The Influence of Creative Thinking and Collaboration Skills on the Learning Outcomes of Students of Integrated Islamic Junior High School Nurul Ilmi Jambi: Environmental Pollution Material Perspective

Abstract:

Creative thinking and collaboration skills are essential in supporting a person's success, especially in learning. This study aims to determine the effect of creative thinking skills and collaboration on the learning outcomes of Nurul Ilmi Integrated Islamic Middle School Jambi students. The population in this study was 286 students of Nurul Ilmi Integrated Islamic Middle School, divided into ten classrooms. The sample used was 100 people, who were taken randomly. The approach used in this study is quantitative descriptive. Data in this study were collected through test techniques. The three variables in the study were measured through tests. Data analysis was carried out using the F test. Both tests were carried out with the help of SPSS 25. Based on the data obtained and the analysis results at the end of this study, there is a significant influence between the variables of creative thinking and collaboration skills on learning outcomes, with an influence of 50.8%. In addition, the test results also show that both variables X1 and X2 affect Y. Thus, the final result of this study is that there is a significant influence between creative thinking skills and collaboration skills on student learning outcomes. The test results also show that the three variables are closely related and influence each other individually and together.

Keywords: Creative thinking, collaboration skills, learning outcomes, environmental pollution

Introduction

One of the essential goals of education is to train thinking skills through a learning process. Thinking activities will develop students' knowledge and skills by seeking as much information as possible to analyze, synthesize, and evaluate the knowledge so that they can make generalizations (Kadrija et al., 2023; Uliyanti et al., 2024). Zhang (2022), O'Reilly et al. (2022), and Muhajarah (2022) state that thinking skills are mental skills that combine intelligence and experience. Experience is closely related to what is seen, heard, felt, and experienced by students. Thus, various materials presented in learning activities are media and stimuli for students to train their thinking. Therefore, using various materials and media in learning is a means to help students develop their thinking abilities.

One of the thinking skills that often gets attention from experts is the ability to think creatively. Haerunisa et al. (2021) and Bashir (2022) stated that individuals must be able to think creatively in this era of globalization. In addition, Fatmawati et al. (2019) and Triwahyuni and Abdul (2024) also said that creative thinking needs serious attention because it is one of the essential skills in the 21st century that supports academic and professional success. The same thing was also conveyed by Nishfi (2022) and Utomo Aji et al. (2024), who stated that one of the essential skills that must be taught to students is the ability to think creatively. According to Borodina et al. (2019), the ability to think creatively is classified as a high-level thinking skill. Thus, it can be understood that the ability to think creatively is an essential element in preparing students for success in the future.

Creative thinking is a way that students need to be able to build ideas that can be applied in life, especially during the learning process (Alam, 2019; Gulnaz, 2020; Urban et al., 2021). In addition, Utomo Aji et al. (2024) also

said that students can find various ideas and solutions to problems with creative thinking skills. According to Ebe (2022), He & Chiang (2024), and Falloon (2024), creative thinking skills can be demonstrated through several indicators, namely (a) being able to propose new ideas, (b) asking questions, (c) daring to experiment, (d) designing strategies. Theoretically, creative thinking skills have four essential components, including (a) fluency, (b) flexibility, (c) originality, and (d) elaboration (Saidah et al., 2024).

In addition to creative thinking skills, collaboration skills are an essential factor in the learning process. Karimi and Farivarsadri (2024) and Ifada et al. (2024) stated that collaboration skills are critical in improving students' knowledge and achieving learning success. Cherbonnier et al. (2024), Jaswal & Behera (2024), and Ruhmawati et al. (2024) also said that collaboration skills can improve learning outcomes during learning activities, students can work together with other goals can work together in different groups or with different individuals. Thus, collaboration skills have the potential to increase a person's chances of achieving the peak of success is collaboration skills.

Theoretically, collaboration skills are skills for working with others to achieve common goals. Haryanti et al. (2024) and Jurkowski and Abramczyk (2024) define collaboration skills as interacting with others to participate, discuss, and compromise to achieve the desired goals. Rizky et al. (2024) define collaboration skills as activities carried out by two or more people with the same goal to complete a task within a certain period. Thus, these collaboration skills help students reach agreements and common goals more quickly. Therefore, learning must be oriented towards efforts to improve collaboration skills to ensure that each student can work together to achieve common goals as well.

Practically, indicators that show collaboration skills, according to Hong & Thi (2024) and Haryanti et al. (2024), include actively participating in every group activity, working productively, showing self-flexibility, prioritizing group interests, showing an attitude of respect and responsibility. Therefore, it can be understood that collaboration skills allow students to achieve success more quickly, effectively, and efficiently because they get support from the surrounding environment. According to Fawwaziara et al. (2024), collaboration skills can be measured through five indicators, namely: 1) positive interdependence, 2) face-to-face interaction, 3) being responsible, 4) communication skills, and 5) ability to work in groups. Thus, in this study, the measurement of collaboration capabilities is based on the indicators above.

Another factor that is the focus in the learning process is learning outcomes, especially in the context of mastering the concept of teaching materials or, in this case, often referred to as cognitive abilities. Putra et al. (2024) state that students' cognitive abilities include knowledge, understanding, application, analysis, synthesis, and evaluation. The same thing was also conveyed by Suprihatien et al. (2024) that there are four categories in the cognitive knowledge dimension: factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge. Meanwhile, the cognitive process dimension is divided into six levels: Remembering, understanding, applying, analyzing, evaluating, and creating. These abilities can be measured in two ways, namely subjective and objective tests (Suprihatien et al., 2024).

Based on the description above, it can be understood that creative thinking skills, collaboration skills, and mastery of concepts or learning outcomes are products of the learning process. In other words, these three variables are interrelated and bound in teaching and learning activities. However, it is not more about how strongly the three variables influence each other. This research has never been done in SMP Islam Terpadu Nurul Ilmi. Information related to the interconnectedness between the three variables is essential. In addition to being used to optimize the three variables by teachers, this information can also be used to design an accurate learning model so that the process of optimizing the three variables to support student success can run better. Therefore, research should provide information related to the influence of creative thinking and collaboration skills on student learning outcomes, especially from the perspective of science learning on environmental pollution.

Method

This study uses a quantitative descriptive approach: the data is collected in numbers and then described narratively. Data collection techniques are carried out by testing. Tests are carried out on all samples in the study to measure creative thinking skills, collaboration skills, and student learning outcomes from the perspective of environmental pollution material. The population in this study was 286 students of SMP Islam Terpadu Nurul Ilmi, divided into ten classrooms. The sample used was 100 from the entire population taken randomly. The test instrument used in the study was in the form of multiple-choice test questions for the learning outcome variable totaling 30 items focused on the abilities: (a) knowledge, (b) understanding, (c) application, (d) analysis, (e) evaluation, and (f) creativity. Therefore, each cognitive indicator is measured with five test questions. Thus, the minimum score for the learning outcome variable is 0, and the maximum score is 30 for the creative thinking ability variable with four indicators, namely (a) being able to propose new ideas, (b) asking questions, (c) daring to experiment, (d) designing strategies. Each indicator is measured with five questions. Thus, for the creative thinking ability variable, the minimum score is 20, and the maximum score is 100. The collaboration ability variable with indicators: (a) positive interdependence, (b) face-to-face interaction, (c) being responsible, (d) communication skills, and (e) ability to work in groups. Each indicator is measured with four questions so that the minimum score is 20 and the maximum score is 100. The variables of creative thinking and collaboration ability are measured using a questionnaire. Scoring is done using a Likert scale. Data analysis was carried out using the R, F, and T-tests. Both tests were carried out using SPSS 25. The use of SPSS software in research is done with the consideration that data analysis can be done more accurately and quickly. The accuracy of the data analysis can minimize the possibility of errors occurring.

Result and Discuss

Based on the measurement results for each variable (measurements were carried out after the implementation of science learning on environmental pollution). This was done considering that each instrument used in the study used the material as its perspective. The measurement results for the three variables were then analyzed and categorized into three groups, namely: "high," "medium," and "low." In general, the results of the analysis can be seen in Table 1 below:

Table 1. Classification and Category of Measurement Results for Each Variable

Variable	Range of Score	Category	Number of respondents	Percentage
Creative thinking	76-100	High	37	37
	51-75	Medium	48	48
	20-50	Low	15	15
Total			100	100
Average	73,83	Medium		
Collaborative	76-100	High	39	39
	51-75	Medium	42	42
	20-50	Low	19	19
Total			100	100
Rata-rata	74,51	Medium		
Learning outcomes	21-30	High	29	29
	11-20	Medium	51	51
	0-10	Low	20	20
Total			100	100
Average	19,64	Medium		

Based on Table 1 above, the creative thinking ability of students who obtained a "high" category score was 37%. Students who obtained a "medium" category score were 48%, and students who obtained a "low" category score were 15%. The average score for creative thinking skills was 73.83, with a "medium" category.

As for the collaborative ability variable, students who obtained a "high" category score were 39%. Students who obtained a "medium" category score were 42%, and students who obtained a "low" category score were 19%. The average score for collaborative ability was 74.51, with a "medium" category. The results of the measurement of the learning outcome variable, students who obtained a "high" category score were 29%, students who obtained a "medium" category score were 51%, and students who obtained a "low" category score were 20%. The average score for the learning outcome variable was 19.64, with a "medium" category.

Furthermore, a correlation test was carried out to determine the effect of creative thinking and collaboration ability. The results of the correlation test with SPSS 25 obtained data as in Table 2 below:

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.713[a]	.508	.498	16.336

As Table 2 above, the correlation value between the creative thinking variable and collaboration ability on learning outcomes is 0.713 with a significant category. Furthermore, based on the R square value of 0.508, variables X1 and X2 contribute to Y by 50.8% each. Therefore, the creative thinking variable and collaboration ability influence learning outcomes, with an influence of 50.8%.

Furthermore, an F test was carried out to find out whether variables X1 (creative thinking ability) and X2 (collaboration ability) affect Y. The test results with SPSS 16 can be seen in Table 3 below:

Table 3 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	26738.630	2	13369.315	50.098	.000[a]
	Residual	25885.960	97	266.866		
	Total	52624.590	99			

a. Predictors: (Constant), Creative Thinking, Collaboration

b. Dependent Variable: Learning outcomes

Based on Table 3 above, it can be seen that the sig. Value on the tested sample obtained a value of 0.000 <0.05, indicating that both variables X1 and X2 affect Y. Furthermore, a significance test is carried out to determine how significant the influence of variables X1 and X2 is on Y. In this study, a T-test was carried out, assisted by SPSS 16 software. The test results can be seen in Table 4 below:

Table 4 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.217	6.461		2.820	.006
	Creative Thinking	.538	.209	.523	2.576	.012
	Collaboration	.219	.224	.199	.977	.031

a. Dependent Variable: Learning outcomes

Based on Table 4 above, it can be seen that in the creative thinking ability test, the sig. The value is 0.012, which means <0.05, so it can be said that there is a significant influence between creative thinking ability and

learning outcomes. As for the collaboration ability test, it was obtained 0.031 <0.05. This shows that collaboration ability has a significant effect on student learning outcomes. Thus, the final result of this study is that creative thinking and collaboration ability significantly influence student learning outcomes. The test results also show that the three variables are closely related and influence each other individually and together. As the data that has been obtained and the analysis that has been carried out Based on the data that has been obtained and the results of the analysis at the end of this study, it can be concluded that there is a significant influence between the creative thinking variable and collaboration ability on learning outcomes, with an influence of 50.8%. In addition, the test results also show that both variables X1 and X2 affect Y. The results of the study are in line with the findings of previous studies, namely that creative thinking ability affects student learning outcomes. Several studies related to this, for example, were conducted by Sahwari (2021), which found that creative thinking skills affect students' mathematics learning outcomes. Laruli (2019) also found that creative thinking skills significantly affect students' learning outcomes.

In addition, the final results of this study also stated that collaboration skills significantly influenced student learning outcomes. These results are in line with previous studies, for example, research conducted by Ifada et al. (2024) that collaboration skills positively impact student learning outcomes. Marita et al. (2023) also said that collaboration skills are closely related to learning outcomes or achievements. Thus, the study's results have contributed to strengthening the results of previous studies.

Furthermore, other test results also show that the three variables are closely related and influence each other individually and together. This indicates that changes in ability in one variable can cause changes in other variables. Thus, if a teacher focuses on improving specific abilities among the three variables, it will be followed by changes in other variables.

Given that the three variables are important elements in supporting student success in the future, teachers need to take systematic steps to improve all of these variables. To improve creative thinking skills, teachers can do this by using learning models that stimulate the growth and development of creativity, for example, the Two Stay Two Stray cooperative learning model (Pratiwi et al., 2024), the PENA learning model (Wafa Naziah, 2024), using the project-based learning model (Aulia Irvana, 2024). As for collaboration skills, teachers can improve these skills by using the PjBL learning model (Desyarti, 2019; Ifada et al., 2024; Ruhmawati et al., 2024), Using Gallery Walk (Rizky et al., 2024), using the guided inquiry learning model (Sarifah & Nurita, 2023), and using the PBL learning model (Fawwaziara et al., 2024). Using these learning models, in addition to improving creative thinking and collaboration skills, also has the potential to improve students' abilities in other areas.

At the end of the study, it is recommended that teachers, especially at Nurul Ilmi Integrated Islamic Junior High School, proactively develop students' creative thinking and collaboration skills more seriously and enthusiastically. Considering that each student in each educational unit has different characteristics, the development of the student's creative thinking and collaboration skills should also be done differently.

According to several studies, one effort to develop students' creative thinking and collaboration skills accurately should start with accurate measurements or assessments of these abilities. More accurate learning plans can be developed according to needs through accurate measurements or assessments. Van Loon (2019), Wang et al. (2019), Yambi (2020), and Gladovic et al. (2024) state that assessment is an essential part of the learning process and in improving the quality of education in general. Therefore, developing assessments can be the best alternative for improving these two variables.

Further research is also needed to learn more about the creative thinking and collaboration skills of junior high school students. This research needs to provide a different perspective and enrich scientific sources to improve the quality of education in Indonesia in general.

Conclusion

Based on the data obtained and the analysis results at the end of this study, there is a significant influence between the variables of creative thinking and collaboration skills on learning outcomes, with an influence of 50.8%. In

addition, the test results also show that both variables X1 and X2 affect Y. Thus, the final result of this study is that there is a significant influence between creative thinking skills and collaboration skills on student learning outcomes. The test results also show that the three variables are closely related and influence each other individually and together.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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