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THE EFFECT OF AN INTERDISCIPLINARY PROBLEM-BASED LEARNING MODEL ON THE CRITICAL AND CREATIVE THINKING SKILLS OF JUNIOR HIGH SCHOOL STUDENTS: UPT SMPN 3 TAPUNG HILIR

Putri Lasmi[1], Zamzami Zamzami[2], Indra Purnama[3]

[1] Lancang Kuning University; putrilasmilasmi@gmail.com
[2] Lancang Kuning University; zamzami@unilak,ac.id
[3] Lancang Kuning University; indra.purnama@unilak.ac.id

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ABSTRACT

This study aims to investigate the extent to which critical and creative thinking skills of junior high school students on ecological topics can be improved through the implementation of a problem-based interdisciplinary learning model. The research was motivated by the low level of student engagement in conventional learning environments and the lack of opportunities to develop higher-order thinking skills. A quasi-experimental design with a non-equivalent control group pretest-posttest model was employed. The study involved two classes at UPT SMPN 3 Tapung Hilir: one received conventional instruction, while the other experienced problem-based interdisciplinary learning. Instruments used to assess students' critical and creative thinking abilities were developed based on Facione's critical thinking indicators and Torrance's creativity framework. The results indicated a significant difference between the experimental and control groups, with the experimental class showing greater improvement from pretest to posttest. The problem-based interdisciplinary approach enabled students to explore concepts more deeply, engage in collaboration, and generate logical and innovative solutions to real-world problems. In conclusion, the problem-based interdisciplinary learning model proved effective in enhancing students' critical and creative thinking skills, particularly in fostering a deeper and more practical understanding of ecological concepts.

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Corresponding Author:
Putri lasmi
[1] Lancang Kunig University ; putrilasmilasmi@gmail.com

1. INTRODUCTION

21st century education demands mastery of high-level thinking skills such as critical and creative thinking. However, the learning process in schools, especially at the junior high school level, is still dominated by lecture methods and conventional approaches that have not

been able to stimulate these skills. One learning model that is considered capable of answering this challenge is the problem-based interdisciplinary learning model. This model encourages active student involvement through solving real problems that involve integration between subjects. Ecosystem material in science learning has great potential to be linked interdisciplinary, such as with social studies and Indonesian. Therefore, this study aims to test the effect of the problem-based interdisciplinary learning model on the critical and creative thinking skills of junior high school students.

2. METHODS

This type of research is a quasi-experimental study with a non-equivalent control group pretest-posttest design. The population of the study was students of grade VIII at UPT SMPN 3 Tapung Hilir. The sample consisted of two classes: class VIII-A as the experimental group and class VIII-B as the control group. The experimental class used a problem-based interdisciplinary learning model, while the control class used conventional learning. The research instruments consisted of: Critical thinking tests based on Facione indicators: analysis, inference, evaluation, explanation, and self-regulation. Creativity tests based on Torrance indicators: fluency, flexibility, originality, and elaboration. Data were analyzed using non-parametric tests because the data were not normally distributed, namely: Wilcoxon Test to measure improvements in each group and Mann-Whitney Test to test differences between the experimental class and the control class.

3. FINDINGS AND DISCUSSION

This research was conducted at UPT SMPN 3 Tapung Hilir with two classes as samples: the experimental class and the control class, each consisting of 26 students. The following are the results of the pretest and posttest of students' critical and creative thinking skills.

Table1. Description of Critical Thinking Experimental Group's Ngain Value Data

Data	Tes awal	Tes akhir	Ngain
N	26	26	
Rata-rata	12.04	19.27	0.553
Sd	1,87	0,53	0,18
Variansi	12,23	0,28	0,03

Table 2. Data Description Values Ngain Critical Thinking Control Group

Data	Tes awal	Tes akhir	Ngain
N	26	26	
Rata-rata	12,23	18,50	0,417
Sd	1,88	0,67	0,20
Variansi	3,54	0,45	0,04

Table 3. Description of the Experimental Group's Creativity Value Data

Data	**Tes Awal**	**Tes Akhir**	**N-Gain**
N	26	26	
Rata-rata	12,00	19,04	0,558
Standar Deviasi (SD)	2,11	0,95	0,18
Variansi	4,46	0,90	0,03

Tabel 4. Data Description Ngain Values Control Group Creativity

Data	Tes awal	Tes akhir	Ngain
N	26	26	
Rata-rata	11,38	14,08	0,275
Sd	2,25	1,74	0,23
Variansi	5,07	3,04	0,05

Based on Tables 4.11 and 4.12, the average N-Gain value of creativity skills in the experimental class is 0.558, which is included in the medium category, while the control class obtained an average N-Gain of 0.275, which is included in the low category. The standard deviation value of N-Gain in the experimental class is 0.18 and the variance is 0.03, indicating a more even distribution of data compared to the control class which has a standard deviation of 0.23 and a variance of 0.05. These results indicate that the problem-based interdisciplinary learning model is more effective in improving student creativity compared to the conventional learning model. The N-Gain value data for creative thinking skills in the experimental group are shown in Table 4.11. The average pretest value of 12.00 increased significantly to 19.04 in the posttest, with an N-Gain value of 0.558 in the medium category, with a standard deviation of 0.18 and a variance of 0.03, indicating that the N-Gain values of almost all students are relatively homogeneous or not too spread out. However, the data from the control group are shown in Table 4.12. They had an average pretest score of 11.38 and an average posttest score of 14.08, indicating that students were in the low category with an N-Gain score of 0.275, which was below the low category. With a standard deviation value of N-Gain of 0.23 and a variance of 0.05, the results showed that the distribution of scores was wider compared to the experimental group, indicating that there was less inequality compared to the two groups, it is clear that the problem-based interdisciplinary learning model used in the experimental group was more effective in encouraging students to be more creative, with a greater average increase and more even learning outcomes. The conventional learning approach used in the control group, on the other hand, produced smaller and uneven increases, meaning it was less effective in developing creative thinking patterns.

To determine whether there is a difference in creative thinking skills between the experimental class and the control class after treatment, a hypothesis test was conducted using the non-parametric Mann-Whitney U Test. This test was used because the results of the previous normality test showed that the posttest data were not normally distributed. The table shows that the significance level of 0.05 is greater than the Asymp. Sig. (2-tailed) value of 0.002. This shows that after the implementation of the problem-based interdisciplinary learning paradigm, students in the experimental class and the control class have significantly different creative thinking capacities. After learning, students in the experimental class and the control class have significantly different creative thinking capacities, according to the results of the Mann-Whitney U Test. The average ranking value of the experimental group (32.79) is greater than the average ranking of the control group (20.21), indicating that students in the experimental class are more proficient in creative thinking. This supports the idea that the problem-based interdisciplinary learning approach in the experimental class effectively encourages students' capacity for original thinking. To encourage more creative thinking, this paradigm invites students to actively participate in cross-disciplinary solutions to real-world problems. These results also support the conclusions of a number of other studies that found that problem-based learning can enhance students' creativity by teaching them to combine ideas, generate creative solutions, and think creatively. Therefore, it has been proven that the use of a problem-based interdisciplinary learning paradigm to teach ecosystem content in experimental classes

helps students develop their creative thinking skills more than traditional instruction in the control group. The purpose of this study was to determine whether students who engage in problem-based interdisciplinary learning and those who follow traditional learning methods on ecological content have significantly different critical and creative thinking skills. The researchers developed the following theories to answer the objectives of the study, namely: Hypothesis (Ho): Students who use the problem-based interdisciplinary learning model and students who use the conventional learning model do not have significant differences in critical and creative thinking skill. Hypothesis (H1): Students who use the problem-based interdisciplinary learning model and students who use the conventional learning model have very different critical and creative thinking skills. To determine the distribution of the data, a normality test was carried out before testing the hypothesis. The non-parametric Mann-Whitney U test was used to test the hypothesis because the results of the normality test showed that the data were not regularly distributed. Based on the results of the Mann-Whitney test, the significance value for critical thinking skills is 0.000, while the significance value for creative thinking skills is 0.002. It can be concluded that H1 is accepted and Ho is rejected because both significance values are less than 0.05. The critical and creative thinking skills of students taught using the problem-based interdisciplinary learning paradigm differ significantly from the abilities of students taught using the traditional model. This difference shows how the problem-based interdisciplinary learning approach really helps students develop their capacity for critical and creative thinking. Students can be more involved in investigating topics, collaborating with others, and generating creative and logical solutions while learning about ecosystems when the focus is on solving real-world problems.

4. CONCLUSION

The purpose of this study was to determine how the application of the problem-based interdisciplinary learning model affects students' critical and creative thinking skills on ecosystem material at UPT SMP Negeri 3 Tapung Hilir. Based on data analysis and discussion, it can be concluded that the problem-based interdisciplinary learning model significantly improves students' critical and creative thinking skills. By combining various fields of science, this learning model allows students to actively participate in the learning process and solve real-world problems, especially ecosystem problems. Learning activities that involve students require, analyze, and evaluate the data obtained. This activity allows students to improve their critical thinking skills, such as interpreting data, finding relationships between concepts, putting forward arguments, and formulating logistical solutions. In addition, students' creative skills also increase. This is especially seen in the ability to elaborate ideas, problem-solving skills, purity of ideas, and speed of thinking. This model gives students the opportunity to learn new concepts and apply them in real learning situations. Therefore, students can not only understand the material conceptually, but they can also creatively apply their knowledge to solve real-world problems. Overall, it has been proven that the use of the problem-based interdisciplinary learning model can improve the quality of science learning. This is especially true for the development of critical and creative thinking skills, which are essential for students in the modern era.

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