

## The Effect of The Trisuis-Assisted Core Learning Model on The Mathematical Problem-Solving Ability of Students of SMKN 1 Majalengka

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### ABSTRACT

The background of this research is the fact that students' mathematical problem-solving abilities are not optimal and need to be further improved. One of the learning models that can improve students' mathematical problem-solving abilities is the Connecting, Organizing, Reflecting, and Extending (CORE) learning model. The purpose of this study was to determine the effect of the CORE learning model assisted by TRISUIS on the mathematical problem-solving abilities of grade X students at SMKN 1 Majalengka with the subject of trigonometry. The next step was to test the differences in mathematical problem-solving abilities between students who applied the CORE learning model assisted by TRISUIS and students who applied the conventional learning model. This study used a quantitative approach with a quasi-experimental research method with a pretest-posttest control group design using an experimental class and a control class. The results of this study indicate that there is a difference in the average score of mathematical problem-solving abilities in the experimental class that applied the CORE learning model assisted by TRISUIS, which is higher than the control class that applied the conventional learning model.

**Keywords :** *Mathematical Problem Solving Ability, CORE Learning Model, Conventional Learning Model, Trigonometry, TRISUIS*

### ABSTRAK

Latar belakang penelitian ini adalah fakta bahwa kemampuan pemecahan masalah matematis siswa belum optimal dan perlu ditingkatkan lebih lanjut. Salah satu model pembelajaran yang dapat meningkatkan kemampuan pemecahan masalah matematis siswa adalah model pembelajaran Connecting, Organizing, Reflecting, dan Extending (CORE). Tujuan penelitian ini adalah untuk mengetahui pengaruh model pembelajaran CORE berbantuan TRISUIS terhadap kemampuan pemecahan masalah matematis siswa kelas X di SMKN 1 Majalengka dengan pokok bahasan trigonometri. Langkah selanjutnya adalah menguji perbedaan kemampuan pemecahan masalah matematis antara siswa yang menerapkan model pembelajaran CORE berbantuan TRISUIS dengan siswa yang menerapkan model pembelajaran konvensional. Penelitian ini menggunakan pendekatan kuantitatif dengan metode penelitian quasi eksperimental dengan pretest-posttest control group design menggunakan kelas eksperimen dan kelas kontrol. Hasil penelitian ini menunjukkan bahwa terdapat perbedaan rata-rata skor kemampuan pemecahan masalah matematis pada kelas eksperimen yang menerapkan model pembelajaran CORE berbantuan TRISUIS lebih tinggi dibandingkan dengan kelas kontrol yang menerapkan model pembelajaran konvensional.

**Kata Kunci :** *Kemampuan Pemecahan Masalah Matematis, Model Pembelajaran CORE, Model Pembelajaran Konvensional, Trigonometri, TRISUIS*

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## 1. INTRODUCTION

Education plays a crucial role in improving an individual's standard of living. Through the learning process, the world's knowledge is broadened. Education is crucial not only for instilling intellectual skills but also for learning moral principles. The learning needed in this era is ideal learning to create a more advanced education. Gen Z, born between 1997 and 2012, is also known as the i-generation, or the age group currently attending high school. Therefore, Generation Z is expected to possess superior problem-solving abilities compared to previous generations. One subject that can improve students' problem-solving abilities is mathematics. In mathematics, students are often faced with the challenge of solving complex problems. Therefore, students need to master one of these skills: problem-solving.

Problem solving is one of the skills students need to possess. However, the learning model currently implemented does not support the development of mathematical problem-solving skills, resulting in students' mathematical problem-solving abilities in Indonesia being relatively low. Students' low mathematical problem-solving abilities are a result of the implementation of inappropriate learning models. This can occur because students are not fully involved in the learning process.

Teachers are required to innovate in classroom learning activities to improve mathematical problem-solving skills by using the Connecting, Organizing, Reflecting, and Extending (CORE) learning model. Furthermore, TRISUIS (Special Angle Trigonometry) teaching aids are needed to help students understand the concept of special angle trigonometry. These aids are designed to visualize trigonometric ratios ( $\sin$ ,  $\cos$ ,  $\tan$ ) at special angles in triangles. These aids aim to facilitate students' understanding of concepts and memorization of values ( $\sin$ ,  $\cos$ ,  $\tan$ ) without the use of a calculator, as well as to improve their ability to solve problems related to trigonometry concepts.

Based on the background description above, the following research questions will be examined in this paper:

1. Is there an effect of the Connecting, Organizing, Reflecting, Extending (CORE) learning model, supported by TRISUIS teaching aids, on students' mathematical problem-solving abilities?
2. Is there a difference in mathematical problem-solving abilities between students who implement the Connecting, Organizing, Reflecting, Extending (CORE) learning model, supported by TRISUIS teaching aids, and students who implement conventional learning models?
3. How do students respond to the implementation of the Connecting, Organizing, Reflecting, Extending (CORE) learning model, supported by TRISUIS teaching aids?

Based on the description of the problem formulation above, the objectives of this study are as follows:

1. To determine the effect of implementing the Connecting, Organizing, Reflecting, Extending (CORE) learning model with the aid of TRISUIS teaching aids on students' mathematical problem-solving abilities.
2. To determine the differences in mathematical problem-solving abilities between students who implement the Connecting, Organizing, Reflecting, Extending (CORE) learning model with the aid of TRISUIS teaching aids and students who implement conventional learning models.
3. To determine students' responses to the implementation of the Connecting, Organizing, Reflecting, Extending (CORE) learning model with the aid of TRISUIS teaching aids.

Some of the benefits of this research can be outlined as follows:

1. It is hoped that for students, the CORE learning model assisted by TRISUIS can increase their enthusiasm for learning, especially in mathematics.
2. It is hoped that for teachers, the CORE learning model can inspire them to create more varied and creative teaching methods.
3. It is hoped that for schools, the CORE learning model can serve as an example of a learning model that can be implemented in schools, allowing educational institutions to focus on the necessary

facilities and infrastructure.

4. It is hoped that future researchers will utilize the CORE learning model assisted by TRISUIS as a reference in developing lesson plans.

## 2. METHOD

This research design is an experiment with a quantitative approach. The experimental research method used is quasi-experimental, and a pretest-posttest control group design with an experimental and control class is used. This skill is designed to help students understand, manage, and use the knowledge they have acquired to navigate situations that are always inconsistent and highly competitive. Problem-solving skills play a significant role in mathematics mastery. Problem-solving skills are considered a process or method of solving problems using mathematical concepts based on known information. This ability is recognized as a very important and fundamental skill.

The researchers applied four indicators of mathematical problem-solving ability, which have been modified and adapted from (Polya, 1973). These indicators were used because they are based on an understanding of each phase that encompasses all problem-solving phases from the opinions of other experts: understanding the problem, developing a problem-solving plan, solving the problem according to the plan, and re-examining the process and results. The ability to solve mathematical problems can be influenced by various factors. Improvement in students' ability to solve mathematical problems is related to their level of mastery of these factors. Generally, these factors originate from within the student or from their surrounding environment.

In this study, the CORE learning model assisted by TRISUIS served as the independent variable. The CORE learning model focuses on students' ability to connect, organize, reflect, and develop the information received. Mathematical problem-solving ability then served as the dependent variable. Mathematical problem-solving ability refers to a person's capacity to analyze and convey various ideas and information through the thought processes undertaken when facing a problem. The CORE learning model consists of a combination of four interrelated words: connecting, organizing, rethinking, and developing. The activity of connecting old information with new information is called connecting. The activity of organizing information to understand a material is called organizing. The activity of rethinking and analyzing the information already learned is called reflecting. The activity of developing, expanding, and applying the information obtained during the learning process is called extending.

Previously, the experimental and control classes were given a pretest to determine the students' initial level of mathematical problem-solving ability. Afterward, the experimental class was given a learning treatment using the CORE learning model assisted by TRISUIS. Meanwhile, the control class was given a learning treatment using a conventional learning model. The final stage, to measure the final mathematical problem-solving abilities of students in the experimental and control classes, was a posttest. Sampling employed a cluster random sampling method, dividing the large population into smaller groups called samples. The population in this study was all 10th-grade students at SMKN 1 Majalengka in the 2024/2025 academic year. Two classes were sampled: 10th-grade students (grades 6-10) as the experimental class and 10th-grade students (grades 2-3) as the control class.

This research was conducted at SMKN 1 Majalengka. This location was chosen based on its strategic location and its reputation as the best vocational high school in Majalengka. The overall research activities were conducted over a three-week period, from May 5, 2025, to May 23, 2025, during the even semester of the 2024/2025 academic year.

In the research process, the author applied the following data collection techniques:

1. Test
2. Questionnaire
3. Interview
4. Documentation

After data collection, the data were evaluated based on established scoring guidelines. The next step was instrument analysis, prerequisite testing, and hypothesis testing.

1. Instrument Analysis
2. Prerequisite Test
3. Hypothesis Testing

### **3. RESULTS AND DISCUSSION**

#### **3.1 Research Results**

This research is an experimental study conducted in the 10th grade at SMKN 1 Majalengka. The study involved two classes: 10th to 6th grade, referred to as the experimental class (the class given the CORE learning model with TRISUIS support) and 10th to 2nd grade, referred to as the control class (the class not given the treatment or only used conventional learning). The data used in this study included pretest data on students' mathematical problem-solving abilities, posttest data on students' mathematical problem-solving abilities, and questionnaire data on students' responses to the implementation of the CORE learning model with TRISUIS support. The pretest results of the mathematical problem-solving abilities of 30 students in the experimental class yielded a total score of 73, a maximum score of 4, a minimum score of 1, a range of 3, and a mean of 2.43. The pretest results of the mathematical problem-solving abilities of 30 control class students yielded a total score of 61, a maximum score of 4, a minimum score of 1, a range of 1, and a mean of 2.03. It can be concluded that the initial mathematical problem-solving abilities of 10th-grade students at SMKN 1 Majalengka are still in the low category. Therefore, the researchers implemented the CORE learning model with TRISUIS assistance in the experimental class and conventional learning in the control class.

Next, the researchers administered a final test (posttest) consisting of four essay-style questions to the experimental class (10 to 6) and the control class (10 to 2). The purpose of the posttest was to determine whether the mathematical problem-solving abilities of 10th-grade students at SMKN 1 Majalengka had improved. Based on the posttest results of the mathematical problem-solving abilities of 30 experimental class students, the total score was 216, with a maximum score of 8, a minimum score of 4, a range of 4, and a mean of 7.20. The posttest results of the mathematical problem-solving abilities of 30 control class students yielded a total score of 140, a maximum score of 8, a minimum score of 1, a range of 7, and a mean of 4.66. Therefore, it can be concluded that the mathematical problem-solving abilities of students in the class implementing the TRISUIS-assisted CORE learning model are higher than those in the class implementing the conventional learning model.

The results of the student response questionnaire on the implementation of the TRISUIS-assisted CORE learning model in the experimental class of 30 students yielded a mean of 83.97, with a maximum score of 96.6, a minimum score of 66.6, and a range of 30, categorizing them as very good and very practical. Based on the pretest and posttest data of both classes, a normality test, homogeneity test, T test, N-Gain test, and ANCOVA test were then conducted. In the normality test, the posttest significance value in the experimental class and the control class was  $0.200 > 0.05$ , which means that the posttest data in the experimental class and the control class were normally distributed. Furthermore, the homogeneity test results obtained a significance value of  $0.068 > 0.05$ , which means that the data was homogeneous. In the calculation results of the Independent Samples Test, a

significance value of  $0.000 < 0.05$  was obtained, which means that there was a significant average difference in mathematical problem-solving abilities between the experimental class and the control class. Then the N-Gain result of the experimental class was 0.85, which means it was in the high category, while in the control class it was 0.44, which means it was in the medium category. In the ANCOVA test, the results of the Test of Between-Subjects Effects on the learning model obtained a significance value of  $0.000 < 0.005$  so that there is a significant influence between the CORE learning model assisted by TRISUIS and the conventional learning model, then from the results of the Estimates also obtained the mean of the CORE learning model assisted by TRISUIS is 7.126 and the mean of the conventional learning model is 4.740 which means that the CORE learning model assisted by TRISUIS has a superior effect than the conventional learning model on mathematical problem solving abilities.

### 3.2 Discussion

- 1) The Effect of the CORE Learning Model Assisted by TRISUIS on Students' Mathematical Problem-Solving Ability in Grade X Students at SMKN 1 Majalengka.

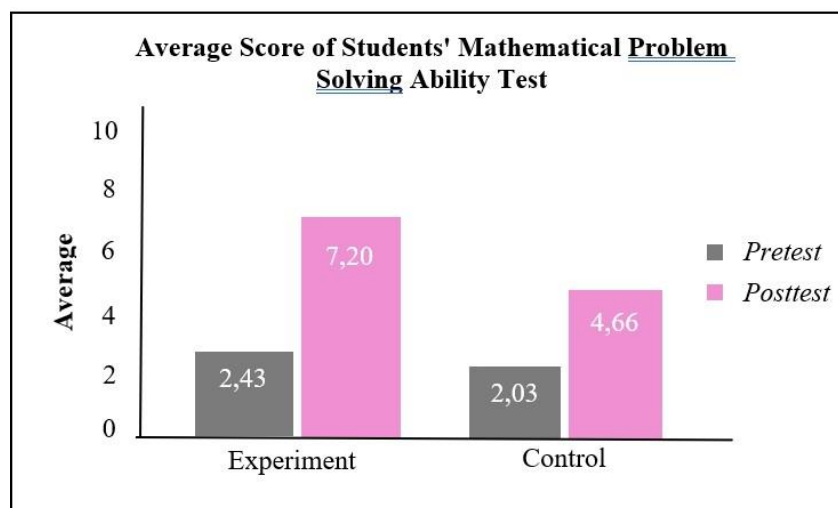
Based on the results of the N-Gain test, the experimental class was 0.85, which is in the high category, while the control class was 0.44, which is in the medium category. The ANCOVA test obtained a significance value of  $0.000 < 0.005$  for the Test of Between-Subjects Effects, indicating that variable X influences variable Y. Furthermore, the Estimates result shows that the mean for the CORE learning model is 7.126 and the mean for the conventional learning model is 4.740. Therefore, it can be concluded that the CORE learning model assisted by TRISUIS has a superior effect on the mathematical problem-solving ability of grade X students at SMKN 1 Majalengka.

- 2) Differences in Mathematical Problem-Solving Ability Between the Application of the CORE Learning Model and the Conventional Learning Model in Grade X Students at SMKN 1 Majalengka.

The Independent Samples Test (STS) yielded a significance value of  $0.000 < 0.05$ , indicating a significant difference in the average mathematical problem-solving ability between the experimental and control classes. The experimental class' average pretest score of 2.43 was in the low category. After being exposed to the TRISUIS-assisted CORE learning model, the posttest average was 7.20, which was in the high category. Meanwhile, the control class' average pretest score of 2.03 was in the low category. After being exposed to the conventional learning model, the posttest average was 4.66, which was in the high category. Therefore, it can be concluded that there is a difference in mathematical problem-solving ability between students who applied the TRISUIS-assisted CORE learning model, with the results being higher than those who applied the conventional learning model.

- 3) Student Responses to the Implementation of the TRISUIS-Assisted CORE Learning Model in Grade X of SMKN 1 Majalengka.

Student responses to the application of the CORE learning model assisted by TRISUIS experimental class students from 30 students obtained a percentage of positive student responses of 83.97% so that it is included in the very good and very practical category. Student responses are categorized as very good, because the CORE learning model assisted by TRISUIS can combine the four stages of learning so that students feel enthusiastic and make students active in learning. In addition, students feel trained in solving problems with learning concepts that involve active cooperation between group members so that students do not feel bored. Moreover, students are also given space to present the results of discussions with their groups so that they can express their opinions on the results of their group discussions.



#### 4. CONCLUSION

- 1) The CORE learning model assisted by TRISUIS has an impact on students' mathematical problem-solving abilities. This can be seen from the results of the Independent Samples Test, which obtained a significance value of 0.000. The N-Gain test for the experimental class was 0.85, while the N-Gain test for the control class was 0.44. The ANCOVA test showed a significance value of  $0.000 < 0.005$ , with estimates indicating a mean of 7.126 for the CORE learning model and 4.740 for the conventional learning model.
- 2) There was a difference in students' mathematical problem-solving abilities in the experimental class (CORE learning model assisted by TRISUIS) compared to the control class (conventional learning). There was an increase in students' mathematical problem-solving abilities in the experimental class, as evidenced by the average pretest score of 2.43, followed by a posttest average score of 7.20. Meanwhile, the control class obtained an average pretest score of 2.03 and a posttest score of 4.66.
- 3) Student responses to the implementation of the TRISUIS-assisted CORE learning model in the experimental class were in the very good category. This can be seen from the average questionnaire score of 83.97, indicating that students very well accepted the implementation of the TRISUIS-assisted CORE learning model.

The author's suggestions are as follows :

1. Students should be more enthusiastic about learning to broaden their knowledge.
2. Teachers should improve the quality of their teaching, especially in mathematics, by developing more innovative and engaging learning models.
3. Schools should provide more support in providing adequate facilities and infrastructure to support the ongoing implementation of teacher-developed learning models.
4. Future researchers should explore other variables that can improve students' mathematical problem-solving abilities beyond learning models and teaching aids.

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