

THE COMPARISON OF TEAM ASSISTED INDIVIDUALIZATION AND THINK PAIR SHARE WITH GUIDED NOTE TAKING ON RELATION AND FUNCTION VIEWED FROM ADVERSITY QUOTIENT STUDENT

Rizky Anggar Kusuma Wardani¹, Mardiyana², Dewi Retno Sari Saputro³

Post Graduate Program of Mathematics Education, Sebelas Maret University^{1,2,3}
(rizky.wardani92@gmail.com)¹ (mardiyana@staff.uns.ac.id)²
(dewi.rss@gmail.com)³

Abstract

The research was a quasi-experimental research with a factorial design 2 x 3 aims to determine the comparison of Team Assisted Individualization – Guided Note Taking (TAI-GNT) and Think Pair Share - Guided Note Taking (TPS-GNT) viewed from Adversity Quotient for students' mathematics achievement. The population of this research were all of Junior High School Students 8th grade in Magetan Regency schools in academic year 2016/2017 whom applied KTSP curriculum. The sampling techniques was taken by using stratified cluster random sampling. The data was collected by using methods of documentation, questionnaires on students AQ, and mathematics achievement test. The analysis data technique used two-ways analysis of variance with unbalanced cells, with significance level was 0.05. Based on the study result, it could be concluded that : (1) TAI-GNT learning model made better mathematics learning achievement than TPS-GNT learning model, (2) Climber students got better mathematics learning achievement than Camper students and Quitter students, while Camper students got better mathematics learning achievement than Quitter students, (3) for every learning model, climber student got better mathematic learning achievement than Camper students and Quitter students, while Camper student got better mathematic learning achievement than Quitter student, (4) for every categories AQ, TAI-GNT learning model made better mathematics learning achievement than TPS-GNT learning model.

Keywords: Adversity Quotient (AQ), Guided Note Taking (GNT), Mathematics Learning Achievement, Relation and Function, Team Assisted Individualization (TAI), Think Pair Share (TPS)

Introduction

The development of science and technology cannot be detached from the developments of the underlying studies, one of which is math. As one of the basic sciences, mathematics has an important role in life. The various efforts undertaken by the Government to improve the quality of education in Indonesia. But various attempts seem to have not managed to improve the quality of education, especially in the subjects of mathematics.

Student's view over mathematics that is regarded difficult and frightful becomes a reasonable matter which causes the low score of mathematics. One of the factors that causes mathematics seem difficult, in both learning and working on it, is the abstract object as the characteristics of mathematics particularly in relation and

function. Michiel, *et al.* (2012) assert that “The concept of function is a central but difficult topic in a secondary school mathematics curriculum”. One of several factors that influences toward the low learning achievement of students is the selected learning model applied by the teacher. Not all teachers are able to select and apply the appropriate learning model in teaching certain competence.

Thus, in teaching mathematics, teachers are expected to be able in selecting and applying the appropriate learning model in accordance with the topic that is learned, so that students can comprehend the material thoroughly. Puteh, *et al.* (2014: 237) in the research asserts that “teaching and learning should take place effectively to enable students to acquire knowledge and develop skills for their future career needs. In learning process, a proper learning model is needed in order to increase student’s ability in terms of cognitive, affective, and psychomotor. For instance, a learning model acquaints the students to be active so that they can develop their creativity and independence. The practice of cooperative learning model can support teachers to involve their students in learning activity. Cooperative learning is a learning strategy that encourages students to work as a team in solving a given problem, to complete assignments in order to accomplish a satisfying learning achievement. Slavin (2009: 4) asserts that cooperative learning model refers to various teaching methods whereas students work in small groups to aid one another in learning subject materials.

Research’s result conducted by Tran (2012: 86-99) concludes that cooperative learning proposes social interaction and enhancement of activity, remembrance, and achievement of students. This result is in accordance with the research which deduces that cooperative learning is beneficial to increase the participation of students in understanding materials. It occurs because in cooperative learning, students work together in groups and every student is active during learning process (Simsek, 2012: 189-199). In addition, research’s Araban, *et al.* (2012) assert that “Teacher must more pay attention to practical approach such as cooperative learning and apply these methods in classrooms to improve cognitive and affective outputs of students”. Then the results of research Bayraktar (2011) asserts that, ”Cooperative learning method has a positive effect on students’ academic knowledge, performing skills and approach to the lesson and it is more effective than the traditional command method in terms of active attendance, cooperating, sharing and social attendance which scales their social skills up, improving interpersonal communication skills, increasing performance and having more academic success”.

Cooperative learning model is divided into several types. One of them is Team Assisted Individualization (TAI) learning model. Team assisted individualized strategy was found to be more effective because students had the opportunity to work together in teams, share views and opinions, and engage in brainstorming on problems (Nneji, 2011: 2). The characteristics of TAI are combining individual skill with team work and giving problems which are divided into three tests that are skill test, formative test, and comprehensive test. In each test, students must use their individual ability to answer all problems. Afterwards, the answers of those problems are discussed with their group partner if they find it difficult to answer.

Another kind of cooperative learning model is Think Pair Share (TPS) learning model. TPS learning model is designed in the shape of group discussion which is expected to increase thinking ability and communication skill of students and to encourage students’ participation in class (Azlina, 2010: 23). In Think stage, students are expected to self-thinking or answer questions given by the teacher. In Pair stage, students discuss in pair and discuss what they have thought in the previous stage. In Share stage, students share their discussion with their class mates and then

collect them together and make a conclusion. This is purposed in order to make students more open with their mates in solving problems they might confront and potential to develop their social skill amongst the students. It is supported by Siburian (2013: 30) who states that not only does TPS increase their achievement in writing descriptive texts but also improves their teamwork ability, responsibility, and self-confidence.

Besides that, to optimize the applying of the learning model, the researcher is interested to modify TAI and TPS learning models with Guide Note Taking (GNT). GNT is by carrying out particular action which is teacher prepares a certain scheme that can help students in making notes when the teacher is delivering the subject material. GNT gives opportunities to students to learn actively, to respond and to get involved with the discussed material. Students will generate comprehensive and accurate notes. By restudying the notes, students will be able to acquire high scores. Teachers use GNT to improve the students' remembrance (Kiewra, 2001: 23). It is supported by Collingwood and Hughes (2002: 175) state that the use of guided notes aids students to concentrate more in adopting subject materials.

The low mathematics achievement of students is not only affected by the applied learning model in class. There are other factors influencing students' learning achievement, one of them is Adversity Quotient (AQ). Stoltz (2004) says "AQ is an intelligence or ability to change or process a problem or difficulty and turn it into a challenge that must be solved so that it does not obstruct their dreams and achievement that they want to accomplish". AQ is a standard to know a person's response toward difficulty/ problem for data powered into opportunities. AQ can also be used to view a person's mentality. Thus, AQ has important influence in the increase of students' learning achievement. Phoolka (2012: 67) says "AQ is the predictor of success of a person in face of adversity, how he behaves in a tough situation, how he controls the situation, is he able to find the correct origin of the problem, whether he takes his due ownership in that situation, does he try to limit the effects of adversity and how optimistic he is that the adversity will eventually end". AQ is divided into several groups which are climber, camper, and quitter. Climber AQ includes a group of people who choose to keep going and struggling to face any problems and they will keep going through facing problems, challenges, obstacles, and daily matters. Camper AQ includes a group of people who already have willingness to face problems and challenges, but at the end they tend to give up due to numbers of problems and challenges they faced. Quitter AQ includes a group of people who are lack of willingness to experience challenges. .

This research aims to determine: 1) which learning model does result in the best mathematics achievement between TAI-GNT learning model and TPS-GNT learning model, 2) which type of AQ does acquire the best mathematics achievement among students with AQ climber, Camper, and Quitter, 3) For every of learning model, which one does result in the best learning achievement of students with AQ Climber, Camper, and Quitter, 4) For every of AQ category, which one does result in the best mathematics achievement between TAI-GNT learning model and TPS-GNT learning model.

Findings and Discussion

This research was included into quasi experimental research with a factorial design 2x3. The population consisted of all students grade VIII in all State Junior High Schools in Magetan district which applied KTSP curriculum, and the sample was taken by doing stratified cluster random sampling technique. This research was

conducted in State Junior High School (JHS) 1 Bendo, State JHS 1 Takeran, and State JHS 2 Bendo. The experimental classes were taken from each school, whereas each school sent off two classes as experimental classes. The number of sample in this research were 158 students consisted of 80 students in experimental class 1 and 78 students in experimental class 2. The independent variable in this research were learning model and students' AQ. Meanwhile, the only dependent variable was mathematics achievement.

The methods to collect data in this research were using documentation, questionnaires, and test methods. Documentation method was used to collect data of the students' initial abilities which were obtained from students' mathematics scores in final examination of second semester school year 2015/2016. Questionnaire method was used to find out data of students' AQ category. Test method was used to collect data of students' mathematics achievement on chapter relation and function. The used instrument in this research was AQ questionnaires in the form of Likert scale and multiple choice test.

After the data of students' initial abilities was obtained, then normality and homogeneity tests were conducted. Equivalence test was also conducted to discover whether the three of population have similar initial abilities. The equivalence test used t test. Prerequisite analysis test in this research used normality test by using Lilliefors, while homogeneity test using Barlett test. Meanwhile, the hypothesis test used two way analysis of variance with unequal cell test continued by multiple comparison test using Scheffe method in case initial hypothesis is rejected.

The result of equivalence test toward students' initial abilities data was that the three of population have similar initial abilities. The experiment resulted, in data of students' mathematics achievement had been tested by normality test and homogeneity test at first on relation and function materials. After normality test and homogeneity test were undertaken, there were taken two way analysis of variance with different cell. The resume of two way analysis of variance with different cell can be seen in Table 1.

Table 1. *The resume of two way analysis of variance with different cell.*

Source	SS	df	MS	F_{obs}	F_{α}	Decision
Model (A)	803,5369	1	803,5369	9,4612	3,8911	H_{0A} rejected
AQ (B)	17427,2909	2	8713,6455	102,5983	3,0437	H_{0A} rejected
Interaction (AB)	14,1764	2	7,0882	0,0835	3,0437	H_{0AB} accepted
Galat (error)	12909,3239	152	84,9298	-		
Total	31154,3280	157	-	-		

Based on Table 1, it can be concluded that: (1) there were differences of mathematics achievement between students who experienced TAI-GNT learning model and TPS-GNT, (2) there were differences of mathematics achievement among students with AQ climber, camper, and quitter, (3) there was no interaction between learning model and AQ for student achievement mathematics. It could be understood that H_{0A} was declined and H_{0B} was declined, thus it was needed to conduct continuing test of post anava. Before seeing the results of further trials the following post, presented the average between cell complete with on average marginally on table 2.

Table 2. *The average between cells and average marginal.*

Learning Model	Adversity Quotient (AQ)			average marginal
	<i>Climber</i>	<i>Camper</i>	<i>Quitter</i>	
TAI-GNT	84,3200	77,1250	59,3043	74,2500
TPS-GNT	80,5450	72,2162	54,1053	70,1538
Average marginal	82,5532	74,4928	56,9524	

Based on anava calculation, it was obtained that H_{0A} was declined. Because there were only two variables of the learning model, it did not need to carry out multiple comparison test for inter-row. By considering marginal average, the marginal average of TAI-GNT learning model was 74,2500 and the marginal average of TPS-GNT was 70,1538. Therefore, it could be concluded that TAI-GNT learning model resulted in better learning achievement than TPS-GNT.

Based on the result of anava calculation, it was obtained that H_{0B} was declined. Hence, it needed to conduct inter-row average comparison test. The summary of inter-row multiple comparison can be seen in Table 3.

Table 3. *Summary of inter-row multiple comparison.*

H_0	F_{obs}	F_{tabel}	decision of the trial	Conclusion
$\mu_1 = \mu_2$	21,3868	6	H_0 rejected	$\mu_1 \neq \mu_2$
$\mu_1 = \mu_3$	171,1609	6	H_0 rejected	$\mu_2 \neq \mu_3$
$\mu_2 = \mu_3$	94,5787	6	H_0 rejected	$\mu_1 \neq \mu_3$

Based on the summary of Inter-column multiple comparison test result in Table 3, it was obtained that AQ Climber resulted in better result of learning achievement than students with AQ Camper. Students with AQ Climber got better mathematics learning achievement than students with AQ Quitter. Students with AQ Camper got better mathematics learning achievement than students with AQ Quitter. Those results simultaneously completed the research conducted by Pambudi (2016) which obtains that mathematics achievement of students with AQ Climber is better than students with AQ Camper and Quitter, while students with AQ Camper have better mathematics achievement than those with AQ Quitter. In addition, the results of the research Huijuan (2009) in the International Journal of Indian Psychology states that "...in college students revealed a significant relationship between AQ and academic performance". Stoltz (2004: 85) asserts that students with high AQ have more constructively excellent response pattern, and they also respond difficulties as opportunities (Stoltz, 2004: 94). Students with high AQ are considered as high motivated people.

Based on anava calculation, it was obtained that H_{0AB} was accepted, thus it did not need to conduct inter-cell average comparison test in the equal row and column. The results in each learning model were, students with AQ Climber had better learning achievement than students with AQ Camper and Quitter, while students with AQ Camper had better learning achievement than students with AQ Quitter. Another result was that each AQ category, TAI-GNT learning model resulted in better mathematics achievement than TPS-GNT learning model.

Conclusion

Based on the study result, it could be concluded that : (1) TAI-GNT learning model made better mathematics learning achievement than TPS-GNT learning model, (2) Climber students got better mathematics learning achievement than Camper students and Quitter students, while Camper students got better mathematics learning achievement than Quitter students, (3) for every learning model, climber student got better mathematic learning achievement than Camper students and Quitter students, while Camper student got better mathematic learning achievement than Quitter student, (4) for every categories AQ, TAI-GNT learning model made better mathematics learning achievement than TPS-GNT learning model.

References

- Araban, S., Zainalipour, H., Saadi, R.H.S., Javdan, M., & Sezide, K. (2012). Studi of Cooperative Learning Effect on Self-Efficacy and Academic Achievement in English Lesson of High School Student. *Journal of Basic and Applied Scientific Research*. 2(9).8524-8526.
- Azlina, N. A. N. (2010). CELLS : Supporting Collaborative Activities Among Students And Teachers Through The Use Of Think Pair Share Technique. *IJCSI International Journal Of Computer Science*. 7(5), 18-29.
- Bayraktar, G. (2011). The effect of cooperative learning on students' approach to general gymnastics course and academic achievements. *Educational Research and Review*, 6(1). 67-71
- Collingwood, V & Hughes, D. C. (2002). Effects Of Three Types Of University Lecture Notes On Student Achievement. *Journal Of Educational Psychology*. 70. 175-179
- Huijuan, Z. (2009). The adversity quotient and academic performance among college students at St. Joseph's College, Quezon City (Bachelor thesis, St. Joseph's College, New York, United States).
- Kiewra, K.A. (2001). Investigating Notetaking And Review: A Depth of Processing Alternative. *Educational Psychologist*. 20. 23-32.
- Michiel, D., Paul, D., Koeno, G., Peter, B., & Helen, R. (2012). Tool Use And The Development Of The Function Concept : From Repeated Calculations To Functional Thinking. *International Journal Of Science And Mathematics Education*, 10, 1243-1267.
- Nneji, L. (2011). Impact of Framing and Team Assisted Individualized Instructional Strategies Students' Achievement in Basic Science in the North Central Zone of Nigeria. *Knowledge Review*. 23(4). 1-8.
- Phoolka, S. & Kaur, N. 2012. Adversity Quotient: A New Paradigm to Explore, *International Journal of Contemporary Business Studies*, 3(4): 2156 - 7507
- Puteh M., Ahmad, C. C. N., Noh M.N., Adnan, M., & Ibrahim M. H. (2014). The Classroom Physical Environment and Its Relation to Teaching and Learning Comfort Level. *International Journal of Social and Humanity*. 5(3): 237-240.
- Siburian, T. A. (2013). Improving Students' Achievement On Writing Descriptive Text Through Think Pair Share. *International Journal Of Language Learning And Applied Linguistics World*. Vol 3(3). 30-43.

- Simsek, U. (2012). The effects of reading-writing-presentation and group investigation methods on students' academic achievements in citizenship lessons. *Journal of Educational Sciences Research*. 2(2), 189–201.
- Slavin, R. E. (2009). *Cooperative Learning Teori, Riset, dan Praktik*. Bandung : Nusa Media.
- Stoltz, P. G. 2004. *Adversity Quotient: Mengubah Hambatan Menjadi Peluang*. Jakarta: Gramedia
- Tran, V. D. (2012). Effect of Cooperative Learning on Students at An Giang University in Vietnam. *International Educational Studies*. 5(1).86-99.