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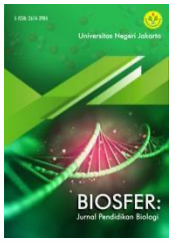

The effect of the emkontan model on students' creative thinking skills in environmental pollution topics

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ABSTRACT

Creative thinking skills are a crucial component of 21st-century competencies, particularly in issue-based learning such as environmental pollution. This study aimed to examine the effectiveness of the EMKONTAN learning model in enhancing students' creative thinking skills regarding environmental pollution. A quasi-experimental design with a non-equivalent control group was employed. The participants were seventh-grade students from a junior high school in Bandung, Indonesia. The sample consisted of two classes, with 27 students in the experimental group and 27 students in the control group. The instruments used in this study included several data collection tools, namely observation sheets used to assess students' creative thinking skills during learning activities, written achievement tests used to measure students' understanding of environmental pollution concepts, and student questionnaires used to collect information regarding students' responses to the implementation of the EMKONTAN learning model. Data were analyzed using the Mann-Whitney test, revealing a significant difference between the experimental and control groups ($p = 0.047 < 0.05$). The normalized gain (N-Gain) score of 0.78 indicated a high level of improvement, with the originality indicator showing the greatest gain and fluency the lowest. The EMKONTAN model, grounded in real-life contexts, effectively facilitated the connection between learning and the students' environment, promoting meaningful and creative ideas. These findings suggest that the EMKONTAN model is a practical and effective approach for environmentally-themed learning to enhance students' creative thinking skills.

INTRODUCTION

Creative thinking skills are among the key competencies in the 21st century, as they help students address complex challenges and generate innovative solutions to real-world problems. International studies indicate that creative thinking is part of the core skills (4Cs: creativity, critical thinking, communication, collaboration) that need to be developed in modern learning environments to prepare students for the demands of the workforce and future life. In the context of 21st-century skills, creativity involves generative thinking and the ability to produce substantial new ideas, which are considered essential indicators of global competence (Almulhim & Alharbi, 2023; Hsu & Wang, 2022).

Moreover, integrating creative thinking skills into learning has been proven to improve the quality of the learning process, as it allows students to solve problems, explore ideas, and connect theory with practice. In environmental issue-based learning, approaches that incorporate real-world and contextual elements can actively engage students, thereby enhancing deep understanding and creative thinking skills. Previous studies in various schools have shown that students involved in problem-based or project-based learning on environmental pollution topics demonstrate higher creative thinking abilities than those in conventional learning (Rahmawati & Prasetyo, 2021).

The national curriculum also emphasizes the importance of developing higher-order thinking skills, such as creativity and problem-solving, to support 21st-century competencies. This emphasis is supported by previous research showing that curricula oriented toward 21st-century skills significantly contribute to the development of students' creative thinking abilities as part of higher-order thinking skills (Dilekçi & Karatay, 2023). However, initial observations in several schools indicate that conventional teaching methods, which still dominate classroom practices, are not sufficient to stimulate students' creative thinking skills on environmental pollution topics. This is supported by research showing that students' creative thinking profiles in environmental change or pollution topics remain in the low to moderate category, particularly in indicators such as originality and elaboration (Wulandari & Putra, 2020).

Creative thinking is generally conceptualized through four main indicators: fluency, flexibility, originality, and elaboration, which remain widely applied in contemporary creativity research (Torrance, 2018). In addition to cognitive dimensions, creativity also encompasses non-cognitive factors such as curiosity, motivation, and the willingness to explore (Evans & Jirout, 2023). However, empirical studies in educational settings indicate that students' higher-order thinking skills, including creativity, are often not optimally developed, particularly in learning contexts related to environmental issues. Students' higher-order thinking skills tend to show limited development when learning is dominated by conventional instructional approaches, highlighting the need for socio-critical and problem-oriented learning strategies to foster critical and creative thinking skills (Purwanto et al., 2022). This condition suggests that creativity has not yet become a core strength within the national education system (Astuti et al., 2025; Fauzi et al., 2025).

This national-level condition is further reflected at the school level.Preliminary research conducted at a private junior high school in Bandung indicates that 48.1% of students experience difficulties in generating multiple ideas when solving problems related to environmental issues. Similar findings have been reported in various empirical studies, which show that students' creative thinking skills particularly fluency and flexibility tend to remain at a low to moderate level when learning activities are dominated by conventional, teacher-centered approaches (Aytaç & Kula, 2022; Ghaleb, 2024). Further studies in science and environmental education contexts reveal that instructional practices emphasizing rote learning and single-solution tasks limit students' opportunities to explore alternative ideas, propose innovative solutions, and engage in divergent thinking processes (Beghetto & Kaufman, 2014; Elvianasti & Amirullah, 2022). Recent research also confirms that the lack of contextual and problem-oriented learning experiences significantly contributes to students' difficulties in developing creative responses to real-world environmental problems, including pollution issues (Ghaleb, 2024; Permata et al., 2022).

Environmental pollution is a highly relevant and contextual learning topic that directly connects scientific concepts to students' everyday experiences. When taught through an issue-based approach, environmental pollution learning can foster creative and divergent thinking skills by encouraging students to analyze problems, formulate innovative solutions, and respond to real-world environmental and social challenges (Parker & Prabawa-Sear, 2019). This perspective aligns with the Merdeka Curriculum, which emphasizes the Pancasila Student Profile, where creativity is defined as the ability to

generate original ideas, develop innovative products, and apply flexible thinking in problem-solving (Hanik, 2024).

To support the development of students' creative thinking skills in environmental learning, an instructional model that integrates real-life experiences, observation, and reflection is required. One such model is the EMKONTAN learning model, a contextual approach that integrates problem-based learning syntax with direct engagement in local environmental issues (Husamah et al., 2024; Nurwidodo et al., 2023). The EMKONTAN model consists of six structured stages and is designed to promote active, collaborative, and reflective student involvement in identifying environmental problems, proposing solutions, and evaluating outcomes (Nurwidodo & Hindun, 2024). However, existing studies on the EMKONTAN learning model have predominantly focused on environmental literacy and collaborative skills, while empirical investigations examining its impact on students' creative thinking skills remain limited.

The application of the EMKONTAN learning model has not been extensively examined within environmental pollution learning contexts. Existing studies predominantly emphasize its contribution to students' environmental literacy and collaborative skills, while empirical investigations addressing its potential to enhance creative thinking skills remain scarce. This limitation highlights a clear research gap and underscores the urgency for further investigation as a continuation and refinement of prior studies. Therefore, the research problem of this study is formulated to examine how the implementation of the EMKONTAN learning model can enhance students' creative thinking skills in learning about environmental pollution.

METHODS

Research Design

The research was quasi-experimental, and the sample was divided into two groups, namely, the EMKONTAN learning model as the experimental group and conventional learning as the control group. The research variables included the EMKONTAN learning model as the independent variable (variable X) and students' creative thinking skills as the dependent variable (variable Y) (Vicol et al., 2024). The research design used in this study was a nonequivalent control group design, as presented in Table 1.

Table 1
Non-equivalent control group design

No	Group	Pretest	Treatment	Posttest
1	Experiment	O_1	X	O_2
2	Control	O_3	-	O_4

Note: O_1 represents the pre-test score of students' creative thinking skills in the experimental class, while O_2 represents the post-test score of students' creative thinking skills in the experimental class. O_3 denotes the pre-test score of students' creative thinking skills in the control class, and O_4 refers to the post-test score of students' creative thinking skills in the control class. The symbol X indicates the treatment administered to the experimental class in the form of the EMKONTAN learning model, whereas the symbol (–) indicates that the control class received conventional learning.

The research employed a non-equivalent control group design. As presented in Table 1, both the experimental and control classes were administered a pre-test prior to the implementation of the treatment and a post-test after the learning activities were completed. The experimental class received instruction using the EMKONTAN learning model, while the control class was taught using conventional learning methods. The learning treatment in the experimental class followed the stages of the EMKONTAN model, which include Socialization and Environmental Problem Observation, problem Identification and Analysis, action plan, action plan implementation, monitoring evaluation, and follow-up. The overall treatment procedure applied in this study is summarized in Table 2.

Table 2
Stage of EMKONTAN learning model

No	EMKONTAN Syntax	Learning Activity
1.	Socialization and Environmental Problem Observation	1. Students form groups and observe environmental issues. 2. The observations are recorded as initial data.
2	Problem Identification and Analysis	3. Students identify environmental problems from news or observations. 4. The causes are analyzed and classified into human and natural factors.

No	EMKONTAN Syntax	Learning Activity
3	Action Plan	5. Students create action plans collaboratively. 6. Plans are presented with outlined problem-solving steps.
4	Action Plan Implementation	7. Students implement their action plans. 8. Each group carries out the steps systematically
5	Monitoring and Evaluation	9. Students monitor and evaluate the problem-solving process. 10. They identify effective steps and areas needing improvement.
6	Follow-up	11. Students prepare a follow-up plan (RTL) from their activities. 12. They compile a final report on creativity and environmental problem-solving.

Modified from Nurwidodo & Hindun (2024)

The EMKONTAN learning model proposed by Nurwidodo & Hindun (2024) is employed in this study because it is theoretically grounded in constructivist learning and higher-order thinking skills frameworks and empirically designed to promote students' creative thinking skills. The model emphasizes contextual and problem-oriented learning activities that provide students with opportunities to generate multiple ideas, explore alternative solutions, and elaborate their thinking, which directly addresses the limitations of conventional teacher-centered instruction reported in previous studies (Beghetto & Kaufman, 2014; Sigit et al., 2019). Moreover, empirical evidence indicates that learning models integrating authentic environmental problems are more effective in fostering creative thinking skills than traditional approaches, particularly in environmental pollution topics that require divergent and innovative problem-solving (Permata et al., 2022; Purwanto et al., 2022). Therefore, EMKONTAN is considered highly relevant and appropriate for bridging the gap between curriculum demands for 21st-century skills and actual classroom practices (Nurwidodo & Hindun, 2024).

Population and Samples

The selection of the population and sample was conducted using a purposive sampling technique. The population consisted of 81 students from three 7th-grade classes at SMP Labschool UPI Kampus Cibiru, Bandung, in the academic year 2024/2025. Two classes were selected based on academic equivalence and pretest results to ensure comparable initial creative thinking abilities. Class VII-B, with 27 students, was designated as the experimental group, while Class VII-C, also with 27 students, served as the control group. The purposive technique was applied to select subjects with characteristics relevant to the research objectives (Kumara, 2018). The demographic characteristics of the selected research sample are presented in Table 3, while the sampling technique and group assignment of the experimental and control classes are summarized in Table 4.

Table 3
Demographic Characteristics of the Research Sample

Variable	Experimental Class (n= 27)	Control Class (n= 27)
Gender (Male/Female)	(14/13)	(13/14)
Age (Mean ± SD)	13.4 ± 0.5	13.4 ± 0.5
Pretest Score (Mean ± SD)	46.9 ± 11.9	46.8 ± 10.2

Table 4
Sampling Technique and Group Assignment

Aspect	Description
Population	All Grade VIII students at a junior high school in Bandung
Number of parallel classes	3 classes
Sampling technique	Purpossive sampling
Sample size	2 classes (54 students)
Group assignment	Random assignment
Experimental group	Class VII-B
Control Group	Class VII-C

Instrument

The instruments in this study included test and non-test instruments to measure students' creative thinking skills (Y) and monitor the implementation of the EMKONTAN learning model (X). The test instrument consisted of 15 essay-type items developed based on Torrance's creative thinking framework, which comprises four main indicators: fluency, flexibility, originality, and elaboration(Torrance, 2018). Students' responses were assessed using a 4–3–2–1 scoring rubric representing excellent, good, fair, and poor levels of performance (Kim, 2006). Non-test instruments included observation sheets structured according to the six stages of the EMKONTAN learning model to evaluate learning implementation and students' creative engagement during instructional activities, as well as questionnaires designed to capture students' reflections, learning engagement, and responses toward the EMKONTAN learning process.. All items underwent content validation by two biology education experts and a try-out to evaluate validity and reliability, with Cronbach's Alpha = 0.95, indicating very high internal consistency (Rosita et al., 2021).

Research Procedure

The research procedure consisted of three stages: preliminary, implementation, and final stages. In the preliminary stage, coordination was conducted with the school and a learning plan was prepared, followed by a trial of the research instruments with students outside the research sample and subsequent validation and reliability testing. The implementation stage began with determining the experimental and control classes, followed by a pre-test to measure students' initial creative thinking skills. The experimental class received learning using the EMKONTAN model, while the control class was taught using conventional methods, and both groups completed a post-test using the same instrument. The final stage involved data analysis using Mann–Whitney and N-Gain tests and interpreting the results to conclude the effectiveness of the EMKONTAN model in enhancing students' creative thinking skills. The research procedures are illustrated in Figure 1.

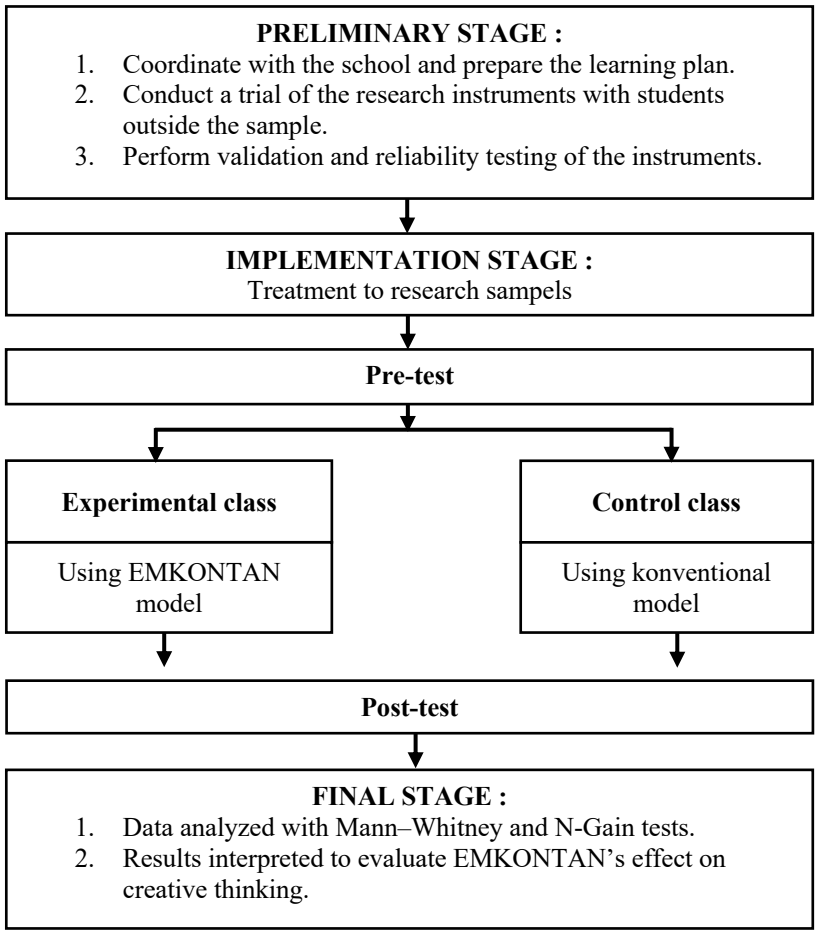

Figure 1. Research Procedures

Data Analysis Techniques

The analysis of learning implementation was conducted by calculating the percentage of classroom observation results, recorded using observation sheets for both teacher and student activities, scored with a Guttman scale (Supriadi, 2022; Widodo et al., 2023). Non-test instrument data, including observation sheets, were analyzed using descriptive percentages to evaluate the implementation of each stage of the EMKONTAN model.

Students' creative thinking skills were assessed through pretests and posttests, and the improvement was measured using the normalized gain (N-Gain) test to determine the relative increase in scores (Lestari & Yudhanegara, 2015). Before hypothesis testing, prerequisite analyses were conducted, including normality tests using the Kolmogorovor–Smirnov method and homogeneity tests using Levene's test (Lestari & Yudhanegara, 2015; Widodo et al., 2023). The results of the normality test are presented in Table 5.

Table 5
The Normality Test Results of the Creative Thinking Skills

Variable	Group		Sample (n)	Sig_{α}	$Sig_{statistic}$
Creative Thinking Skills	Experiment	Pretest	27	0.050	0.046
		Posttest	27	0.050	0.018
	Control	Pretest	27	0.050	0.022
		Posttest	27	0.050	0.008

The results of the normality test indicate that the pre-test and post-test data in both the experimental and control classes were not normally distributed. This is shown by the significance values that did not meet the normality criteria. Therefore, the data did not fulfill the assumption of normal distribution, and further analysis was conducted using non-parametric statistical tests. The next analysis was the variance homogeneity test, the results of which are presented in Table 6.

Tabel 6
Results of the Variance Homogeneity Test

Variable	Sig	Results
Creative Thinking Skills	0.832	0.832 > 0.05

The results of the homogeneity test presented in Table 6 show that the significance value is greater than 0.05. This indicates that the data from both the experimental and control groups have homogeneous variances. Since the normality assumption was not met, hypothesis testing was subsequently conducted using a non-parametric statistical test. Based on the results of the prerequisite tests, the significance of the EMKONTAN learning model's effect on students' creative thinking skills was examined using the Mann–Whitney U-test for non-parametric data. Effect size analysis using Cohen's d was subsequently performed to determine the magnitude of the treatment effect. In addition, students' questionnaire responses were analyzed descriptively using quantitative methods to capture feedback on the learning process.

RESULTS AND DISCUSSION

The analysis results of students' creative thinking skills in both the experimental and control groups are presented in Table 7.

Table 7
Results of Creative Thinking Skills

Data	Experiment Class		Control Class	
	Pretest	Posttest	Pretest	Posttest
Sampel (n)	27	27	27	27
Highest Score (Max)	65.00	98.00	70.00	97.00
Lowest Score (Min)	20.00	78.00	20.00	73.00
SD	12.00	7.00	10.00	7.00
Average	47.00	88.00	47.00	84.00
Category	Medium	High	Medium	High

The above data indicate that the pretest results of the experimental and control classes show comparable initial creative thinking skills, both categorized at a moderate level. A clearer distinction emerges in the posttest results, where the experimental class demonstrates better performance than the control class. These findings are in line with previous studies showing that contextual and problem-oriented environmental learning can effectively enhance students' creative thinking skills by engaging them in real-life problem solving and idea exploration(Purwanto et al., 2022). The greater improvement in the experimental group is further supported by the observation results, which demonstrate very good implementation of teacher and student activities across all learning stages, as presented in Table 8.

Table 8
Results of Observations of Teacher and Student Activities in Experimental Class

No	Stage	Object	Meeting	Mark(%)	Category	Mean	Category
1	Preliminary	Teacher	1st	100.00	Very Good	100.00	Very Good
			2nd	100.00	Very Good		
		Student	1st	87.00	Very Good	93.50	Very Good
			2nd	100.00	Very Good		
2	Core Activity	Teacher	1st	83.00	Very Good	91.50	Very Good
			2nd	100.00	Very Good		
		Student	1st	83.00	Very Good	81.50	Very Good
			2nd	80.00	Very Good		
3	Closing Activities	Teacher	1st	100.00	Very Good	100.00	Very Good
			2nd	100.00	Very Good		
		Student	1st	100.00	Very Good	100.00	Very Good
			2nd	100.00	Very Good		

The observation results in Table 7 show that the implementation of teacher and student activities during the learning process was carried out very well and consistently followed the stages of the EMKONTAN learning model. This finding is consistent with previous research indicating that structured learning models grounded in real-world environmental contexts and implemented through clear instructional stages can improve student engagement and support the development of higher-order thinking skills, including creative thinking, when learning activities are conducted as intended, thereby reinforcing the effectiveness of the treatment given in the experimental class (Dilekçi & Karatay, 2023; Sumarni et al., 2024).

Table 9
Results of the Mann–Whitney U Test

	Group	Sample (n)	Sig.
Creative Thinking Skills	Experiment	27	0.047
	Control	27	

Based on the results presented in Table 8, the Mann–Whitney U test shows a significance value (Sig. < 0.05), indicating a statistically significant difference between the experimental and control groups. This finding suggests that the implementation of the EMKONTAN learning model significantly affects students' creative thinking skills; therefore, H_0 is rejected. The greater improvement observed in the experimental group supports previous research indicating that instructional models integrating real-world problems and structured learning phases can effectively promote creative thinking by enabling students to generate original ideas and explore multiple solution pathways. Although the data were homogeneous (Sig. > 0.05), a non-parametric statistical test was applied because the data were not normally distributed (Nurwidodo, Wahyuni, et al., 2023; Susilowati et al., 2025). To further examine the magnitude of this improvement, the increase in students' creative thinking skills was analyzed using the N-Gain test, and the results are presented in Table 8.

Table 10
Results of N-Gain analysis comparing the experimental class and the control class

Variable	Group	N-Gain	Category
Creative Thinking Skills	Experiment	0.78	High
	Control	0.70	High

Table 11
Results of N-Gain Test for Creative Thinking Skill Indicators

Indicators of Creative Thinking Skills	Experiment Class		Control Class	
	N-Gain	Criteria	N-Gain	Criteria
Fluency	0,83	High	0,78	High
Flexibility	0,89	High	0,80	High
Originality	0,98	High	0,98	High
Elaboration	0,93	High	0,80	High
Mean	**0,91**	**High**	**0,84**	**High**

Data in Table 9 indicate that both the experimental and control groups achieved high N-Gain levels across all creative thinking indicators, demonstrating that learning activities in both classes contributed to the improvement of students' creative thinking skills. However, the experimental group consistently showed higher gains, indicating that the EMKONTAN learning model provided stronger support for creative thinking development through structured stages that encourage independent problem exploration, idea generation, and contextual analysis, as also reported in studies on environmentally oriented and student-centered learning (Álvarez-Huerta et al., 2021). This finding is further supported by research showing that learning models which emphasize contextual problems and active cognitive engagement are more effective in fostering creative thinking than guided conventional instruction, where opportunities for originality and flexible thinking remain relatively limited (Dilekçi & Karatay, 2023)

The effectiveness of the EMKONTAN model is also supported by the observation results of teacher and student activities during the learning process. Teacher performance showed consistent improvement throughout the learning stages, indicating clearer instruction, better classroom management, and more effective facilitation. Although student activity slightly fluctuated, the overall implementation of learning stages was categorized as very good. This finding aligns with previous studies stating that EMKONTAN is a valid and practical model for fostering creativity and environmental literacy through contextual and experiential learning (Nurwidodo et al., 2021; Pendas, 2024). Emotional engagement during the introductory phase also played a role in enhancing students' attention and motivation (Uno, 2023).

During the core learning activities, students were actively involved in observing and identifying environmental pollution problems in their school environment. Activities such as interviews, field observations, and problem analysis trained students to generate questions, organize information, and establish cause-and-effect relationships (Baek, 2023). These processes support meaningful learning and analytical thinking, although some students still require guidance in structuring arguments and expressing ideas confidently. The need for scaffolding in this stage indicates that continuous feedback and modeling remain important in optimizing students' creative thinking development (Arfida et al., 2024).

In the planning and implementation stages, students demonstrated creativity by proposing practical solutions to environmental problems, such as designing simple water filters, organizing waste management systems, and creating environmental campaign media(Mejía-Villa et al., 2023). These activities required students to apply flexibility and originality in adapting ideas to real conditions. However, differences in collaboration quality among groups affected the depth of the solutions produced, suggesting that collaborative skills play a crucial role in maximizing creative outcomes (Pratiwi, 2023).

The improvement in creative thinking skills was further reinforced by the experiential nature of the EMKONTAN model, which positions students as active participants in learning, allowing them to engage with authentic environmental problems and reflect on their experiences to construct deeper understanding(Sevimli-Celik & Güvelioglu, 2026). Experiential learning emphasizes hands-on,

collaborative, and reflective activities that significantly enhance students' creative thinking and problem-solving skills by connecting theory to real-world contexts, thereby promoting cognitive engagement, intrinsic motivation, and creative confidence(Doğantan, 2023). Additionally, structured experiential activities such as problem analysis, action planning, and solution design create opportunities for students to generate and refine ideas, enhancing their creative potential more effectively than traditional teacher-centered approaches(Quibrantar & Ezezika, 2023). Research indicates that collaborative, hands-on learning activities within experiential frameworks lead to substantial gains in creative thinking, as students negotiate challenges, reflect on feedback, and build innovative responses through active participation (Li & Yu, 2025).

In contrast, the control class showed relatively lower improvement in creative thinking skills. This condition may be attributed to learning activities that provided fewer opportunities for exploration and real-world problem solving. Conventional approaches tend to focus on content delivery rather than contextual application, limiting students' opportunities to develop divergent and creative thinking (Utami & Haris, 2024).

Further analysis based on creative thinking indicators revealed that originality showed the highest improvement in both groups, particularly in the experimental class. Students demonstrated original thinking by generating unique ideas and contextual solutions related to environmental pollution issues. This finding supports previous studies stating that learning environments that allow idea exploration and solution design can enhance students' originality (Nurlaelah & Mulyani, 2023; Rahmat & Yuliana, 2024).

Originality emerged as the strongest indicator in both classes because learning activities that engage students in open-ended idea generation and real-world problem solving inherently emphasize the production of unique and novel responses. Research shows that originality plays a central role in predicting creative activity and accomplishment when multiple divergent thinking dimensions interact in educational contexts (Tang et al., 2025) , and that pedagogical innovations oriented toward contextual and exploratory learning consistently reinforce originality as a key dimension of creative performance in students (Runco & Alabbasi, 2024). Moreover, studies indicate that originality often interacts with other divergent thinking facets such as fluency and flexibility to drive overall creative achievement, supporting its prominence when students are prompted to generate distinctive and meaningful solutions (Álvarez-Huerta et al., 2021).

The elaboration indicator also showed substantial improvement, reflected in students' ability to explain problems and solutions in detail through worksheets and action plans. Learning activities that required in-depth analysis and systematic explanation facilitated students' elaboration skills (Sari & Marlina, 2022; Wicaksono & Suhartini, 2023). Meanwhile, flexibility showed moderate improvement, indicating that students were beginning to view problems from different perspectives, although solution diversity remained limited. This suggests the need for learning strategies that further encourage multi-perspective exploration (Setyawati & Firmansyah, 2023).

The fluency indicator showed the lowest improvement among the four indicators. Students were able to propose solutions, but the number and variation of ideas were still limited. This indicates that students require more structured opportunities for idea generation, such as brainstorming and open-ended questioning, to strengthen divergent thinking skills. This finding is consistent with studies emphasizing that fluency develops through free idea exploration and supportive learning environments (Oktaviani & Kurniawan, 2023; Vygotsky, 2023).

Overall, the discussion confirms that the EMKONTAN learning model effectively enhances students' creative thinking skills by integrating contextual learning, experiential activities, and real environmental problem solving. Although the model shows strong potential, aspects such as collaboration, flexibility, and idea fluency still need further strengthening to optimize students' creative thinking development.

CONCLUSION

Based on the research findings, it can be concluded that the EMKONTAN learning model is effective in improving students' creative thinking skills in environmental pollution learning. This improvement is indicated by the high N-gain category, with the highest contribution found in the originality and elaboration indicators. The implementation of EMKONTAN was carried out consistently and showed a high level of learning implementation, supporting meaningful and contextual learning

experiences. These results indicate that EMKONTAN is a relevant learning model for fostering creative thinking skills in science learning contexts and can be applied to other topics that require creativity and problem-solving skills.

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