ICEE-2

Improving Students Achievement on Social Science by Using Cooperative Learning Method

Ino Budiatmanr✉[1], Ary Patriasurya[2]

[1,2] Faculty of Teaching, Universitas Muhammadiyah Tangerang, Tangerang, Indonesia
✉ ibudiatman@gmail.com

Abstract. Various attempts have been taken by teachers in improving students achievement in learning social science. One of them is using various methods and strategies to attract students interest to learn the subjects. One of methods that is popular nowadays for elementary school is cooperative learning method. As a method, there are some strategies to deliver the learning materials and three of them are Jigsaw (JIG), Numbered Head Together (NHT), and Make a Match (MaM). This research tries to find out which strategies that is most effective in improving students achievement. The research is conducted in level 5 elementary schools in Tangerang district of Banten Province. The sampel is three schools in choosen by using cluster random sampling. Each of sample is taught same material by using different strategies for four times. Data analysis shows that there is a significant different on students achievement before and after treatment. Further analysis shows that there is no any significant different on students achievements using JIG, NHT, and MaM. The research concludes that all strategies can be used to increase students achievements.

Keywords: Jigsaw, Numbered Head Together, Make a Match, Students Achievement.

INTRODUCTION ~ Educational institutions functions to mantain and develop social values and develop constantly to meet the needs of entire society, to live in better conditions, to live in harmony with citizens who have diverse characteristics and to be skilled in relating to others. Skilled citizens, are believed can contribute to the constitution of a skilled society for they own sensitivity to social problems, constantly develop themselves, have high order thinking skills, adopt national and universal values, and can adapt to the information and communication era (Bayır, 2016)

In this case, schools, especially in elementary, has to teach social science in order to create both a good society and citizenship as well. As it is cited by Bayir (2016), learning social science is about learning human life in relation with all sorts of behaviors and needs. The objectives of social science learning are: (a) to provide knowledge about human experiences in the past, present, and future; (b) to develop skill to process information; (c) to develop appropriate democratic values and attitudes; and (d) to develop opportunities for social participation.

By learning social science at school, a child will learn about his role as a social creature and will be able to implement his role in his society. For these purposes, social science has to be taught in the right way by using an effective method and technique. One of them that is popular nowadays is cooperative learning method with its various techniques.

According to Slavin (2013), cooperative leraning method has a significant correlation with students achievement, interstudents relation, self esteem, and general developing knowledge. He also argues that the aim of cooperative

method is using learner potensials to share with his peers in his group in the class. Consequently, all the group members has a better comprehension about teaching materials they are learning rather than teacher explain it alone (Slavin, 2013).

Since it is introduced for first time, cooperative learning method has attracted educational researchers and practioners to develop techniques beyond this method. Slavin (2013) identifies more than six models using this cooperative learning methods: (a) *Student Teams-Achievement Divisions* (STAD), (b) *Teams-Games-Tournaments* (TGT), (c) *Team Assisted Individualization* (TAI), (d) *Jigsaw Learning Together Group*, (e) *Investigation* dan (f) other learning models. These models has been used broadly in teaching practices. Beside in schools, cooperative learning method is also used in leadership training and, in fact, it can increase leadership competencies. Garcia, Abrego, and Robert (2017) finds that they who are trained by using jigsaw model shows better leadership. This finding is not a surprised one since Dewey argued that

> if humans are to learn to live cooperatively, they must experience the living process of cooperation in schools. Life in the classroom should represent the democratic process in microcosm, and the heart of democratic living is cooperation in groups. (Schmuck, 1985)

As it has been cited before, cooperative learning method has advantage to increase students social skills. Therefore, this method is useful to apply for children in order to prepare them as a democtratic citizen. In short it can infered that implementing cooperative learning method in elementary school has a great advantage in preparing the pupil to learn to live together. Schmuck (1985) assert that one things that has to be noticed in preparing young generation to a democratic citizenship is to let them learn to handle any problems constructively and creatively. This afore mentioned statement implies that learning through cooperative model has not only advantages to build students coqnitives, but also to maintain their attitude in facing any differences in social context.

The problems, now, is cooperative learning method has many techniques. Besides, as it has been cited before, there are many developed teaching techniques beyond this cooperative learning method. Suprijono (2015) identifies some of this teaching technique models that root to cooperative learning method are: (a) Jigsaw, (b) Number Heads Together, (c) Think-Pair-Share, (d) Team Assisted Individulization, (e) Student Teams Achievement Divisions, (f) Picture and Picture, (g) Problem Solving, (h) Team Games Tournament, (i) Cooperative integrated (j) Reading and Composition, (k) Learning Cycle, (l) Cooperative Script, (m) Cooperative Make a Match, (n) Tipe Group Investigation, and so on.

Since teaching techniques beyond this cooperative method is various, therefore, it will take a long time and a hard attempt to compare them in a single research. Therefore in this research those techniques

is limited into three techniques, viz: (a) jigsaw (JIG); (b) Numbered Head Together (NHT); and (c) Make a Match (Mam). The subject that are to be studied is limited only social science since the answers are various and one can have different perspective about it. By using this cooperative learning method the pupils can contruct phenomena collaboratively. This research try to find out which teaching technique among those three techniques is a most effective one in increasing students achievement on social science.

Gillies (2016) conclude that cooperative learning method is different from learning together. The failure that is often found in learning together is diminished by constructing five components of successful cooperative learning to its structure. Firstly, it should create positive interdependence structure that students link together in such a way that one cannot achieve success unless they all do, and they must learn to synchronize their efforts to ensure this occurs. Secondly, the structure and the class should build a promotive interaction and facilitate each other's efforts to complete their tasks in order for the group to achieve its goal. Thirdly, the group have to build individual accountability or one's responsibility in ensuring that he or she completes his or her share of the work while also ensuring that others complete theirs. The next, students need to be taught the social skills needed for high quality cooperation and they must be motivated to use them if they are to facilitate learning in themselves and others. Furthermore, providing students with feedback on how they use these skills not only helps to create more positive relationships among group members, but it also helps to increase students' achievement. The last, successful cooperative learning depends on group processing that is students reflecting on their progress and their working relationships.

Furthermore Gilles (2016) finds that a meaningful learning is where students try to integrate their new knowledge with the old ones and it is a better than to memorize it. One of methods to integrate themn is sharing various experiences among the students. Cooperative learning is built on this context. Cooperative learning is a learning method that refer from constructivism that emphasize building knowledge from experiences and through cooperation learning among various students in a group (Supriatna, et. al., 2010). In cooperative learning, students learn together cooperatively in a small group and in structured activity where students face each others in a classroom. (Adams, 2013).

Cooperative learning method is a method that make students working together in a group to get group goals that cannot be obtained through self-employment or competitively (Johnson, Johnson and Holubec,1986). Nevertheless, Adam (2013) emphasizes the importance of structuring activites so that the learning process can run more effectively. Through this

structured activity the participant learn to share knowledge within their groups and knowledge within their groups and continue to expand in their classroms. Thus, cooperative process can run more effectively. Through this structured activity the participants learn to share knowledge within their groups and continue to expand in their classrooms. Thus, cooperative learning is basically a learning method that applies various techniques to encourage learning activities and improve participants' understanding of learning about the subject matter discussed using a structured approach that requires participants to learn to create, analyze, and apply concepts. (Kagan, 1990)

According to slavin (2013) well-structured methods such as those found in cooperative learning have a positive influence on the size of learning outcomes compared to other learning practices eventhough they use an innovative curriculum textbooks. The problem, then, is that techniques that can be used to implement cooperative learning methods are to implement cooperative learning methods are very diverse so it needs to be compared to understand which techniques are more effective in improving learning outcomes

Jigsaw was one of the earliest of the cooperative learning methods. In Jigsaw, each student in a five- to six - mernber group is given unique information on a topic that the whole group is studying. After the students have read their sections, they meet in "expert groups" with their counterparts from other groups to discuss the information. Next, the students retum to their groups and teach their tearnmates what they have leamed. The entire class may take a test for individual grades at the end. (Arató and Varga, 2015)

The main point of the jigsaw method is that the contents of the lesson to be acquired are divided into as many parts as the number of micro-groups, or as the number of the members in a small group. Then the children engaged in different parts teach each other their own segments. Then the lesson is built up together as a whole, step by step, like a jigsaw puzzle (Arató and Varga, 2015).

According to Adam (2013) the jigsaw tehnique cooperative learning method was developed by social psychologis Elliot Aronson in 1971. This tecnique divides method this technique divides the learning participants with different competencies into groups of 4 to 5 study participants. This group is then divided into "expert" categories. After finishing summarizing the subject matter they are studying, the expert from each group then deepens the conclusions they have arranged in their respective groups to be explained into their respective groups.

Suprijono (2015) assert that jigsaw learning technique can be done by introducing a chosen topic by writing it on the board and then the teacher captures answers from students to find out which students understand the topic. The students, then, are divided into group that consists of 10

people and one or two of them are appointed to be experts in the group, while others students were categorized as textual groups. After each group discussed and concluded what they discussed in their group, these experts were then gathered in one group to discuss conclusions that they make in their respective groups. After getting the final conclusion, they go back to their original group to explain the final conclusions they got during discussions with other experts and then presented and reviewed together and the teacher closes the learning session by giving a summary of the material.

Another technique that belongs to collaborative learning method is Numbered Head Together (NHT). This technique firstly developed by Kagan (1993), that makes students to be more active and take full responsible to comprehend the learning material as group and individual. The students in a small group are structured with the aim of influencing the pattern of student interaction. This structure is basically in order to make students can work with each other to rely on small groups cooperatively. As its basic principle norm, NHT enable students to learn from each other, work together, and must check that everyone can understand and answer the questions. Students are accountable to each other for sharing ideas, they may also be required to share their partner's ideas to another pair or whole group. Every student must be able to give the group response to the questions. Each student within the group has an equal opportunity to share. High degrees of interaction at any moment make all of the students will be actively engaged in purposeful speaking and listening. In the end of process, that number is called, called again by the teacher. This technique makes that not all members of the group called by the teacher.

Like preceding technique, NHT, according to Suprijono (2015) is done by dividing students into small groups that consists of 9 – 10 students and each group member is given a numbers between 1 to 9 or 10. After the teacher gives the topic to be studied, each group is, then, given a time to discuss it together. After discussing period, the teacher mentions a number between 1 to 9 or 10 randomly and the student who own the number from each group have to describe the topics and answer the questions given by the teacher or any classmates. When the students cannot answer the questions correctly, other member of his/her group can help.

Make a Match (MaM) technique, according to Huda (2016) was developed by Lorna Curran (1994). Like preceding technique, in this MaM, the students also are divided into several groups. Differ from JIG and NHT, in MaM technique, they are not provided with experts. In delivering lesson material, teachers prepare two or more cards. Each card can be a list of words or pictures that belongs to same

category. The students, then, are asked to arrange them in a logical order by looking for an appropriate word or picture in their group. In the end of session, each group should present their job in front of class and all students can make corrections if there is something to be corrected.

This technique can also be applied by dividing group into two or more sub groups. Each sub group hold one a list of words that belongs to a certain category. Each sub group, then, may change information they have to arrange logically.

METHOD

The research is aimed to know any differences *Jigsaw,* NHT dan MaM techniques that belong to cooperative learning methods on students achievement in learning social science by using true experiment analysis. Population is Government Elementary schools (SD Negeri) in Tangerang district. Sample is three schools that is taken by using cluster random sampling. Each schools is represented by its level 5. They are given treatment for four times each other by using different technique. The first school with 39 students is taught by using Jigsaw technique, the second with 31 students by by using NHT, and the last with 35 students by using MaM. Lesson materials are appropriated with schools curriculum that is stated in official 2013 curriculum.

Treatment

Treatment for the first sample is conducted by dividing the students into goups that consists of 4 – 5 students homogenusly and one or two of them is appointed as an expert(s). They are given a fuzzle to be arranged, discuss the theme of the picture they have arraged together and write a description in their group before presenting the result in front of the class by one of group members.

The second sample is also divided into groups contain 4 – 5 homogenous students and one of them is appointed as an expert. Each member is given number. They also are given a fuzzle to arrange together in their group. After finishing the fuzzle, they have to discuss the picture and make a description together. In the end of the class, teacher state a number between 1 and 4. The number students that is mentioned in each goup has to present their group works in front of the class.

For the third sample, the students are divided into 4 or 5 group of students. Each group is given three lists. The first is a 30 items list of profession's names, the second is 30 items list of activity, and the last is place's names. They, then, are ordred to make a match from those lists. A place could be used for more than one profession. After discussing for a period of time, each group is asked to present the result of their match discussions. In the end of class, the teacher make conclusion by adding other professions, activities, or places to complete the final list.

ICEE-2

Analysis Technique

In the end of treatment, all samples is tested by using an objective test that has been examed for its validity and reliability. Its validity is measured by using *r product moment* that produces 20 valid item. Its reliability coefficient is 0,84 by using KR 20 technique. The test items is used in conducting prestest and postest. Data analisys is done by applying SPSS sub *anova within treatment* dan *post hoc test*.

RESULTS AND DISCUSSION

Students Achievement Before Treatment

By using SPSS, student achievement in learnings social science before they are treated by using different techniques can be seen as follows.

Table 1. Descriptive Analysis Before Treatment

Students achievement					
Metode Collaborative	Mean	N	Std. Deviation	Minimum	Maximum
JIG	8,1538	39	2,08426	2,00	10,00
NHT	7,4516	31	1,82279	3,00	10,00
MaM	7,6000	35	1,28795	5,00	10,00
Total	7,7619	105	1,78414	2,00	10,00

Anova test for these achievement can be shown in this table below

Table 2. ANOVA Test

Students achievement					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	9,893	2	4,947	1,571	,213
Within Groups	321,154	102	3,149		
Total	331,048	104			

The table shows that the *p* value = .213 > 0,05 that means there is no any significant differences among the classes before they are taught by using techniques that belong to cooperative learning methods.

Students Achievement After Treatment

By using SPSS, student achievement in learnings social science after treateing with different techniques in cooperative method can be seen as follows.

Table 3. Descriptive Analysis After Treatment

Students achievement					
Metode Collaborative	Mean	N	Std. Deviation	Minimum	Maximum
JIG	15,9487	39	1,52088	12,00	19,00

ICEE-2

NHT	16,4839	31	1,58894	13,00	19,00
MaM	17,7714	35	,91026	16,00	20,00
Sum	16,7143	105	1,56718	12,00	20,00

Multiple comparison of those scores can be seen from the table below

Table 4. Scores Multiple Comparisons

Dependent Variable: Students achievement

	(I) Metode Collaborative	(J) Metode Collaborative	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	JIG	NHT	-,53515	,32997	,108	-1,1896	,1193
		MaM	-1,82271*	,31929	,000	-2,4560	-1,1894
	NHT	JIG	,53515	,32997	,108	-,1193	1,1896
		MaM	-1,28756*	,33822	,000	-1,9584	-,6167
	MaM	JIG	1,82271*	,31929	,000	1,1894	2,4560
		NHT	1,28756*	,33822	,000	,6167	1,9584

*. The mean difference is significant at the 0.05 level.

In order to see whether those scores are dilfferent each other, analysis is continued by applying anova test and the result can be drawn in the table below

Table 5. ANOVA Test

Students achievement

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	63,618	2	31,809	16,915	,000
Within Groups	191,811	102	1,880		
Total	255,429	104			

Above-mentioned ANOVA test shows that *p* value is 0,00 < 0,05 that means there is a significant different for these achievements after treating them in different ways. In

order to know the differences, analysis, then, is continued by using Turkey analysis and the result can be drawn below.

Table 6. Turkey Analysis on Students Achievement

	Metode Collaborative	N	Subset for alpha = 0.05	
			1	2
Tukey B[a,b]	JIG	39	15,9487	
	NHT	31	16,4839	
	MaM	35		17,7714

The table above describes that there is no significant different between Jigsaw and NHT technique in increasing students achievement in learning social science, bur both of them differs significantly with MaM technique. Based on their average score in student achiement, it can be infered that the most effective technique in increasing elementary student achievement in learning social science beyond cooperative method is MaM, then is followed by NHT and Jigsaw. Through those analysis, it can be understood that Jigsaw and NHT technique is not different significantly and they can be used interchangeable. Meanwhile, MaM technique is different with those techniques in increasing students achievement in learning social science for elementary school.

DISCUSSION

In Based on above finding, among those three technique that are examined in this study, MaM technique tend to be a most effective on in increasing students achievement. One reason for this fact is grounded by students involvement in deciding the subtopic that they want to learn. The technique makes increasement on student self esteem and self confidence in learning topics they are discussing. It is not suprised for one of advantages in using cooperative method for this reason. Students, eventhough, they are pupil are also human that own its unique willingness. When the teacher can accomadate them, students spirit to learn will increase. If they fail to understand the topic, they can ask their friends. For Indonesian students, sometimes they worry or are ashamed to ask the teacher if they cannot understand material they are learning. Therefore, they can ask friends to help. Not only that, before expressing their ideas, they can also listen to other ideas and contruct another new ideas.

As it is stated by Dewey that is cited by Schmuck (1985), "Life in the classroom should represent the democratic process in microcosm, and the heart of democratic living is cooperation in groups". Cooperation in this context is not for the students alone, but also for student

and teacher relation. In this case, the teacher are viewed by students as their peers for the teacher involve the students to decide what learning material they are interested in.

Another reason that make MaM technique to be the best one among those three techniques is its setting. Using MaM technique seems to be like playing for the pupil. They can make any experiments in arranging the words or pictures, but they cannot refuse the logical one.

CONCLUSION

Based on afore mentioned data analysis, The research concludes that among those three techniques – JIG, NHT, and MaM – MaM is the most effective one in increasing students achievement in learning social science in the level 5 of elementary school. Next, eventhough there is a different score between JIG and NHT, this different is not significant. Therefore, they can be used interchangeable.

ACKNOWLEDGMENTS

I would like to express my special thanks of gratitude to Kementerian Riset dan Teknologi dan Perguruan Tinggi (Kemristek Dikti) who gave me the golden opportunity to do this wonderful project on the topic "Improving Students Achievement on Social Science by Using Cooperative Learning Method" which also helped me in conducting the research project by preparing financial support. Secondly, I would also like to thank all school principal who gave me a great chance and a lot of support in finalizing this project within the limited time frame.

REFERENCES

Adams, Francis Hull. (2013). Using Jigsaw Technique As An Effective Way Of Promoting Cooperative Learning Among Primary Six Pupils In Fijai, International Journal Of Education And Practice. 1(6):64-74

Arató, Ferenc. Varga, Aranca. (2015). *A Handbook for learning together – an introduction to co-operative learning*, Róbert Marcz and Berta Bakony (trans.) Pecs: University of Pécs, Faculty of Humanities, Institute of Education Sciences.

Garcia, Alejandro. Abrego, Jesus and Reguenes, Robert. (2017). "Using the Jigsaw Method for Meaningful Learning to Enhance Learning and Rentention in an Educational Leadership Graduate School Course" Global Journal of Human-Social Science: G Linguistics & Education Volume 17 Issue 5 Version 1.0. pp 1 – 15

Huda Miftahul, (2016). *Cooperative Learnig, Metode, Teknik, Struktur Dan Model Terapan*.Yogyakarta: Pustaka Pelajar.

Kagan, S. Educational leadership. http://home.capecod.net/~tpanitz/ tedsarticles/ coopdefinition.html.

Ömür, Gürdoğan Bayır. (2016). The Role of Social Studies Course in Creating Society with Skilled Citizens: Pre-Service Elementary Teachers Express their Views. Turkish Online Journal of Qualitative Inquiry (TOJQI) Volume 7, Issue 4, October 2016: 493-520 DOI: 10.17569/tojqi.39722

Robyn M. Gillies. (2016). Cooperative Learning: Review of Research and Practice, Australian Journal of Teacher Education. 41(3), pp 39 – 54

Schmuck, Richard. (1985). "Learning To Cooperate, Cooperating To Learn Basic Concepts" in Learning To Cooperate, Cooperating To Learn Basic Concepts, Robert Slavin et al, eds. New York: Springer Science+Business Media. pp. 1 – 4.

Slavin, Robin E. (2013). Cooperative learning. Cooperative Learning: Student Teams. What Research Says to the Teacher. Washington, D.C: National Education Association, 2013.

Supriatna, Nana. (2010). Pendidikan IPS (Social Science Esucation). Bandung: UPI Press.

Suprijono, Agus. (2015). *Cooperative Learning Teori dan Aplikasi Paikem*. Yogyakarta: Pustaka Pelajar.

W. Johnson, R.T. Johnson and E.J. Holubec. (1986). Circles of learning: Cooperation in the classroom. Edina, MN: Interaction Book Company.