
Analysis Connection Mathematical Student through Learning Styles Think Talk Write (TTW) Tips Collaboration

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Abstract. *This study aims to analyze students' mathematical connections through the application of the Think Talk Write (TTW) learning style and collaboration in the context of mathematics learning. The Think Talk Write (TTW) method emphasizes developing critical thinking, communication and writing skills in understanding mathematical concepts. Collaboration between students is also integrated to strengthen mathematical understanding through discussion and joint problem solving. This research uses a qualitative approach with case studies as the analytical framework. Data was collected through classroom observations, interviews with students, and analysis of students' writing. Research findings show that implementing the Think Talk Write (TTW) method with collaboration can improve students' mathematical connections, strengthen conceptual understanding, and improve communication and mathematical problem solving skills. Pedagogical implications of these findings are discussed to promote more effective and inclusive mathematics learning practices.*

Keywords: *Analysis, Mathematical Connections, Learning Style, Think Talk Write (TTW), Collaboration, Mathematics Learning.*

BACKGROUND

Hasratuddin (2015) explains that mathematical connections are defined as relationships between mathematical ideas, relationships between mathematical concepts internally or relationships externally. Thus, mathematical connection ability is a person's ability to see and apply the relationship between mathematical concepts and principles. .

Students need mathematics to meet practical needs and solve problems, both problems in other subjects or in everyday life. However, until now, there are still many students who think that mathematics is a difficult subject and is a lesson full of formulas. Especially in solving problems related to story problems or everyday life.

Hasratuddin (2015) said that to improve mathematics learning, mathematics teachers in the classroom must adopt a harmonized learning model that has been widely practiced and proven to be effective. The learning model that must be applied is a learning model that has the following characteristics: (1) a learning model where students can actively participate in learning, and (2) a learning model where students can build exchanges between themselves. , between students and teachers, and (3) a learning model that allows students to help each other,

share and work together to carry out tasks set by the teacher. (4) learning models that allow students to work on problems individually or with their peers.

According to SIGMA (2020), an alternative for overcoming this problem is cooperative learning. Cooperative learning makes students more active when studying in class, this gives students the opportunity to collaborate and interact with other students and teachers, and allows students to develop knowledge about themselves. In addition, students no longer see other students as competitors but as colleagues who support them in achieving their goals and success.

One form of strategy that teachers need in presenting material is to choose a learning model that is appropriate and appropriate to the material to be taught. Application model Which appropriate on process learning can increase students' mathematical connection abilities . One learning model that can help teachers and students in mathematics learning activities is the Think-Talk-Write learning model.

Think-Talk-Write is a strategy that facilitates oral language practice and writing that language fluently. This strategy, which was first introduced by Huinker and Laughlin, is based on the understanding that learning is a social behavior. The TTW strategy encourages students to think, talk, and then write about a certain topic. This strategy is used to develop writing fluently and practice language before writing. The TTW strategy allows students to influence and manipulate ideas before expressing them in written form. He also assists students in gathering and developing ideas through structured conversations.

According to Isokratun (2018), the *Think Talk Write* (TTW) learning model is based on constructive learning which is applied through thinking, speaking and writing activities. This learning model has steps that start from the thinking process, namely students build their own knowledge and look for ideas or solutions to contextual problems related to everyday life or solve problems related to mathematical concepts or other scientific disciplines (Yasmin & Ansari, 2012). The next step is to talk or communicate various ideas or solutions that students have found to their friends in the discussion group. The TTW steps, namely speaking and writing, which have been explained previously can make all students actively involved in the learning process. Only students who are not active are those with superior abilities, but students who are less superior also try to find ideas or solutions and convey them to their group of friends (Sulastri, 2015).

THEORETICAL STUDY

Ability Connection Mathematical

According to Hasratuddin (2015), mathematical connections are defined as relationships between mathematical ideas, connections between mathematical concepts internally or externally. Thus, mathematical connection ability is a person's ability to see and apply the interconnectedness of mathematical concepts and principles. This means that concepts and principles in mathematics are interconnected with each other. Mathematical connections allow someone to be able to connect a mathematical concept with things related to real concepts.

Indicator Ability Connection Mathematical

Hasratuddin (2015) describes several indicators regarding mathematical connections as follows:

1. Search for and understand the relationship between various representations of concepts and procedures.
2. Using mathematics in other fields of study or everyday life
3. Understand equivalent representations of the same concept or procedure
4. Looking for concepts from one procedure to another procedure in equivalent representation
5. Using connections between math topics, and between math topics and topics other

Learning model Cooperative Type *Think Talk Write*

According to Mifhatul Huda (2017) *Think-Talk-Write* is a strategy that facilitates oral language practice and writing the language fluently. This strategy, which was first introduced by Huinker and Laughlin, is based on the understanding that learning is a social behavior. The TTW strategy encourages students to think, talk, and then write about a certain topic. This strategy is used to develop writing fluently and practice language before writing.

The TTW strategy allows students to influence and manipulate ideas before expressing them in written form. He also assists students in gathering and developing ideas through structured conversations. As the name suggests, this strategy has a syntax that matches the order in it, namely *think* (thinking), *talk* (talking/discussing), and *write* (writing).

Stage 1: *Think*

Students read the text in the form of questions (if possible starting with questions related to everyday or contextual problems). At this stage students individually think about possible answers (solving strategies),

Stage 2: *Talk*

Students are given the opportunity to discuss the results of their investigation in the first stage. At this stage students reflect, organize and test (negotiate, share) ideas in group discussion activities. Students' communication progress will be seen in their dialogue in discussions, both in exchanging ideas with other people or in their own reflections which they express to others.

Stage 3: *Write*

At this stage, students write down the ideas they get from the first and second activities. This article consists of the basic concepts used, relationships with previous material, completion strategies, and solutions obtained. The teacher's role and duties in an effort to make effective use of the TTW strategy are to propose and provide assignments that enable students to be actively involved in thinking, encouraging and listening carefully to the ideas put forward by students orally and in writing, considering and providing information on what students have discovered. in discussions, as well as monitoring, assessing, and encouraging students to participate actively.

According to Aris Shoimin (2016), the *Think Talk Write type learning method* consists of 6 steps, including:

1. The teacher distributes worksheets containing questions that students must work on as well as instructions for their implementation.
2. Students read the problem in the worksheet and make small notes individually about what they know and don't know about the problem. When students make small notes, a thinking process will occur *in* students. After that, students try to solve the problem individually. This activity aims to enable students to differentiate or combine ideas contained in the reading and then translate them into their own language.
3. Teacher divides students into small groups (3-5 students)
4. Students interact and collaborate with group friends to discuss the contents of the notes from the notes (*talk*). In this activity they use their own language and words to convey ideas in the discussion. Understanding is built through interaction in discussions. The discussion is expected to produce solutions to the questions given.
5. From the results of the discussion, students individually formulate knowledge in the form of answers to questions (containing the basis and connection of concepts, methods and solutions) in written form *in* their own language. In the writing, students connect the ideas they obtain through discussion.
6. Group representatives present the results of the group discussion, while other groups are asked to provide responses.

- The final learning activity is to make reflections and conclusions on the material studied. Before that, several or one student is selected as a group representative to present the answer, while other groups are asked to provide responses.

RESEARCH METHODS

The type of research used is research with a qualitative approach. Qualitative research focuses on non-mathematical data analysis that obtains results through data that has been collected from various methods, including interviews, observations, documents, and experiments. The method used is literature study . Library study is an activity that is closely related to methods of collecting library data, reading and taking notes as well as processing research materials.

The steps taken to conduct this research are as follows:

- Data reduction is a procedure that focuses on simplifying, abstracting and converting "rough" data formed from data contained in several thesis letters, newspapers and theses. For this reason, the data is summarized and only the most important are selected.
- Presentation of data, in the form of explanations (descriptive), diagrams, *flowcharts* and relationships between categories with narrative test interpretation.
- Conclusion, conclusion withdrawn gradually , starting from conclusion beginning. Para researcher Also request consideration from stakeholders Which related with study This.

RESULTS AND DISCUSSION

From the search results, researchers found 5 studies (3 journals and 2 theses) that were relevant to the research topic. The journals and theses are as follows:

Table 1. Relevant Research

No	Writer's name	Research Title	Publication Year	Code
1	Lis Sulastri, Riana Irawati, Dety Amelia Karlina	The Influence of a Contextual Approach with <i>Think Talk Write</i> (TTW) Strategy on Students' Mathematical Connection Ability in Comparative Material	2017	P1
2	Rana Rafidah , Swida Purwanto, Dwi Antari	<i>the Think Talk Write (TTW)</i> Type Cooperative Learning Model with a Contextual Approach on the Mathematical Connection Ability of Students	2020	P2

		at State Middle School 97 Jakarta		
3	Fitria Nurapriani	Improving Communication Skills and Mathematical Connections of Middle School Students Through the <i>Think Talk Write Strategy</i>	2016	P3
4	Lasmi	<i>Think-Talk-Write (TTW)</i> Learning Strategies in Class XI IPS 4 SMA Muhammadiyah 1 Karanganyar Academic Year 2015/2015	2015	P4
5	Siti Zahara Manurung	The Influence of Cooperative Learning Strategy <i>Think Talk Write (TTW)</i> Type and <i>Think Pair Share (TPS)</i> Type on Students' Mathematical Connection Ability and Problem Solving Ability Trigonometry Material Class X Taman Madya (SMA) Tamansiswa Medan Academic Year 2018/2019	2019	P5

Table 2. Summary of Analysis of Students ' Mathematical Capacity Capacity Using Cooperative Learning Model *Think Talk Write (TTW)* Type

No	Code	Research result
1	P1	The results of the test data analysis of the average initial and final values of the experimental class using the Wilcoxon test with a significance level ($\alpha = 0.05$) obtained a <i>P-value</i> $< \alpha$ of 0.000, so H_1 was accepted and H_0 was rejected. The initial score in the experimental class was 34.41. The final score of the experimental class after being given treatment using a contextual approach with the <i>Think Talk Write (TTW)</i> strategy was 64.38. This shows that contextual learning with the <i>Think Talk Write (TTW) strategy</i> has a significant effect on students' mathematical connection abilities.
2	P2	The results of hypothesis testing with the t-test show that the value of $t = 3.0520$ and $t_{table} = 1.6716$ so that $t > t_{table}$ means H_0 is rejected. Thus, it can be concluded that there is an influence of the <i>Think Talk Write (TTW)</i> cooperative learning model with a contextual approach on students' mathematical connection abilities. Testing continued to determine how much influence the <i>Think Talk Write (TTW)</i> type cooperative learning model with a contextual approach had on students' mathematical connection abilities. The effect size test was carried out using <i>the Cohen-Test</i> . Based on calculations, the value of $d = 0.8015$ is obtained, which is in the large category, with the presentation being that 69% of students in the experimental class are above the control class average. The influence given can be seen from the average mathematical connection ability test score of experimental class students, which is 69, which is higher than the average mathematical connection ability test score of control students, namely 58.83.
3	P3	The average pretest score for the mathematical connection ability of the experimental class was 5.710 and the control class was 5.742. The difference is around -0.032, indicating a difference in students' initial mathematical connection abilities. Meanwhile, after the learning was carried out, the average post-test score for the mathematical connection ability of the students in the experimental class was 19.74 and the control class was 12.68. So, in calculating the standard deviation of the post-test scores for the experimental class and control class, it can be seen that the distribution of students' mathematical connection ability after using the <i>Think Talk Write strategy</i> was greater. better than regular learning.

4	P4	<p>Two cycles were carried out in this research.</p> <p>In the pre-cycle, students' mathematical connection abilities in terms of recognizing and using mathematical ideas were 56.25% poor, 37.5% sufficient and 6.25% good. During cycle I, students' mathematical connection abilities in terms of recognizing and using mathematical ideas were 48.875% insufficient and 53.125% sufficient. During cycle II, students' mathematical connection abilities in terms of recognizing and using mathematical ideas were 18.75% sufficient, 28.125% good and 53.125% very good. From these results it can be concluded that students' mathematical connection abilities in terms of recognizing and using mathematical ideas increased after cooperative learning of the <i>Think Talk Write type was carried out</i>.</p> <p>In the pre-cycle, students' mathematical connection abilities in terms of understanding the interrelationship of mathematical ideas and forming ideas with each other so as to produce a comprehensive interrelationship is 96.875% insufficient and 3.124% sufficient. During cycle I, students' mathematical connection abilities in terms of indicators of understanding the interrelationship of mathematical ideas and forming ideas with each other so as to produce a comprehensive interrelationship were 56.25% poor, 9.375% sufficient, 18.75% good and 15.625% very good . During cycle II, students' mathematical connection abilities in terms of indicators of understanding the interrelationship of mathematical ideas and forming ideas with each other resulting in a comprehensive interrelationship were 9.375% poor, 12.5% sufficient, 31.25% good and 46.875% very good . From these results it can be concluded that students' mathematical connection abilities in terms of indicators of understanding the relationship between mathematical ideas and forming ideas with each other so as to produce a comprehensive connection increase after carrying out <i>Think Talk Write type cooperative learning</i>.</p> <p>In the pre-cycle, students' mathematical connection abilities in terms of knowing and applying mathematics in real life were 3.124% poor, 87.5% sufficient and 9.375% good. During cycle I, students' mathematical connection abilities in terms of knowing and applying mathematics in real life were 56.25% poor, 12.5% sufficient and 31.25% good. During cycle II, students' mathematical connection abilities in terms of recognizing and using mathematical ideas were 18.75% sufficient, 40.625% good and 43.74% very good. From these results, it can be concluded that students' mathematical connection abilities in terms of recognizing and applying mathematics in real life increased after cooperative learning of the <i>Think Talk Write type was carried out</i>.</p> <p>Judging from the increase in students' mathematical connection abilities without indicators after carrying out <i>Think Talk Write type cooperative learning</i>. So it can be concluded that the <i>Think Talk Write cooperative learning model influences students' mathematical connection abilities</i></p>
5	P5	<p>The influence of learning strategies on mathematical connection abilities can be seen in changes in student scores from pre-test to post-test. In the indicator of writing known and asked, there was an increase of 16.66%. In the connection indicator, it was formulated that there was an increase of 38.70%. And in the completion steps indicator there was an increase of 35.75%. So it can be concluded that the think talk write type cooperative learning model influences students' mathematical connection abilities</p>

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusion

, there is a good influence on mathematical connection abilities using the Think *T alk Write cooperative learning method* . Some are significant, others experience little influence. The Think *T alk Write cooperative learning model can be used* to improve students' mathematical connection abilities .

2. Suggestion

Based on the results of the literature study that has been carried out, the researchers put forward several suggestions:

1. Based on literature studies, it is true that students' mathematical connection abilities can increase
2. For schools and teachers, it is hoped that they will use the TTW type cooperative learning model because it can improve students' mathematical connection abilities

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