ICEE-2

Creative Thinking Ability of V Grade Students through Mind Mapping Learning Model

Hany Handayani[1], Erni Purnamawati[2], Wiwin Winarti[3], Indra Suhendra[4]

[1,2,3]STKIP, Purwakarta
[1,4]Prodi Pendidikan Dasar, Sekolah Pascasarjana Universitas Pendidikan Indonesia, Bandung
[1]hanyhandayani011117@gmail.com , [2]purnama2396@gmail.com, [3]03wiwin@gmail.com, [4]indrasuhendra@upi.edu

Abstract. This research used a quasi-experimental research method with the aim to see the role of mind mapping learning models to the creative thinking skills of Natural Science in grade V of elementary school by comparing between the experimental class that applied the conventional learning model and experimental class that applied the mind mapping model to students' creative thinking skills. The skills were a skill where students can develop their intuition in seeing a problem and seeing it from a different perspective on a problem. Critical thinking skills were certainly very important to be mastered by students, but the results of the study revealed that students ' creative thinking skills were still low. It needs a learning model that can encourage students to be able to think creatively. The results of statistical tests in the experimental class with a significant level of 0.05 indicated that the pretest results were 0.628, and the posttest results were 0.021 which showed that the posttest results after learning mind mapping skills of creative thinking skills in class students V increased.

Keywords: Mind Mapping, Sains Education, Creative Thinking Skills

INTRODUCTION ~ Science is one of the subjects that began to be taught both at primary and secondary education levels (Nurdyansyah, 2016; Government, 2005). According to (Samatoa, 2016) Learning Science in elementary schools can develop students' curiosity to find answers based on evidence and develop thinking skills. Meanwhile, according to (Handayani, Winarti, Labiah, & Somantri, 2019) science for students is very useful in studying themselves, studying the environment, as well as studying nature as a whole which ultimately can utilize and maintain the universe wisely. Furthermore according to (Trianto, 2016) argues that science is a systematic knowledge, and overall that science is limited by natural symptoms. Based on a number of opinions about science it can be concluded that science is one of the important subjects in elementary school and in learning science subjects it requires high-level thinking skills.

Creative thinking is one of high-level thinking skills. According to (Desstya, 2015), the ability to think at a higher level is a thinking ability that not only requires the ability to remember, but requires other higher abilities, such as the ability to think creatively and critically. The ability to think creatively is considered very important in the process of learning science (Insyasiska, Zubaidah, & Susilo, 2017). According to Munandar (2009), with the growth and development of creative thinking abilities in students can realize themselves, can see various possibilities in solving problems, and can improve the quality of life.

But seeing the facts in the field, based on research (Fauziah, 2011) in the learning process that took place so far the students have not developed the ability to think

creatively and the learning process is more centered on the teacher (teacher center). This is in accordance with the results of preliminary observations made by researchers at SDN Benteng on February 13, 2017 with class V students.

Given these conditions, efforts are needed to increase the ability to think creatively. In (Siswono, 2005) one of the efforts that can improve the ability to think creatively is to apply innovative and creative learning methods so that students can develop the ability to think creatively. One method that can develop the ability to think creatively is to apply mind mapping methods or mind maps (Ristiasari, Priyono, & Sukaesih, 2012).

According to (Buzan, 2006) the mind mapping method is a creative, effective way to take notes literally to map our thoughts very simply. Buzan in (Huda, 2013) also mentions in making mind maps, a person usually starts by writing the main idea in the middle of the page and from there he can spread it in all directions to create a kind of diagram consisting of keywords, phrases, concepts concepts, facts and images. Mind maps are also one of the ideal strategies to jump-start students' thinking (Huda, 2013).

By seeing the advantages of the mind mapping method, it is expected that applying this method in the learning process can develop students' creative thinking abilities.

Literature Review

1. The ability to think creatively

Associated with the ability to think creatively (Siswono, 2005) states that the ability to think creatively is the ability of students to understand a problem and find some alternative solutions to the problem, there are facts in research (Syaodih & Handayani, 2014) that the findings in the field can be concluded that weak ability of students to solve the types of questions that require higher-order thinking skills. This is the task of educators to find and try various methods that can develop and encourage students' thinking abilities so that they develop optimally.

2. Mind Mapping Learning Methods

The mind mapping method was developed as an effective method for developing ideas through a series of maps. According to (Shoimin, 2014) mind mapping is mind mapping is the technique of utilizing the whole brain by using visual images and other graphic infrastructure to form impressions. The brain often remembers information in the form of images, symbols, sounds, forms and feelings (Aini & Anindyarini, 2012). In addition (Swadarma, 2013) said that mind mapping is a system of thinking that radiates (radians thinking) so that it can develop ideas and thoughts in all directions, divergent, and see it from all points of view. In line with this, mind mapping according to (Rahayu, 2016) has the advantage of being able to improve brain performance, stimulate creativity, be simple and easy to do, be attractive and easily caught by the eye (eye catching),

and can see a number of data easily, at any time time can easily recall existing data. In addition, other benefits of the mind mapping learning method according to (Buzan, 2007) are to plan, communicate, be more creative, save time, solve problems, focus attention, organize and explain thoughts, remember better, learn faster and efficient. Therefore, the mind mapping method is very appropriate to be used to encourage and develop higher-order thinking skills, one of which is the ability to think creatively (Darmayoga, Lasmawan, & Marhaeni, 2013).

Based on the description that has been described, it can be concluded that mind mapping is a learning model with note taking techniques that can develop ideas and can encourage students to be able to think creatively. This mind mapping learning method has learning steps. According to (Swadarma, 2013) there are 5 steps in applying the mind mapping method, namely the orientation phase, the tracking stage, the inquiry stage, the accommodation stage, and the transfer stage.

METHOD

1. Design

The research method used in this research is the Quasi Experimental Design research method, the quasi-experimental design of the Non-equivalent pretest postest control group design. Where researchers used two groups of subjects, the experimental group and the control group. This is in line with that expressed by Creswell (2017) in (Sugiyono, 2008) that the quasi-experimental method is a method used to investigate the causal relationship of the treatment given to the experimental group and the control group. In addition, according to Experiments (Ruseffendi, 2005) is a study conducted to see the causal relationship, namely treatment (treatment), given to the independent variables can be seen the results on the dependent variable. In addition, according to (Jaedun, 2011), Quasi Experimental Design is a development of True Experimental Design because it has in the implementation of a control group research that does not fully control external variables.

2. Samples

Data were collected from two classes totaling 60 students. In the VA class as many as 30 people as the experimental class and VB as many as 30 people were determined as the control class. This research was conducted at Benteng State Elementary School. The school is located in Kp. Benteng RT / RW. 03/02 Benteng Village, Campaka District, Purwakarta Regency.

3. Instruments

In this study using three data collection techniques, namely observation, use of tests and documentation.

4. Procedure

The implementation of this research began on April 25 2017, with the first step the researcher looked for a problem faced and determined the learning material. After that the researcher makes an instrument of creative thinking ability test, an observation sheet and an effective Learning Implementation Plan (RPP) to alleviate problems in class learning. Followed by researchers conducting expert validity tests on lecturers and testing instruments in the field and then revising the instruments. Furthermore, researchers conducted data collection into the field. The data collection process in this study was conducted five times. At the first meeting, the researcher conducted a pretest in the experimental class and the control class to find out both classes had the same or different initial creative thinking abilities.

At the second meeting to the fourth meeting students were given treatment. Students are given learning using the mind mapping method. After being given a posttest to find out the increase in students' creative thinking abilities.

After being given a pretest and posttest, then the data is processed and analyzed. Normality test, homogeneity test and t test are used by researchers to analyze data. In processing the data, researchers used the SPSS 25 for Windows program.

RESULTS AND DISCUSSION

Pretest Data Analysis

Pretest data obtained from the two classes are not normally distributed so homogeneity tests are not carried out but hypothesis testing is directly carried out. The non-parametric statistical test Man-Whitney (U-Test) is used to determine the initial ability of creative thinking of students in the experimental class and the control class. The hypotheses tested are as follows.

H0 = There is no significant difference in the average initial ability between experimental class students and control class students.

H1 = There is a significant difference in the average initial ability between experimental class students and control class students.

By using a significance level of 5%, the decision making criteria are if the P-Value (Sig.2-tailed) is greater or equal to 0.05 then H0 is accepted and if the P-Value (Sig.2-tailed) is smaller or equal to 0.05 then H0 is rejected. The results of the Man-Whitney non-parametric statistical test are presented in the following table.

Table 1. Mann-Whitney Data Pretest Test Statistics Test Results

Test Statistics[a]

	CTA
Mann-Whitney U	417.500
Wilcoxon W	882.500
Z	-.484

Asymp. Sig. (2-tailed)	.628

a. Grouping Variable: Latar_Belakang

Based on the data in table 1. It can be seen that the results of the calculation of the difference in the average pretest of the Experiment class and the control class using the non-parametric Mann-Whitney test (U-Test) with a significance level of a = 0.05 obtained by P-Value (Sig .-2tailed) of 0.628. This shows that there is no significant difference in the average initial ability between experimental class and control class students.

Posttest Data Analysis

Posttest data obtained from the normality and homogeneity tests show that the data are normal and homogeneous. So then the hypothesis test is performed using the Independent Sample Sample t-test with the help of the SPSS 25 for Windows program. The hypotheses tested are as follows:

H0 = There is no difference in the final ability between experimental class students and control class students.

H1 = There is a difference in the final ability between experimental class students and control class students.

By using a significance level of 5%, the decision making criteria is that if the P-Value (Sig.) Is greater or equal to 0.05 then H0 is accepted and if the P-Value (Sig.) Is smaller or equal to 0.05 then H0 is rejected . The calculation results are then presented in the following table.

Table 2. Posttest Analysis of Posttest Data on Creative Thinking Ability

	Independen-Samplet-test		
Posttest value	Sig.(2-tailed)	Significance level	information
	.021	0,05	There is a different

Based on the data in table 2. It can be seen that the average results of the final ability of creative thinking of science students in the experimental class and the control class are different. This is based on the acquisition of P-Value (Sig.) Of 0.21, which means less than the significance level a = 0.05. Thus H0 is rejected. In other words, the improvement of students' creative thinking abilities using mind mapping methods is significantly better than students learning through lecture and question and answer methods.

Analysis of Observation Results of Teacher Activities

In this study the teacher's activity was measured using a non-test instrument, the teacher activity observation sheet. Observation of the teacher aims to determine the suitability of the learning steps both in the experimental class and the control class. Observations were made at each meeting conducted by an observer, one of the students of STKIP Purwakarta. The results of the recapitulation of the percentage of each

indicator of each meeting on the teacher's activities in the experimental class can be seen in table 3 as follows.

Table 3. Recapitulation of Percentage of Observations on Teacher Activity

Indicator	Percentage	Interpretation
Prepare learning tools and media	100%	Very good
Explain the steps to make mind mapping	89%	Very good
Directing students to write the main theme in the middle of the paper	78%	Good
Directing students to make branches with branches	89%	Very good
Directing students to place ideas on a branch that is related to the main theme	67%	Good
Directing students to write keywords in each branch	89%	Very good
Directing students to determine ideas related to the previous branch	56%	Enough
Guiding students to make mind mapping independently	67%	Good
Assessment	82%	Very good

Based on table 3. Overall teacher activities can be interpreted very well and the activities of teachers in learning are appropriate and can support success in learning. So, it can be concluded that mind mapping learning can develop students' creative science thinking abilities.

Analysis of Student Observation Results

The results of the recapitulation of the percentage of each indicator of each meeting on the activities of students in the experimental class can be seen in table 4. As follows.

Table 4. Recapitulation of Percentage of Observations of Student Activity

Indicator	Percentage	Interpretatio
Prepare learning tools and media	77%	Good
Draw or write the main theme in the middle of the paper	78%	Good
Make branches in the form of tree branches	69%	Good
Placing ideas on a branch related to the main theme	75%	Good
Write down keywords in each branch	68%	Good
Determine ideas related to the previous branch	79%	Good
Make mind mapping independently	84%	Very good
Average performance	76%	Good

Based on table 4. Overall activities of students can be interpreted well. Thus the use of mind mapping methods can support the process of learning activities so that students' creative thinking abilities can be seen from the learning activities undertaken by students by making a mind mapping.

CONCLUSION

Based on the results of data analysis and the discussion that has been presented in the above explanation, the conclusion in this study is the mind mapping method has a significant effect on the ability of creative thinking in science. This is evidenced by the average value of students in the experimental class when the pretest was 49.90 and when the posttest reached 66.87. While the control class when the pretest was 50.63 and when the posttest was 59.83. Besides that, based on the analysis of the results of the tests of creative thinking of natural science, a positive and significant effect can be seen from the results of the t-test N-gain data which shows the P-Value (sig.2-tailed) <(0.05) at the 5% significance level, then H0 rejected. By looking at the average difference between the two classes, it can be concluded that learning by using the mind mapping method has a significant effect on the ability to think creatively in science.

REFERENCES

Aini, A., & Anindyarini, A. (2012). Metode Mind Mapping untuk Meningkatkan Keterampilan Berbicara Siswa Sekolah Dasar. *METODE MIND MAPPING UNTUK MENINGKATKAN KETERAMPILAN BERBICARA SISWA SEKOLAH DASAR*, *1*(1), 125–137.

Buzan, T. (2006). *Buku pintar mind map*. Gramedia Pustaka Utama.

Buzan, T. (2007). *Buku pintar mind map untuk anak: Agar anak jadi pintar di sekolah*. Gramedia Pustaka Utama.

Darmayoga, I. W., Lasmawan, I. W., & Marhaeni, A. (2013). Pengaruh Implementasi Metode Mind Mapping Terhadap Hasil Belajar IPS ditinjau dari Minat Siswa Kelas IV SD Sathya Sai Denpasar. *PENDASI: Jurnal Pendidikan Dasar Indonesia*, *3*(1).

Desstya, A. (2015). IPA DAN PEMBELAJARAN BERPIKIR TINGKAT TINGGI (Telaah Buku Siswa SD Kelas IV Tema 3, Karya Much. Azam, Dkk). *Prosiding SNPS (Seminar Nasional Pendidikan Sains)*, *2*(0), 259-266–266.

Fauziah, Y. N. (2011). Analisis kemampuan guru dalam mengembangkan keterampilan berpikir kreatif siswa Sekolah Dasar kelas V pada pembelajaran Ilmu Pengetahuan Alam. *Jurnal Edisi Khusus*, *1*(1), 98–106.

Handayani, H., Winarti, W., Labiah, A., & Somantri, M. (2019). *Praktikum IPA di SD*. Purwakarta: Han An Hua.

Huda, M. (2013). *Model-model pengajaran dan pembelajaran*. Yogyakarta: pustaka pelajar.

Insyasiska, D., Zubaidah, S., & Susilo, H. (2017). Pengaruh project based learning terhadap motivasi belajar, kreativitas, kemampuan berpikir

kritis, dan kemampuan kognitif siswa pada pembelajaran biologi. *Jurnal Pendidikan Biologi*, *7*(1), 9–21.

Jaedun, A. (2011). Metodologi Penelitian Eksperimen. *Fakultas Teknik UNY*.

Nurdyansyah, N. (2016). Developing ICT-Based Learning Model to Improve Learning Outcomes IPA of SD Fish Market in Sidoarjo. *Jurnal TEKPEN*, *1*(2). Retrieved from https://journal.unesa.ac.id/index.php/jtp/article/view/1137

Pemerintah, P. (2005). Nomor 19 Tahun 2005 tentang Standar Nasional Pendidikan. *Jakarta: Departemen Pendidikan Nasional RI*.

Rahayu, R. (2016). Peningkatan Karakter Tanggung Jawab Siswa SD melalui Penilaian Produk pada Pembelajaran Mind Mapping. *Jurnal Konseling GUSJIGANG*, *2*(1).

Ristiasari, T., Priyono, B., & Sukaesih, S. (2012). MODEL PEMBELAJARAN PROBLEM SOLVING DENGAN MIND MAPPING TERHADAP KEMAMPUAN BERPIKIR KRITIS SISWA. *Journal of Biology Education*, *1*(3). Retrieved from https://journal.unnes.ac.id/sju/index.php/ujbe/article/view/1498

Ruseffendi, E. T. (2005). Dasar-dasar penelitian pendidikan dan bidang non-eksakta lainnya. *Bandung: Tarsito*.

Samatoa, U. (2016). Pembelajaran IPA di Sekolah Dasar (cet. Ke-III). *Jakarta Barat: Indeks*.

Shoimin, A. (2014). Model pembelajaran inovatif dalam kurikulum 2013. *Yogyakarta: Ar-Ruzz Media*.

Siswono, T. Y. (2005). Upaya meningkatkan kemampuan berpikir kreatif siswa melalui pengajuan masalah. *Jurnal Pendidikan Matematika Dan Sains*, *10*(1), 1–9.

Sugiyono. (2008). *Metode penelitian pendidikan:(pendekatan kuantitatif, kualitatif dan R & D)*. Alfabeta.

Swadarma, D. (2013). *Penerapan mind mapping dalam kurikulum pembelajaran*. Elex Media Komputindo.

Syaodih, E., & Handayani, H. (2014). Metode Pengembangan Higher Order Thinking Skills (Hots) Pada Anak Usia Sekolah Dasar. *Pedagogik-Pendas*, *456*.

Trianto, M. P. (2016). *Desain Pengembangan Pembelajaran Tematik: Bagi anak Usia Dini*. Prenada Media.