



The Effectiveness of the Team Assisted Individualization (TAI) Cooperative Learning Model with a Contextual Approach to Student Problem Solving at SMPN 1 Bringin

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Abstract: This research was conducted at SMP Negeri 1 Bringin. This study aims to determine the effectiveness of the Team Assisted Individualization (TAI) cooperative learning model with a contextual approach to student problem solving. This research was conducted in class VIII, with a population of all classes VIII A to F. The sample of this study was class VIII D, as the experimental class and class VIII F as the control class. This study used a quasi-experimental quantitative research design, namely a posttest only control group design where researchers gave posttests to both the experimental and control classes, but only the experimental group received treatment. The method used in the problem-solving stages of this study is Polya's four stages. By using data analysis at a significance level (α) = 0.05, the hypothesis results were $2.885 > 2.056$ with the conclusion that in class VIII D or the experimental class H_0 was rejected and H_a was accepted, then the Team Assisted Individualization (TAI) cooperative learning model with a contextual approach was able to improve student problem solving.

Keywords: *Problem Solving; Contextual Approach; Team Assisted Individualization.*

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1. INTRODUCTION

Education in the 21st century is very important and determines the development of a country. This is in accordance with the objectives contained in the 1945 Constitution, paragraph IV, namely to advance public welfare and educate the nation's life. This objective is reinforced by Law No. 20 of 2003 concerning the national education system, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society, nation, and state. To face the world of education today, the challenges and problems faced are increasingly complex. Life in the 21st century demands various skills that must be mastered, education is expected to prepare students to master various skills in order to become successful individuals in life. Through education, students can develop knowledge

and skills (Rahmawati Dwi Arum, 2021). Important skills in the 21st century are still relevant to the four pillars of education according to UNESCO which include learning to know, learning to do, learning to be, and learning to live together. The four pillars of education contain specific skills that need to be empowered in learning activities to prepare a superior generation to face the challenges of the 21st century.

Based on the results of the PISA survey in 2022, Indonesia was ranked 68 out of 81 countries in mathematics with a score of 379 which can be categorized as low (OECD, 2022). The cause of students' low mathematics scores is the weak ability to solve problems at high levels. The questions tested in PISA consist of 6 levels and the questions tested are contextual questions, the problems are taken from the real world. Students in Indonesia are accustomed to working on routine questions at levels 1 and 2. Therefore, it can be concluded that the mathematical problem-solving abilities of Indonesian students are still relatively low.

Based on the results of observations obtained at SMP N 1 Bringin which has 6 classes at each level with a total of 170 students per class, the mathematical problem-solving abilities of students are still relatively low. The results of the students' final exam scores were low with an average score of 65 out of 170 students with a minimum completeness criterion of 75, there were still 55% of students who had not met the minimum completeness criterion or 93 students who had not met the minimum completeness criterion. Low student problem solving can be seen from the daily test scores because students were less able to solve story problems.

The conventional learning model is less effective in working on mathematics. This approach emphasizes the role of the teacher who provides explanations of formulas, causing students to tend to memorize without understanding. This results in difficulties when applying knowledge in solving problems. Therefore, teacher creativity is needed in delivering material to increase student interest and motivation. By reducing monotonous learning and providing interesting learning, mathematics does not need to be considered scary, and students can achieve optimal learning outcomes.

Time Assisted Individualization (TAI) learning is student-centered learning. In this learning model, students learn independently or in groups according to their abilities, the teacher is tasked with supervising and providing assistance to students who need it. In this learning, the teacher acts as a facilitator. Students must be able to work in groups and actively participate in understanding concepts and solving problems from the material discussed in learning (Aminah Mursalin & Muhsam, 2021).

Based on research conducted (Putri Nabila et al., 2022) it was stated that learning activities

using the Team Assisted Individualization (TAI) learning model can improve students' mathematical problem solving. Brinus et al. (2019) that contextual learning can improve the understanding ability of SMPN 4 Langke Rembong class VII students because in contextual learning there is a relationship between material and everyday life. In addition, research conducted by Lailati Fina (2019) that TAI cooperative learning with a contextual approach on the subject of quadrilateral plane shapes in class VII-F SMP N 5 Tuban in the 2017/2018 academic year experienced an increase in student learning outcomes.

Based on the results of the research above, this study has similarities, namely using TAI cooperative learning with a contextual approach. However, the above study also has differences, namely only using TAI learning and contextual learning to improve mathematical understanding and learning outcomes. With the existing background, the researcher conducted a study related to the Effectiveness of the Team Assisted Individualization (TAI) Cooperative Learning Model with a Contextual Approach to Problem Solving.

2. METHOD

This research was conducted in SMP Negeri 1 Bringin class VIII, this study used a quantitative quasi-experimental design approach. The design used in this study is a post-test only control group design, namely, giving post-tests to both the control and experimental classes, but only the experimental group was given treatment. The population in this study was class VIII of SMP Negeri 1 Bringin which consisted of 170 students divided into 6 classes. In this study, sampling was carried out by cluster random sampling, which was carried out randomly, not individually, but in small groups or random sampling techniques without looking at the start (Sugiyono, 2019). The sample in this study consisted of two classes, VIII D as the experimental class and VIII F as the control class. The variables in this study consisted of independent variables and dependent variables. The independent variable in this study is the cooperative learning model of the Team Assisted Individualization (TAI) type with a contextual approach, while the dependent variable in this study is student problem solving. The instrument used in this study uses a test instrument. This instrument is used to measure students' problem solving level. The test used is in the form of 5 descriptive questions with a moderate level of difficulty.

3. RESULTS AND DISCUSSION

The validity found in this study shows that the instrument used is able to measure relevant aspects according to the measurement objectives, so that the results obtained can be trusted to describe students' problem-solving abilities.

In addition to validity, instrument reliability is also the main focus in this study. Reliability is an important indicator to assess the consistency of the results obtained when the instrument is used in repeated measurements. In this study, reliability was measured using the Cronbach Alpha coefficient, which produced a value of 0.792. This value is greater than the threshold set, which is 0.70, indicating that the instrument has good internal consistency. Thus, the results obtained from the use of the instrument tend to be stable and reliable.

A difficulty level test was also conducted to ensure that the questions used in this study have a balanced level of difficulty, so that they can test students' abilities effectively. From the results of the analysis, it was found that 7 questions had a moderate level of difficulty, while the other 5 questions were relatively easy. This balance of difficulty levels is important so that the instrument can differentiate well between students who have high and low abilities in problem solving.

In addition, the discriminatory power test provides important insights into the quality of the questions. Good discriminating power indicates that the questions are able to differentiate between students with high and low abilities. The test results show that most of the questions have good discriminating power, with the discriminating power index value ranging from 0.41 to 0.70. This further strengthens the validity and reliability of the instrument, because the questions are not only valid and reliable, but also able to effectively differentiate students' abilities.

Prerequisite testing through normality and homogeneity tests ensures that the data obtained meets the assumptions required for further analysis. The results of the normality test show that the data from both groups have a normal distribution, while the homogeneity test shows that both groups have homogeneous variances. With the fulfillment of these two prerequisites, further statistical analysis can be carried out more accurately.

Finally, the hypothesis test shows that the Team-Assisted Individualization (TAI) type cooperative learning model with a contextual approach has a higher effectiveness in improving students' problem-solving abilities compared to conventional learning models. This is supported by the results of the t-test, where the calculated t value is greater than the t table, which indicates that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Thus, it can be

concluded that the implementation of the TAI type cooperative learning model has a significant positive impact on improving students' problem-solving abilities. This finding indicates that the contextual approach integrated into the TAI model is able to provide a more relevant and meaningful learning experience for students, thereby increasing the effectiveness of learning in the context of developing problem-solving abilities. This approach offers a superior strategy to be used in learning, especially in situations that require the development of critical and analytical thinking skills among students.

4. CONCLUSION

Based on the research results obtained at SMP N 1 Bringin which has 6 classes, that students' problem-solving abilities are still relatively low. Low student problem solving can be seen from the daily test scores because students are less able to solve story problems. The cause of students experiencing difficulties is the ineffective learning model with this, the researcher wants to conduct research with the application of the TAI learning model with a contextual approach. The researcher took two classes of class VII of SMP N 1 Bringin to be used as experimental classes and control classes. Because all students have been divided into classes, the researcher determined the sample class using the cluster random sampling technique, where the sampling was selected based on existing classes or groups. After the researcher carried out the technique, the sample consisted of two classes, namely class VIII D as the experimental class and class VIII F as the control class. This study uses the T test which states that there is a difference between the TAI learning model and the contextual approach to student problem solving. This is evidenced by the data obtained from the average test of the TAI learning model with a contextual approach of 354.3462 and the conventional learning model obtained an average of 610.9788 according to the results of the hypothesis test calculation that $t_{\text{count}} = 2.8852 > t_{\text{table}} = 2.056$ so that H_0 is rejected, it can be concluded that student problem solving with the TAI learning model with a contextual approach is better than the conventional learning model. The results of this study are in accordance with the research conducted by Yeni Novita et al., 2022 entitled "Improving Students' Mathematical Problem Solving Ability through the Team Assisted Individualization (TAI) Learning Model" stating that the Team Assisted Individualization (TAI) learning model can improve mathematical problem solving abilities. Research conducted by Fina Lailati, 2019 with the title "The Effect of Team Assisted Individualization (TAI) Learning Model with a Contextual Approach on the Subject of Quadrilateral Plane Buildings in Class VII F of SMP N 5 Tuban in the 2017/2018 academic year" stated that students' mathematics learning outcomes during the Team Assisted Individualization (TAI)

cooperative learning with a contextual approach increased. Based on previous research, the application of the TAI learning model with a contextual approach in the mathematics learning process is effective in improving students' problem solving. Coupled with a contextual approach, students have more experience in finding new things in solving problems. This is proven by students being more active in learning, for example, at the beginning of learning, the teacher will ask students to identify objects around them so that students independently have an idea of the shapes of objects around them, so that when they enter the discussion phase, students are able to provide examples of objects in the form of cubes and cuboids, identify formulas through the number of edges and are able to apply formulas to problems given by the teacher. In addition, the TAI learning model with a contextual approach will train students to be able to collaborate with their friends, so that more optimal learning outcomes are created.

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