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Integrated Science Learning with Connected Model Based on Ethnoscience to Enhance the Creative Thinking Dimension of Pancasila Student Profile

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Abstract

This study aims to analyze the effectiveness of integrated science learning using a connected model based on ethnoscience to improve the Pancasila Student Profile, particularly in the creative thinking dimension. A quantitative approach with a quasi-experimental method was employed. The research sample consisted of 30 eighth-grade students from MTs Ma'arif Garung, divided into experimental and control groups. Research instruments included pretests, posttests, observation sheets, and interviews. Data analysis was conducted using t-tests and N-Gain analysis with SPSS software. Results indicated that the average N-Gain score for the experimental class reached 60%, categorized as effective, while the control class scored 42.3%. The t-test yielded a significance value of 0.000 (<0.05) and a t-value of 3.846 (>t-table 2.074), indicating that the ethnoscience-based connected learning model effectively enhanced students' creative thinking skills.

Keywords: Connected; Creative thinking; Ethnoscience; Integrated science; Pancasila student profile

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INTRODUCTION

The 21st century has ushered in the era of the Fourth Industrial Revolution, demanding students to develop competencies in various fields to compete globally. These competencies include critical thinking and problem solving, creativity and innovation, communication, and collaboration. Teachers are also expected to demonstrate creativity and innovation, particularly in their teaching methods within the school environment (Mardiyah et al., 2021). These 21st-century skills are crucial not only in academic contexts but also as foundational capabilities for students to adapt to the dynamic changes of modern times (Saputri & Herman, 2022).

The Pancasila Student Profile, as outlined in the Ministry of Education and Culture's vision under Regulation No. 22 of 2020 regarding the Strategic Plan for 2020-2024, describes Indonesian learners as lifelong learners with global competencies who act according to Pancasila's values. This profile encompasses six main characteristics: having faith and piety towards God Almighty, demonstrating noble character, respecting diversity, practicing cooperation, being independent, thinking critically, and being creative. Galuh and Dewi (2021) suggest that implementing Pancasila values includes adhering to religious teachings, living with tolerance, practicing social care, and maintaining courtesy. These characteristics align closely with the practical implementation described in their study (Sriwijaya, 2023). As Indonesia is a religious nation, character education rooted in culture, religion, and Pancasila plays a pivotal role in embedding Pancasila values within society through education (Susilawati, Sarifudin, & Muslim, 2021).

Creative thinking (creativity and innovation) is a vital skill in the era of the Fourth Industrial Revolution to navigate rapid and dynamic changes (Darwanto, 2019). This skill requires a critical mindset to generate new ideas. Four aspects define creative thinking: fluency (the ability to generate many ideas), flexibility (the ability to think divergently), originality (the ability to create unique ideas), and elaboration (the ability to refine or expand ideas) (Goran et al., 2021).

Integrated learning is an approach that connects and integrates teaching materials within or across subjects, considering children's development, needs, interests, and social as well as familial demands (Sunaryati, Subekti, Lukito, & Sari, 2024). Trianto (2014) explains that integrated learning allows students to gain hands-on experiences that strengthen their ability to acquire, retain, and apply learned concepts. This approach encourages holistic, meaningful, authentic, and active learning processes.

Fogarty (1991) proposed ten models for implementing integrated learning, including fragmented, connected, nested, sequenced, shared, webbed, threaded, integrated, immersed, and networked. This study focuses on the connected model, which explicitly links different topics and concepts, relating one subject matter to another, and connecting current learning activities with future tasks. The connected model ensures a deliberate effort to establish interconnections within a subject, recognizing that students may not automatically see these relationships. Teachers play a crucial role in facilitating these connections, progressively inte

The erosion of ancestral cultural heritage due to the influx of foreign cultures through electronic media poses a significant challenge. Ethnoscience is a learning model based on observations of local wisdom. Indonesia's cultural and social diversity offers a robust foundation for linking local scientific knowledge to science education (Nurhasnah, Azhar, Yohandri, & Arsih, 2022). Traditions and local wisdom can define a region's identity, and education can serve as a medium to introduce these cultural elements to future generations. The integration of culture, traditions, and community practices into the learning process, learning resources, and media is essential (Idrus, 2022). Thus, ethnoscience utilizes local cultural resources, processes, and materials in educational contexts.

This study aims to evaluate the effectiveness of integrated science learning using the connected model based on ethnoscience in enhancing the Pancasila Student Profile, particularly in the creative thinking dimension. By integrating local cultural aspects into the learning process, it is expected to strengthen students' understanding of scientific concepts and foster the creative thinking skills essential for navigating contemporary challenges.

The hypothesis of this research posits that integrated science learning using the connected model based on ethnoscience can enhance the Pancasila Student Profile in terms of students' creative thinking. The integration of local cultural values and scientific knowledge is believed to positively impact students' creative thinking abilities, enriching their learning experiences and stimulating their creativity and innovation.

METHODS

This study employed a quantitative approach with a quasi-experimental field research design. The sampling was conducted using purposive sampling, where participants were selected based on specific criteria (Rifka Agustianti, 2022). The

research subjects included all eighth-grade students of MTs Ma'arif Garung during the 2024/2025 academic year. The population was divided into two groups: an experimental class and a control class, each consisting of 30 students. The experimental class received integrated science learning using the connected approach based on ethnoscience, while the control class was taught using conventional methods.

Data collection utilized various instruments, including pretests and posttests to assess students' creative thinking abilities, observation sheets to document classroom activities, interviews to gather qualitative insights, and documentation to support the study's findings. The pretest and posttest were designed to evaluate four dimensions of creative thinking: fluency, flexibility, originality, and elaboration (Luluk Rachmatul Yasiro, 2021). Observational data provided an additional layer of understanding about how the connected and ethnoscience-based approach influenced classroom dynamics and student engagement.

Hypothesis testing was conducted using t-tests and N-gain analysis, with the assistance of SPSS software to ensure accurate statistical analysis. The t-test assessed significant differences between the experimental and control groups, while the N-gain analysis measured the improvement in students' creative thinking abilities. These methods were selected to determine the effectiveness of the connected and ethnoscience-based integrated science learning approach in enhancing the creative thinking dimension of the Pancasila Student Profile.

RESULTS AND DISCUSSION

The implementation of integrated science learning using the connected model based on ethnoscience was conducted in Class VIII.A, which served as the experimental group, while Class VIII.B acted as the control group, following conventional teaching methods. The learning process in the experimental class began with the teacher greeting students, leading a collective prayer, checking attendance, inquiring about their well-being, and providing motivational encouragement. Subsequently, the teacher explained the learning objectives, outlined the steps of the lesson, and conducted an initial engagement activity (aperception). To commence the core activity, Class VIII.A students were given a pretest comprising ten essay questions to assess their initial understanding of the concept of force. The integrated science learning in the experimental class employed a connected approach based on ethnoscience.

In the initial phase, the teacher engaged students in a discussion using a question-and-answer session about the concept of force in daily life, linking it to local cultural practices such as traditional seesaws. Students were then divided into groups to conduct simple experiments on the effects of force on traditional tools and to gather additional references. Following the experiments, the groups presented their findings. The session concluded with a collaborative summary of the material by the teacher and students, followed by a posttest to assess learning outcomes.

The learning activities ended with additional motivational remarks, a closing prayer, and farewell greetings. The control class, Class VIII.B, employed a traditional teaching approach without any specific interventions. Activities included direct instruction through lectures, note-taking, and examples drawn from daily life. Similar to the experimental class, students in the control group were administered

pretests and posttests comprising ten essay questions at the beginning and end of the learning process. Pretest results for both the experimental and control classes are illustrated in Figure 1.

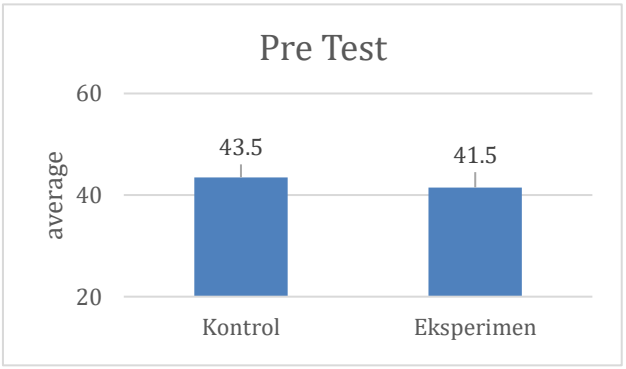

Figure 1. Average pretest scores of the experimental and control classes

The initial creative thinking abilities of students in the experimental and control classes demonstrated average scores of 41.5 and 43.5, respectively, indicating that the baseline conditions of both classes were relatively equivalent. The highest score in the experimental class reached 55, while the control class's highest score was 60. Conversely, the lowest score in both the experimental and control classes was 30.

Subsequently, a posttest was conducted to determine whether there was an improvement in the students' creative thinking skills in both the experimental and control classes. The average posttest scores of the two classes are presented in Figure 2.

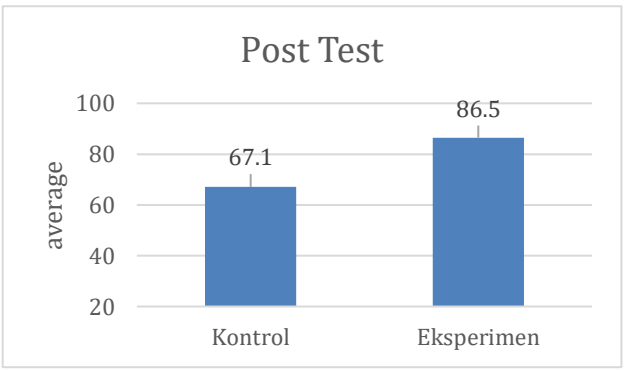

Figure 2. Average posttest scores of the experimental and control classes

After the intervention, the posttest scores of the experimental class were significantly higher compared to the control class. The average creative thinking skills score of students in the experimental class reached 86.5, whereas the control class achieved an average score of only 67.1. The highest score in the experimental class was 100, while the highest score in the control class was 80. Conversely, the lowest scores were 70 for the experimental class and 50 for the control class. An analysis of students' creative thinking skills based on each aspect in both classes is presented in the following diagram.

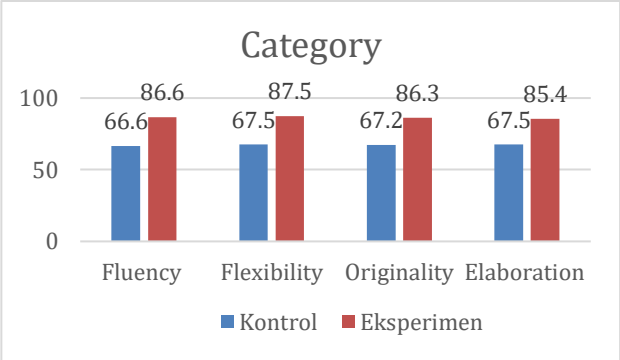

Figure 3. Analysis of students' creative thinking skills by aspect

Based on Figure 3, the average scores obtained by the experimental class for the aspects of fluency, flexibility, originality, and elaboration were 86.6%, 87.5%, 86.3%, and 85.4%, respectively, categorized as highly creative. In contrast, the control class achieved average scores of 66.6%, 67.5%, 67.2%, and 67.5%, respectively, categorized as creative. For the additional aspect, the scores of the experimental and control classes were 79.5% and 72.3%, respectively, both categorized as creative. Overall, the highest creative thinking achievement was observed in the fluency aspect, with a score of 82.4%, indicating that students could analyze a problem from various perspectives.

The data analysis was conducted through several stages, including initial analysis, prerequisite testing, hypothesis testing, and follow-up testing.

Normality Test

Table 1. Results of normality test analysis

Kolmogorov-Smirnov[a]				
Class		**Statistic**	**df**	**Sig.**
Control	Pre Tes	0.131	30	0.198
	Post Tes	0.121	30	0.200*
Exsperiment	Pre Tes	0.101	30	0.200*
	Post Tes	0.131	30	0.198

The students' learning outcomes were tested for normality using SPSS software. The purpose of the normality test was to determine whether the collected data followed a normal distribution. In this study, the Liliefors test method was employed, which is appropriate for research with small sample sizes (Dauli, 2019). The test was conducted at a 5% significance level, and the results indicated that the data were normally distributed. This was evidenced by significance values of 0.198, which exceeded the threshold of 0.05 in several tests, such as 0.200 > 0.05, 0.200 > 0.05, and 0.198 > 0.05.

Homogeneity Test

The homogeneity test aimed to assess whether the samples drawn from the population exhibited uniformity or shared similar characteristics (Usmadi, 2020). In this study, the homogeneity test was conducted using the F-test method at a 5% significance level. The results of the test are presented in Table 2.

Table 2. Result homogeneity test

		Levene Statistic	Sig.
Learning outcome	Based on Mean	1.209	0.310

The F-value was calculated as 1.209 with a significance level of 0.310. Since the significance value of 0.310 exceeds 0.05, the data are deemed homogeneous. After confirming homogeneity, the next step was to perform an independent sample t-test.

Hypothesis Testing

Hypothesis testing was conducted using the independent sample t-test. This test aimed to evaluate the effectiveness of the connected model based on the ethnoscience approach applied to the topic of force. The t-test assessed whether there was a statistically significant difference in creative thinking skills between students in the experimental and control groups, determining the impact of the innovative teaching approach.

Table 3. Result t-test

		t	Sig. (2-tailed)	Mean Diff.	SE Diff.
Mark	Equal variances assumed	3.846	0.000	9.41667	2.44837
	Equal variances not assumed	3.846	0.000	9.41667	2.44837

Based on the calculations, the obtained significance value was 0.000, which is less than 0.05. Additionally, the calculated t-value (t = 3.846) exceeded the critical t-value (t = 2.074). Therefore, the null hypothesis (H0) was rejected, and the alternative hypothesis (H1) was accepted, indicating that the integrated science learning model with the connected approach based on ethnoscience was effective in enhancing students' creative thinking skills.

N-Gain Test

The N-Gain test was employed to measure the improvement in students' creative thinking skills. The detailed results of the N-Gain analysis are presented in Table 4.

Table 4. Results of the gain test

Class	Average N-Gain (%)	Critria
Exsperiment	60%	Moderate
Control	42,3%	Sedang

The average N-Gain score for the experimental class reached 60%, categorized as moderate, while the control class scored 42.3%, also in the moderate category. This indicates that the integrated science learning model with a connected approach based on ethnoscience was more effective compared to conventional teaching methods.

In conclusion, the implementation of the integrated science learning model with a connected ethnoscience approach significantly improved students' creative thinking skills. The results of the independent sample t-test for the experimental and

control classes showed a calculated t-value (t = 3.846) greater than the critical t-value (t = 2.074) at a 5% significance level, confirming the acceptance of H1. This model proved effective in enhancing the creative thinking skills of Grade VII students at MTs Ma'arif Garung in the science subject, particularly on the topic of force.

A substantial improvement in creative thinking skills was observed in the experimental class following the intervention. The N-Gain test results indicated a score of 60% for the experimental class, categorized as moderate, while the control class scored 42.3%, also in the moderate category. These findings reinforce the effectiveness of the integrated science learning model with a connected ethnoscience approach over conventional teaching methods.

However, this study has some limitations, such as the sample size being limited to 30 participants, which may not be sufficiently representative of broader conditions. Future research is recommended to employ longitudinal data and further refine this model by incorporating additional research variables.

CONCLUSION

Based on the findings, the integrated science learning model with a connected ethnoscience approach proved to be effective in enhancing the creative thinking skills of Grade VIII students at MTs Ma'arif Garung. This was evidenced by an average N-Gain score of 60% in the experimental class, categorized as moderate. Furthermore, the t-test results showed a significance value of 0.000 and a calculated t-value of 3.846, which exceeded the critical t-value. Thus, this learning model had a significantly positive impact compared to conventional teaching methods.

RECOMMENDATION

Teachers are encouraged to adopt the integrated science learning model with a connected ethnoscience approach to enhance students' creative thinking skills, particularly by integrating local culture into the learning materials. This study serves as a valuable reference for further development of ethnoscience in integrated learning, offering a basis for broader application in various educational settings. Future research should aim to expand the scope by involving larger sample sizes and incorporating additional variables to yield more comprehensive and generalizable results.

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REFERENCES

Darwanto, D. (2019). Kemampuan Berpikir Kreatif Matematis: (Pengertian dan Indikatornya). *Eksponen*, *9*(2), 20–26.

Dauli, N. (2019). *Metodologi Penelitian Kuantitatif*. Yogyakarta: CV Budi Utama.

Fogarty, R. (1991). *The Mindful School: How to Integrate the Curricula*. Illinois: Skylight Publishing.

Goran, M. B., Kaleka, M. B. U., & Daud, M. H. (2021). Profil Kemampuan Berpikir

Kreatif Fisika Siswa Kelas X SMA Negri 1 Demon Pagon Flores Timur. *Jurnal Pendidikan Fisika*, *5*(6), 113-121.

Idrus, S. W. Al. (2022). Implementasi STEM Terintegrasi Etnosains (Etno-STEM) di Indonesia: Tinjauan Meta Analisis. *Jurnal Ilmiah Profesi Pendidikan*, *7*(4), 2370–2376. https://doi.org/10.29303/jipp.v7i4.879

Mardiyah H. R., Aldriyani, C. & Zulfikar R. M., (2021). Pentingnya Keterampilan Belajar di Abad 21 sebagai Tuntutan dalam Pengembangan Sumber Daya Manusia. *Jectura: Jurnal Pendidikan, 71*(1), 63–71.

Nurhasnah, N., Azhar, M., Yohandri, N., & Arsih, F. (2022). Etno-Stem Dalam Pembelajaran Ipa : a Systematic Literature Review. *Kwangsan: Jurnal Teknologi Pendidikan*, *10*(2), 147. https://doi.org/10.31800/jtp.kw.v10n2.p147--163

Rifka, A, d. (2022). *Metode Penelitian Kuantitatif&Kualitatif*. Makassar: Tohar Media.

Saputri, V., & Herman, T. (2022). Integrasi STEM Dalam Pembelajaran Matematika: Dampak Terhadap Kompetensi Matematika Abad 21. *Journal Pembelajaran Matematika Inovatif*, *5*(1), 247–260. https://doi.org/10.22460/jpmi.v5i1.247-260

Sriwijaya, U. (2023). Implementasi Kebhinekatunggalikaan Dan Sila-Sila Pancasila Sebagai Penguatan Profil Pelajar Pancasila Kurnia Widiyani. *Jurnal Pendidikan West Science*, *1*(02), 150–158.

Sunaryati, T., Subekti, W. U., Lukito, A. N., & Sari, W. P. (2024). Analisis Pengembangan Pembelajaran Terpadu Berbasis Kearifan Lokal Guna Meningkatkan Daya Kognitif Dan Perkembangan Karakter Siswa Di Sekolah Dasar. *Jurnal Ilmu Pendidikan Dan Pembelajaran, 06*(4), 158–184.

Susilawati, E., Sarifudin, S., & Muslim, S. (2021). Internalisasi Nilai Pancasila Dalam Pembelajaran Melalui Penerapan Profil Pelajar Pancasila Berbantuan Platform Merdeka Mengajar. *Jurnal Teknodik*, *25*, 155–167. https://doi.org/10.32550/teknodik.v25i2.897

Usmadi, U. (2020). Pengujian Persyaratan Analisis (Uji Homogenitas dan Uji Normalitas). *Jurnal Inovasi Pendidikan*, *7*(1), 50-62.