

The effect of Cooperative Learning Model Think-Talk-Write (TTW) Type on Mathematical Problem-Solving Abilities In Terms of Learning Habits

Agus Slamet Susanto¹, Haninda Bharata², Syarifuddin Dahlan³

^{1,2,3} Universitas Lampung

¹Correspondence Address; augustslamet@gmail.com

Abstract

The purpose of this research are: (1) to know the influence of Think Talk Write (TTW) model of learning ability to solve mathematical problems of learners; (2) to know the effect of learning habit on students' mathematical problem solving ability; (3) to know the interaction between learning model and study habit to students' mathematical problem solving ability. The type of research used is quasi experiment with 3×3 factorial research design. The hypothesis test used is a parametric test with data analysis technique using Anova test. The result of the research for the prerequisite test is based on normality test which can be known by using Liliefors test and homogeneity test can be known by using Barlett test, it is obtained that the test result data from both groups are normal and homogeneous, so it can be continued for parametric test by using anava test two paths with unequal cells. Based on data processing, it is found that: (1) there is influence of Think Talk Write (TTW) learning model to students' mathematical problem-solving ability; (2) there is the influence of learning habit on the ability of mathematical problem of learners; (3) there is no interaction between the learning model and the learning habits of the mathematical problems of the learners. This means that the learning model Think Talk Write (TTW) is more effective than the conventional model so that Think Talk Write (TTW) model more influence on the problem-solving ability of learners.

Keywords: Problem Solving; Think-Talk-Write (TTW)

INTRODUCTION

Mathematics has important roles in life. Mathematics can be as a tool to think logically in solving life problems (Misel, 2016) (Dewimarni, 2017). However, the ability of students to find solutions these days are still relatively low. Starting from elementary school to high school level, are having difficulty in solving unusual problems (Jitendra, Harwell, Dupuis, & Karl, 2016; Morin, Watson, Hester, & Raver, 2017; Spooner, Saunders, Root, & Brosh, 2017). There are several factors that affect the low level of mathematical problem-solving, among them are attitudes and learning habits that become a very complex set of learning activities in addition to involving one's individual mental-physical activities (Irwanto, 2016). Strategic innovations are needed to solve this problem (Jitendra, Brown, Lein, Zaslofsky, Kunkel, Jung, & Egan, 2015). One of the strategic that can be effective is by using the right model (Morin dkk., 2017). An effective and appropriate learning model which is cooperative type learning model with Think Talk Write (TTW) model (Angriani, Bernard, Nur, & Nurjawahirah, 2016).

Think Talk Write (TTW) learning model is a learning that begins with thinking through reading material by listening (think), the reading results are communicated with presentations, discussions (talk), and make a presentation report (write) (Angriani dkk., 2016; Atikasari & Kurniasih, 2015). The Think Talk Write (TTW) learning model requires the learners to think about the solutions to the problems they are facing in accordance with their own ideas in a discussion so that they can find new ideas to solve an existing problem (Atikasari &

Kurniasih, 2015). Through the application of Think Talk Write (TTW) model, it can improve mathematical problem-solving abilities (Angriani dkk., 2016). Solving mathematical problems requires a relevant literature to support a learning activity by applying the Think Talk Write (TTW) model (Cowan, 2017). Although in their learning activities, each student has different learning habits that greatly affect the success of the learning goals that have been planned in the beginning (Amelia, 2015). As for previous research that has used the Think Talk Write (TTW) cooperative type learning model including which is: Think Talk Write (TTW) influences; mathematical creative thinking abilities, critical thinking abilities, problem-solving abilities, mathematical writing abilities (Afriyani, Chotim, & Hidayah, 2014; Atikasari & Kurniasih, 2015; Wahyuni & Efuansyah, 2018). There are also several studies that have been conducted that the Think Talk Write (TTW) model produces something positive in each variable that has been studied (Elida, 2012; Juniasih, Jampel, & Setuti, 2013; Sugiarti, Putra, & Abadi, 2014). Learning habits that influence; learning achievements, problem-solving, learning outcomes (Arifin, 2012; Siagian, 2013; Amelia, 2015; Irwanto, 2016).

Based on previous researches, the same model was also applied in this study, namely Think Talk Write (TTW) model with renewal, which to see: (1) the influence of Think Talk Write (TTW) cooperative type learning model on mathematical problem-solving abilities of the learners; (2) the influence of learning habits on mathematical problem-solving abilities of the learners; (3) the interaction between learning models and learning habits on mathematical problem - solving abilities of the learners.

THE RESEARCH METHODS

The applied research method was experimental research. The type of research used was quasi experimental research. Variables in this research are divided into two, which are dependent variable and independent variable. Dependent variable in this research is problem-solving abilities of the learners, whereas independent variable in this research is learning method (Think Talk Write (TTW) and direct) and learning habits. The design of experiment used was designed with factorial design 3×3 . Sampling in this research used random sampling technique. Data collection used documentation method, questionnaire method, test method. Instrument used for data sampling consists of problem solving skill test and habitual questionnaires. Prerequisite test for normality test using Lilliefors test with significant level 5% with the hypothesis being test are:

H_o : a normal data distribution

H_a : not a normal data distribution

Data distribution is said to be a normal distribution if $L_{calculated} < L_{table}$ then H_o is accepted, however, if $L_{calculated} \geq L_{table}$ then H_o is rejected.

Prerequisite test for homogeneity trial by using Bartlett test with significant level 5% with the hypothesis being tested are:

H_o : Data distribution is homogene

H_a : Data distribution is not homogene

Data distribution is said to be homogene if $X^2_{calculated} \leq X^2_{table}$ then H_o is accepted, however, if $X^2_{calculated} \geq X^2_{table}$ then H_o is rejected.

Balance test using two-way Anova test with the cells not same, using variance analysis two-way Anova hypothesis test with the cells not same and then with double comparison test using Scheffe' method if the hypothesis is rejected. As for the research design procedure presented in Table 1.

Table 1. Faktorial Design 3×3

Factor B (Applied Conventional Model)	Level	Mathematical Problem-Solving Abilities		
	[Low (0) , Moderate (1), High (2)]			
	2	02	12	22
	1	01	11	21
	0	00	10	20
		0	1	2

Factor A (Applied TTW Model)

The combination of the design above are A_0B_0 , A_1B_0 , A_2B_0 , A_0B_1 , A_1B_1 , A_2B_1 , A_0B_2 , A_1B_2 , A_2B_2 and as for each combination, it consists of experimental response value based on observations in the experiment.

THE RESULTS OF THE RESEARCH AND THE DISCUSSION

The data of the mathematical problem-solving abilities score and learning habits questionnaire are taken when the research is on progress. The Think Talk Write (TTW) learning model is applied in the experimental class and the Conventional learning model is applied in the control class. Before the research began, the two of those classes were standardized by applying the Conventional learning model. The learning took place with several meetings. The first meeting, the learners in the class that applied the Think Talk Write (TTW) learning model are not used to discuss in a group, someone who accompanies and gives some advice to each group is needed. When the learning is taking place, the learners are quite active in discussing, presenting the result of the discussion, and responding to the answer of other groups. While in the control class, during the learning the learners are monotonous, they only take note and pay attention. The second meeting, the learners in the class that applied the Think Talk Write (TTW) learning model are no longer given guidance to each group because the learners understand so that they can solve the problem-solving question properly and independently. While in the control class that applied the Conventional model are monotonous. At the third meeting, the learners are used to the learning using Think Talk Write (TTW) learning model. The learners become more active and show their abilities both in solving the problem-solving question and in the discussions. Each group is more enthusiastic in giving their opinions while in the control class that applied the Conventional learning model are still not proper and good enough, guidance is needed. After getting learning process that is given a different way to each class by applying the Think Talk Write

(TTW) model and the Conventional model, at the last meeting the learners are given problem-solving ability test and learning habits questionnaires.

After doing the problem-solving ability test and learning habits questionnaires, obtained the results. There are some stages on processing data, first it must fulfill prerequisites test namely normality test and homogeneity test, as the requirement of Anova test. After the prerequisites test is fulfilled, obtained the data distribution is normal and homogeneous. Next, perform the two-way Anova test. The purpose of the two-way of Anova test is to find out the average difference, 1 of 3 hypotheses result. Obtained, there are differences in mathematical problem-solving abilities on the learners who get Think Talk Write (TTW) learning model and The Conventional learning model.

From the explanation above, it can be concluded that the experimental class that uses the Think Talk Write (TTW) learning model have better problem solving than the control class that uses the Conventional learning model (direct learning).

1. Learning Habits

The result of the research shows that there are mathematical problem-solving differences in the learning habits of the learners (high, moderate, and low) learning habits that applied or the learners who get the Think Talk Write (TTW) learning model and The Conventional learning model. Based on the double comparison test on the learning habits of the learners, it can be concluded that there is a difference between (high-learning habits and moderate-learning habits) and there is a difference between (high-learning habits and low-learning habits). But, there is no difference between (moderate-learning model and low-learning model). This is because of the external factor on the learners. Learning habits that influences the success of study is a good learning habits, while something that makes the learner failed is because doing bad learning habits (Wahyuni & Efuansyah, 2018).

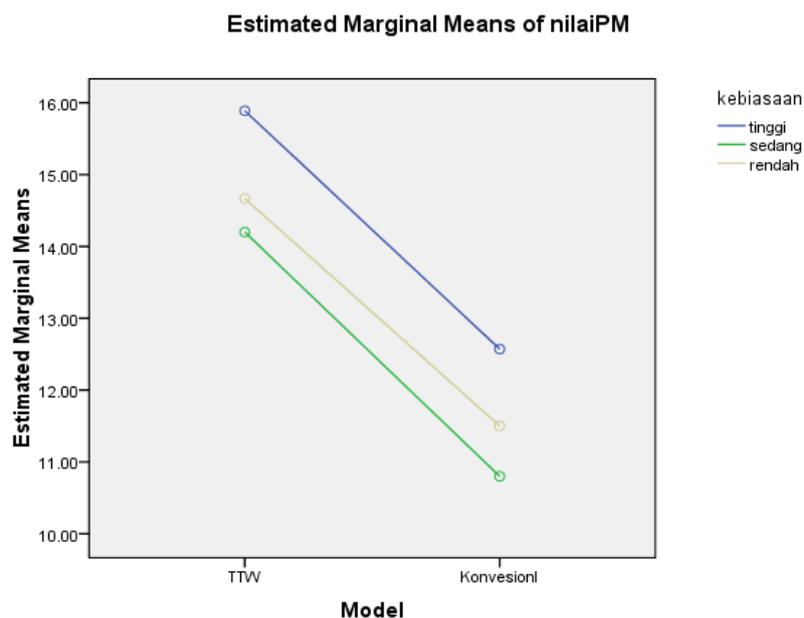
The success of the study itself signed with the good study achievement of learners in the school (Mu'min, 2014; Suningsih, 2016). In that process, the learners who have high-learning habits can influence the learners who have low-learning habits. The learners who have low-learning habits are motivated by the learners who have high-learning habits. While the learners who have moderate-learning habits feel enough and do not want to improve their learning habits. In developing a learning habits, it should be built by improving the competitive and learning spirit that can be done by placing their friend as the main competitor (Nurdeni & Liberna, 2012).

As in Ahmadi and Supriono assume that learning habits is an attitude where a good attitude and learning habits will produce good learning outcomes otherwise a negative attitude and learning habits will produce low learning outcomes (Irwanto, 2016). High-learning habits, moderate-learning habits, and low-learning habits have differences because high-learning habits is trained and used to solve question so that when given mathematical problem-solving ability test, the learners who have high-learning habits are ready and able to do the question easily. Unlike the learners who have moderate-learning habits and low-learning habits are not trained and used to solve the question so that when given mathematical problem-solving ability test, they are not ready and unable to do the question. Based on this, it can be seen that

high-learning habits is better than moderate and low-learning habits to the abilities of mathematical problem-solving in the class that applied the Think Talk Write (TTW) learning model. It means that Think Talk Write (TTW) learning model is more effective on the mathematical problem-solving abilities.

2. Interaction

Based on data analysis, there is no interaction between the learning model and the learning habits on the learner's mathematical problem-solving abilities. There is no interaction, it means that there is no influence both on learning model and learning habits on the mathematical problem-solving abilities. It means that the Think Talk Write (TTW) learning model and the learning habits can't give an influence to the problem-solving abilities. The Conventional learning model and learning habits also can't give and influence to the problem-solving abilities and independent to the Think Talk Write (TTW) learning model. As seen in Picture 2.



Picture 2. Two-way of Anova Tabulation using SPSS

Based on two-way of analysis of varians (anova) calculation test using SPSS, high-learning habits is higher than moderate and low-learning habits and low-learning habits is higher than moderate-learning habits. It can be seen that the Think Talk Write (TTW) learning model is higher than the Conventional learning model. It can be seen in the picture that all the 3-line separated from each other and do not intersect. It shows that there is no interaction between learning model and learning habits on mathematical problem-solving abilities. It means that Think Talk Write (TTW) learning model is better than The Conventional learning model. Learning model which is more effective on mathematical problem-solving abilities is Think Talk Write (TTW) learning model (Afriyani dkk., 2014).

CONCLUSION AND SUGGESTION

Based on the result of analysis and data processing supported with theoretical basis and refers to the purpose of the research, so it can be concluded that there is the influence of Think Talk Write (TTW) learning model on the mathematical problem-solving abilities of the learners, there is the influence of learning habits on the mathematical problem-solving abilities of the learners, and there is no interaction between learning model and learning habits on the mathematical problem-solving abilities of the learners. It means that Think Talk Write (TTW) learning model is more effective than the Conventional learning model so Think Talk Write (TTW) learning model is more influence on the problem-solving abilities of the learners. It means that Think Talk Write (TTW) learning model is more effective than The Conventional learning model. There is the difference in the problem-solving abilities of the learners who have high, moderate and low learning habits that is applied Think Talk Write (TTW) learning model and those that applied The Conventional learning model.

Based on the conclusion above, there are some suggestions which are: for the next research could find other learning models which more effective on mathematical problem-solving abilities of the learners and try to use the same model or other learning models by looking for other influences or by adding review of the research on affective-abilities of the learners. Hopefully, this research can be useful and be a reference for further research.

REFERENCES

- Afriyani, A. D. N., Chotim, M., & Hidayah, I. (2014). Keefektifan Pembelajaran TTW dan SGW Berbantuan Kartu Soal Terhadap Kemampuan Pemecahan Masalah. *Unnes Journal of Mathematics Education*, 3(1), 48–55.
- Amelia, M. (2015). Pengaruh Adversity Quotient, Iklim Kelas, dan Kebiasaan Belajar Terhadap Prestasi Belajar Ekonomi Siswa Kelas XI.IIS SMA Negeri di Kabupaten Tanah Datar. *Journal of Economic Education*, 4(1), 149–159.
- Angriani, A. D., Bernard, Nur, R., & Nurjawahirah. (2016). Meningkatkan Kemampuan Pemecahan Masalah Melalui Pembelajaran Kooperatif Think Talk Write Pada Peserta Didik Kelas VIII MTsN Model Makassar. *Jurnal Matematika dan Pembelajaran*, 4(1), 11–28.
- Arifin, P. (2012). Hubungan Kebiasaan Belajar dengan Prestasi Belajar Siswa Kelas VII B SMP Negeri 13 Malang. *Pd. skripsi, UM, Malang*.
- Atikasari, G., & Kurniasih, A. W. (2015). Keefektifan Model Pembelajaran Kooperatif dengan Strategi TTW Berbantuan Geogebra Terhadap Kemampuan Berpikir Kreatif Matematis Siswa Kelas VII Materi Segitiga. *Unnes Journal of Mathematics Education*, 4(1), 85–94.
- Cowan, J. (2017). The Potential of Cognitive Think Aloud Protocols for Educational Action Research. *Active Learning in Higher Education*, 1–14.

- Dewimarni, S. (2017). Keampuan Komunikasi dan Pemahaman Konsepn ALjabar Linear Mahasiswa UNiversitas Indonesia 'YPTK' Padang. *Jurnal Pendidikan Matematika* , 8 (1), 53-62.
- Elida, N. (2012). Meningkatkan Kemampuan Komunikasi Matematik Siswa Sekolah Menengah Pertama Melalui Pembelajaran Think Talk Write (TTW). *Infinity Journal*, 1(2), 178–185.
- Irwanto, Z. (2016). Pengaruh Teknik Problem Solving Dalam Meningkatkan Kebiasaan Belajar Siswa. *Journal of Educational Science and Technology (EST)*, 2(3), 213–225.
- Jitendra, A. K., Harwell, M. R., Dupuis, D. N., & Karl, S. R. (2016). A Randomized Trial of The Effects of Schema Based Instruction on Proportional Problem Solving for Students With Mathematics Problem Solving Difficulties. *Journal of Learning Disabilities*, 50(3), 1–15.
- Juniasih, N. W., Jampel, I. N., & Setuti, N. M. (2013). Pengaruh Model Pembelajaran Think Talk Write (TTW) Berbantuan Media Konkret Terhadap Hasil Belajar IPA Siswa Kelas IV SD. *Mimbar PGSD Undiksha*, 1(1).
- Misel, E. S. (2016). Penerapan Pendekatan Matematika Realistik Untuk Meningkatkan Kemampuan Representasi Matematis Siswa. *Metoda Didaktik* , 10 (2), 27-36.
- Morin, L. L., Watson, S. M. R., Hester, P., & Raver, S. (2017). The Use of a Bar Model Drawing to Teach Word Problem Solving to Students With Mathematics Difficulties. *Learning Disability Quarterly*, 40(2), 1–14.
- Nugroho, A. A., Putra, R. W. Y., Putra, F. G., & Syazali, M. (2017). Pengembangan Blog Sebagai Media Pembelajaran Matematika. *Al-Jabar : Jurnal Pendidikan Matematika*, 8(2), 197–204.
- Nurdeni, & Liberna, H. (2012). Pengaruh Kebiasaan Belajar Dan Kreativitas Belajar Siswa Terhadap Hasil Belajar Matematika (Survey Pada SMA Di Kecamatan Ciledug Tangerang. *Jurnal Fourier*, 1(2), 71–76.
- Siagian, R. E. F. (2013). Pengaruh minat dan kebiasaan belajar siswa terhadap prestasi belajar matematika. *Jurnal Formatif*, 2(2), 122–131.
- Spooner, F., Saunders, A., Root, J., & Brosh, C. (2017). Promoting Access to Common Core Mathematics for Students with Severe Disabilities Through Mathematical Problem Solving. *Research and Practice for Persons with Severe Disabilities*, 42(3), 171–186.
- Sugiarti, N. L. P. Y., Putra, I. K. A., & Abadi, I. B. G. S. (2014). Pengaruh Model Pembelajaran TTW (Think Talk Write) Berbantuan Media Gambar Berseri Terhadap Keterampilan Menulis Bahasa Indonesia Siswa Kelas V SD Gugus 1 Kecamatan Kediri, Tabanan Tahun Ajaran 2013/2014. *Mimbar PGSD Undiksha*, 2(1).
- Wahyuni, R., & Efuansyah. (2018). Model Pembelajaran Missouri Mathematics Project (MMP) Menggunakan Strategi Think Talk Write (TTW) Terhadap Kemampuan

Berpikir Kritis dan Kemampuan Pemecahan Masalah. *Jurnal Nasional Pendidikan Matematika*, 2(1), 24–36.