) Delivery of goals and motivation; (b) Group division; (c) Presentation from the teacher; (d) learning activities in teams; (e) Quiz; and (f) Team achievement awards. Learning activities can be identified through the teacher and student activity observation sheets. The observer's observations on the teacher's ability to manage learning in the STAD class were three meetings. Teacher observation is used to see whether the teacher can carry out the learning process according to the syntax in the STAD type cooperative learning model. The results are presented in the following Table 3

Table 3. Results of Teacher Activity

Teacher Activity	Meeting		
	I	II	III
Total score	49	62	68
Active percentage	65.33%	82.67%	90.67%
The average percentage of activeness	79.56%		

From Table 3 above, it can be seen that the percentage of teacher activity in STAD learning for class IXD after being averaged is 79.56%. This percentage indicates that the activity of teachers in the STAD type of cooperative learning is classified as active. This shows that in carrying out learning, the teacher is active and has followed the STAD type cooperative learning steps.

Assessment of student activity is used to see student activity during the learning process. The results are given in the following Table 4

Table 4. Results of Student Activity

Student Activity	Meeting		
	I	II	III
Total score	36	48	54
Active percentage	60%	80%	90%
The average percentage of activeness	76.67%		

From Table 4 above, it can be seen that the average percentage of student activity in the learning process using the STAD learning model for class IXD is 76.67%. This percentage indicates that student activities in the learning process using the STAD type cooperative learning model are classified as active. This shows that students are active during the learning process.

Thus, this shows that in carrying out learning, teachers and students are active and have followed the steps of the student teams achievement division (STAD) cooperative learning model. The implementation of STAD learning has succeeded in creating a conducive, comfortable atmosphere and encouraging students to be active in the learning process. In addition, the teacher also shows a friendly, friendly attitude, so that students feel comfortable, and are in a pleasant learning atmosphere.

2. Problem solving ability

Analysis of mathematical problem solving ability in the STAD type cooperative learning model can be seen through the average value (mean), variance, and standard deviation. The following analysis results are given in the following Table 5.

Table 5. Students' Mathematical Problem Solving Ability

Aspect	Score
Mean	70
Variance	82.82
Standard Deviation	9.10
Minimum	52.86
Maximum	84.29

Based on Table 5 above, it can be seen that the average mathematical problem solving ability taught by the STAD learning model shows a mean value of 70, variance of 82.82 and standard deviation of 9.10. Meanwhile, based on the category, it is said that the average problem solving ability of students (70) is in the good category. The complete categorization of students' solving abilities is presented in the following diagram:

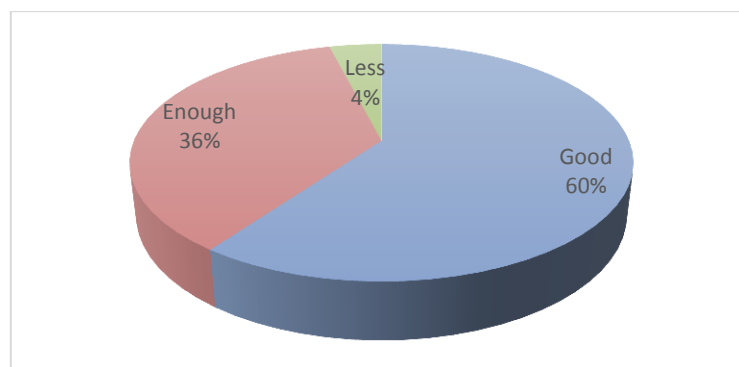


Figure 1. Category Problem solving ability

Based on the diagram shows that most of the problem-solving abilities of students in STAD learning are in the good category (60%). Others are in the sufficient (36%) and less (4%). This is in line with the research of Tambunan et al., (2020) and Suriyani (2019) that there is a positive influence of the STAD learning model on problem solving abilities. The importance of problem-solving skills is not only to make it easier for students to understand mathematics lessons but in other lessons as well as in everyday life (Ariani et al., 2017). Mathematical problem solving abilities obtained in learning mathematics in general can be transferred to be used in solving other problems or making a decision (Reski et al., 2019).

D. Conclusion

The average mathematical problem solving ability of students with the STAD type cooperative learning model is 70. This average indicates that problem solving abilities are in the good category. The average percentage of teacher activity is 79.56%, while the average

percentage of student activity is 76.67%. Both of these activities indicate that STAD learning activities are in the active category.

Thus, teachers are expected to have sufficient knowledge and ability to choose the right learning method or model and in accordance with the material to be taught so as to improve problem solving abilities. In addition, it is recommended for teachers to use the STAD type cooperative learning model in learning mathematics to facilitate students in improving students' mathematical problem solving abilities.

E. References

- Alis, R. (2020). Peningkatan Aktivitas Dan Hasil Belajar Siswa Pada Mata Pelajaran Matematika Melalui Model Pembelajaran Koperatif Tipe Think Pair Share. *Jurnal Junjungan Pendidikan (Intelektual dan Edukatif)*, 1(1), 62–80.
- Ariandi, Y. (2016). Analisis Kemampuan Pemecahan Masalah Berdasarkan Aktivitas Belajar Pada Model Pembelajaran PBL. *Seminar Nasional Matematika X Universitas Negeri Semarang*. Seminar Nasional Matematika X Universitas Negeri Semarang, Semarang.
- Ariani, S., Hartono, Y., & Hiltrimartin, C. (2017). Kemampuan Pemecahan Masalah Matematika Siswa pada Pembelajaran Matematika Menggunakan Strategi Abduktif-Deduktif di SMA Negeri 1 Indralaya Utara. *Jurnal Elemen*, 3(1), 25. <https://doi.org/10.29408/jel.v3i1.304>
- Dewi, N. A., Irham, M., & Wibowo, S. E. (2021). pengaruh penerapan pembelajaran kooperatif tipe stad terhadap kemampuan pemecahan masalah matematika. *ganec swara*, 15(1), 874–879. <https://doi.org/10.35327/gara.v15i1.186>
- Farman, Chairuddin, & Hali, F. (2019). Penerapan Model Pembelajaran Kooperatif Student Teams Achievement Division (Stad) Dalam Upaya Meningkatkan Hasil Belajar Matematika Materi Himpunan Siswa Kelas VII1 SMP Negeri 15 Kendari. *Jurnal Karya Pendidikan Matematika*, 6(2), 10.
- Farman, F., Arbain, A., & Hali, F. (2021). Learning Style Preferences Based on Class and Gender. *AL-ISHLAH: Jurnal Pendidikan*, 13(1), 164–172. <https://doi.org/10.35445/alishlah.v13i1.368>
- Farman, F., & Chairuddin, C. (2020). Pembelajaran Flipped Classroom Berbantuan Edmodo Untuk Meningkatkan Minat Dan Hasil Belajar Siswa Pada Materi Pythagoras. *Jurnal Karya Pendidikan Matematika*, 7(2), 92–100. <https://doi.org/10.26714/jkpm.7.2.2020.92-100>
- Sugiyono. (2011). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta.
- Mawaddah, S., & Anisah, H. (2015). Kemampuan Pemecahan Masalah Matematis Siswa Pada Pembelajaran Matematika Dengan Menggunakan Model Pembelajaran Generatif (Generative Learning) di SMP. *EDU-MAT Jurnal Pendidikan Matematika*, 3(2), 10.
- Reski, R., Hutapea, N., & Saragih, S. (2019). Peranan Model Problem Based Learning (PBL) terhadap Kemampuan Pemecahan Masalah Matematis dan Kemandirian Belajar Siswa. *JURING (Journal for Research in Mathematics Learning)*, 2(1), 049–057. <https://doi.org/10.24014/juring.v2i1.5360>
- Rianti, R. (2018). Profil Kemampuan Pemecahan Masalah Matematis Siswa SMP Pada Materi Bangun Ruang Sisi Datar. *Jurnal Pendidikan Tambusai*, 2(4), 11.
- Sahrir. (2016). *Efektivitas Model Pembelajaran Kooperatif Tipe Team Games Tournament (TGT) Terhadap Kemampuan Pemecahan Masalah Matematika Siswa SMP Negeri 1 Kolaka*. Skripsi: FKIP Universitas Sembilanbelas November Kolaka.
- Suriyani, S. (2019). Pengaruh Model Pembelajaran Student Teams Achievement Division (STAD) terhadap Kemampuan Pemecahan Masalah Matematika. *Jurnal Pembelajaran Dan Matematika Sigma (JPMS)*, 5(1), 1–6. <https://doi.org/10.36987/jpms.v5i1.1236>
- Tambunan, N., Siregar, E. Y., & Harahap, M. S. (2020). Efektivitas Model Pembelajaran Kooperatif Tipe Student Teams Achievenment Division (Stad) Terhadap Kemampuan Pemecahan Masalah Matematis Siswa SMA NEGERI 1 ANGKOLA SELATAN. *JURNAL MathEdu (Mathematic Education Journal)*, 3(1), 61–68.