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Mind Mapping Learning Method for Memory

ABSTRACT: The student study result, which is less satisfied, making researcher conducts experiment on mind mapping learning method for improving student memory. This research aims to know the effectiveness of mind mapping learning method for improving the memory of student at the SDIT (Sekolah Dasar Islam Terpadu or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia. The used research method is quasi experimental method through quantitative approach. The population in this research is students grade V at the SDIT Cendekia in Purwakarta chosen using purposive sampling technique. The data collection technique uses questionnaire and documentation study. The findings showed that there is a memory increasing about 6.833. The increasing has reached the success indicator, which is excellent criteria. Excellent criteria showed by all students have mastered the recall information skill, such as: alphabet; number; picture; and color by mentioning, recognizing, and illustrating which is recorded though direct memorization in 20 minutes. The use of mind mapping method in learning can improve the memory of 10-11 years old student. The learning application using mind mapping method is the explanation of all pictures on mapping media to the student by mentioning or describing the features of explained picture. The use of mind mapping method can help student to remember the obtained information. Besides, mind mapping method gives a more realistic illustration, because students do not only listen and imagine the object, but also see it. Hence, students can easily understand the delivered information.

KEY WORD: Learning Method; Mind Mapping; Memory; Elementary School Students.

INTISARI: "Metode Pembelajaran Pemetaan Pemikiran untuk Daya Ingat". Hasil belajar siswa, yang kurang memuaskan, membuat peneliti melakukan percobaan dengan metode pembelajaran pemetaan pemikiran untuk meningkatkan daya ingat siswa. Penelitian ini bertujuan untuk mengetahui efektivitas metode pembelajaran pemetaan pemikiran untuk meningkatkan daya ingat siswa di SDIT (Sekolah Dasar Islam Terpadu) Cendekia di Purwakarta, Jawa Barat, Indonesia. Metode penelitian yang digunakan adalah metode kuasi eksperimen melalui pendekatan kuantitatif. Populasi dalam penelitian ini adalah siswa kelas V di SDIT Cendekia di Purwakarta, yang dipilih menggunakan teknik sampel bertujuan. Teknik pengumpulan data menggunakan kuesioner dan studi dokumentasi. Temuan menunjukkan bahwa ada peningkatan daya ingat sekitar 6.833. Peningkatan tersebut telah mencapai indikator keberhasilan, yang merupakan kriteria yang sangat baik. Kriteria sangat baik yang ditunjukkan oleh semua siswa telah menguasai keterampilan informasi mengingat, seperti: huruf; angka; gambar; dan warna dengan menyebutkan, mengenali, dan menggambarkan yang direkam melalui penghafalan langsung dalam 20 menit. Penggunaan metode pemetaan pemikiran dalam pembelajaran dapat meningkatkan daya ingat siswa berusia 10-11 tahun. Aplikasi pembelajaran menggunakan metode pemetaan pemikiran adalah penjelasan semua gambar pada media pemetaan kepada siswa dengan menyebutkan atau menggambarkan fitur-fitur gambar yang dijelaskan. Penggunaan metode pemetaan pemikiran dapat membantu siswa untuk mengingat informasi yang diperoleh. Selain itu, metode pemetaan pemikiran memberikan ilustrasi yang lebih realistik, karena siswa tidak hanya mendengarkan dan membayangkan objek, tetapi juga melihatnya. Oleh karena itu, siswa dapat dengan mudah memahami informasi yang disampaikan.

KATA KUNCI: Metode Pembelajaran; Pemetaan Pemikiran; Daya Ingat; Siswa Sekolah Dasar.

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INTRODUCTION

Education is a growing and development process as the result of individual interaction with social and physical environment, which occurs the entire life of human from born until maturity (Henderson & Thompson, 2010; Ferguson *et al.*, 2013; and Sadulloh *et al.*, 2015). This maturity is grown and developed through conscious effort given by adult to learner or student (Manning, 2007; Langeveld, 2008; and Sadulloh *et al.*, 2015).

From the description, education can be interpreted as a process of growth that adapts to the environment, a direction, and guidance given to the child in his/her growth, a conscious effort given to students (Leithwood *et al.*, 2004; Langeveld, 2008; and Ihsan, 2013).

Some effective techniques are under utilized many teachers do not learn about them; and, hence, many students do not use them, despite evidence suggesting that the techniques could benefit student achievement with little added effort (Dunlosky *et al.*, 2013; Bhagat, Vyas & Singh, 2015; and Kulasegaram & Rangachari, 2018).

Teacher is a vital component in an education system wholly, which must get central, first, and main attention, because teacher really determines the success of student, particularly related with learning process (Mulford, 2003; Mulyasa, 2008; and Fry, Ketteridge & Marshall eds., 2009).

In this context, Kemdikbud RI (*Kementerian Pendidikan dan Kebudayaan Republik Indonesia* or Ministry of Education and Culture of the Republic of Indonesia), in 2016, added that fun learning was a learning either inside or outside the class using interesting learning method, which attracted student attention, fun, and making student was challenged in understanding the subject. In developing creativity, hence, student is more spirit in learning; and the student result or performance is improved (*cf* Fry, Ketteridge & Marshall eds., 2009; Kemdikbud RI, 2016; and Serdyukov, 2017).

But, in reality, learning carried out in

schools is often directed at the teacher-centered learning process and makes students passive in the learning process. Fun learning can be created if the teacher masters a variation of learning method and compiles it in order to make a variative learning method (Aththibby, 2015; Kemdikbud RI, 2016; and Serdyukov, 2017).

According to P. Fathurrohman & S. Sutikno (2014), and other scholars, method is a way used to achieve the fixed goal, so the teacher cannot teach well if he/she does not master the method exactly (Prozesky, 2000; Fathurrohman & Sutikno, 2014; and Sadulloh *et al.*, 2015). It is strengthened by Aunurrahman (2016), and other scholars, that the exact model development or learning method, in essence, aims to create learning condition which creates condition for student to study effective and fun; so, student can achieve the optimal study result and performance (Dunlosky *et al.*, 2013; Aunurrahman, 2016; and Zosh *et al.*, 2017).

Study result of student is determined in three aspects, such as cognitive, affective, and psychomotor. Cognitive is a term used by psychology expert to explain all mental activities relating with perception, mind, memory, and information processing, which enables someone to acquire knowledge, solve a problem, and plan for the future (Wilson & Cole, 1991; Desmita, 2009; and Zosh *et al.*, 2017).

Similarly, Robert M. Gagne (1985), as cited also in Y. Putra (2009), stated that in Cognitive Theory, study is a process of acquiring, processing, saving, and remembering information controlled inside the brain. One of cognitive aspects, which must be developed in cognitive development, is memory (*cf* Gagne, 1985; Putra, 2009; and Schunk, 2012).

Memory is a core element from cognitive development. Using memory, had by individual, is possible to save the accepted information all the time (Schank & Abelson, 1995; Desmita, 2009; and Cowan, 2014). Memory is also the process of saving and collecting information in the brain and becomes a core of learning and thinking. Learning is the process of

obtaining new information; and memory is the process of saving that information. Combination between learning and memory is a basic of all knowledge and skills (Schank & Abelson, 1995; Carter & Russel, 2011; and Alosaimi, 2016).

From explanation above, it can be concluded that for achieving education goal is really needed learning method for improving memory, because learning and memory are a base of knowledge and skill. Therefore, the development of learning method which must be done is mind mapping learning method.

The mind mapping strategy is one of the teachers' strategies in teaching. Not only mind maps show facts, but also show the overall structure of a subject and the relative importance of individual parts of it. It helps students to associate ideas, think creatively, and make connections that might not otherwise make (Buzan, 2008; Riswanto & Putra, 2012; and Suyanto, 2015).

That effort is one of innovations in education realm aiming to improve student memory. Therefore, this article reveals how the effectiveness of mind mapping learning method in improving student memory.

METHODS

The approach used in this research is a quantitative approach with quasi experimental methods. Sugiono (2010), and other scholars, stated that the main feature of quasi experimental design is the development of true experimental design, which has a control group, but cannot function fully to control external variables that affect the conduct of experiments (Thompson & Panacek, 2006; Sugiono, 2010; and DeRue, 2012).

The sampling technique in this study was carried out by purposive sampling. The sample in this study were 48 grade V of students at the SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia. The research sample was grouped into two groups: the first group, as treatment group, there are 24 students. Then, the treatment is done with

the mind mapping learning method. The second group, as control group, where there are 24 students, but in this group did not receive treatment, but only controlled the learning outcomes related to student memory (cf Sugiono, 2010; Suyanto, 2015; and Seltman, 2018).

This research is conducted in the SDIT Cendekia in Purwakarta, West Java, Indonesia. This study aims to reveal the effectiveness of mind mapping in improving student memory in the grade V of SDIT Cendekia in Purwakarta. The used method in this research is quasi experimental method (Thompson & Panacek, 2006; Sugiono, 2010; and DeRue, 2012).

This research, in essence, wants to reveal how mind mapping learning method can improve student memory in the grade V of SDIT Cendekia in Purwakarta. Data collection is done by interviewing the teachers of SDIT Cendekia in Purwakarta; and conducts test, both on the controlled group and experimental group. Data analysis is done by comparing the result of pre-test and post-test, both on the controlled group and experimental group (Dimitrov & Rumrill, Jr., 2003; Sugiono, 2010; and Zientek, Nimon & Hammack-Brown, 2016).

RESULTS AND DISCUSSION

The research result reveals that the average student in the grade V of SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia has a good memory. The measurement of student memory in the grade V of SDIT Cendekia Purwakarta, in this research, uses theory form of R.J. Sternberg (2008), stating that there are seven aspects in construction of memory, such as: aspect of explicit memory; declarative knowledge; retrieval; free recognition; instruction reminder; recognition/re-recognize; and implicit memory (cf Sternberg, 2008:149; May & Einstein, 2013; and Rasch & Born, 2013).

Student memory in the grade V of SDIT Cendekia form those seven aspects,

declarative knowledge has the highest score. Declarative knowledge is a knowledge often declared in form of word or in a brief is a conceptual knowledge. That shows student memory on the conceptual knowledge is higher (Sternberg, 2008; Zimmermann, 2014; and Stern, 2017).

In general, student memory in the grade V of SDIT Cendekia in Purwakarta is in the good category, if it is classified in a score criteria. In this category, student less masters a recall skill of the information, such as alphabet; number; picture; and color by mentioning, recognizing, and illustrating the information, which is recorded through memorization in 20 minutes (*cf* Dunlosky *et al.*, 2013; Dzulkifli & Mustafar, 2013; and Thorne, 2017).

Formulation of Mind Mapping Learning Method. Mind mapping takes the form of radiating out from the central image using simple lines, symbols, words, and images that are familiar to the child's brain. Long information and tedious can be transformed into colorful, memorable, regular, and in line with the natural ways of the child's brain using mind mapping (Buzan, 2008:7; Mamura, 2011; and Silalahi, 2016).

In this study, mind mapping is used by the teacher as a medium to explain learning material in class to students. Mind mapping in this study was made by researcher by containing the theme of ongoing learning in class V SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia.

The mind mapping method was developed based on B.D. Porter & H. Mike (2000), and other scholars, who were saying that mind maps were a technique of utilizing the whole brain by using visual images and other graphic infrastructure to form impressions (Porter & Mike, 2000; Hofland, 2007; and Buzan, 2008). In addition, A. Suyanto (2015) and other scholars said that mind maps were used to produce, visualize, structure, and classify ideas, and as assistance in learning, organization, problem solving, decision

making, and writing. In addition to teaching techniques, another important aspect related to learning outcomes is intelligence. In general, this method is shown in developing students' memory (*cf* Nesbit & Adesope, 2006; Suyanto, 2015; and Alosaimi, 2016).

A mind map consists of an imaginative way of registering ideas and is an effective method of notes taking and useful in the generation of ideas by association. I.M. Joao & J.M. Silva (2014), and other scholars, said that the mind map consists of a main idea summarized as a central image or word phrase. From the central idea radiated the main themes of the subject as branches (Nesbit & Adesope, 2006; Joao & Silva, 2014; and Suyanto, 2015).

The branches comprise of a keyword, image or topic presented on an associated line; and they divide out into higher level sub-branches. The branches usually diminished size and thickness meaning that they are thick at the center and finer towards the periphery. The small branches of inner branches radiate out to a much larger number of outer branches. To aid the process of memory and recall, the mind map makes use of visual images, where ever appropriate which are helpful to illustrate different themes and topics (Nesbit & Adesope, 2006; Joao & Silva, 2014; and Bertoft, 2017).

In addition, some different colors are used to differentiate areas of the mind map and help to divide different categories. The map represents the mental model of the team and it will represent the ideas of the group helping to create a big picture of everything the group wants to include. The mind map highlights the use of artistic and textual prompts to help with the organization of the ideas produced by the group (Novak, 1993; Cunningham, 2005; and Nesbit & Adesope, 2006).

Hypothetic Formula of Mind Mapping Learning Method. Mind mapping learning method for improving student memory in the grade V of SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam)

Table 1:
Component Description of Mind Mapping Learning Method

No.	Program Component	Program Descriptions
1.	Rational.	Rational is a base of compilation for mind mapping learning method in conceptual or empiric. Rational makes a phenomenon foundation, which is occurred and an empirical data, is supported in strengthening the important of mind mapping learning method for student of SDIT ((<i>Sekolah Dasar Islam Terpadu</i> or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia.
2.	Needs Description.	Needs Description contains the description of student needs based on the empirical data, which is obtained before. That data shows the student memory in the grade V of SDIT Cendekia in Purwakarta, which is made as the compilation foundation of career guidance program. The needs description is, then, explained in form of descriptive table.
3.	Learning Method Goal.	This part explains a matter, which becomes a goal of mind mapping learning method for improving the student memory in the grade V of SDIT Cendekia in Purwakarta. The goal of learning method needs to be based on an orientation of student memory improvement based on an existing indicator to be further developed.
4.	Program Target.	This part explains about mind mapping learning method, which is conducted. In this case is the grade V students of SDIT Cendekia in Purwakarta.
5.	Teacher Competency.	This part contains the description of ability, which is needed by teacher for conducting learning using mind mapping learning method.
6.	Program Structure and Step.	Structure and Step contain the illustration step of work and activity, which exist in every learning process. Every implementation step of mind mapping learning method is compiled for the achievement of study goal.
7.	Evaluation and Success Indicator.	Evaluation in the implementation of mind mapping learning method is oriented in two things, such as: (1) process evaluation is related with the learning, which is done in every meeting; and (2) result evaluation is done in the end of all activities by using instrument to test the student memory.

Cendekia in Purwakarta, West Java, Indonesia is based on the cognitive learning, which is also based on a profile survey result of student memory in the grade V of SDIT Cendekia in Purwakarta. The profile survey result of student memory in the grade V of SDIT Cendekia in Purwakarta shows that mostly students are in medium category; meaning students less master the recall skill of information, such as alphabet, number, picture, and color by mentioning, recognizing, and illustrating the information which is recorded through memorization in 20 minutes (*cf* Nesbit & Adesope, 2006; Dzulkifli & Mustafar, 2013; and Lestari, 2016).

Elementary school age children need the fun learning, which can improve student memory. One of cognitive learning theories is information processing theory. Cognitive learning theory considers in this study is the process of acquiring, processing,

saving, and recalling the information controlled by the brain. Cognitive learning theory also explains a way the child uses the information to solve the problem and make a decision. One of learning methods, which can be used for improving student memory, is mind mapping learning method (Nesbit & Adesope, 2006; Jong, 2010; and Cowan, 2014).

Mind mapping activities require students to actively engage in their learning, often by connecting their prior knowledge to new information (Nesbit & Adesope, 2006; Jones *et al.*, 2012; and Stokhof *et al.*, 2018). See table 1.

Explanation of Mind Mapping Learning Implementation for Improving Student Memory. Tony Buzan (2008), and other scholars, said that the learning using mind mapping learning method is divided into several steps, as follows: (1) pra and beginning learning

activity; (2) core learning activity; and (3) closing activity and learning follow-up. Those three steps are done in one meeting. The learning using mind mapping learning method is conducted into eight meetings (Buzan, 2008; Suyanto, 2015; and Meister, 2017).

Before the learning using mind mapping learning method, student is given pre-test to measure the student memory before; it is conducted learning using mind mapping learning method. After eight meetings, it is conducted post-test to measure the development of student memory in the grade V of SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia, after study using mind mapping learning method (cf Suyanto, 2015; Meister, 2017; and Stokhof *et al.*, 2018).

Implementation Process Using Mind Mapping Learning Method: First Step. First step of learning implementation is conducted to reveal the student memory profile in the grade V of SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia. The first meeting is an initial step, in which in this meeting is conducted pre-test to reveal the beginning of student memory profile in the grade V of SDIT Cendekia in Purwakarta.

The pre-test conduction in the first meeting is held around 50 minutes. The activity is started with greeting and introduction. Then, students are given explanation and understanding about the activity, which will be held in the first meeting. After students understand the implementation intention and purpose, teacher spread a memory instrument to the students. The students consequently are instructed to read carefully the filling instruction of instrument before give the answer (cf Suyanto, 2015; Hidayatullah, 2018; and Stokhof *et al.*, 2018).

After student understand well the instruction, students are instructed to give the answers on the provided sheet. After all of done, teacher collects the

instruments, which have been filled by the students (Suyanto, 2015; Meister, 2017; and Samhudi, 2017).

Implementation Process and Learning Evaluation Using Mind Mapping Learning Method: Second Step. Implementation process and learning evaluation using mind mapping learning method is consisted of eight meetings. The learning implementation is consisted into several steps. The first, the pra and the beginning of activity is proposed to create an initial learning condition. In this step, teacher shows a fun gesture in order to make students do not feel tense, stiff, and afraid (Mirza, 2016; Meister, 2017; and Waloyo, 2017).

Teacher checks the students present. To save the time while checking, students who present are instructed to mention the students, who are not present. Then, teacher asks why that student is not present and so on. The teacher conducts apperception or conducts initial test by giving questions to be answered by the students, or give stimulus for students to contend, or give statement related with the delivered subject (Meister, 2017; Waloyo, 2017; and Hidayatullah, 2018).

The second is the core learning activity, which aims to illustrate about the use of strategy and approach used by the teacher in learning process. In this step, teacher tells the aim or the main material and what ability that students will learn. The topics about Social Science subject is orally delivered and written on the board. The teacher tells the students about learning activity using mind mapping method, which must be taken by the students to study the Social Science topics (Suyanto, 2015; Meister, 2017; and Hidayatullah, 2018).

Teacher proposes history concept with “Bandung Lautan Api” (Bandung Sea of Fire) as material, which will be responded by students and the problem should have alternative answer. Teacher forms a group consisted of 2-3 students. Every group is given one topic related with theme “Bandung Lautan Api”. The answer of discussion is showed in form of mind

Table 2:
Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	The result score of pre-tests and post-tests on the controlled group	24	.893	.000
Pair 2	The result score of pre-tests and post-tests on the experimental group	24	.853	.000

mapping. Every group (randomly) read the result of discussion; and the teacher writes on the board and classifies in accordance with the teacher need (cf Suyanto, 2015; Mirza, 2016; and Meister, 2017).

The last step and learning follow-up aim not only to close the learning, but also as assessment of student's study results and follow up activity. Teacher assesses the result learning process using mind mapping method. Teacher gives work/exercise, which has to be done outside the lesson hours. Teacher gives motivation and study guidance. Teacher gives learning alternative done by students outside the lesson hours (Suyanto, 2015; Meister, 2017; and Stokhof *et al.*, 2018).

Observation result of data collection is done by the observer in the current learning process. It is found the improvement student attention on the subject delivered by the teacher. Students are shown more interested with mind mapping learning method. It is proved by nine students who ask, and there are fifteen students answering from four questions asked by the teacher. Therefore, learning uses mind mapping learning method can improve student memory (cf Khoiriyah, 2014; Suyanto, 2015; and Waloyo, 2017).

Implementation Process and Learning Evaluation Using Mind Mapping Learning Method: Third Step. Learning implementation in the third step is done for revealing student memory profile in the grade V of SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia, after doing learning process, using mind mapping learning method. The implementation of post-test in the last meeting is held about

50 minutes. The activity is started with greeting and introduction (cf Pamungkas, 2012; Indra, 2013; and Hidayatullah, 2018).

Then, students are given explanation and understanding about the activity, which will be held in the last meeting. After students understand the implementation intention and purpose, teacher spread a memory instrument to students. The students consequently are instructed to read carefully the filling instruction of instrument before give the answer. After the student understand well the instruction, the students are instructed to give the answers on the provided sheet. After all of done, teacher collects the instrument which has been filled by the students (Sari, 2011; Hossain, 2015; and Ginting, 2017).

The Effectiveness of Mind Mapping Learning Method in Improving Student Memory. Based on the data analysis of student pre-test and post-test is obtained that student memory in the experimental class using mind mapping learning method is higher than that of in the controlled class. Besides, the improvement of student memory based on analysis result is known that the use of mind mapping learning method significantly influences on the improvement student memory in the grade V of SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia.

It is supported by analysis result using calculation and statistical test, as shown in the table 2. The different result on the experimental group can be described by several experts regarding the ability of student memory in the learning process. In this research, student memory is categorized into short term memory. Before

Table 3:
Paired Samples Test

		Paired Differences					T	df	Sig (2-tailed)
		Mean	Std. Devia- tion	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	The result score of pre-tests and post-tests on the controlled group	-2.417	3.623	.739	-3.946	-.887	-3.268	23	.003
Pair 2	The result score of pre-tests and post-tests on the experimental group	-6.833	4.788	.977	-8.855	-4.811	-6.991	23	.000

it is conducted the paired samples test, it is firstly conducted correlation test which the result can be seen also in the table 2.

Based on the table 2, the relation between the result of pre-test and post-test on the controlled group strongly relates with the score of correlation coefficient 0.893. Next, the relation between the result of pre-test and post-test on the experimental group also strongly relates with the score of correlation coefficient 0.853. See, then, table 3.

While for proving this research hypothesis, it is used paired samples test. For pre-test and post-test on the controlled group are obtained mean deviation = -2.417 with significant score 0.003; meaning there is a significant difference between the result of pre-test and post-test on the controlled group, because sig. score < 0.05. While for pre-test and post-test of experimental group are obtained mean deviation = -6.833 with significant score 0.000; meaning there is significant difference between the result of pre-test and post-test on the controlled group because sig. score < 0.05.

Short term memory is a memory system, in which information is usually saved for 30 seconds. Short term memory is characterized by remembering the information for several seconds until several minuses (Davelaar *et al.*, 2005; Sternberg, 2008; and Brown *et al.*, 2011). That statement is in line with Mohamad Surya (2014), and other scholars, that short

term memory is a vessel, where information is processed to be interpreted. Information is assumed come into short term memory, when it is accepted by sensory memory (*cf* Brown *et al.*, 2011; Surya, 2014:23; and Norris, 2017).

In similar with sensory memory, short term memory is limited in capacity and duration. In the learning process, the memory which is captured by student has short duration to be well accepted as a process effort of study result delivered by the teacher in the class (Cowan, 2014; Surya, 2014; and Norris, 2017).

The measurement of student memory in the grade V of SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia, in this research, using theory from R.J. Sternberg (2008) who stating that memory construction has seven aspects, such as: aspect of explicit memory; declarative knowledge; retrieval; free recognition; instruction reminder; recognition/re-recognize; and implicit memory (*cf* Ronnlund, 2003; Sternberg, 2008:149; and May & Einstein, 2013).

The research result states that post-test score is higher than pre-test on the controlled group with score deviation -2.417. This shows that there is memory improvement on the controlled group. However, the value change of post-test result in whole is higher on the experimental group.

The measurement on the controlled group in this research is known that explicit memory aspect has deviation score about 0.5. Then, declarative knowledge aspect has deviation score about 0. Next, retrieval aspect has deviation score about 0.54. Free recognition aspect has deviation score about 0.21. Instruction reminder aspect has deviation score about 0.67. Recognition/re-recognize aspect has deviation score about 0.33. Lastly, implicit memory aspect has deviation score about 0.58. In total, the highest score for the controlled group is showed in the instruction reminder aspect with the score about 0.67.

The measurement on the experimental group after the implementation of mind mapping method. The explicit memory aspect shows the score deviation 2.37. The measurement on declarative knowledge aspect has deviation score 0.8. Retrieval aspect has deviation score 0.66. Free recognition aspect has deviation score -0.04. Then, in instruction reminder has deviation score 0.55. Recognition/re-recognize has deviation score about 0.67. Implicit memory aspect has deviation score about 1.83. In total, the highest score for the experimental group is showed in explicit memory aspect with score about 2.37.

Further, explicit memory aspect has higher deviation score than the other aspects on the experimental group. It is proved by the change deviation score from pre-test to post-test on the experimental group about 2.37 and supported by memory measurement theory which is used. The reveal of subject memory, in other word, is explicit memory if the used method is a direct memory test or in form of implicit memory if the used method is an indirect memory test. It is different from the kinds of short term memory and long-term memory, which tries to explain human memory system, explicit and implicit memory are appropriate used for explaining the reveal process of someone's memory (Manelis, Hanson & Hanson, 2011; Ramos, Marques & Garcia-Marques, 2017; and Tying *et al.*, 2017).

In the next development, the term of

short term memory is changed by the term of working memory. Working memory emphasises the current activity in the process of short term memory by the availability of implementation controlling process. This system is a system which organises and controls the process of acceptance and information saving either visual or audio (Cowan, 2014; Surya, 2014:23; and Kirschner *et al.*, 2018).

In the relation between learning, A.D. Baddeley (2000), as cited also in Mohamad Surya (2014), developed what it was called Cognitive Content Theory as working memory for understanding the learning. This theory states the learning experiences obstacle, due to the limitation of process capacity. The higher cognitive content which must be learnt, the harder activity learning which is demanded (*cf* Baddeley, 2000; Jong, 2010; and Surya, 2014:23).

Several research results have given consideration several ways to ease cognitive charge by creating the better learning material plan and tackling effectively the limitation of source. The better learning method, mentioned in this research, is mind mapping learning method focusing on the teacher ability in learning process for improving the learning memory of student. Mind mapping is a visual technique, which can harmonize the learning process with the way of brain work naturally (Alamsyah, 2009; Hossain, 2015; and Suyanto, 2015).

Several studies about short term memory, using either direct or indirect test, has been widely reported. However, it has been separately done and has not been related with the noisy. The obtained conclusions are: (1) noisy intensity affects short term memory, if the used test method is direct test memory and the higher noisy intensity will make the decrease of short term memory; (2) noisy intensity does not affect short term memory, if the used test method is indirect test memory; (3) noisy factor is a new proof, which strengthen the dissociation between explicit and implicit memory; (4) in the noisy condition, the process of short term memory search tends to be serial or one item in a moment, not

in parallel or all items in a moment; and (5) in noisy situation, a reaction time for responding positive probe is lower than negative probe (cf Brem, Ran & Pascual-Leone, 2013; Angwin *et al.*, 2017; and Monteiro *et al.*, 2018).

Therefore, the change of deviation score happened on explicit memory aspect is shown a significant difference between controlled group and experimental group using mind mapping method. It is shown also that the use of mind mapping is effective in improving the grade V students' memory (Suyanto, 2015; Mirza, 2016; and Utami, 2017).

CONCLUSION ¹

This research reveals the effectiveness of mind mapping learning method on the student memory in the grade V of SDIT (*Sekolah Dasar Islam Terpadu* or Elementary School of Integrated Islam) Cendekia in Purwakarta, West Java, Indonesia. Based on the research result and explanation, it can be concluded that the use of mind mapping method can improve student memory in the grade V of SDIT Cendekia in Purwakarta. The research result shows that there is a memory increasing about 6.833. The increasing has reached the success indicator, which is excellent criteria. Excellent criteria showed by all students have mastered the recall information skill, such as: alphabet; number; picture; and color by mentioning, recognizing, and illustrating which is recorded though direct memorization in 20 minutes.

The use of mind mapping method in learning can improve the memory of 10-11 years old student. The learning application using mind mapping method is the explanation of all pictures on mapping media to the student by mentioning or describing the features of explained picture.

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The use of mind mapping method can help student to remember the obtained information. Besides, mind mapping method gives a more realistic illustration, because students do not only listen and imagine the object but also see it. Hence, students can easily understand the delivered information.²

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²**Statement:** I am declaring that this article is my research paper and, most importantly, it is an original work and not a product of plagiarism; and it is not submitted, reviewed, and published yet by other scholarly journals.

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