

# The Right Method for Developing Elementary School Student's Creative Thinking Skills

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## ABSTRAK

Kemampuan berpikir kreatif sangat penting bagi siswa di abad 21 karena tuntutan zaman mengharapkan siswa kreatif untuk menemukan hal-hal baru dalam kemajuan ilmu pengetahuan dan teknologi. Metode pembelajaran yang diterapkan saat ini belum dapat melatih siswa berpikir kreatif. Penelitian ini bertujuan untuk menganalisis perbedaan kemampuan berpikir kreatif siswa antara metode mind mapping dengan metode picture and picture. Metode penelitian yang digunakan adalah eksperimen semu dengan rancangan posttest only control group design. Sampel yang digunakan adalah siswa kelas V SD sebanyak 45 orang. Teknik pengumpulan data menggunakan tes kemampuan berpikir kreatif yang terdiri dari empat indikator yaitu kemampuan berpikir lancar, luwes, originalitas, dan elaborasi. Analisis data menggunakan uji-t melalui program perangkat lunak Jeffreys's Amazing Statistics. Hasil analisis data menunjukkan skor Cohen's d adalah 0,830. Hasil ini menunjukkan adanya perbedaan yang signifikan antara kedua metode pembelajaran tersebut. Berdasarkan nilai rata-rata dan persentase skor yang diperoleh siswa pada masing-masing indikator berpikir kreatif menunjukkan bahwa mind mapping lebih unggul daripada metode picture and picture dalam mengembangkan berpikir kreatif. Disimpulkan bahwa guru sekolah dasar dapat menerapkan metode mind mapping untuk mengembangkan kemampuan berpikir kreatif siswa.

## ABSTRACT

Thinking creatively is very important for students in the 21st century because the demands of the times expect creative students to discover new things with advances in science and technology. The learning method applied at this time has yet to be able to train students to think creatively. This study aims to analyze differences in students' creative thinking skills between the mind mapping method and the picture and picture method. The research method used was quasi-experimental with a posttest-only control group design. The sample used was 45 fifth-grade elementary school students. The data collection technique uses a creative thinking ability test, which consists of four indicators: the ability to think fluently, flexibly, originality, and elaboration. Data analysis used a t-test through Jeffreys's Amazing Statistics software program. The results of the data analysis showed that Cohen's d score was 0.830. These results indicate a significant difference between the two learning methods. Based on the average score and the percentage of scores obtained by students on each indicator of creative thinking, it shows that mind mapping is superior to the picture-and-picture method in developing creative thinking. It was concluded that elementary school teachers can apply the mind mapping method to develop students' creative thinking skills.

## 1. INTRODUCTION

Selecting the right learning method is an important decision for a teacher to make in guaranteeing the quality of the learning outcome. The technique implemented must conform to the requirements and current development. The teacher's role is not just teaching but also becoming a learning manager which impacts learning quality outcomes conforming to the demands of the times (Buchari, 2018; Gultom & Saun, 2016). One of the important learning outcomes to be developed is creative thinking ability. Creative

thinking must be sought to be developed because students will gain many benefits in the future. Creativity in various things will emerge if the learning process renders students the liberty to work on something and do it by themselves, conforming to their needs (Nizaar et al., 2020; Wannapiroon & Pimdee, 2022). Creative thinking is the ability to generate new thoughts and ideas different from anybody else, and they can observe problems from diverse points of view (Ananda, 2019; Ulandari et al., 2019). Creative thinking can be trained by utilizing intuition, stimulating imagination, finding new ways, and coming up with unexpected ideas. Creative thinking ability is categorized as high-level thinking skills (S. Y. Chen et al., 2019; Muskitta & Djukri, 2016). The outcome of students' creative thinking ability can be observed through their work in designing, developing, and generating new designs. Hence, education requires innovative methods and learning strategies to develop student's creative thinking skills (Acesta, 2020; Su et al., 2022).

One of the learning methods that may develop creative thinking ability is the mind mapping method. This mind mapping method significantly affects students' creative thinking ability in elementary school, and creative students increase in numbers (Acesta, 2020; S. A. Febriyanti & Wulandari, 2021; Wulandari et al., 2019). Through this mind mapping method, students' imagination potency is molded because the brain receives and processes information in imagination and exchanges imagination within a group (Serevina & Heluth, 2022; Z. Sh. Abdunazarova, 2021). Previous study discover that the effectiveness of using a mind mapping strategy stimulates the ability to innovate within students' minds and enhance students' skills. When students follow learning utilizing the mind mapping method, students tend to get excited and enthusiastic in processing information and completing rather complex tasks (Alderbashi & Moussa, 2022; Lokat et al., 2022).

Furthermore, the picture and picture method is similar to mind mapping. This picture and picture method utilize an image or picture media in a study group activity. The picture and picture method may affect students' creative thinking ability. This picture and picture method stimulates students to actively think about the images presented (Marlina, 2020; Pratiwi & Aslam, 2021). Both picture and picture and mind mapping methods have the same characteristics: the inquiry process in learning activities. This inquiry method allows students to be actively involved in project or discussion activities (Prasetya, 2021; Schut et al., 2022).

Previous research correlating creative thinking ability with the inquiry learning process conducted by students through picture and picture and mind mapping method has been widely conducted ((N. W. E. Febriyanti et al., 2017; Sumarta, 2017; Wulandari et al., 2019). Both methods encourage students to participate in any activities to create real works actively. Students are expected to bring up interesting and different ideas from anybody else. Students will become creative, searching for new things and ideas addressed to their friends (Putra et al., 2019; Savitri et al., 2019; Syahidah, 2015). Students can also observe the product they have made in pictures, designs, and writing outcomes (Septian et al., 2020; Susdiana, 2017). Learning becomes more fun and meaningful because students may feel the process and observe the outcome products of their work. Image media can accelerate the improvement of the quality of education through the implementation of a quality learning process. Therefore, This learning model needs to be disseminated to teachers so that they can apply these techniques to stimulate students' creative thinking abilities (Acesta, 2020; Aditya et al., 2022; Damayanti et al., 2019). Based on the similarities in the inquiry process and learning outcome characteristics of the mind mapping and picture and picture, it is necessary to analyze the differences in students' creative thinking abilities. The analysis result can provide teachers with the right learning method for the subject material (Mulyasari, Putu Arga, 2022; Pratiwi & Aslam, 2021).

In separate research on the application of mind mapping and picture and picture methods, it shows the same advantages in aspects of students' creative thinking abilities. Both methods are recommended for use in developing students' creative thinking skills. However, no research has tested which method is more effective between the mind mapping method and the picture and picture method. In addition, generally the method of collecting data on students' creative thinking abilities was carried out by previous researchers through observation techniques of scientific attitudes and scientific skills in project activities. Meanwhile, this study developed a new instrument in the form of a cognitive test to measure creative thinking skills based on indicators for assessing creative thinking abilities. The results of this study will be useful for teachers in developing effective learning methods in developing students' creative thinking skills. Learning methods to develop students' creative thinking abilities in the learning process are very important to find because the goals of 21<sup>st</sup> century learning require that every teacher be able to develop students' creative thinking abilities.

## 2. METHOD

The research method applied is quasi-experimental with a posttest only control group design. In this design, the study compares posttest results in the experiment and control group (Fox & Bayat, 2007; Madadzadeh, 2022). This research flowchart is presented in Figure 1.

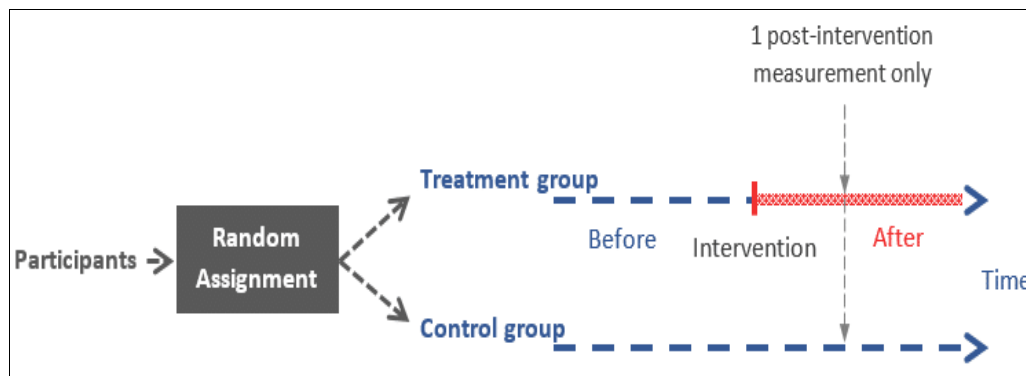


Figure 1. Research Flowchart

The experiment group uses mind mapping, while the control group uses picture and picture methods. Quasi-experimental with posttest only control group design compares the difference of the final result of the two learning methods. Based on the literature review, both groups have their own strength and allow students to develop creative thinking abilities. The study implemented a research sample of as many as 45 students of Grade V at State Elementary School 1 Cakranegara. It consists of 24 students in class A and 21 students in class B. Class A students are taught using the mind mapping method, while class B students are treated with learning using the picture and picture method. The data collection method uses a creative thinking ability test. This test is an instrument to measure and assess, in the form of questions, instructions, or directions presented to students, to obtain responses conforming to the research objective (Evangelisa et al., 2020). The disseminated test to students consisted of four indicators, fluency, flexibility, originality, and elaboration. Before testing students, we conduct instrument validation through expert judgment. The purpose is to assess the questions' content accuracy, relevance to the objectives, and questions construct accuracy. Two experts conducted this validation process. The instrument used is in the form of a test. The test measures students' creative thinking skills. The instrument for students' creative thinking skills consists of four indicators as show in Table 1.

Table 1. Creative Thinking Skills Indicators

Aspect	Indicators
Fluency	a. Ideas are expressed quickly b. Sured about the ideas presented
Flexibility	a. Accepting different views even though they are different b. Find solutions according to factual conditions
Originality	a. The ideas conveyed are different from others b. The idea presented is unique
Elaboration	a. The answers given are detailed b. The explanations given sere developed and expanded

The method to analyze data uses a t-test, and data calculation was assisted with Jeffreys's Amazing Statistics Program (JASP) software. The t-test is one of the statistical tests employed to test the hypothesis stating that no significant difference occurs among two means of the sample taken randomly from the same population. The tested hypothesis is a comparative hypothesis, where  $H_0$ : no significant difference occurs in students' creative thinking ability who are taught using the picture and picture method with those prepared using the mind mapping method in State Elementary School 1 Cakranegara ( $\mu_1 = \mu_2$ ). On the contrary,  $H_a$ : there is a significant difference in students' creative thinking ability who are taught using the picture and picture method with those taught using the mind mapping method in State Elementary School 1 Cakranegara ( $\mu_1 \neq \mu_2$ ). Before we carried out data analysis, we conducted

normality and homogeneity tests as the prerequisite of the t-test. The study employed the Kolmogorov-Smirnov test for normality test, while the Levene test for testing homogeneity.

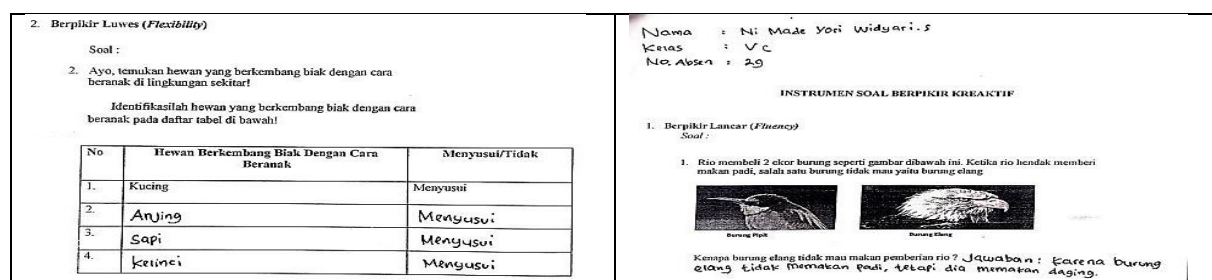
### 3. RESULT AND DISCUSSION

#### Result

Data collection was carried out through paper tests on Cakranegara 1 state elementary school students. The test consists of 5 questions about the growth and development of living things. The questions presented contain indicators of creative thinking. The experts' validation of the creative thinking ability test revealed several improvements, as experts suggested. After the study conducted validity analysis, we obtained a 0.89 validity score; hence, the instrument was feasible for further testing. Data were obtained from 45 students who had taken the test. The results of descriptive statistics from the raw data are presented in Table 2. The sample of student learning outcomes is presented in Figure 2.

**Table 2.** Descriptive Statistics of Test Results Data

Deskription	Method	
	Mind Mapping	Picture and Picture
Mean	79.68	60.11
Standard deviation	13.32	18.37
Minimum	56.25	25.00
Maximum	93.75	100.0



**Figure 2.** Sample of Student Learning Outcomes

Figure 2 are examples of students' work outcomes showing grade V students' critical thinking ability at State Elementary School 1 Cakranegara. The characteristic of fluent thinking is indicated in students' ability to answer by stirring their responses in solving the problem of eagles not wanting to eat seeds. The characteristic of flexible thinking is shown by their knowledge to come up with the example of calving and lactating animals. The traits of original thinking are demonstrated by students' ability to mention the examples of taproot plants found in everyday life. The attributes of detailed thinking are demonstrated in the ability to detail the characteristics of a healthy cat based on the observed images. Based on the students' work outcomes, the study obtained data on the percentage of students' critical thinking skills based on four indicators of critical thinking as show in Table 3.

**Table 3.** Percentage of Students' Critical Thinking Ability by Indicators

Indicator	Category	Mind Mapping Class	Picture and Picture Class
Thinking Fluency	4	4.16%	9.52%
	3	50%	28.57%
	2	29.16%	19.04%
	1	16.6%	42.85%
Thinking Flexibility	4	95.83 %	57.14%
	3	4.17%	14.28%
	2	0%	19.04%
	1	0%	9.52%
Thinking Originality	4	54.16%	33.3%
	3	16.6%	9.52%
	2	0%	23.80%
	1	29.16%	33.3%
Thinking Elaboration	4	66.6%	19.04%

	3	20.83%	9.52%
	2	0%	19.04%
	1	12.5%	52.38%

Table 3 describes the students' percentage who think fluency, flexibility, originality, and elaboration based on four categories in each class. Category 4 is highly fluency, flexibility, originality, and elaboration. Category 3 means they are fluency, flexibility, originality, and elaboration. Category 2 means they are fluency enough, flexibility enough, originality enough, and elaboration enough. Category 1 means they are less fluency, less flexibility, less originality, and less elaboration. The average scores of the mind mapping method are higher than picture and picture methods. Observing the percentage of students' critical thinking skills indicators, the study obtained comparisons based on the upper and lower categories. The upper category gets a 3 and 4 score, while the lower category gets a 1 and 2 score. Analysis of comparative results of the percentage of high category and low category is show in Table 4. The average value is obtained by calculating the scores obtained by students in class VA and VB, as shown in Table 5. A description of the differences in data from the result of mind mapping and picture and picture class group test is shown in the graph as show in Figure 3.

Table 4. Analysis of Comparative Results of the Percentage of High Category and Low Category

Indicator	Class	Total Percentage	
		High Category	Low Category
Thinking fluency	Mind mapping	54.16	45.76
	Picture and picture	38.09	61.89
Thinking Flexibility	Mind mapping	100	71.42
	Picture and picture	28.56	28.56
Thinking Originality	Mind mapping	70.76	29.16
	Picture and picture	42.82	57.1
Thinking Elaboration	Mind mapping	87.43	12.5
	Picture and picture	28.56	71.42

Table 5. Post Test Scores Differences in Each Class

Method/Class	Average	Highest Score	Lowest Score
Picture and Picture	60.119	100	25
Mind Mapping	79.688	93	56

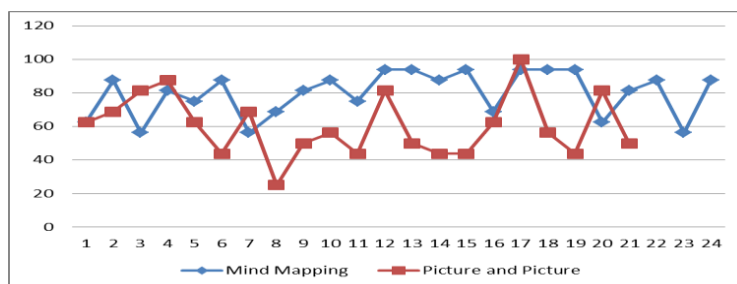


Figure 3. Posttest Scores Recapitulation of Students' Creative Thinking Abilities

Figure 3 shows the score of students' creative thinking ability test taught through the picture and picture method is higher than that of students' creative thinking ability test through the mind mapping method.

Before the study conducted the t-test, we previously carried out a normality test. The result of the data normality test using the Shapiro-Wilk formula obtained a W score of = 0.916. The data is declared normally distributed if the p-value is > 5%. Therefore, data is normally distributed at 0.916 > 0.05. the t-test result using Jeffreys's Amazing Statistics Program (JASP) application obtained the study results as shown in Table 6.

Table 6. The t-test Result using Jeffreys's Amazing Statistics Program

Measure 1	Measure 2	t	df	p	VS-MPR*	Mean Difference	SE Difference	Cohen's d	SE Cohen's d
Mind	Picture	3.805	20	<.001	88.516	19.940	5.240	0.830	0.383



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 Mapping and  
Picture
 

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Table 6 shows  $t=3.805$ , and  $p$ -score means there is significance between mind mapping and picture and picture method. This result is delivered from a  $p$  score less than 0.001 ( $p < 0.001$ ), and Cohen's  $d$  score shows a high effect  $> 0.05$ ; this shows a very significant difference in results. The t-test indicates that the score of creative thinking ability is higher in the mind mapping method than in the picture and picture method ( $t = 3.805$ ;  $p = 0.001 < 0.05$ ).

### Discussion

The comparison of students' thinking skills taught through the Picture and Picture method and the Mind mapping method can be seen from the average scores obtained by students. The analysis result shows that students taught using the mind mapping method are superior on all indicators than picture and picture methods. Observing the average score differences students obtained between the two classes also shows differences; the mind mapping method class got an average 79.68 score, while the picture and picture method class received an average 60.11 score. This difference significance is also shown from the analysis of difference using a t-test, which obtained Cohen's  $d$  effect size score of 0.830. The greater Cohen's  $d$  score, the greater the significance among the two groups. If Cohen's score is 0.2, it shows a small effect. If the score is 0.5, it offers a medium effect; the 0.8 score reflects a large impact. Therefore, the difference between the two learning methods shows an enormous difference between the two.

Implementing the picture and picture method requires the teachers to randomly prepare several sets of pictures. Students are free to sort in order the pictures conforming to the right sequence. The pictures the teachers prepare can be cartoon images, which can create students' active participation during learning. Students must think fast and right. Accordingly, students search for knowledge actively so that the knowledge students obtain lasts longer in their memory. This strategy is equipped with cartoon pictures functioning to attract students to learn more enthusiastically (S.-Y. Chen, 2022; Damayanti et al., 2019). Meanwhile, mind mapping method, teachers give students more freedom to find the object they want to connect by themselves. This way, students are encouraged to think harder to find the object they can relate to. According to previous study teachers deem it more precise to use mind mapping techniques for science and language lessons in class (Seyihoglu & Kartal, 2010). The advantages of mind mapping are (1) improve knowledge structuring, (2) maximizing the brain's working system, (3) The knowledge acquired is interconnected with one another so that students have more ideas and information to explain, (4) hastening creative thinking, dan (5) stimulate the student to think divergent and convergent (Davies, 2011; Usman et al., 2020).

The results of this study are very important for teachers in applying effective methods to develop students' creative thinking abilities through the mind mapping method. One of the main aspects of 21st century learning objectives is to develop creative thinking skills. Therefore, the choice of learning method should be an important concern. In addition to learning science, the mind mapping method is also appropriate for language learning (Serevina & Heluth, 2022; Su et al., 2022). Many benefits are obtained in the mind mapping method, namely (1) increasing the absorption of knowledge, (2) maximizing the working system of the brain, (3) lots of ideas and information that can be explained, (4) spurring creativity, and (5) developing divergent thinking skills and converge (Hidayat et al., 2020; Vorona et al., 2020). The contribution of this research also supports the cognitive learning theory by Jean Piaget that the learning process must maximize the working potential of the brain (Juwantara, 2019). The advantage of the mind mapping method is that it can improve students' abilities because it combines the working potential of the brain and the potential for discussion in groups. Students' thoughts are more detailed and focused. In addition, the implication of the benefits obtained is that students' critical power increases because students are very focused on designing concept maps.

The implication of this research is that there are many methods that teachers can apply to develop students' creative thinking skills, but each method depends on students' abilities, type of material, and there are no learning disorders. If the mind mapping method is chosen by the teacher, it is necessary to ensure that students are able to focus on learning, topics are in accordance with students' life problems, and avoid distractions from friends. In the class learning process, students must be encouraged to re-observe the concept map they made so that the flow of structuring relationships between objects that are built is right. The more relationships flow students make, the higher the level of student's creative thinking abilities. Teachers must ensure that the students focus on making the concept map in their group. The obstacle that must be anticipated is that students do not focus on group activities because students often bother their friends in discussion activities. This study also encountered this obstacle; teachers have difficulty managing discussions because not all groups discuss the topics being studied but talk about

other things. Therefore, the mind mapping method would be better done in smaller groups so that the teacher can control the discussion activities well.

#### 4. CONCLUSION

Based on this research result, it can be concluded that there are differences in students' creative thinking skills taught through the mind mapping method and the picture and picture method. The two methods have some technical similarities, one of which is that students are expected to be actively involved in group inquiry activities. The mind mapping method is superior in developing creative thinking indicators. Teachers need to apply the mind mapping method in classroom learning frequently.

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