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The Effectiveness of the Mind Mapping in PjBL on the Learning Outcomes and the Creativity of Elementary School Students

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ABSTRAK

Rendahnya hasil belajar dan kreativitas siswa disebabkan oleh metode dan model pembelajaran yang digunakan guru kurang melibatkan siswa secara langsung dan aktif. Penelitian ini bertujuan untuk menganalisis perbedaan dan efektivitas metode mind mapping dalam model project based learning ditinjau dari hasil belajar dan kreativitas siswa kelas 4 SD. Metode penelitian yang digunakan adalah penelitian eksperimen dengan jenis quasi-experimental research. Subyek penelitian siswa di kelas 4 total 41 siswa, terdiri dari 22 siswa di kelas 4 A sebagai kelas kontrol, dan 19 siswa di kelas 4 B sebagai kelas eksperimen. Penelitian ini mengumpulkan data menggunakan metode tes dan rubrik penilaian lembar observasi. Analisis data dilakukan dengan Microsoft Excel dan SPSS untuk Windows versi 25. Dalam penelitian ini, uji statistik terdiri dari normalitas, homogenitas, uji T, uji lembar observasi, dan uji N-Gain. Hasil penelitian menunjukkan bahwa nilai signifikansi t-test sebesar 0,000 < 0.05. Maka H_0 ditolak dan H_a diterima yang berarti terdapat perbedaan yang signifikan pada metode mind mapping dalam model project-based learning ditinjau dari hasil belajar. Hasil N-Gain score pada kelas eksperimen adalah 0,64 dan pada kelas kontrol adalah 0,36 yang berarti keduanya termasuk dalam kategori sedang dan N-Gain Persen pada kelas eksperimen cukup efektif sedangkan pada kelas kontrol tidak efektif. Pada aspek kreativitas diperoleh data rata-rata nilai kreativitas siswa pada setiap indikator selama empat pertemuan di kelas eksperimen lebih tinggi dibandingkan kelas kontrol dan nilai dari masing-masing indikator N-gain score pada setiap pertemuan di kelas eksperimen mengalami peningkatan.

ABSTRACT

The methods and models applied by teachers affect learning outcomes and student creativity. This research intends to analyze differences and effectiveness of mind mapping methods in the project-based learning model in terms of creativity and learning outcomes. The research method used is experimental research with a quasi-experimental design. The reseaech subjects were 41 students, 22 students in grade 4 A as a control group, and 19 students in grade 4 B as an experimental group. Data collection procedures in this research used test procedures and observation sheet assessment rubrics. The statistical tests used in this research include normality tests, homogeneity tests, t-tests, observation sheet tests, and N-Gain were assisted by SPPS for Windows version 25 and Microsoft Excel. The independent sample t-test yielded a significance value (sig.2-tailed) of 0.000, that is less than 0,05. This implies that H_0 is disused while H_a is allowable. This suggests that there exists a major gap admist mind mapping approach used in the project-based learning paradigm and student learning outcomes. The N-Gain score for the experimental class was 0,64, while for the control class was 0,36. Both scores fell within the medium category. The N-Gain Percent for the experimental class was found to be effective, while for the control class, it was not. The data revealed that the average student creativity score for each indicator during the four meetings in the experimental class was higher than in the control class. Furthermore, the value of each N-gain score indicator at each meeting in the experimental class increased.

1. INTRODUCTION

Education is a progress of developing student behavior for becoming an adult and live on one's own. Education is developed not only through intellectual intelligence but requires a balance of emotional intelligence and spiritual intelligence so that in the future it can adapt to its environment (Anggraeny et al., 2023; Syaparuddin & Elihami, 2020). Education is an important need to produce quality human capital so that they can think and act by prevailing morals. Civic Education is developing students' personality so they have a loyal attitude and love towards the country. Civic education is an education that is closely related to human characteristics as social beings who live in nations and states that aim as education to

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form good citizens in accordance with applicable laws (Kartini & Anggraini, 2021; Parawangsa et al., 2021). The independent curriculum is an improvement on the prior curriculum, the 2013 Curriculum. The independent Curriculum is designed so that students can achieve the abilities outlined in studying results. One of the differences between the 2013 Curriculum and the independent curriculum is changing the PPKn subjects into *Pancasila* Education subjects. Competencies to be achieved in these subjects include aspects of knowledge, attitudes, values, norms, and skills that aim to form responsible and democratic citizens (Hasibuan et al., 2022; Manalu & Gandamana, 2023). *Pancasila* Education is an education that contains values to develop the character of *Pancasila* which is developed in the life of society, nation, and state so that learning is divided into four elements: *Pancasila*, the Constitution of the Republic of Indonesia 1945, *Bhinneka Tunggal Ika*, and the Unitary State of the Republic of Indonesia. *Pancasila* education is the ideological education of the Indonesian nation to develop citizenship attitudes by understanding their rights and obligations as citizens. *Pancasila* education aims to develop students so in the future they can live in society as good citizens so that the teaching is carried out starting from the elementary level where students are in an intellectual period that continues to develop (Akhyar & Dewi, 2022; Salim et al., 2023).

The learning that is implemented cannot be separated from internal and external constraints so students experience difficulties and the results obtained are unsatisfactory (Sunarsih, 2020; Utami, 2020). Education subjects aim to develop attitudes to being good citizens so that there is a lot of material about rules and laws that need to be learned such as norms, *Pancasila*, and the 1945 Constitution. The obstacle faced during *Pancasila* Education learning is materials that are hard to understand for students because the material of *Pancasila* Education is quite vast and too heavy for students. This can be a factor in the learning process of *Pancasila* Education, students are less active and their learning outcomes are less than satisfactory. The learning methods used by teachers also affect the learning process. Teacher today are often found using lecture method which causes a lack of student involvement in the process of learning previous research shows that the lecture method is less effective because students are less involved in the learning process and only become listeners who receive all learning information from the teacher (Aisah et al., 2022; Putra & Lutfiyah, 2020).

Conclusions of the interviews and observations done by the researcher with grade 4 teachers of SDN Tambakaji 05 Semarang City stated that student learning outcomes were still below the learning objectives attainment criteria and had to be remedied. This is due to the method chosen by the teacher is less to encourage active involvement of students so that in terms of the value of student creativity is still lacking. Teachers convey that students like learning where students are directly involved. Researchers are interested in using the mind mapping method that will be realize in the project-based learning model. This research will direct students to create projects in the form of mind mapping through educational activities with the project-based learning model. Students will rewrite the material that has been delivered by the teacher in the mind mapping project which will be made according to the creativity of students in groups. To overcome these problems, one of the steps that can be taken is to apply learning methods and models that suit the needs of students. Learning methods and models applied according to the needs of students can affect student learning outcomes and creativity. Learning outcomes are achievement of student abilities after going through the learning process carried out by students covering the cognitive, affective, and psychomotor domains (Samaratungga et al., 2021; Tae et al., 2019). Creativity is a person's ability to take action to create or create a new creation and provide various ideas to face a problem or problem. Creativity is judged by the ability to think with fluency, flexibility, originality, elaboration. Creativity can develop through student activities in pouring out the ideas they think of (Octafianellis et al., 2021; Wulandari et al., 2019).

Learning methods are means or ways used to bridge students to master existing learning materials, so it influences the course of learning activities (Mansir et al., 2021; Setiawan et al., 2017). Mind mapping is a recording technique that strengthens visual learning styles so that it can facilitate someone in organizing and remembering information both in writing and verbally (Pane, 2022; Widiyono, 2021). The mind mapping method be able a strategy inside learning to help students get an outline of the material discussed to improve abilities in the cognitive aspects of students (Astriani et al., 2020; Huda et al., 2022). Mind mapping is a method that can be applied to students in elementary schools. Mind mapping can explore the brain's ability to make it easier for students to make notes about learning that has been done. Students compile mind mapping using keywords so that students can develop knowledge by compiling the main ideas of a concept into a mind map that is easy to understand and by student creativity (Ekawati & Kusumaningrum, 2020; Kustian, 2021).

The learning model used shall be in compliant with the student's needs. The learning model is a series of presentations of teaching material when learning is carried out by the teacher with all facilities used directly or indirectly (Ariani, 2020; Trust & Pektas, 2018). The project-based learning model is a learning model that provides challenges for students to solve problems by producing projects in groups

(Ariani, 2020; Sumarni, 2020). The project-based learning model does not only focus on learning outcomes but pays attention to the process when making projects. The process of making projects that involve students' knowledge and skills can motivate students to be more active and think creatively to generate new ideas so that student learning outcomes can improve (Mangangantung et al., 2023; Rizkasari et al., 2022).

Previous research revealed that the project-based learning model with the help of mind mapping can enhance learning output in thematic learning (Wulandari et al., 2019). Ascertained by other studies that reveal effective mind mapping methods to improve learning outcomes in Civic Education subjects (Fitriana & Attalina, 2023). The mind mapping arrangement can be a solution that can be operate to help students in the learning process. Students are not required to memorize all the information obtained during learning but students can write down ideas through mind mapping to increase their creativity (Acesta, 2020; Sapoetra, 2019) (Acesta et al., 2020; Sapoetra, 2019). Previous research revealed that in addition to improving learning outcomes, the mind mapping method can also upsurge student creativity (Nofitasari et al., 2022; Rizkiyani & Kristin, 2022).

Based on the views of some of these studies, the actual utilization of the mind mapping method in the project-based learning model can help students in summarizing the information that has been obtained. The novelty of this study can encourage student involvement so they can be more active by making a mind mapping project based on student creativity. Several studies have also shown that there is something significant impact on student learning outcomes and creativity when applying the mind mapping method. This research focused on the aim to analyze the differences and effectiveness of mind mapping methods in project-based learning model compared to conventional methods and models.

2. METHOD

This research is quantitative. The research method implemented in this research is experimental research with a quasi-experimental research design and a non-equivalent control group design pattern. Experimental research is research to observe changes after treatment, in other words, it aims to determine the relationship between two or more variables (Rogers & Revesz, 2019). In this research, two groups were given different treatments for 4 meetings, namely the experimental class, acquired assistance made use of mind mapping method in the project-based learning model and the control class was given treatment using conventional methods and models. The data collection technique in this research used a test technique to measure learning outcomes and an observation assessment rubric to measure creativity. Before being given treatment, the two groups were given pretest questions to determine the initial situation and given posttest questions to determine the situation after being given treatment. The experimental design used in this research is presented in Table 1.

Table 1. Nonequivalent Control Group Design.

Group	Pretest	Treatment	Posttest
Control	O_1	X_1	O_2
Experiment	O_3	X_2	O_4

The data in Table 1 points out that this research used a quasi-experimental research design with the type of non-equivalent control group design. Sampling for this research used non-probability sampling techniques through saturation sampling type, namely all members of the population used as a sample (Sugiyono, 2013). The research subjects were 4th grade students of SDN Tambakaji 05 who were all members of the sample. This was done in response to the population in this research was pretty a small amount, with 41 students. Determination of experimental and control classes shows that class 4 A as a control class with 22 students and 4 B as an experimental class with 19 students. The research instruments used in this research were pretest and posttest questions to measure learning outcomes and observation assessment rubrics to measure student creativity. Before use, to measure learning outcomes, the question instrument was tested on 4th grade students of SDN Tambakaji 02, with 27 students. After testing the questions, the validity and reliability of the question instruments have been tested. Analysis of the test question instrument using the validity test with the Product Moment Correlation formula and the reliability test using the Cronbach's Alpha formula. The lattice of the test question instrument is presented in Table 2.

Table 2. Question Instrument Grid

Question Indicator	Form of Question	Question Number	Number of Questions
Presented with a statement or picture, students can show the meaning of the integrity and territorial characteristics of the Republic of Indonesia appropriately.	Multiple Choice	1,3,8,18,19	5
Presented with a statement, students can analyze the form of state and form of government of Indonesia according to the 1945 Constitution appropriately	Multiple Choice	2,4,5	3
Presented with a statement, students can correctly analyze the meaning of unity and its legal basis.	Multiple Choice	6,7,9,10,14, 16	6
Presented with a statement, students can show the meaning of the motto as a form of cooperation to maintain unity correctly.	Multiple Choice	11,12,13,15 ,17	5
Presented with questions, students can analyze the function of the state as a form of maintaining integrity in unity and integrity according to the 1945 Constitution appropriately.	Multiple Choice	20,21,22,23	4
Presented with a statement, students can correctly point out behaviors that pose a threat and efforts to maintain the integrity of the Unitary State of the Republic of Indonesia.	Multiple Choice	24,25,26,27 ,28,29,30	7
Amount			**30**

The validity test was carried out using the Product Moment Correlation formula, and it was found that the r table was 0.38 (27 students). The question is declared valid if the value of r count > r table. The validity test results obtained 21 questions declared valid. The question instrument was tested with the level of difficulty and differential power then the results of 20 questions had good criteria so that they could be used as pretest and posttest questions. The reliability test uses the Cronbach's Alpha formula and the result is 0,80, so the reliability is high and declared reliable. Data on question numbers that are declared valid and have good criteria can be seen in Table 3.

Table 3. Data on Question Numbers that Are Valid and Have Good Criteria

Valid or Invalid	Question Number	Amount
Valid	1, 2, 3, 4, 5, 6, 7, 12, 15, 16, 17, 19, 21, 22, 25, 26, 27, 28, 29, 30	20
Invalid	8, 9, 10, 11, 13, 14, 18, 20, 23, 24	10

The next instrument is the observation sheet lattice to measure student creativity. The lattice of creativity assessment rubric instruments can be seen in Table 4.

Tabel 4. Student Creativity Instrument Grid

No	Indicator	Assessment Criteria
1	Fluency	Ability to think fluently by creating ideas in solving problems
2	Flexibility	Ability to think flexibly by looking at problems from other perspectives and developing imagination
3	Originality	Ability to develop and create new ideas that are different or have not been thought of by others to solve problems
4	Elaboration	Ability to make a report with a complete explanation and by the subject matter

Description: creativity assessment is assessed through a score scale, namely: score 4 (very good), score 3 (good), score 2 (sufficient), and score 1 (less).

The data in Table 4 points out that this research showed that students creativity was assessed through 4 indicators, namely fluency, flexibility, originality, and elaboration. The value of creativity was assessed when the research took place during four meetings using a creativity assessment rubric or observation sheet. The assessment was carried out through student discussion activities and the value of LKPD from student discussions. The experimental class focused on project activities to create mind mapping and the control class focused on discussion activities to write material ideas.

The statistical analysis test used in this research consisted of normality test, homogeneity test, and t-test using the help of SPSS for Windows version 25. Then the observation sheet and N-Gain test used the help of Microsoft Excel. Normality tests obtained from pretest and posttest data are used to test whether the data obtained is normally distributed or not. The homogeneity test obtained from pretest and posttest data is used to test whether the two groups are homogeneous or come from the same variance. To test the hypothesis of whether there is a major difference admist the application of the mind mapping method in the project-based learning model with conventional methods and models, an independent sample t-test is done on the learning outcomes data and the average comparison of each indicator on the creativity outcomes data. To test the effectiveness of learning outcomes and creativity, the N-Gain test was conducted.

3. RESULT AND DISCUSSION

Result

The description of the data in this research includes the scores of pretest and posttest results of students who were given different treatment with the mind mapping method in the project-based learning model applied in the experimental class and conventional methods and models applied in the control class. Descriptive data analysis is used to recite research data which includes the amount of data, highest score, lowermost score, mean score, and standard deviation. The following descriptive analysis of data obtained using the help of SPSS 25 for Windows is presented in Table 5.

Table 5. Descriptive Analysis of Learning Outcomes Data

Group	N	Range	Minimum	Maximum	Mean	Std. Deviation
Pretest Experiment	19	40	30	70	46.32	11.766
Posttest Experiment	19	35	60	95	79.74	10.338
Pretest Control	22	35	25	60	42.73	10.086
Posttest Control	22	45	40	85	62.95	13.598
Valid N (listwise)	19					

Based on Table 5. it shows that the experimental class has 19 valid samples. In pretest results, the lowermost score was 30 and the highest score was 70 with a mean score of of 46.32 and a standard deviation of 11.766. In posttest results, the lowermost score was 60 and the highest score was 95, with a mean score of 79.74 and a standard deviation of 10.338. The control class has 22 valid samples. In pretest results, the lowermost score was 25 and the highest score was 60, with a mean score of 42.73, and a standard deviation of 10.086. In posttest results, the lowermost score was 40 and the highest score was 85, with a mean score of 62.95 and a standard deviation of 13.598. Testing the research hypothesis can acknowledged the differences and effectiveness of the mind map in the project-based learning model on student learning outcomes. Before testing the hypothesis, a prerequisite test is required which consists of a normality test and homogeneity test. Normality test with the aim of knowing whether the research data is normally distributed or not. The parametric statistic is used if the data is distributed normally, meanwhile, abnormally distributed data using nonparametric statistics. Table 6 shows the results of the normality test carried out on learning outcomes data using SPSS 25 for Windows.

Table 6. Normality Test Results

Dependent Variable	Class	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	Df	Sig.	Statistics	Df	Sig.
Learning Outcomes	Pretest Experiment	0.125	19	0.200*	0.941	19	0.280
	Posttest Experiment	0.168	19	0.162	0.946	19	0.333
	Pretest Control	0.135	22	0.200*	0.955	22	0.403
	Posttest Control	0.176	22	0.075	0.943	22	0.230

*. This is a lower bound of the true significance.

Table 6 shows that the normality test on Shapiro Wilk's column pretest value in the experimental class had a significant value of 0,280, whereas the control class had a significant value of 0,403. The posttest value normality test yielded a significant value of 0,333 in the experimental class and 0,230 in the control class. Based on those data, it can be concluded that student learning outcomes data from pretest and posttest scores in both experimental and control classes are distributed normally because they have significant value more than 0,05. Therefore, the type of statistics used is parametric statistics.

The homogeneity test has the aim of knowing whether the two groups are homogeneous or come from the same variance. Homogeneity test decision making is based if a sig value less than 0.05, H_0 is disused and H_a is allowable. This indicates that the variance in each group is not comparable or inhomogeneous. If the sig value more than 0.05, then H_0 is allowable and H_a is disused. This means that the variation in each group is comparable or homogeneous. The results of the pretest homogeneity test using the help of SPSS 25 for Windows can be seen in Table 7.

Table 7. Pretest Value Homogeneity Test Results

	Statistics Parameters	Levene Statistic	df1	df2	Sig.
Learning Outcomes	Based on Mean	0.302	1	39	0.586
	Based on Median	0.249	1	39	0.621
	Based on the Median and with adjusted df	0.249	1	38.053	0.621
	Based on trimmed mean	0.263	1	39	0.611

The data in Table 7 show that the significant value (Sig) based on the mean is 0,586. Since 0,586 > 0.05, it is possible to conclude that the pretest values of the experimental and control classes come from populations with the same variance or homogeneous. Table 8 shows the homogeneity test of the posttest values of the experimental and control classes performed with SPSS 25 for Windows.

Table 8. Posttest Value Homogeneity Test Results

	Statistics Parameters	Levene Statistic	df1	df2	Sig.
Learning Outcomes	Based on Mean	2.324	1	39	0.135
	Based on Median	2.359	1	39	0.133
	Based on the Median and with adjusted df	2.359	1	36.999	0.133
	Based on trimmed mean	2.364	1	39	0.132

Based on Table 8 shows that the significant value (Sig) Based on Mean is 0,135. Since 0,135 > 0,05, it can be concluded that the posttest value data for the experimental class and control class comes from a population with homogeneous variance. For data that has passed normality and homogeneity tests, hypothesis testing is required at the next stage. Hypothesis testing in this research implemented an independent sample t-test. The independent sample t-test test was established to determine whether there was a significant difference between student learning outcomes in the experimental and control classes. The independent sample t-test is used to test two unpaired data such as between two groups having different amounts and given different handling or methods and models. The independent samples t-test utilizing SPSS 25 for Windows can be seen in Table 9.

Table 9. Independent Sample T-Test Results

Statistics Parameters		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Learning Outcomes	Equal variances assumed	2.324	0.135	4.392	39	0.000	16.782	3.822	9.053	24.512
	Equal variances not assumed			4.481	38.432	0.000	16.782	3.746	9.203	24.362

The data in Table 9 show that the significance value of Sig (2-tailed) in the Equal Variances Assumed column is 0.000. Independent sample t-test decisions require sig (2-tailed) < 0.05 to disused H_0 and accept H_a, indicating a significant difference. If sig (2-tailed) > 0.05, H_0 is allowable and H_a is disused, indicating no significant difference. The results of the independent sample t-test show that the significance value attained sig (2-tailed) is 0.000 < 0.05. So H_0 is disused while H_a is allowable, showing a big difference

in the mind mapping process in the project-based learning paradigm in terms of student learning outcomes. This is also recited by the average score of the *Pancasila* Education posttest results in experimental classes using the mind mapping method in the project-based learning model is higher at 79.74 compared to the control class using conventional methods and models of 62.95.

The next data analysis is the N-Gain test to figure out the effectiveness of changes in student learning outcomes before and after giving certain treatments by calculating the difference in posttest and pretest scores and then dividing by the ideal maximum score minus the pretest score. N-Gain analysis decision-making is based on the interpretation of the N-Gain score, divided into three categorizations: high (g > 0,7), medium (0,3 ≤ g ≤ 0,7), and low (g < 0,3). Furthermore, to validate effectiveness, it uses the N-gain percent obtained from the N-Gain Score multiplied by 100. Decision-making based on N-Gain percent is divided into four categories: ineffective if <40%, less effective is from 40% to 55%, quite effective is from 56% to 75%, and effective if >76%. Analysis of the N-Gain test using the help of Microsoft Excel can be viewed in Table 10.

Table 10. Results of N-Gain Analysis of Learning Outcomes.

No	Class	Mean	N-Gain Score	Interpretation	N-Gain Percent	Category
1	Pretest Experiment	46.32	0.64	Medium	64%	Quite Effective
	Posttest Experiment	79.74				
2	Pretest Control	42.73	0.36	Medium	36%	Ineffective
	Posttest Control	62.95				

Data in Table 10 showed that the average experimental pretest score was 46.32 and the average post-test score was 79.74. Then in the control class, the average pretest score was 42.73 and the average post-test score was 62.95. From those data, the N-Gain score attained in the experimental class was 0.64 and the N-Gain score in the control class was 0.36 which means that both have values greater than or equal to 0.3 and less than or equal to 0,7 so they are contained within the medium category. The results of N-Gain Percent in the experimental class attained 64% which means it is contained within the category of quite effective and in the control class a value of 36% is obtained which means it is contained within the category of ineffective. This shows that the application of the mind mapping method in the project-based learning model applied to the experimental class is more effective than conventional methods and models applied in the control class in terms of student learning outcomes.

The next data analysis is the value analysis of creativity. The value of creativity was assessed at the time of the research during four meetings using a creativity assessment rubric or observation sheet. Student creativity is assessed through four indicators: fluency, flexibility, originality, and elaboration. Assessment is carried out through student discussion activities and LKPD scores from student discussions. The experimental class focused on project activities to make mind mapping and the control class focused on discussion activities to write down material ideas. Analysis of the average value of creativity using the help of Microsoft Excel can be viewed in Figure 1.

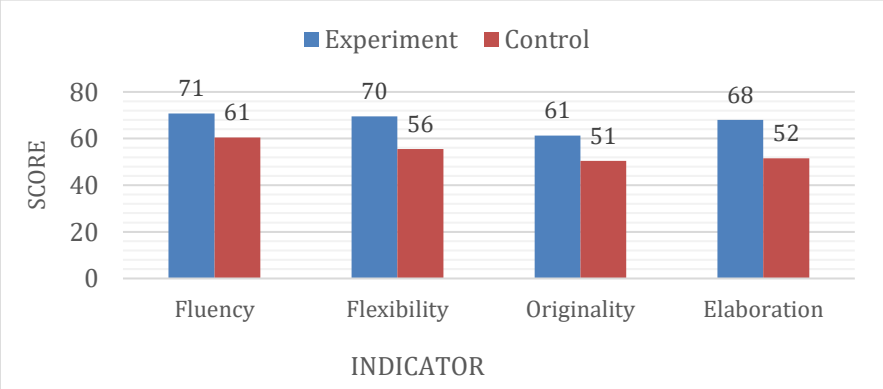

Figure 1. Comparison of Average Creativity Scores Between Experimental and Control Classes

Figure 1 shows that the average creativity score of students on each indicator during the four meetings in the experimental class was higher than the average creativity score in the control class. This shows that the mind mapping methods application in project-based learning in experimental classes has

better than using conventional methods and models in control classes. The average creativity score of students on the indicators of originality and elaboration in the experimental class and control class was lower than the average value of creativity on the indicators of fluency and flexibility. This is caused by students who can think fluently and flexibly in solving problems but have not been able to find new things that have not been thought of by others and have not been able to provide detailed or complete results. The next data analysis is the N-Gain test at each meeting to settle on the amount regarding the growth in student creativity in the experimental class and control class. The data used were the scores of student observation sheets in both classes. Analysis of the N-Gain test using the help of Microsoft Excel in the experimental class can be viewed in Table 11.

Table 11. Results of N-Gain Analysis of Creativity Aspects in Experimental Class

Indicators	N-Gain Meeting to-				
Creativity	1&2	2&3	3&4	1&4	Average
Fluency	0.33	0.51	0.61	0.87	0.58
Flexibility	0.35	0.43	0.67	0.88	0.58
Originality	0.18	0.45	0.50	0.77	0.48
Elaboration	0.39	0.45	0.67	0.89	0.60
Average	**0.31**	**0.46**	**0.61**	**0.85**	**0.56**

Data in Table 11 showed that the N-Gain score results for four meetings on each indicator in the experimental class have upraised. At the meetings 1 and 2, N-Gain scores obtained on the originality indicator are contained within the low category, whilst other indicators are included in the medium category. At meetings 2 and 3, N-Gain scores obtained by each indicator were contained within the same medium category as in meetings 3 and 4. The N-Gain score obtained at the 1 and 4 meetings is counted in the high category. Results of the N-Gain score analysis for four meetings acquired an average of 0.56 which means it is included in the medium category. The next data analysis was the average N-Gain test to determine the effectiveness of student creativity in the control class. Analysis of the N-Gain test using the help of Microsoft Excel can be viewed in Table 12.

Table 12. Results of N-Gain Analysis of Creativity Aspects in Control Class

Indicators	N-Gain Meeting to-				
Creativity	1&2	2&3	3&4	1&4	Average
Fluency	0.12	0.11	0.36	0.50	0.27
Flexibility	0.17	0.22	0.18	0.47	0.26
Originality	0.14	0.23	0.30	0.53	0.30
Elaboration	0.14	0.32	0.18	0.52	0.29
Average	**0.14**	**0.22**	**0.25**	**0.50**	**0.28**

Data in Table 12 showed that the N-Gain score results for four meetings on each indicator in the control class did not always grow. At the meeting 1 and 2, N-Gain score obtained by each indicator was in the low category. At the meetings 2 and 3, the N-Gain score obtained on the erabolation indicator is in the medium category while the other indicators is included in the low category. At the meetings 3 and 4, N-gain score obtained on the fluency and originality indicators were included in the medium category, while for other indicators it was included in the low category. At the meeting 1 and 4, N-Gain score obtained is included in the medium category. From the results of the N-Gain score analysis for four meetings, an average of 0,28 was obtained, which means it is included in the low category. Analysis of the N-Gain test using the help of Microsoft Excel can be seen in Table 13.

Table 13. Results of N-Gain Analysis of Creativity.

Class	N-Gain Score	Interpretation	N-Gain Percent	Category
Experiment	0.56	Medium	56%	Quite Effective
Control	0.28	Low	28%	Ineffective

The data in Table 13 shows that the N-Gain score obtained in the experimental class is 0,56 which is classified as medium category, and the N-Gain score obtained within the control lesson is 0,28 which is classified as low category. Then, the N-Gain Percent results in the experimental class obtained 56% which means it is included in the quite effective category and the control class obtained 38% which means it is

included in the ineffective category. This shows that the implementation of the mind mapping method in the project-based learning model applied in the experimental class is more effective than the conventional method and model applied in the control class in terms of student creativity.

Discussion

This research's intention is to analyze the differences and effectiveness of the mind mapping method in the project-based learning model in terms of the learning outcomes and creativity of grade 4 students of SDN Tambakaji 05 in the *Pancasila* Education subject. The research subjects were class 4 A as a control class totaling 22 students and 4 B as an experimental class totaling 19 students. The data collection technique used in this research used test and observation techniques. Test techniques in the form of pretest and posttest questions to measure learning outcomes and observation to assess creativity. This research was done for 4 meetings in each class. In the experimental class, the mind mapping method is applied where students are taught about how to make mind mapping and what are the benefits of learning. Control classes are applied using methods and models that are generally applied by class teachers, conventional methods and models. At the first meeting in the experimental class, the usance of the mind mapping method in the project-based learning model still experienced several obstacles. Some students were still confused because they had no experience in making mind maps. So at the first meeting, more assistance was still needed. Researcher gave instruction to students to write down the keywords or main topics and then add branches according to students' thinking ideas (Hikmawati, 2020; Sakti, 2020).

The second meeting, some students were getting used to making mind maps, but some students still do not adapt well. At meetings 3 and 4, students have begun to become more proficient at creating mind maps effortlessly. The end results of data analysis show that the independent sample t-test obtained a sig (2-tailed) value of 0.000 < 0.05, then H_0 is disused and H_a is allowable which means there is a significant difference between mind mapping methods in the project-based learning model conventional methods and models in terms of student learning outcomes. The N-Gain score obtained in the experimental class was 0,64 and in the control class was 0,36 which means that both are contained within the medium category. The results of N-Gain Percent in the experimental class obtained a value of 64% which means it is contained within the category of quite effective and the control class a value of 36% is obtained which means it is contained within the category of ineffective. In accordance with previous research, the mind mapping method in the project-based learning model is effective for involving students actively so that learning outcomes will increase (Ekawati & Kusumaningrum, 2020; Faturohmah et al., 2023). The mind mapping method can provide advantages in the learning process, especially in subject matter that has many material topics so students find it difficult to remember the material. Mind mapping can be an effective tool for remembering material because students are not only passive and receptive to the information provided by the teacher but try to call up with keywords and then elaborate it in a wider mind mapping (Rofisian, 2020; Saputra et al., 2023).

The results of creativity data analysis show that the N-Gain score in the experimental class is 0,56 which means it is contained within the medium category and in the control class is 0,28 including in the low category. N-Gain percent within the experimental course was 56% contained within the quite effective category whereas N-Gain percent within the control class was 28% included contained within the ineffective category. This implies that there's a difference between experimental class and the control class. The mind mapping method in the project-based learning model has proven to be more effective than conventional methods and models. In accrodance with previous research, the mind mapping method can upsurge creativeness (Acesta et al., 2020; Tambunan et al., 2023). Based off of the average value of creativity on each indicator: fluency, flexibility, originality, and elaboration during four meetings in the experimental class acquired a higher average score than in the control class. The N-gain score in the experimental class showed that creativity in the four indicators increased at each meeting (Century et al., 2020; Nugraha et al., 2021). On the indicators of flexibility and fluency, experimental and control classes obtained a higher average score compared to the average scores on the indicators of originality and elaboration. Students can think fluently in developing ideas and flexible thinking by showing imaginative thinking in solving problems. However, students have not been able to develop new ideas that are different from others. Students also have not been able to provide detailed or complete results to solve problems (Pamungkas et al., 2017; Wahyuni & Palupi, 2022). The application of the mind mapping method can increase student creativity because it gives students the freedom to be more creative in developing ideas to solve problems. Student creativity can be seen through the stimulus of the project that is done, making mind mapping by writing material ideas that have been conveyed by being given various colors and pictures to make it interesting. Mind mapping can assist students to be more active and creative and the learning will be fun so that the learning is more meaningful and learning goals can be reached (Cahyanti et al., 2021; Hidayat et al., 2020; Yusikah & Turdjai, 2021).

The results acquired in this research are in accordance with the results of previous studies, which have shown that the application of the mind mapping method in the project-based learning model can improve learning outcomes in thematic learning (Wulandari et al., 2019). Another research found that the mind mapping strategy improves learning outcomes in civic education subjects (Fitriana & Attalina, 2023). Along with enhancing learning outcomes, previous research also revealed that the application of the mind mapping method can enhance student creativity (Nofitasari et al., 2022; Rizkiyani & Kristin, 2022). As stated in the results of the research that is done, it can be known that the mind mapping method in the project-based learning model has a significant difference and better effectiveness in terms of student learning outcomes and creativity.

4. CONCLUSION

From the research that has been done, it can be concluded that there are significant differences between the mind mapping method in the project-based learning model with conventional methods and models in terms of student learning outcomes and creativity. The results of the N-gain analysis also show that the mind mapping method in the project-based learning model has proven to be more effective than conventional methods and models. In general, this research emphasizes that the selection of mind mapping methods in the project-based learning model has a significant impact and higher effectiveness in accomplishing learning goals, especially in learning outcomes and student creativity. This research is expected to be a suggestion for school principal to encourage and support teachers to create innovative and fun learning. Teachers must be able to pick the ideal learning methods and models so that learning objectives can be accomplished. The suggestions for follow-up researchers are to be able to conduct more extensive and in-depth research, especially on creativity variables where there are still several indicators that have not experienced a significant increase.

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