International Journal of Science and Applied Science: Conference Series P-ISSN: 2549-4635
Int. J. Sci. Appl. Sci.: Conf. Ser., Vol. 2 No. 1 (2017) E-ISSN: 2549-4627
International Conference on Science and Applied Science 2017 doi: 10.20961/ijsascs.v2i1.22734

The Comparison of Cooperative Learning Model Viewed from Students' Emotional Intelligence

Ahmad Junaedi[1,a)], Budiyono[2,b)], Isnandar Slamet[3,c)]

[1]Graduate Student of Mathematics Education of Sebelas Maret University
[2,3]Lecturer Of Mathematics Education Graduate of Sebelas Maret University
Jl. Ir. Sutami 36A Kentingan Jebres Surakarta 57126, INDONESIA

E-mail: [a)] ahmadjunaedi09@gmail.com, [b)] budiyono53@yahoo.com
[c)]isnandar06@yahoo.com

Abstract. This research aimed to know the different influence of each learning model, emotional Intelligence, and interaction between those two elements toward the students' achievement in mathematic. This is an experimental study within the 3x3 factorial design. The populations of this study were VII grade students of State Junior High Schools (*SMP*) in Surakarta city in academic year of 2016/2017. The samples of this study were students of SMPN 8 Surakarta, SMPN 16 Surakarta, and SMPN 20 Surakarta which were taken by stratified cluster random sampling. The instruments to collect the data were achievement test, questionnaire and documentation. The technique to analyze the data was variance analysis of two ways with different cell. Based on the result, it can be concluded that: (1) TGT model produced the same good result as well as TAI model, TGT model produced the better achievement than the direct learning, and TAI model produced the better achievement than direct learning in the algebra material. (2) Students having high emotional intelligence are better than students having low and medium emotional intelligence in term of achievement in mathematics. The students having medium emotional intelligence are as low as students having low emotional intelligence in term of achievement in algebra material. (3) In each category of emotional intelligence, TGT model produced higher achievement than TAI model and direct learning model, TAI and direct learning model produced the equal result in algebra material. (4) In each learning model, students' achievement of those who have high emotional intelligence are higher than those who have medium and low emotional intelligence, and students who have low and medium intelligence produced the equal achievement in algebra material.

Keyword: TGT, TAI, Learning Achievement and Emotional intelligence.

1. Introduction

Basically, education is a process to help people in fostering themselves, so that they are able to face the changes [11]. In order to fully help Indonesian people, the development in educational field is a very good tool in managing human resources. Hence, education field needs to get good attention and management [8]. This is the educational role to produce human resources who are ready to fight and to compete with other countries. Learning is a systematic interaction between students and teacher within the educational material in an educational environment [12]. Learning activity manages all students' potential to be experts in the expected competency. Nurhadi states that learning activity

needs to be centered in students by creating an enjoyment and challenging condition to grow students' creativity and provide various learning experience [6]. Learning also brings value, ethic, esthetic, logic, and kinesthetic [9]. Whether success or not, a learning activity depends on students and teacher as the actors in learning [12].

In developing the achievement in mathematics, the experts of practitioner introduce and apply many approaches and methods. Some of them are learning approaches which are mixed in a learning model to make it appropriate for student's characteristic in mathematics. These models will change the application of learning strategies which in beginning they focus on giving concepts to the learning strategies which are focused on critical skilled, creative and innovative in applying mathematic concepts [9, 11]. The fact in educational field shows that the students' achievement in mathematic are not yet satisfying. From the interview's result of some students in Surakarta city, one of factors causing low achievement in mathematic is teacher's strategy. The conventional mathematic teaching still gives superiority to teacher to dominate classroom teaching and learning process and give little attention for students to develop independently through discovery in their thinking process. Besides, the inner factor from students' personality also affects the students' achievement [2, 5]. Many people believe that to get higher score in studying, someone has to have high emotional intelligence, because it is a potential supply to make someone easy to learn and reach optimal achievement. This is in line with Goleman who states that there are some students who have higher intelligence but get lower achievement; meanwhile, there are some students who have lower intelligence but can get higher achievement [4]. That is the reason why the intelligence is not the only one factor which decides someone's success, because there are some factors which are also influencing [1].

Some teachers are not willing to apply the cooperation as in cooperative learning because of some reasons such as worry of the mesh in the classroom and students cannot learn if they are in group. A high IQ person but unstable emotion and easy to get angry often make mistake in deciding and solving problems because they cannot concentrate [4, 5]. Their ingrowing and uncontrolled emotion often makes them inconsistent to face the problem and react to others so that they often make conflict [5]. Unstable emotion also makes someone in high favor to agree toward something but reject what he or she favors in a short time. It will cause a mesh in a cooperation one makes with others and it will possibly cause him or her failed. This assumption is supported by Suparno, who states that someone's intelligence is not only rhetoric but also necessary to be proven in reality in his or her everyday life [8]. Emotional intelligence is a human capacity which belongs to someone and it is very useful to face, strengthen him- or herself, and change his or her bad condition become something logic to be faced.

Many students are unwilling to work in pairs with others because clever and diligent students feel that they need to work harder than others. Meanwhile, lower level students feel inferior so that the cooperation among students in small group are often denied by teachers. According to Duxbury, "*Cooperative learning suggests that learning would be*

more *meaningful if learners should experiment on their own learning instead of listening to the teacher's lectures. Furthermore, conflicts resolution will help promote students' cognitive growth* [2]*"*. It means that cooperative learning promotes meaningful learning because students do experiment by themselves rather than listening to teachers' speeches. In addition, solving conflict helps students develop their thinking. There are some types of cooperative model namely jigsaw, *Game Investigation* (GI), *Student Teams Achievement Division* (STAD), *Teams Assisted Individualization* (TAI), *Two Stay Two Stray* (TSTS), Teams *Games Tournament (*TGT), *Numbered Heads Together* (NHT) [12], and many more. Cooperative learning model type TGT is a class management model in which students are placed in group within heterogeneous ability to compete in a game. According to Slavin, TGT can improve basic competence, students' achievement, positive interaction between students, various acceptance among classmate and self-confidence [12]. In this model, students become ready and try to understand and capable to learn the material that teacher gives in learning process and train students to work in pairs with their group members to answer the tasks given by the teacher. Besides TGT, the alternative model that can be used is TAI. In cooperative learning especially TAI model, students are encouraged more and help each other to work hard in order that their team succeed in the game [15]. The individual's responsibility is guaranteed because it just scores the sum of the last test and students do the last test without group members' help. Students have the same opportunity to be successful because everything is placed according to their ability level.

Based on the problems that have been identified above, the researchers just want to do research regarding to problem of the use of learning model and its' influences toward students' emotional intelligence. The researchers' just want to discover whether the cooperative learning type TGT is able to produce better achievement than cooperative learning type TAI. Besides, the researchers want to know whether the learning model is appropriate for the algebra material. In addition, the researchers want to know whether emotional intelligence will affect students' achievements. Based on the previous background, the research questions are formulated as follows:

a. Which one of cooperative learning type TGT, type TAI and direct learning, can give the best mathematics achievement?
b. Which one has better mathematics achievement, students with high, medium, or low emotional intelligence?
c. In each level of emotional intelligence, which one can give the better mathematics achievement, students who are given mathematics learning using TGT model, TAI model or direct learning?
d. In each learning model, which one can give better mathematics achievement, students with high, medium, or low emotional intelligence?

2. Research Method

This research was conducted in some state junior high schools (SMP) in Surakarta city in grade VII, first semester in academic year of 2016/2017. This research is quasi experimental. There are two variables in this research namely learning models and students' emotional intelligence. The learning models used were cooperative learning

model type TGT, type TAI and direct model, meanwhile, students' emotional intelligence are divided into high, medium, and low. Therefore, this research uses factorial design 3x3. The populations in this study were all students grade VII of state junior high schools in Surakarta city which implement KTSP curriculum in academic year of 2016/2017. There are approximately 27 schools. Schools of the sample were SMPN 8 Surakarta SMPN 16 Surakarta, and SMPN 20 Surakarta. The samples of this study were gathered by taking 3 schools out of 27 schools. The sampling technique was stratified cluster random sampling. The method of collecting data were documentation method, questionnaire, and test. The technique of analyzing the data were normality test with Lilliefors method, homogeneous test with Bartllet method and balance test with variant analysis with one way with different cell. Meanwhile, to test the hypothesis, analysis of two-ways variance with different cell was used, double comparative test with Scheffe' test.

3. Result and Discussion

Prerequisite test result indicated that all samples from population had normal distribution, had the same various and had balance basic skills. For prerequisite test, the results were analyzed using analysis variance; this is the analysis variance result of mathematics achievement learning students.

3.1. Normality Test Achievement Learning

Normality test is used to know whether the data of samples research is normally distributed in population. For this research, *Lilliefor*s was used for normality test. Here is the result of normality test with significance level of 5%.

Table 1. The result of normality test data of achievement learning mathematics

Group	L_{obs}	T_{able}	Decisions	Conclusion
TGT	0.0918	0.0924	H_0 accepted	Normal
TAI	0.0813	0.0929	H_0 accepted	Normal
Direct	0.0664	0.0924	H_0 accepted	Normal
High emotional intelligence	0.0874	0.0909	H_0 accepted	Normal
Medium emotional intelligence	0.0718	0.0861	H_0 accepted	Normal
Low emotional intelligence	0.0642	0.1030	H_0 accepted	Normal

Based on Table 1 it is known that each sample has $L_{obs} < L_{0.05;n}$. This means $L_{obs} \notin DK$ so that at a significance level of 5% the decision of the normality test of the population for each sample is H_0 accepted. Thus, it is concluded that all samples in this study come from normally distributed populations.

3.2. Homogeneity Test Achievement Learning

Homogeneity test is used to know whether research population is homogeny or not. For testing this homogeneity, *Bartllet method* was used. Here is the result of homogeneity test with significance level of 5%.

Table 2. The result of homogeneity data of achievement learning

Groups	K	X^2_{obs}	$X^2_{(0.05;k-1)}$	Decisions	Conclusion
Learning model	3	2.8296	5.991	H_0 accepted	Various Homogeneity Population
Emotional intelligence	3	3.5460	5.991	H_0 accepted	Various Homogeneity Population

Based on Table 2 it is known that each sample has $L_{obs} < L_{0.05;\ n}$. This means $L_{obs} \notin DK$ so that at a significance level of 5%, the decision of the homogeneity test of the population for each sample is H_0 accepted. Thus, it is concluded that the biased population has a homogeneous variance.

3.3. Balanced Test Achievement Learning

Balanced test is conducted within three groups before treatment to know whether or not those groups are equal. Statistic test used in balanced test is ANOVA one way with different cell. The result of balanced test with significance level of 5% produced that $F_{obs} < F_{tabel}$ that is $0.7159 < 3.0287$ so that it can be concluded that those three groups have the same early ability or equal.

3.4. Analysis Test of Two Ways with the Different Cells

The test results on the data requirements prior knowledge and learning achievement concluded that all the samples come from normally distributed populations and populations have the same variance. This is shown in the results of the normality test and homogeneity test calculations on the data prior knowledge and learning achievement. Based on the results of balanced tests, it was concluded that the sample of the population group learning model is balanced. Furthermore, two-way ANOVA test with different cells on learning achievement data was done. Summary of two-way ANOVA with different cells are presented in Table 3.

Table 3. The resume of variant analysis of two ways with different cell

Source	JK	dK	RK	F_{obs}	F_{tabel}	Decision
Model (A)	1717.550	2	858.775	3.388	3.030	H_0 rejected
Emotional intelligence (B)	1877.719	2	938.860	3.703	3.030	H_0 rejected
Interaction (AB)	440.983	4	110.246	0.435	2.406	H_0 accepted
Galat	67433.460	266	253.509	-	-	-
Sum/total	71469.712	274	-	-	-	-

Based on the resume of variant analysis of two ways with different cell with significance level 5% on the table 3, it can be concluded that:

a. In the effect of learning model, $F_{obs\ (A)} > F_{tabel(A)}$ that is $3.388 > 3.030$ so that H_{0A} is rejected. It means that there is a differentiation between students who are taught using TGT learning model, TAI learning model, and direct learning model toward students' achievement in mathematics.
b. In the effect of students emotional intelligence, $F_{obs\ (B)} > F_{tabel(B)}$ that is $3.703 > 3.030$ so that H_{0B} is rejected. It means that there is a differentiation between students who have high, medium, and low emotional intelligence toward students' achievement in mathematics.
c. In the interaction of AB (learning model and students' emotional intelligence) $F_{obs\ (AB)} < F_{tabel(AB)}$ that is $0.435 < 2.406$ so that H_{0AB} is accepted. It means that there is no interaction between learning model and students' emotional intelligence toward students' achievement in mathematics.

Summary of average marginal on each model of learning and students' emotional intelligence are presented in Table 4.

Table 4. The mean cell and mean marginal

Learning Model	Emotional intelligence			Marginal Mean
	High	Medium	Low	
TGT	74.7586	73.0000	72.6957	73.4783
TAI	74.5143	67.3939	66.9565	70.0220
Direct	72.2581	66.1818	63.5714	67.4348
Marginal Average	73.8526	69.1321	67.4595	

Based on the calculation results of ANOVA showed that H_{0A} is rejected. Therefore, it is necessary to test multiple comparison between lines (between the learning models). Summary results of multiple comparison test between the lines is presented in Table 5.

Table 5. Summary of test results comparison between classified doubles

H_0	F_{obs}	$2F_{0.05;2;274}$	Decision
$\mu_1. = \mu_2.$	2.1558	6.059	H_0 Accepted
$\mu_1. = \mu_3.$	6.6273	6.059	H_0 Rejected
$\mu_2. = \mu_3.$	6,8750	6.059	H_0 Rejected

Based on **Table 5** and the mean marginal in **Table 4**, it can be concluded that (a) TGT learning model produced the same achievement as TAI learning model; (b) TGT learning model produced better achievement than direct learning model. This can be seen from the mean marginal. This is in line with the results of research conducted by Fitria Vault, showing that the mathematics achievement of students with learning model teams games tournament (TGT) is better than student achievement with conventional learning model [3]. (c) TAI learning model produced better learning model than direct learning model. It can be seen from the marginal intelligence. This is in line with the results of research conducted by Ulfa, showing that the mathematics achievement of students with learning model teams games tournament (TAI) is better than student achievement with direct learning model [15].

Based on the calculation results of ANOVA, it is shown that H_0B is rejected. Therefore, it is necessary to test multiple comparison between columns. Summary results of multiple comparison test between columns is presented in Table 6.

Table 6. Summary of test results comparison between the dual columns

H_0	F_{obs}	$2F_{0.05;2;274}$	Decision
$\mu._1 = \mu._2$	6,5112	6.059	H_0 Rejected
$\mu._1 = \mu._3$	6.7067	6.059	H_0 Rejected
$\mu._2 = \mu._3$	0.4809	6.059	H_0 Accepted

Based on **Table 6** and the mean marginal in **Table 4**: it can be concluded that (a) high emotional quotient students produce better achievement than those who have the medium emotional quotient. It can be seen from mean marginal. This is in line with the results of research conducted by Goleman stating that there are learners having intellectual ability above average but obtaining educational achievement relatively low, whereas there are students whose intellectual abilities are low, can achieve relatively high learning achievement [4], Therefore, intelligence is not the only factor that determines the success of a person, because there are other factors that affect one's success among of them is emotional intelligence. In the process of students' learning, the intelligence is necessary [6]. IQ (intellectual intelligence) cannot function properly without the participation of the EQ (emotional quotient) of the subjects delivered in schools, but both these intelligence are usually complementary. The balance between IQ and EQ is the key to the success of students in school.

High emotional intelligence students produce better achievement than low emotional intelligence students. It can be seen from mean marginal. Emotional intelligence itself is the ability of students to recognize the emotions themselves, manage the emotions themselves, motivate themselves, recognize the emotions of others (empathy), and the

ability to build relationships (cooperation) with others [4]. This is in line with research conducted by Nwadinigwe and Zukav indicating that there is a positive relationship between emotional intelligence and academic achievement so that the development of emotional intelligence will improve the achievement [7].

Medium emotional intelligence students produce the same achievement as the low emotional intelligence students. It is in line with research result got by Stefy [14] and Nwadinigwe & Azuka-Obieke [7]. Therefore, students' achievement can be caused by the learning model applied by the teacher and the difference of emotional intelligence. Therefore, it is necessary to conduct research to know the proper learning model, and the influence of emotional intelligence on the achievement of learning mathematics.

4. Conclusion

Based on the findings and the discussion above, it can be concluded that; (a) TGT learning model produces the same good achievement as TAI learning model. TGT learning model produces better learning achievement in mathematics than direct learning model; and TAI learning model produces better achievement in mathematics than direct learning model in algebra material. (b) Students having high emotional intelligence are better than those having low emotional intelligence in term of achievements in mathematics. Students having medium emotional intelligence are the same as those having low emotional intelligence in term of achievement in algebra material. (c) In each category of emotional intelligence, TGT learning model produces better achievement than TAI learning model and direct learning model. Meanwhile, TAI learning model and direct learning model produce the same achievement in type of algebra material. (d) In each learning model, students having high emotional intelligence are better than those having medium and low emotional intelligence. Meanwhile, students having medium emotional intelligence are the same as those having low emotional intelligence in term of achievement in algebra material.

5. Suggestion

Based on the conclusion, below are the suggestions for other researchers: for the next researcher, in this research, researcher used emotional intelligence preview. It is because it is a dominant intelligence and has big contribution towards students' achievement in mathematics. For other researcher, it can be seen from other preview.

References

[1] Birknerova, Z. 2011. *Social and* Emotional *Intelligence in School Environment*. (Asia: Asian Social Science), 7(10): 241-248.

[2] Duxbury, J. G., & Tsai, L. (2010). *The effects of cooperative learning on foreign language anxiety: A* comparative *study of Taiwanese and American universities*. (Amerika: International Journal of Humanities and Social Science), 2 (16), 1-18.

[3] Fitria, K *Eksperimentasi Pembelajaran Matematika dengan Model Kooperatif*

Tipe Teams Games Tournaments *(TGT) terhadap Hasil Belajar Matematika Ditinjau Dari Motivasi Belajar Matematika Siswa Sekolah Dasar Se Kecamatan Depo*k (Sebelas Maret University, Surakarta, 2009).

[4] Goleman, D. 2003. *Working with Emotional Intelligence (terjemahan)*. (Jakarta : PT. Gramedia Pustaka Utama).

[5] Johnson, M.C. & Wang, A. 2003. *Emotional Intelligence and Academic Performance of* College *Honors and Non-Honors Freshmen*. Journal of the National Collegiate Honors Council, 10(1): 105-114.

[6] Nurhadi, 2004. Pembelajaran *Kontekstual dan Penerapannya dalam KBK*. (Indonesia: Universitas Negeri Malang, Surabaya).

[7] Nwadinigwe, I.P. & Azuka-Obieke, U. 2012. *The Impact of Emotional Intelligence on Academic Achievement of Senior Secondary* School *Students in Lagos*, (Nigeria. Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS), 3(4): 395-401.

[8] Onyekuru, B. U. 2015. *Field Dependence-Field Independence Cognitive Style, Gender, Career Choice and Academic Achievement of Secondary School Students in Emohua*. Local Government Area of Rivers State Journal of Education and Practice, 6 (10), 76 – 85.

[9] Suparno, P. (2004). Filsafat *Konstruktivisme dalam Pendidikan.* (Yogyakarta: Penerbit Kanisius`)

[10] Salmani, M. A. & Nodoushan. (2007). *Is Field Dependence or Independence a Predictor of EFL* Reading *Performance?* (Tesl Canada Journal/Revue Tesl Du Canada), 24 (2), 82-108,

[11] Sudjana, N. (2005). *Dasar-Dasar Proses Belajar Mengajar*. (Bandung: Sinar Baru Algensindo).

[12] Slameto. (2003). *Belajar dan Faktor-Faktor Yang Mempengaruhinya*. (Jakarta. Rineka cipta).

[13] Slavin, Robert E. 2005. *Cooperative Learning (Cara efektif dan menyenangkan pacu prestasi seluruh* peserta *didik)*. (Bandung: Nusa Media).

[14] Stefy E.N. 2012. *Eksperimentasi Model Pembelajaran number head togedher (NHT) dan Think Pair Shere (TPS) Terhadap Prestasi Belajar Matematika Ditinjau dari Tingkat Kecerdasan Emosional siswa SMP Negeri di Kabupaten Sukoharjo*. (Tesis Program Pascasarjana Universitas Negeri Surakarta. Tidak diterbitkan).

[15] Ulfa, N. F. (2016). *The Experimentation of Learning Model Team Assisted Individualization (TAI) and Think Talk Write (TTW) Viewed from the Adversity Quotient on The Topic of function in Eighth-grade of State Junior High School In Boyolali Regency in Academic Year* 2015/2016. (Indonesia: UPT)

[16] Wenno, H. (2014). *Direct Instruction Model to Increase Physical Science Compentence of Students as One Form of Classroom Assesment*. (International Journal of Evaluation and Research in Education), 3 (3), 169-174.