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THE INFLUENCE OF PROBLEM BASED LEARNING (PBL) MODEL ON STUDENTS CREATIVE THINKING ABILITIES ON ELEMENTAL, COMPOUND AND MIXTURE MATERIALS IN CLASS VIII OF SMP NEGERI 1 SEI RAMPAH ACADEMIC YEAR: 2024/2025

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Abstract

This research aims to determine the effect of the Problem Based Learning (PBL) model on students' creative thinking skills on the material of elements, compounds and mixtures in Class VIII of SMP Negeri 1 Sei Rampah in the academic year 2024/2025. This study uses a Quantitative method using the Quasi Experimental Design experimental method, the instrument used is a Test. The results of the study showed that the influence of the Problem Based Learning (PBL) Model was more effective in improving students' creative thinking skills in class than conventional models, the average post-test score of the Experimental class was 83.7 higher than the Control class with an average of 78.26. The Problem Based Learning (PBL) Model improves creative thinking skills in the four indicators of the post-test scores of the experimental class, namely fluent thinking with an average of 94.20, original thinking 89.42, detailed thinking 73.44 and flexible thinking 68.55. Meanwhile, the control class has an average of creative thinking indicators, namely fluent thinking with an average of 85.71, original thinking 81.23, flexible thinking 65.82 and detailed thinking 64.58. The PBL model improves creative thinking skills in all four indicators. The results of the N-Gain test show that there is an influence of the Problem Based Learning (PBL) model on students' creative thinking skills on the material of elements, compounds and mixtures in Class VIII of SMP Negeri 1 Sei Rampah Academic Year 2024/2025 with details of the Experimental Class 0.76 (High) and the Control Class 0.69 (Medium).

Keywords: PBL, student, creative, thinking, materials

Introduction

Education is one of the important things that can create quality human resources and is needed by a nation to be able to compete and be competent with other nations. Through education, it is hoped that this nation can follow developments in the fields of science and technology that are increasingly developing (Ekawati et al., 2019).

21st century learning requires high-level thinking skills. In the development of the 21st century, students need 4C thinking skills, namely critical thinking, communication, collaboration, and creativity. One of the skills that needs to be developed in the learning process is the ability to think creatively. Based on Maslow's opinion in Munandar (2012) states that "creativity is one of the basic human needs to see the many possible solutions to a problem". However, in reality this form of thinking has not been widely considered and developed in formal education.

Based on the results of observations and interviews that have been conducted with Natural Sciences (IPA) teachers at SMP Negeri 1 Sei Rampah, it is known that current learning is still focused on teachers with lecture methods, questions and answers and giving practice questions to students. Another learning method that is often used in studying science, especially the material of elements, compounds and mixtures, is the demonstration learning method, but students still have difficulty in mastering the material, difficulty in solving problems and difficulty in designing science products. This can be caused by the low creative thinking skills of students. Other information obtained is the unstable learning enthusiasm of students when the teacher explains or asks questions during teaching and learning activities, students tend to be silent or unresponsive, especially students are asked for their opinions about a problem or asked to answer non-objective questions. From this information, it can be said that the learning method applied is less effective, so that many materials in science subjects are not well mastered by students, including material on elements, compounds and mixtures and students' creative thinking skills in teaching and learning are still less visible.

One effort to improve students' creative thinking skills is to apply the right learning model. One model that can be used in science learning is the Problem Based Learning (PBL) model. The PBL model has stages of orientation, organization, investigation, presentation, analysis and evaluation. The problem based learning (PBL) model is designed to encourage students to explore ideas, find knowledge resources and think logically. The steps in this learning model are first, identifying problems. Second, exploring existing knowledge. Third, generating hypotheses and explaining mechanisms by identifying learning objectives. The role of teachers in learning as facilitators by encouraging all students to contribute to learning (Al-hoqail & Badr, 2010). PBL is a learning that can cause students' thinking skills to be truly optimized through a systematic group or team work process, so that students can empower, hone, test, and develop their thinking skills continuously (Rusman, 2012).

Research methods

The method used in this study uses Quantitative Research using quasi-experimental research. Quasi Experiment is an experimental research with research subjects grouped by purposive sampling. Like experimental research in general, the implementation of quasi-experiments also compares two classes (experimental-control) and uses the same pretest-posttest as its research design. The design form of quasi-experiments according to Maulana (2009) is as follows.

0	X	0
0		0

Keterangan:

0 : *Pretes* dan *postest*

X : Treatment of the Experimental Group

Research Location

This research was conducted at SMP Negeri 1 Sei Rampah, in two classes, namely class VIII-1 as the experimental class and VIII-3 as the control class starting from June 24 to August 12, 2024.

Research Instruments

In the study, data collection and processing were carried out. The data obtained came from test instruments. The test instruments used in this study were by using creative thinking ability and learning outcomes test questions.

Data Analysis Techniques

Data analysis techniques in this study use quantitative data processing techniques. Quantitative data is data in the form of numbers. Quantitative data can be processed or analyzed using mathematical and statistical calculations. Data obtained from student test results are examined, then calculations are carried out as a whole to determine student learning outcomes. Quantitative data in this study were obtained from the results of the pretest and posttest. The test results are then calculated using Microsoft Excel 2010 to test normality, homogeneity, t-test and N gain test from student test results.

RESULTS AND DISCUSSION

Creative Thinking Test Results and Learning Outcomes

Table 1. Learning Outcomes Creative Thinking Skills

Type Test	Experiment	Control
Pretest	34,72	30,07
Postest	83,67	78,26

Table 2 above can explain that the creative thinking ability of students in the experimental class who received PBL model learning actually experienced a significant increase. This can be seen from the average post-test score which is higher than the control class.

Learning Outcomes Based on Creative Thinking Indicators

The learning outcomes of students with the Problem Based Learning (PBL) model on creative thinking skills, in creative thinking skills there are several indicators, namely Fluency Thinking, Flexibility Thinking, Originality Thinking, and Elaboration Thinking. Learning outcomes based on creative thinking indicators can be seen in the following table.

Table.2 Creative Thinking Learning Outcomes of Experimental Class

Type Test	*Pretest*	*Postest*
Fluent Thinking (*Fluency)*	62.95	94,20
Flexible Thinking (*Flexibility*)	41,80	68,55
Original Thingking (*Originality*)	32,23	89,42
Detailed Thinking (*Elaboration)*	30,21	73,44
Average	41,80	81,40

It can be seen from table 3.11 that Fluency Thinking is higher than other thinking indicators, namely 62.95 (Pretest) and 94.20 (Postest), with an average of 41.80. While the Learning Outcomes (Postest) experienced changes, namely the highest value of 94.20 (Fluent Thinking), 89.42 (Original Thinking),73.44 (Detailed Thinking) and 68.55 (Flexible Thinking) with an average of 81.40.

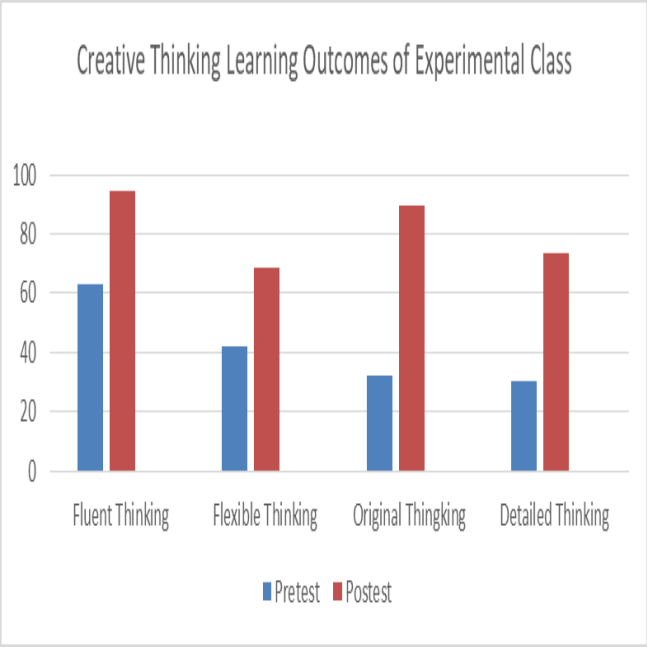

Figure 1. Bar Chart of Experimental Class Learning Outcomes

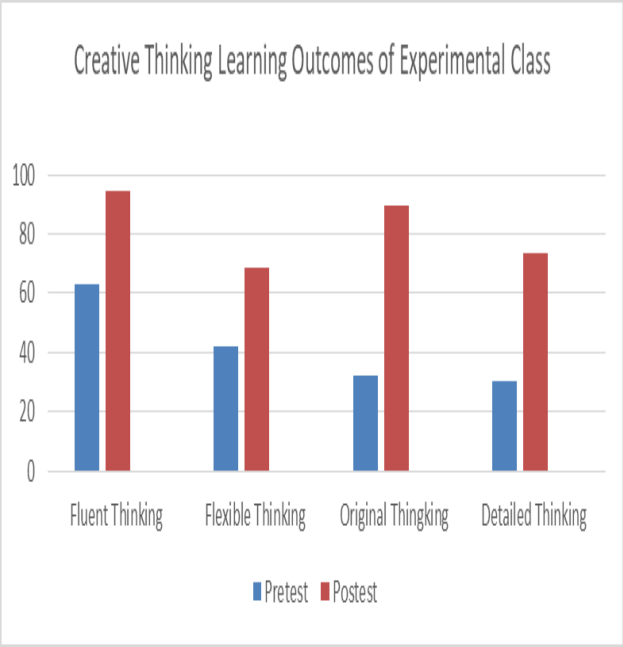

Figure 2. Bar Chart of Learning Outcomes of Control Class

Table. 3 Creative Thinking Learning Outcomes of Control Class

Type Test	*Pretest*	*Postest*
Fluent Thinking (*Fluency)*	56,25	85,71
Flexible Thinking (*Flexibility*)	39,16	65,82
Original Thingking (*Originality*)	24,22	81,23
Detailed Thinking (*Elaboration)*	39,06	64,58
Average	39,67	74,34

It can be seen from table 3.11 that Fluency Thinking is higher than other thinking indicators, namely 62.95 (Pretest) and 94.20 (Postest), with an average of 41.80. While the Learning Outcomes (Postest) experienced changes, namely the highest value of 94.20 (Fluent Thinking), 89.42 (Original Thinking),73.44 (Detailed Thinking) and 68.55 (Flexible Thinking) with an average of 81.40.

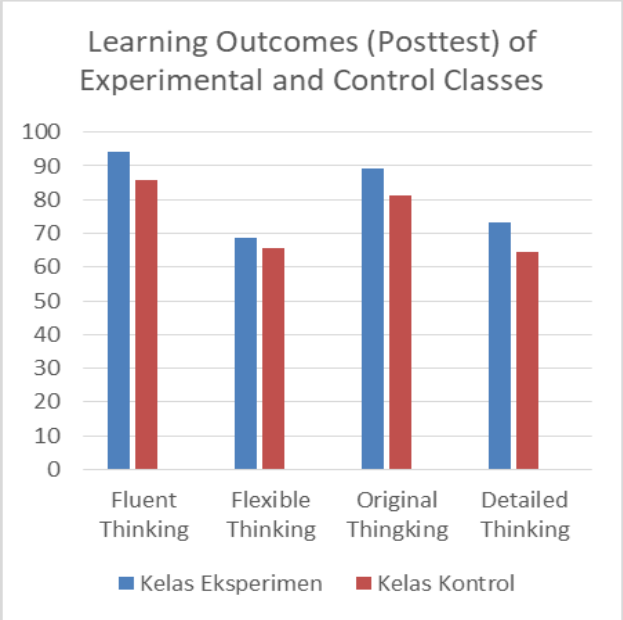

Figure 3. Bar Chart of Learning Outcomes (Posttest) of Experimental and Control Classes

From Figure 3 it can be explained that the two classes, namely the experimental class and the control class, have significantly different abilities. The experimental class has a higher average value of Learning Outcomes (Posttest) for creative thinking ability compared to the control class. After receiving different learning for the two classes, namely the experimental

Data Analysis of Students' Creative Thinking Skills

Tabel 4. Normality Test Resul

Statistics	Class			
	Experiment		Control	
	Pretest	*Postest*	*Pretest*	*Postest*
Sample	32	32	32	32
Average	34,72	83,7	30,07	78,26
Std.Deviation	9,05	8,88	6,47	6,18
L_{count}	0,07229136	0,15318681	0,09392918	0,10624953
L_{Table}	0.15662415	0.15662415	0.15662415	0.15662415
Conclusion	**Normal**	**Normal**	**Normal**	**Normal**

In table 4 of the pretest data of the experimental class is 0.07229136 and the posttest is 0.15318681, the large L count of the experimental class is normally distributed. While the control class pretest is 0.09392918 and the posttest is 0.10624953, the large L count of the control class is also normally distributed. Likewise, the results of both classes can meet the criteria of Lcount < Ltable and it can be concluded that both classes are normally distributed in the Pretest and Posttest.

Tabel 5. Homogeneity Test Results

Statistics	*Pretest*		*Postest*	
	Experiment	Control	Experiment	Control
SD^2	81,96591683	41,91295796	32,482863	46,435484
F_{count}	0,5113462		0,4850233	
F_{table}	1,8221323		1,8221323	
Conclusions	**Homogen**		**Homogen**	

Table 5 above, the Pretest data of the experimental class and the control class obtained Fcount 0.5113462 and the Posttest results Fcount 0.485023 as well as the **results** of Ftable 1.8221323. The data from both classes obtained Fcount <Ftable, so it can be concluded that both samples have the same variance and are declared homogeneous.

Tabel 6. Hypothesis Test Results

Class	n	Average	Sp	t_{table}	t_{count}	Conclusion
Experiment	32	83,66	0,86	1.696	2,04	There is Influence
Control	32	78,77	0,94			

Based on table 6 above, the results of the hypothesis test obtained that the number of t-count values > t-table, namely 2.04 > 1.696. If the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted, then H1.is accepted and the conclusion is that by conducting a hypothesis truth test, there is a significant influence of using the PBL model on students' creative thinking abilities.

Tabel 7. N-Gain Value Recap

Class	N-gain	Category
Expeiment	0,76	High
Control	0,69	Medium

It can be concluded that there is a difference in students' creative thinking abilities between the experimental class taught using the problem based learning (PBL) model and the control class which does not use the conventional model.

DISCUSSION

This study was conducted to determine the effect of using the PBL model on students' creative thinking skills on the material of elements, compounds and mixtures in class VIII of SMP Negeri 1 Sei Rampah. The study wanted to find out the difference between using the PBL model and the conventional model. After the pretest was conducted and each class was given a posttest using the specified learning model to see the increase in the creative thinking skills of students in the experimental class, the posttest score with an average of 83.7. And the control class posttest score with an average of 78.26. So that the creative thinking

skills of students have increased. Due to differences in actions or treatments, where the experimental class uses the PBL model which has many advantages, namely Students better understand the concepts taught Students are directly involved in solving problems and demanding higher thinking skills of students, Students can feel the benefits of learning, because the problems solved are directly linked to real life, Conditioning students in learning groups that interact with each other towards learning and their friends, so that the achievement of student learning completeness, and the PBL model can develop students' creativity, both individually or in groups, because at every step it demands student activity, and Makes students more independent and mature, able to provide aspirations and accept the opinions of others, and instill positive social attitudes with other students. Based on the discussion above, the PBL model, namely: makes students actively find concepts and solve problems that can be linked to real life so that students are more independent, active, and creative.

In line with the research results above, many relevant studies state that the PBL model can improve student learning outcomes, such as Gusti, (2017), who stated that the PBL model not only improves creative thinking, but also sees the impact of PBL on overall student learning outcomes and helps students achieve good learning outcomes. Djonomiarjo, (2019), who stated that the PBL model can improve student learning outcomes compared to conventional learning models. Ummaspul, (2021) who stated that he conducted a meta-analysis of several previous studies and concluded that PBL significantly improved student learning outcomes. In this study, creative thinking skills have four indicators, namely fluent thinking, original thinking, flexible thinking and detailed thinking. In the research data, the ability to think fluently has the highest average value for students, original thinking, flexible thinking and detailed thinking get values that are not far from that.

In line with this, because using the PBL model in Phase 2 Organizing students to learn, namely the teacher helps students define and identify problems that students will know and find out about the problem. Although all stages in PBL have an important role, Phase 2 is the key to developing and has great potential in improving students' fluent thinking skills. By providing opportunities for students to generate many ideas in the early stages, Through exposure to diverse problems, a supportive learning environment and a focus on learning, the PBL Model can make students generate many ideas and think fluently to find solutions to the problem.

Conclusions

1. The influence of the Problem Based Learning (PBL) Model is more effective in improving students' creative thinking skills compared to conventional models, the average post-test score for the Experimental class was 83.7, higher than the average Control class of 78.26.

2. The Problem Based Learning (PBL) model improves creative thinking skills in the four post-test value indicators of the experimental class, namely fluent thinking with an average of 94.20, original thinking 89.42, detailed thinking 73.44 and flexible thinking 68.55. While the control class has an average of creative thinking indicators, namely fluent thinking with an average of 85.71, original thinking 81.23, flexible thinking 65.82 and detailed thinking 64.58.

3. The results of the N-Gain test show that there is an influence of the Problem Based Learning (PBL) model on students' creative thinking skills on the material of elements, compounds and mixtures in Class VIII of SMP Negeri 1 Sei Rampah Academic Year 2024/2025 with details of the Experimental Class 0.76 (High) and the Control Class 0.69 (Medium)

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