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Implementation of the Everyone Is a Teacher Here (ETH) Learning Model Based on the Mathematical Communication Ability

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Abstract

Covid-19 has become an epidemic that has most affected the education sector, one of which is the implementation of online learning. Online learning, of course, affects students' mathematical communication. This study aims to apply the ETH (everyone is a teacher here) learning model to overcome problems, especially in students' mathematical communication problems. Based on these objectives, researchers used a qualitative approach. The data was obtained through observation, written tests, and questionnaires and then analyzed to conclude. The results showed that: The application of the ETH-type learning model to the material of a system of linear equations with two variables for three meetings as a whole can be carried out following the steps that have been planned with the acquisition of values that fall into the very good category with the average value of teacher activity in learning the value of 91. Based on the results of student observations conducted by researchers when learning took place, which was divided into four activity activities with an average score of overall activity getting a score of 87.5 with a very good category. In the last activity, Communicating, the average score was 91.7, where students could conclude the material given. These results show positive results where student activity goes very well when using the ETH learning model. The increase in mathematical communication can be seen in the ability of oral mathematical communication to get an average score of 78.3 in the good category. Meanwhile, the increase in written mathematical communication ability can be seen from the post-test results, which are higher than the results of the pretest. Very good, with an average of 87.5. The analysis of student responses gave a positive response to the implementation of ETH-type learning with an average score of 91.9%, and students gave a negative response of 8.1%. Based on these results, it can be concluded that learning through the application of the ETH learning model has achieved indicators of effectiveness.

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INTRODUCTION

Coronavirus disease 2019, or Covid-19, has become a global pandemic and has caused health problems in all countries, including Indonesia. Many segments of human life in Indonesia have been disrupted, without exception, in the education sector (Shah, 2020). Many negative impacts occur during online learning, such as a decrease in student learning outcomes and students' mathematical communication when online learning takes place (Arum & Susilaningsih, 2020).

Hodiyanto (2018) states that an important aspect that teachers must do is to encourage students to express their thoughts or ideas in writing or speech. This aims

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to enable students to be able to interact with other students. Especially in mathematics lessons, communication skills are fundamental, and students must master verbal and written communication (Marfuah, 2017). Gayatri (2020) Mathematical communication is defined as a conversation that occurs in the classroom environment or an event of mutual dialogue and the process of sending and receiving messages that contain material that students are studying, for example, in the form of learning strategies, concepts, or formulas in a problem. Teachers and students become parties to the involvement of mathematical communication in the classroom.

According to Wijaya (2016), students' mathematical communication abilities are divided into 2, namely verbal and written communication, which are essential aspects of mathematical communication. Oral communication is carried out with the involvement of students in class in a group during the learning process. Likewise, with mathematical communication in writing, students can convey ideas or thoughts in the form of notations, vocabulary, structures, or mathematical concepts in expressing thoughts and ideas to solve problems.

Much-needed learning models whose main focus can allow students to play an active role in the learning process and in terms of improving mathematical communication skills, and students can express their ideas. The ETH (Everyone is a Teacher Here) cooperative learning model is one of the solutions so that this problem can be solved. ETH is a strategy whose primary focus is making classes more active and getting overall class participation, and each student gets individual responsibility (Nurmalasari, 2019). ETH allows all students to be more active, and students take on the role of teaching other students. With the ETH strategy, students who have been less active and less involved in-class learning will be involved in learning. The ETH-type cooperative learning model is used to improve student learning processes to achieve goals, especially the ability to express opinions through various teaching materials. Ability to solve analytical problems, ability to write opinions after making observations, ability to conclude, etc.

In previous research conducted by Kriswandani & Novisita Ratu (2015), the average student activity and learning outcomes of students using the ETH-type cooperative learning model are better than the average learning outcomes using conventional methods and can improve mathematical communication skills. Another research conducted by Amral (2018) shows the successful implementation of the ETH type of cooperative learning in the material around and area of Bangui Datar. This can be seen from the increase in learning outcomes, learning activities, responses, mathematical communication skills, and student learning independence. Piadi's (2015) research shows that improving students' mathematical communication abilities by implementing ETH strategies are superior to classes that apply conventional learning methods.

Judging from the background above, further research is needed regarding the influence of the ETH-type cooperative learning model based on students' mathematical communication skills both orally and in writing, whether using ETH-type cooperative learning can affect mathematical communication skills orally or in writing when face-to-face learning is carried out after the Covid – 19 pandemic. So the purpose of this research is to determine how teachers and students activities in implementing ETH when learning takes place, determine whether implementing

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ETH can improve students' mathematical communication skills, and describe how students respond to ETH learning.

RESEARCH METHOD

The type of research used in this study is descriptive research with a qualitative approach. The subjects in this study took one class, namely class VIII students at SMP Negeri 1 Karangrejo, which consisted of 32 students. Sampling in the study will be carried out randomly, and which will then be selected as many as six students for further analysis on written and oral mathematical communication. There are three stages in this research procedure, namely the preparatory stage, which contains the preparation of all research instruments. The implementation stage is the data collection stage applying the learning model used until the implementation of the test, and the closing includes analysis and evaluation activities.

The data collection technique uses Observation, Tests, and Questionnaires; the Instruments used in the form of observation sheets for the implementation of learning, which consist of student and teacher activity instruments and Oral mathematical communication Instruments for test instruments in the form of test Sheets containing pretest and posttest, and student response questionnaires. Meanwhile, the data analysis uses the techniques of Miles and Huberman, namely, the first process is data reduction, then data presentation, and the last is the conclusion. The formula for the average percentage of the teachers and students activity is as follows:

$$x = \frac{Total\ score}{Total\ overall\ score} \times 100\%$$

The intervals and categories as follows:

Tabel 5. Interval and Category of Test Results

No	Interval	Category
1	$80 < x \leq 100$	Very Good
2	$75 < x \leq 80$	Good
3	$65 < x \leq 75$	Sufficient
4	$x \leq 65$	Deficient

The intervals and categories for as follows:

RESULTS AND DISCUSSION

The results and analysis of the implementation of the everyone is a teacher here type learning model on the material of a two-variable linear equation system (SPLDV) for class VIII SMP Negeri 1 Karangrejo have been held in 3 meetings. The analysis of the instrument shows that the results of the validation of the research instrument show an average percentage of 90.0% for lecturers and 85.0% for teachers. So that the average result of the research instrument validation from the two validators is 87.5% and is included in the "Very Valid" category so that the instrument can be tried out. The following describes the results of the descriptive statistical analysis of the data collected during the implementation of the research.

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a. Teacher Activities on the implementation of the ETH model

The application of the ETH model to observe teacher activities during the learning process takes place, consisting of 3 activities, namely initial, core, and final activities. The subject teacher carries out the assessment. The observation results explain the teacher's activities during the three meetings, which will be presented in the following table.

Table 1. Teacher Activity

Activity	Percentage of Average Score
Initial activity	95,8
Core activities	93,8
End activities	83,3
The average of all activities	91

In the initial activity, an average score of 95.8 was obtained, with this value in the initial activity being included in the very good category. In the core activities, the researcher carried out each indicator well following the lesson plan so that he got an average in a very good category with an average score of 93.8. In the final activity, the average score was 83.3, which was included in the very good category. For the overall average of ETH learning activities, researchers get an average score of 91 which is classified as very good. This means that researchers can carry out or carry out the learning stages following the RPP that has been prepared.

b. Student Activities on the Application of ETH

The application of the ETH model to observe student activities during the learning process takes place, which consists of 4 types of activities: observing, asking, reasoning, and communicating. Researchers carried out the assessment. The observation results explain student activities during the three meetings, which will be presented in the following table.

Table 2. Student Activity

Type of activity	Average
Observe	91,7
Ask	83,3
Reasoning	83,3
communicate	91,7
Overall Average	87,5

They were based on the results of student observations made by researchers when learning took place, which was divided into four activities with an average score of overall activity getting a score of 87.5 with a very good category. In observing activities, the average value is 91.7. In asking activities, an average score of 83.3 is obtained. For reasoning activities, students get an average score of 83.3. In the last activity, namely Communicating, the average score was 91.7. These results show positive results where student activity goes very well when using the ETH learning model.

c. Oral Mathematical Communication Skills

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Oral mathematical communication skills can be known through observations during the learning process.

Table 3. Results of Analysis of Oral Students' Mathematical Communication Ability

No.	Aspect	Average Score
1.	Describe a situation or idea orally	75
2.	Listen and discuss mathematics	72,9
3.	Making conjectures, dealing with arguments, and formulating definitions and arguments.	77,1
4.	Express everyday events in terms, symbols, or mathematical notation.	85,4
5.	Explain and make statements	81,3
	Average of all aspects	78,3

Based on the table, it is known that verbal and mathematical communication skills reach a good level of mastery, for all aspects of oral mathematical communication skills well done. In the first aspect, an average score of 75 is included in the excellent category. The second aspect gets an average score of 72.9, which is included in the good category. For the third aspect, a score of 77.1 is included in the good category. Fourth aspect 85.4 very good category. The fifth aspect also falls into the very good category, scoring 81.3. The average value of all aspects of verbal and mathematical communication assessment is 78.3 in the good category. Based on these results, most students can communicate orally well.

d. Mathematical Communication Ability in Writing Judging from the Written Test

Mathematical communication ability in writing seen from the results of the student's written test on SPLDV material with pretest and posttest to see the improvement of written mathematical communication. Assessment of mathematical communication in writing is assessed based on four aspects

Table 4. Statistical Scores of Pretest and Posttest Written Test Results

Aspect	Average Score	
	Pretest	*Posttest*
Write down ideas, situations and mathematical relations	4,2	91,7
Use terms, symbols or mathematical notation	25	98,7
Making conjectures, dealing with arguments, and formulating definitions and arguments.	66,7	91,7
Interpret and evaluate mathematical ideas	45,8	70,8
Overall Average	35,4	87,5

Based on the table above, the pretest results showed that the students scored severely in the first aspect of 4.2. In the second aspect, get a score with an average of 25. The third aspect with an average value of 66.7. For the fourth aspect, with an average value of 45.8. The overall average on the pretest got a score of 35.4 which was included in the less good category. Judging from the pretest results, it showed that students' written communication abilities still needed improvement.

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Meanwhile, based on the results of the posttest, it was found that the results of the analysis stated that the first aspect obtained an average score. The average is 91.7. The second aspect has an average value of 95.5. For the third aspect, get an average score of 91.7. Finally is the fourth aspect, with an average value of 70.8. The average of all aspects is 87.5, which is included in the very good category. This is different from the pretest results on the posttest results, which have experienced a very significant increase. It can be concluded that students experienced increased mathematical communication in writing after being given treatment.

e. Analysis of Student Response Questionnaire Data
Data about students' responses to the ETH learning model were obtained through a student response questionnaire which was distributed after the implementation of the ETH learning.

Table 5. Percentage of Student Responses to ETH Learning

Answer	Total	Average
Positive answer	294	91,9
Negative answer	26	81,3

In general, the students gave a very positive response. For the total average number that gives a positive answer with an average of 91.1%, it means that it is in the very good category. Thus, students positively responded to the application of learning with the ETH model.

Discussion

Implementing the Everyone Is A Teacher Here learning model to improve the mathematical communication skills of class VIII students, carried out at SMPN 1 Karangrejo, which lasted three meetings was an alternative learning that the teacher could use and went well. This can be seen from direct observation of student activity during the learning process, obtaining an overall average score of 78.3 in the good category. The results of the research conducted by Amral (2018) show the successful implementation of the Everyone is a Teacher Here type of cooperative learning in the topic of Circumference and the Area of Bangui Datar. This can be seen from the increase in learning outcomes, learning activities, responses, mathematical communication skills, and student learning independence. Another study by Kriswandani & Novisita Ratu (2015) showed that the average student activity and learning outcomes of students using the ETH-type cooperative learning model are better than the average learning outcomes using conventional methods and can improve students' mathematical communication skills.

During learning through the ETH-type learning model, students were initially confused and seemed awkward actively participating in learning activities, especially when discussing and asking other students. However, after learning took place, students seemed to quickly adapt to the learning given because the researcher directed and explained how to discuss with groups. Collaboration and support from mathematics teachers and colleagues are one of the factors for the success of this ETH-type learning model. Besides that, the

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involvement factor of students who actively participate in learning with ETH is also one of the supporting factors for implementing a good learning model.

Students' mathematical communication skills with the ETH model have been going well, based on data obtained during observations and tests when learning takes place and has been analyzed. The oral mathematical communication skills result obtained an average score of 78.3 in the good category. In contrast, the written communication skills obtained from the pretest and posttest results experienced a very significant increase. Initially, the pretest value was 38.7 increasing to 87.5 in the Very good category. The results of previous research conducted by Piadi (2015) show that improving students' mathematical communication abilities by implementing ETH strategies are superior to classes that apply conventional learning methods.

Another research conducted by Gayatri (2020) at SMAN 3 Singaraja found that the mathematical communication abilities of students who were taught using the ETH learning model using online learning showed better results than the mathematical communication abilities of students who were taught using conventional learning models. Based on previous research, the model that has been applied, namely ETH, affects students' mathematical communication abilities.

CONCLUSION

Based on the results of research that have been carried out on teacher activities, student activities, and students' mathematical communication abilities by applying the ETH model to SPLDV learning for class VIII SMP Negri 1 Karangrejo, it can be concluded as follows. The application of the ETH-type learning model to the 2-variable linear equation system material for three meetings as a whole can be carried out following the steps planned with the acquisition of grades that fall into the very good category with an average value of teacher activity in the learning of 91. Based on the results of student observations made by researchers when learning took place, they were divided into four activities with an average score of overall activity, getting a score of 87.5 with a very good category. In the last activity, Communicating, the average score was 91.7, where students could conclude the material given. These results show positive results where student activity goes very well when using the ETH learning model.

The increase in mathematical communication can be seen in the students' verbal communication skills obtaining an average score of 78.3 in the good category. While the increase in mathematical communication skills in writing can be seen from the results of the posttest, which were higher than the results of the pretest, this was affected after using the ETH-type learning model by getting very good results with an average of 87.5. The analysis results of student responses gave a positive response to implementing ETH-type learning with an average score of 91.9%, and students gave a negative response of 8.1%. Based on these results, learning through the application of the ETH learning model has achieved indicators of effectiveness which is used as a benchmark where a positive response is at least 70% of all respondents.

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