

## **Literature Review Using Think Talk Write (TTW) Cooperative Learning Model in Students' Mathematical Reasoning Ability**

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### **Abstract**

The purpose of this research is to analyze Think Talk Write (TTW) learning whether this model is effective in improving students' mathematical reasoning abilities. This type of research is a literature review related to the theory of the Think Talk Write (TTW) type cooperative learning model and mathematical reasoning abilities. This research uses library materials as the main data source that discusses the effectiveness of using cooperative learning models to improve students' mathematical reasoning abilities. The selection of sources from the literature review is chosen according to the development of the journal for the last 5 years, namely 2018 to 2022. Reasoning ability is the ability to draw conclusions or make new statements based on previous statements. For cooperative learning model type Think Talk Write (TTW) is an activity to think about reading material by listening, criticizing, and providing solutions. The results of this study indicate that increasing mathematical reasoning ability is more effective using Think Talk Write (TTW) compared to conventional learning, because the use of Think Talk Write (TTW) type learning model will make students understand the material better because they learn from thinking, compiling, testing, , reflect, and write down ideas.

**Keywords:** think talk write (TTW); reasoning ability

### **INTRODUCTION**

Education is a continuous and never-ending process to produce quality human resources as provisions in the face of the times. Ki Hajar Dewantara as the Father of Indonesian National Education argues that education is an effort from parents to children with the intention of supporting the progress of their lives in providing useful life guidance, so that children get the perfect happiness of life by using the guidance that has been given. (Wiryopranoto et al., 2017)

One of the subjects that can be seen as useful for everyday life is learning mathematics. Learning mathematics as one of the lessons that becomes a way of thinking logically, analytically, systematically, critically and creatively so that it trains the ability to work together in dealing with various problems by utilizing the news it receives. According to (Dikembangkan, 2010) mathematics has characteristics that emphasize deductive processes that require logical and axiomatic reasoning. In mathematics, understanding concepts, problem solving, communication, reasoning and mathematical connections are abilities that will be

obtained when studying mathematics. This ability will improve the quality of human resources for future science. The weaknesses of students that cause low student learning outcomes are not having a good understanding of prerequisite material, lacking the ability to understand basic concepts, lack of accuracy in listening and analyzing problems, and lack of students' reasoning abilities. (Sibuea, 2017)

To get sources Quality resources in education are not only learning and the use of books as learning media, but the way students learn in the classroom can affect learning outcomes. The way of learning in the classroom can usually be referred to as a learning model. Nowadays, many learning models have been created, one of which is the *Think Talk Write* (TTW) type cooperative learning model.

*Think Talk Write* (TTW) is a type of cooperative learning model that emphasizes thinking, compiling, testing, reflecting, and writing ideas by prioritizing collaboration between students in groups to achieve learning goals (Jami'atun & Wijayanti, 2020). Based on the understanding of TTW, it can be stated that *Think* means thinking, which means using the mind to consider and decide something. Then *Talk* which means talking or discussion, with this students communicate about conveying ideas by using language words they understand. And the last is *Write* which means to write, students write down the ideas obtained in *Think* and *Talk* activities in the form of concepts used, methods of completion, and solutions obtained. (Irwan & Permata Sari, 2018)

TTW is used to develop students' ways of writing fluently and practice language before writing them, besides that it can help students in collecting and developing ideas through conversation. TTW learning activities start from thinking about reading material by listening, criticizing, and providing solutions. Then the results of the readings are communicated with presentations, discussions and making reports on the results of the presentations.

Type cooperative learning *Think Talk Write* model is a learning model that can foster students' mathematical reasoning abilities. Mathematical reasoning ability is an essential ability to be developed in high school students, and is one of the abilities that students must have in learning mathematics because it is one part of mathematical thinking skills. The thought process to draw conclusions can be based on previous statements and their truth has been proven.

According to Sumarmo in (Konita et al., 2019) ) the indicators of mathematical reasoning ability are as follows:

- a. Draw logical conclusions
- b. Provide explanations with models, facts, characteristics, and relationships
- c. Estimating the answer and the solution process
- d. Using patterns and relationships to analyze situations or make analogies and generalizations
- e. Develop and test the conjecture
- f. Create *counter example* (counter example)
- g. Follow the rules of inference and check the validity of arguments

- h. Develop valid arguments
- i. Develop direct, indirect, and use mathematical induction.

Reasoning ability is very influential with the process of learning mathematics in class, because students who have good reasoning abilities will easily understand mathematical material, and vice versa if students who have low reasoning abilities will have difficulty understanding mathematical material. The importance of reasoning ability in learning mathematics because every mathematical problem must be solved by a reasoning process. Reasoning can be understood and trained by solving mathematical problems. The importance of reasoning ability can be seen from student learning outcomes by being given the opportunity to use their reasoning skills in making assumptions based on their own experience and generating new concepts according to their thinking. (Fajriyah et al., 2015)

With the many articles and field findings in the educational environment that use the *Think Talk Write* (TTW) type cooperative learning model, the researcher feels the need to conduct a literature review with the following objectives: first, to find out the other studies that have been done by other people that discuss the topic of research that is being carried out at this time. Second, literature review can link the current study with the broad discourse in the literature with the same topic of discussion. By understanding the existence of previous research, the researcher will design how the new research project will be carried out. Third, it will demonstrate the ability of researchers to integrate what others already know about the field of study. (Asbar & Witarsa, 2020). Based on the description above, the researcher conducted a study entitled "Literature Study of the Use of *Think Talk Write* (TTW) Cooperative Learning Model in Students' Mathematical Reasoning Ability". This study was conducted to determine the ability of mathematical reasoning in terms of the use of the TTW type cooperative model.

## RESEARCH METHOD

Method The method used is a literature review related to the *Think Talk Write* (TTW) type cooperative learning model to improve students' mathematical reasoning abilities. The data found in this library study are sourced from various related literature. The related literature used is articles that have conducted research in the last 5 years, from 2018 to 2022, so that the data obtained is in accordance with the development of the state of education. The primary sources used in this literature review are references related to the *Think Talk Write* (TTW) type cooperative learning model and mathematical reasoning abilities. While the secondary sources used are learning activities and child psychology.

## RESULTS AND DISCUSSION

### Mathematical Reasoning Ability Through Cooperative Learning Model Type *Think Talk Write* (TTW).

According to (Purwanto, 2012) mathematics learning achievement using the TTW type cooperative learning model is better than using conventional learning models and student learning achievement using the TTW type cooperative learning model is the same as TPS type learning as well as TPS and conventional learning provide good learning achievement. same.

According to (Sibuea, 2017) stated in the results of his research that students before being given action there were 11 students who had reached the level of mastery learning, while 25 students had not reached the level of mastery learning with absorption. This means that the use of the TTW type of cooperative learning model can improve students' mathematics learning outcomes.

According to (Jami'atun & Wijayanti, 2020) stated in the results of his research that the proportion of students' mathematical reasoning abilities with the TTW model is higher than students with the PBL model, so it can be concluded that the TTW model is not effective on students' mathematical reasoning abilities.

As is the case with research conducted by (Bernard & Rohaeti, 2016) which carried out activities to analyze students' mathematical reasoning abilities into the aspect of group reasoning. The following are indicators of mathematical reasoning according to Sumarmo, namely:

1. Indicators draw logical conclusions  
There are so many people who cannot think logically so they only take and accept the arguments presented. The use of logic in a science that teaches to pronounce the right words through reason and common sense, as well as reasoning, has the same goal as logical thinking, which is to find answers using thoughts and common sense. An example of the relationship between mathematics and the conclusion that exists in mathematics. Before carrying out the work activities, students carry out activities to imagine what the shape of the problem will be.
2. Indicators provide explanations with models, facts, properties, and relationships  
Reasoning is a conscious activity by applying logic to reach a conclusion, the activity of seeing existing relationships, not only the relationship between objects but the relationship between ideas, then use the relationship to obtain other objects or ideas. Examples of mathematical relationships with models of an area and the existence of facts regarding the existence of the relationship between the arrangement of distances between highways and mathematics.
3. Indicators of improving answers and solution processes  
Students will practice predicting answers, solutions or trends, and using relationship patterns to analyze situations. Students can carry out calculations based on certain rules or formulas to get a conclusion that is expected to determine the validity of the conclusions obtained.
4. Indicators use patterns and relationships to analyze situations, or make analogies and generalizations.

Students use supporting data to design mathematical forms based on the information presented to seek answers. Existing information must be based on analogues that are made, namely based on the similarity of data, concepts, or processes. From the answers that have been obtained, not all answers have the same form, it is necessary to draw general conclusions based on a number of observed data.

5. Indicators of constructing and testing conjectures  
Mathematical reasoning is needed to achieve the ability to construct mathematical conjectures. A conjecture is a proposition as a real, true, or original thing based on something that has not been concluded. Reasoning and making conjectures in the process of learning mathematics will encourage understanding that searches for patterns, conditions, relationships, and core sequences of mathematics.
6. The indicator follows the rules of inference and checks the validity of the arguments.  
Able to provide known and asked questions, work steps, and conclusions correctly and use formulas according to the problems in question. Work in accordance with the existing order and arguments that have been used.
7. Developing valid arguments  
An argument is a series of statements to reveal the conclusion (inference). An argument is said to be valid for any statement that is substituted for the hypothesis. If all the hypotheses are true, then the conclusion is also true. If all the hypotheses are true but the conclusion is false, then the argument is called false.
8. The indicator creates *counter example* In mathematics  
A counter example is used to refute a statement. If you want to prove that a statement is true, you need evidence that shows that it is always true. Writing down evidence to show the truth is very necessary, because giving examples is not enough. If you want to show that a statement is not true, it is necessary to provide an example scenario where the statement is false.
9. Indicators construct direct, indirect evidence, and use mathematical induction  
Direct proof is usually applied to prove a hypothesis that is used as a known fact or as an assumption. For indirect proof, the activity is carried out by proving the truth of the implication statement, which is proven through contraposition. In mathematics it is impossible to determine one by one the truth of a statement, but with the use of mathematical reasoning through mathematical induction so as to be able to make inferences to a statement.

### **Articles - Articles of Mathematical Reasoning Ability Through Cooperative Learning Model *Think Talk Write* (TTW) Type.**

The articles on the application of the *Think Talk Write* (TTW) type cooperative learning model in students' mathematical reasoning abilities are in table 1 below:

**Table 1. List of Articles**

No	Author's Name	Published Article Article	Title	Research Method Research	Results
1	- Irwan - Devi Permata Sari	2018. Math Educa. 2(2). Pages 113-127	Application of the Think Talk Write Cooperative Learning Model to the Mathematical Reasoning Ability of Class XI IPA MAN Padang City	Quasi Experiments with a randomized control group only design. With Random Sampling class XI IPA2.	The results of data analysis from the experimental class were taken from class XI IPA 2 and MAN 1 Padang, and for the control class from class XI IPA 1 and MAN 1 Padang using hypothesis testing, it can be obtained that the students' mathematical reasoning abilities using the TTW type cooperative learning model are significantly better than those taught conventionally.
2	- Siti Jami'atun - Kristina Wijayanti	2020. PRISMA. 3. Page 599-604	Mathematical Reasoning Ability in TTW Learning ( <i>Think Talk Write</i> ) Viewed from Student Learning Style	The test method is used to obtain data on students' mathematical reasoning ability in class VII SMP in Semarang city. technique <i>the random cluster</i>	The sample taken is a class that uses the TTW and PBL learning models. Based on the discussion carried out, it was obtained that the TTW model student mastery was 66.7% and the average mathematical reasoning ability of students with the TTW model was higher than students with the PBL model, so it can be concluded that the TTW model is not effective on students' mathematical reasoning abilities.
3	- Beautiful Desrani Lia - Volunteer zulyadaini	2019. Phi. 3(1). 21-24	Comparison of Students' Mathematical Reasoning Ability Through Cooperative Learning Model Type <i>Think Talk Write</i> (TTW) with <i>Problematic Based Learning</i> (PBL) Learning Model in Class VII Students of SMP Negeri 5 Jambi City	Research population 10 students from class VII SMP Negeri 5 Jambi City . And it was found that the experimental class division using a <i>think talk write</i> was class VII B while the control class using the <i>problem based learning</i> is class VII E.	The cooperative learning model of the <i>Think Talk Write</i> (TTW) type has an average score of 32,649 with a standard deviation of 3,615. Meanwhile, for the control class, the <i>Problem Based Learning</i> (PBL) model obtained an average of 28,135 with a standard deviation of 3,698. type cooperative learning model <i>Think Talk Write</i> for mathematical reasoning abilities is more effective than the <i>Problem Based Learning</i> (PBL)

In the first article, (Irwan & Permata Sari, 2018) conducting research activities regarding the application of the *Thing Talk Write* (TTW) type cooperative learning model to mathematical reasoning abilities, they conducted research on MAN students of class XII science in the city of Padang. Researchers see the low mathematical reasoning ability of MAN Padang city students from the average UN score obtained is still very low. Before conducting research, checking students' abilities also needs to be done, such as giving questions about mathematical reasoning. The results obtained by most students have not been able to get to the expected answers and have not been able to reason what was ordered according to the question indicators, namely drawing conclusions, compiling evidence, providing reasons or evidence for several solutions.

In this study, research was conducted using 2 classes, namely the experimental class with 38 students and the control class with 40 students. The hypothesis testing was conducted four times to determine the mathematical reasoning ability of students who were taught with the TTW type cooperative learning model in the experimental class and the control class. Calculations were carried out and resulted in an analysis of the initial ability test data that the control class students' mathematical reasoning abilities were higher than the average score of the experimental class. And for the analysis of the final ability test data, it was found that the control class students were lower than the experimental class. (Irwan & Permata Sari, 2018)

In the second article, Siti Jami'atun and Kristina (2020) conducted research on seventh grade students of SMP in Semarang city in the 2018/2019 academic year. In this study, 2 samples were used, namely the experimental class and the control class. The test method was used to obtain data on students' mathematical reasoning abilities on line and angle material. The result of the research that has been done is that the classical mastery of the *Think Talk Write* (TTW) model is 66.7%, so that it does not meet the classical mastery of 75%. However, when compared with the use of the PBL model, the *Thing Talk Write* (TTW) model on the average and proportion of reasoning abilities has a higher value. (Jami'atun & Wijayanti, 2020)

In the third article, (Mayssara A. Abo Hassanin Supervised, 2014) conducted research on mathematical reasoning abilities in seventh grade students of SMP Negeri 5 Jambi city in the 2018/2019 academic year. From 10 classes in junior high school, samples were taken using *random sampling technique* by analyzing math scores which had scores that were normally distributed and had a homogeneous variance according to the prerequisite test. Research was conducted on the class with the *Thing Talk Write* (TTW) learning model and the *Problem Based Learning* (PBL) learning model class, the first activity being a *post-test* on the number material.

Based on the results of the *post-test* conducted on the *Thing Talk Write* (TTW) learning model, the experimental class obtained an average of 32,649. This

value is obtained because of several advantages of the TTW model, namely the involvement of students in the learning process, because students can communicate the results of their thoughts and can dialogue and convey their thoughts after going through the process of reading, finding, discussing, and then sharing ideas. And for the control class with *Problem Based Learning* (PBL) learning model obtained an average of 28,135. (Indah Lia et al., 2019)

In the fourth article, the proceedings of Asep Ikin Sugandi (2011) conducted research on 80 class IX junior high school students by conducting a set of tests in the form of descriptions to measure mathematical reasoning abilities, and using worksheets that have been prepared. based on signs of cooperative learning type *Thing Talk Write* (TTW). The results of the research at the *Think* showed that the activities of thinking about possible solutions, taking notes to understand the ideas in the reading were more effective in improving communication and reasoning skills. At the *Talk*, they carry out discussion activities from ideas in groups that have been obtained previously so that they will generate new ideas from several ideas that have been communicated by all group members. *Talk* has an important role in mathematics, because in mathematics learning there is not only one way to solve problems, so that in this activity students' reasoning is expected to receive more appropriate answers to solve existing problems. At the *Write*, writing has several benefits for communicating solutions to problems or questions given including calculations, work steps, and researching all work arrangements so that no work is left behind. So that in this study the role of *Thing Talk Write* (TTW) learning has its own advantages compared to conventional learning. (Ikin Sugandi, 2011)

In the fifth article, research conducted by Novia Fajar, Budiyo, and Budi Usodo (2014) in public junior high schools throughout Wonogiri Regency in the 2013/2014 academic year was conducted using research data collection methods, documentation, tests, and questionnaire. In the study, data showed that the *Thing Talk Write* (TTW) learning model with PMR provided an increase in achievement that previously used the *Thing Talk Write* conventional and Because the *Think Talk Write* (TTW) learning model uses understanding using concrete objects that are used to illustrate the problems that exist in the LKS. Mathematical reasoning ability has an important role in learning achievement, because in this study it was proven that students who have high and moderate reasoning abilities have good learning achievements than students who have low reasoning abilities. (Utami et al., 2014).

## CONCLUSION

Mathematical reasoning ability is still low, so a learning model that can improve is needed, namely the TTW type cooperative learning model. The mathematical reasoning ability of students taught with the TTW type cooperative learning model was significantly better than those taught only with conventional learning.type of learning model *Think Talk Write* will make students understand the material better because they learn from thinking, compiling, testing, reflecting, and writing ideas.



## REFERENCES

- Asbar, R. F., & Witarsa, R. (2020). Kajian Literatur Tentang Penerapan Pembelajaran Terpadu Di Sekolah Dasar. *Jurnal Review Pendidikan Dan Pengajaran*, 3(2), 225–236. <https://doi.org/10.31004/jrpp.v3i2.1220>
- Bernard, M., & Rohaeti, E. E. (2016). Meningkatkan Kemampuan Penalaran Dan Disposisi Matematik Siswa Melalui Pembelajaran Kontekstual Berbantuan Game Adobe Flash Cs 4.0 (Ctl-Gaf). *Edusentris*, 3(1), 85. <https://doi.org/10.17509/edusentris.v3i1.208>
- Dikembangkan, D. A. N. B. (2010). *Utari Sumarmo, Januari 2010– Hal : 1. 1–27.*
- Fajriyah, L., Nugraha, Y., Akbar, P., & Bernard, M. (2015). Pengaruh Kemandirian Belajar Siswa SMP Terhadap Kemampuan Penalaran Matematis. *Journal On Education*, 01(02), 288–296.
- Ikin Sugandi, A. (2011). Pengaruh Model Pembelajaran Kooperatif Tipe Think Talk Write Terhadap Kemampuan Komunikasi dan Penalaran Matematis. *Prosiding UNY*, 41–50.
- Indah Lia, D., Relawati, & Zulyadaini. (2019). Perbandingan Kemampuan Penalaran Matematis Siswa Melalui Model Pembelajaran Kooperatif Tipe Think Talk Write (TTW) dengan Model Pembelajaran Problem Based Learning (PBL) pada Siswa Kelas VII SMP Negeri 5 Kota Jambi. *Phi*, 3(1), 21–24.
- Irwan, & Permata Sari, D. (2018). Penerapan Model Pembelajaran Kooperatif Tipe Think Talk Write Terhadap Kemampuan Penalaran Matematis Siswa Kelas XI IPA MAN Kota Padang. *Math Educa*, 2(2), 113–127.
- Jami'atun, S., & Wijayanti, K. (2020). Kemampuan Penalaran Matematis pada Pembelajaran TTW ( Think Talk Write ) Ditinjau dari Gaya Belajar Siswa. *PRISMA, Prosiding Seminar Nasional Matematika*, 3, 599–604.
- Konita, M., Asikin, M., & Noor Asih, T. S. (2019). Kemampuan Penalaran Matematis dalam Model Pembelajaran Connecting, Organizing, Reflecting, Extending (CORE). *PRISMA, Prosiding Seminar Nasional Matematika*, 2, 611–615.
- Lestari, K. E. dan M. R. Y. (2017). *Penelitian Pendidikan Matematika* (R. Aditama (ed.); Edisi ke-9).
- Mayssara A. Abo Hassanin Supervised, A. (2014). 濟無No Title No Title No Title. *Paper Knowledge . Toward a Media History of Documents*, 1–36.
- Purwanto, B. (2012). *Eksperimentasi Model Pembelajaran Kooperatif Tipe Think-Talk-Write (TTW) dan Tipe Think-Pair-Share (TPS) Pada Materi Statistika Ditinjau dari Kemandirian ...*. <https://digilib.uns.ac.id/dokumen/detail/25300>
- Sibuea, M. F. L. (2017). Implementasi Model Pembelajaran Kooperatif Tipe Think Talk Write (TTW) Sebagai Upaya Meningkatkan Hasil Belajar Siswa. *MES (Journal of Mathematics Education and Science)*, 2(2), 44–51.
- Utami, N. F., Budiyo, & Usodo, B. (2014). Eksperimentasi Model Pembelajaran Think Talk Write (TTW) Dengan Pendekatan Matematika Realistik (PMR) Terhadap Prestasi Belajar Matematika Ditinjau Dari Kemampuan Penalaran Matematika Dan Kreativitas Belajar Siswa SMP Se-Kabupaten Wonogiri. *Jurnal Elektronik Pembelajaran Matematika*, 2(3), 260–269.

Wiryopranoto, S., M. S. Herlina, N., Marihandono, D., Tangkilisan B, Y., & Nasional, T. P. K. (2017). *Perjuangan Ki Hajar Dewantara: Dari Politik Ke Pendidikan*.