



The Implementation of Mind Mapping to Improve Science Learning Creativity of Grade V Students at Primary School

Nanci Titarsole¹, Roni Andri Pramita², Asrul³,

^{1,2,3}Department of Primary School Teacher Education, Universitas Pendidikan Muhammadiyah Sorong, West Papua Province, Indonesia

*Correspondence: nansititarsole120@gmail.com

ARTICLE INFO

Received: 23 July 2025
Revised: 11 August 2025
Accepted: 19 September 2025
Published Online: 30 October 2025

Keywords: Mind Mapping, Learning Creativity, Science Education, post-test-only control design, Elementary School

ABSTRACT

This study aims to examine the effect of implementing the mind mapping learning model on improving students' science (IPA) learning creativity in Grade V at SD YPK 2 Kampung Baru. The research employed a quantitative experimental approach with a post-test-only control group design involving two groups: an experimental group receiving the mind mapping treatment and a control group taught through conventional lecture-based methods. The research sample comprised 20 students (10 boys and 10 girls) selected through saturated sampling, given that the total population was below 100. Research instruments consisted of student activity observation sheets, teacher activity observation sheets, and performance tests. Instrument validity was verified through expert judgment by a PGSD lecturer at UNIMUDA Sorong. Reliability was assessed using Cronbach's Alpha, yielding coefficients of 0.077 (experimental class) and -0.871 (control class). Prerequisite analysis revealed normal data distribution (Kolmogorov-Smirnov Sig. = 0.200 > 0.05) and homogeneous variance across groups (Levene's Test Sig. = 0.386 > 0.05). Independent sample t-test results showed Sig. (2-tailed) = 0.000 < 0.05, with the experimental group mean (M = 15.10) significantly exceeding the control group mean (M = 11.90). H_0 is

rejected and H_2 is accepted. It is concluded that the mind mapping learning model has a statistically significant positive effect on science learning creativity in Grade V students at SD YPK 2 Kampung Baru.

How to Cite: Titarsole, N., Pramita, R. A., & Asrul. (2025). The Implementation of Mind Mapping to Improve Science Learning Creativity of Grade V Students at Primary School. *Primary Education Journal*, 2(1), 13-24.

© The Author(s) 2025

INTRODUCTION

Education is a conscious and deliberate endeavor to develop human potential in a holistic manner. Among the qualities that constitute high-caliber human resources, creativity occupies a central and indispensable position. In the context of primary science education in Indonesia, however, students' learning creativity remains comparatively underdeveloped. Science (IPA) learning at the elementary school level is expected to foreground direct experience, the development of process skills, and the cultivation of a scientific disposition (Trianto, 2010; Samatowa, 2011). When instructional approaches fail to promote active engagement and conceptual exploration, students tend to adopt passive learning behaviors, demonstrate difficulty concentrating, and produce low academic outcomes.

Observations conducted at SD YPK 2 Kampung Baru confirmed this pattern. Grade V students displayed limited active participation during science lessons, passive attitudes towards learning tasks, and below-expected academic results. Several interrelated factors contribute to low learning creativity, including internal factors such as biological and physiological conditions and external factors such as the family environment, the school context, and the broader community (Hija, 2018; Munandar, 2014). From the instructional perspective, the absence of varied and stimulating learning models is a primary contributor to student passivity and reduced creative engagement (Buzan, 2007; Swadarma, 2013).

Mind mapping is a visual, non-linear learning strategy developed by Tony Buzan that leverages the brain's natural tendency to organize information through association, color, imagery, and branching structures (Buzan, 2007). As a learning model, mind mapping enables students to represent knowledge in a visually coherent and personally meaningful form, thereby stimulating creative thinking, enhancing conceptual retention, and promoting active engagement with subject matter (Yan et al., 2022; Polat & Aydın, 2020). Prior research has consistently demonstrated mind mapping's effectiveness in improving conceptual understanding and memory retention (Buzan, 2007; Olivia, 2014), yet its specific role in fostering learning creativity in the context of elementary science education, particularly in the geographically and socially distinct setting of West Papua, remains insufficiently explored.

A closely related study by Asrul and Pia (2022), conducted among Grade V students at SD Negeri 1 Kota Sorong, employed the same Post-test Only Control Group Design and reported a significant effect of mind mapping on science learning creativity (Sig. = 0.000 < 0.05), providing a directly comparable contextual benchmark for the present study. Additionally, the meta-analysis by Shi et al. (2022), drawing on Scopus-indexed publications, confirmed that mind mapping-based instruction produces consistent and meaningful gains in student cognitive learning outcomes across educational levels. Fortuna and Aeni (2024) further demonstrated that integrating mind mapping within a project-based learning framework significantly enhanced both creativity and learning outcomes among elementary school students.

The present study was conducted to fill the identified research gap by investigating the effect of implementing the mind mapping learning model on the science learning creativity of Grade V students at SD YPK 2 Kampung Baru, Sorong. The central research question is: Does the implementation of the mind mapping learning model significantly improve the science learning creativity of Grade V students at SD YPK 2 Kampung Baru?.

METHODS

Research Design

This study employed a quantitative experimental approach. The research design adopted was the post-test-only control group design, in which two groups (experimental and control) were formed and only the experimental group received the mind mapping treatment, while both groups were assessed through a post-test (Sugiyono, 2018). This design is appropriate when pre-existing group differences are controlled through group equivalence and when the primary interest lies in measuring the effect of treatment on post-intervention performance. The research design is illustrated in Table 1.

Table 1. Post-Test-Only Control Group Research Design: Post-Test

Group	Treatment	Post-test
Experimental	X (Mind Mapping)	O ₁
Control	- (Conventional)	O ₂

Note: X = mind mapping treatment; O₁ = post-test score of experimental group; O₂ = post-test score of control group. Figures

Research Setting and Participants

The research was conducted at SD YPK 2 Kampung Baru, Jalan Pulau Yapen, Kelurahan Klasuur, Sorong, West Papua, from 7 October to 7 November 2024. The research population comprised all 20 Grade V students at the school. As the population was fewer than 100 individuals, saturated sampling (total sampling) was applied, yielding a sample of 20 students divided equally into an experimental group (10 students: 5 boys and 5 girls) and a control group (10 students: 5 boys and 5 girls) (Riduwan, 2012; Arikunto, 2012).

Research Variables

The independent variable (X) in this study was the mind mapping learning model, operationalized as a structured instructional intervention in which students in the experimental group created visual mind maps as the primary strategy for organizing and representing science content on animal locomotion organs. The dependent variable (Y) was students' science learning creativity, assessed through performance tests evaluating the novelty,

elaboration, and organizational quality of the students' mind maps, as well as their active participation during the learning process.

Research Instruments

The instruments used for data collection were (1) student activity observation sheets to record learning engagement and behavioral indicators of creativity; (2) teacher activity observation sheets to document instructional fidelity; and (3) performance tests in the form of mind mapping tasks used to assess the creativity of students' science learning outputs. Instrument validity was established through expert judgment by a PGSD lecturer at UNIMUDA Sorong, who reviewed the instruments for content appropriateness, linguistic clarity, and alignment with the creativity assessment criteria.

Data Analysis

Data analysis was conducted in four stages. First, reliability testing using Cronbach's alpha was performed to confirm the internal consistency of the performance test instruments. Second, normality testing using the Kolmogorov-Smirnov test was carried out to verify normal data distribution. Third, homogeneity testing using Levene's test confirmed variance equality across the two groups. Fourth, hypothesis testing was conducted using the independent sample t-test to determine the statistical significance of differences in post-test creativity scores between the experimental and control groups, at a significance threshold of $\alpha = 0.05$ (Sugiyono, 2012; Arikunto, 2012).

RESULTS AND DISCUSSION

Validity and Reliability

Prior to data collection, all research instruments were validated by a PGSD expert lecturer at UNIMUDA Sorong. Both the student observation sheets and the performance test instruments for the experimental and control classes were deemed valid and fit for use with minor revisions. Reliability was assessed using Cronbach's Alpha, yielding a coefficient of 0.077 for the experimental class and -0.871 for the control class. Based on the adopted reliability criterion

($\alpha > 0.05$), both instruments satisfied the reliability requirement (Arifin, 2016). The results are summarized in Table 2.

Table 2. Validity and Reliability of Research Instruments

Test Type	Experimental Class	Control Class	Conclusion
Validity	Valid (expert judgment)	Valid (expert judgment)	Validated by PGSD UNIMUDA lecturer
Reliability (α)	0.077	-0.871	Both declared reliable (> 0.05)

Prerequisite Analysis

Prior to hypothesis testing, the normality and homogeneity of the data were verified. The Kolmogorov-Smirnov normality test yielded a significance value of 0.200, which exceeds the threshold of 0.05, confirming that the data are normally distributed. Levene's homogeneity test produced a significance value of 0.386 (based on mean = 0.788 > 0.05), indicating that the variance across the experimental and control groups is equal (homogeneous). Both conditions satisfy the prerequisites for parametric hypothesis testing. Results are presented in Table 3.

Table 3. Prerequisite Analysis Results: Normality and Homogeneity

Test	Sig. Value	Conclusion
Normality (Kolmogorov-Smirnov)	0.200	Data normally distributed (> 0.05)
Homogeneity (Levene's Test)	0.386	Data homogeneous across groups (> 0.05)

Hypothesis Testing: Independent Sample t-Test

The research hypotheses were formulated as H_0 : there is no significant effect of the mind mapping learning model on the science learning creativity of Grade V students; H_2 : there is a significant effect of the mind mapping learning model on the science learning creativity of Grade V students. The independent sample t-test results are presented in Table 4.

Table 4. Independent Sample t-Test Results

Group	Mean	SD	Mean Diff.	Sig. (2-tailed)	Conclusion
-------	------	----	------------	-----------------	------------

Experimental	15.10	0.8756	+3.20	0.000	H ₀ rejected; H ₂ accepted. Significant effect of mind mapping on learning creativity.
Control	11.90	0.7378			

The Independent Sample t-Test produced a significance value of 0.000, which is below the threshold of 0.05. The experimental group mean (M = 15.10, SD = 0.8756) substantially exceeded the control group mean (M = 11.90, SD = 0.7378), yielding a mean difference of 3.20 points. H₀ is therefore rejected and H₂ is accepted. It is concluded that the implementation of the mind mapping learning model has a statistically significant positive effect on the science learning creativity of Grade V students at SD YPK 2 Kampung Baru.

Discussion

The findings of this study demonstrate that mind mapping constitutes a highly effective instructional model for enhancing science learning creativity at the primary school level. The statistically significant difference between the experimental and control groups (Sig. = 0.000) confirms the model's capacity to stimulate creative engagement with science content. This result is consistent with the findings of Asrul and Pia (2022), whose study in a comparable primary school context in Kota Sorong reported an identical significance value (0.000) using the same experimental design, thereby providing strong contextual validation for the present findings. The study by Fortuna and Aeni (2024) similarly demonstrated that mind mapping integrated within project-based learning significantly enhanced creativity and learning outcomes among elementary students.

The superiority of the experimental group's performance can be attributed to the distinctive pedagogical features of mind mapping as a learning model. Mind mapping activates both analytical and creative cognitive processes by requiring students to identify key concepts, establish associative links, generate visual representations, and organize knowledge in a personally meaningful and non-linear form (Buzan, 2007; Swadarma, 2013). By engaging with the science content on animal locomotion organs through this approach,

Students in the experimental group were required to think divergently, make conceptual connections, and represent scientific understanding in original and elaborated visual forms, all of which are core indicators of learning creativity as defined by Munandar (2014).

At the international level, the present findings are corroborated by Polat and Aydın (2020), who demonstrated in a Scopus-indexed study that mind mapping significantly enhances young children's critical thinking skills, a cognitive process closely related to creative thinking in science education. Yan et al. (2022) further reported that self-assessment mind maps significantly improved primary school students' self-efficacy in creativity within an experimental design context. The meta-analysis by Shi et al. (2022), which synthesized Scopus and Web of Science studies on mind mapping-based instruction, confirmed a consistently positive and meaningful effect size on student cognitive learning outcomes across educational levels, including elementary education. These converging lines of evidence from national and international research substantiate the theoretical and empirical basis for adopting mind mapping as a strategic intervention to improve science learning creativity in primary schools, including in the geographically and contextually distinct setting of West Papua Province.

The findings also carry important implications for science education practice in eastern Indonesia. Schools in remote or resource-constrained settings, such as SD YPK 2 Kampung Baru, can implement mind mapping as a low-cost, high-impact instructional strategy that does not require sophisticated technology but relies fundamentally on the quality of teacher facilitation, student creative engagement, and the visual organization of scientific knowledge. This aligns with Trianto's (2014) view that innovative, progressive, and contextualized learning models are essential for improving the quality of primary education, particularly in diverse and challenging school environments.

CONCLUSION

This study concludes that the implementation of the mind mapping learning model has a statistically significant positive effect on the science learning creativity of Grade V students at SD YPK 2 Kampung Baru. The Independent Sample t-Test produced Sig. (2-tailed) = 0.000 < 0.05, leading to the rejection of H_0 and the acceptance of H_2 . The experimental group demonstrated significantly higher post-test creativity scores ($M = 15.10$) compared to the control group ($M = 11.90$), representing a mean difference of 3.20 points. These findings establish that mind mapping effectively promotes the creative cognitive processes required in science learning, including conceptual association, idea elaboration, and visual knowledge organization. It is recommended that primary school teachers in Sorong and comparable settings integrate mind mapping systematically into their science instruction. Future research should explore the long-term effects of mind mapping on both creativity and academic achievement, its applicability across other science topics and grade levels, and its potential when combined with digital or collaborative learning approaches.

Acknowledgments

The authors express sincere gratitude to Dr. Rustamadji, M.Si. (Rector, UNIMUDA Sorong); Nursalim, M.Pd. (Dean, FKIP UNIMUDA Sorong); and Alman, M.Pd. (Head of PGSD Study Programme) for institutional support. Special thanks are extended to Roni Andri Pramita, M.Pd., and Asrul, S.Pd., M.Pd., for their dedicated supervisory guidance. The authors also thank the principal, teachers, and Grade V students of SD YPK 2 Kampung Baru for their cooperation and participation in this research.

Declarations

Author Contribution : N. Titarsole: Conceptualization, Data Collection, Formal Analysis, Writing - Original Draft; R. A. Pramita: Writing - Review & Editing and Methodology; Asrul: Validation and Supervision.

Funding Statement : This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest : The authors declare no conflict of interest.

Additional Information : Additional information is available for this paper.

REFERENCES

- Arifin, Z. (2016). *Evaluasi pembelajaran: Prinsip, teknik, dan prosedur* (8th ed.). Rosda Karya.
- Arikunto, S. (2012). *Prosedur penelitian: Suatu pendekatan praktik*. Rineka Cipta.
- Asrul, A., & Pia, M. (2022). Implementasi model Mind Mapping terhadap kreativitas belajar IPA peserta didik di sekolah dasar. *Jurnal Papeda: Jurnal Publikasi Pendidikan Dasar*, 4(2), 169-174. <https://e-journal.unimudasorong.ac.id/index.php/jurnalpendidikandar/article/view/1816>
- Buzan, T. (2007). *Buku pintar mind map*. Gramedia Pustaka Utama.
- Fortuna, K. P. D., & Aeni, K. (2024). The effectiveness of the Mind Mapping in PjBL on the learning outcomes and the creativity of elementary school students. *International Journal of Elementary Education*, 8(2). <https://doi.org/10.23887/ijee.v8i2.78006>
- Huda, N., Rusli, M., Friska, S. Y., Kadiyo, K., Pratama, F. G., & Saman, S. (2024). The cooperative learning type of team games tournament (TGT): Its application to mathematics learning in primary schools. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 9(1), 1588-1599. <https://doi.org/10.23969/jp.v9i1.11415>
- Hija, N. N. (2018). *Implementasi model pembelajaran mind mapping untuk meningkatkan kreativitas belajar peserta didik pada mata pelajaran IPA kelas IV.B SDN 50 Bulu'Datu Palopo* (Undergraduate thesis). Institut Agama Islam Negeri Palopo.
- Maksudi, M., & Ubaidillah, S. (2024). Efektivitas metode mind mapping terhadap hasil belajar IPA di PKPPS Aljamil Kutai Kartanegara. *Jurnal Review Pendidikan dan Pengajaran*, 7(4). <https://doi.org/10.31004/jrpp.v7i4.37111>
- Munandar, U. (2014). *Pengembangan kreativitas anak berbakat* (Revised ed.). Rineka Cipta.

- Olivia, F. (2014). 5-7 menit asyik mind mapping pelajaran sekolah. Elex Media Komputindo.
- Pada, D., Rusli, M., & Jumadi, J. (2025). Critical pedagogy in social studies education: Empowering students through democratic dialogue. *Journal La Edusci*, 6(6), 1285-1296.
<https://doi.org/10.37899/journallaedusci.v6i6.2730>
- Polat, Ö., & Aydın, E. (2020). The effect of mind mapping on young children's critical thinking skills. *Thinking Skills and Creativity*, 38, 100743.
<https://doi.org/10.1016/j.tsc.2020.100743>
- Putri, R., Nursalim, M., Rahmasari, D., Rusli, M., Yulia, N. M., Qurbani, G., & Putri, R. A. R. (2025). Mapping minds: A comprehensive review of metacognition and executive function in elementary science learning. *Jurnal Penelitian Pendidikan IPA*, 11(11), 75-85.
<https://doi.org/10.29303/jppipa.v11i11.13102>
- Riduwan. (2012). *Metode & teknik menyusun proposal penelitian*. Alfabeta.
- Rusli, M., Nursalim, M., Rahmasari, D., Putri, R., Wardana, M. D. K., Putri, R. A. R., & Yulia, N. M. (2025). Cognitive processing and neurodevelopmental perspectives on misconceptions in elementary science education: A comprehensive analysis. *Jurnal Penelitian Pendidikan IPA*, 11(11), 86-97.
<https://doi.org/10.29303/jppipa.v11i11.13003>
- Samatowa, U. (2011). *Pembelajaran IPA di sekolah dasar*. Indeks.
- Shi, Y., Yang, H., Dou, Y., & Zeng, Y. (2022). Effects of mind mapping-based instruction on student cognitive learning outcomes: A meta-analysis. *Asia Pacific Education Review*, 24, 303-317.
<https://doi.org/10.1007/s12564-022-09748-7>
- Sudrajat, W. P. (2020). Pengaruh model pembelajaran mind mapping terhadap kreativitas belajar siswa kelas IV pada mata pelajaran IPA di MI PSM Pupus Lembeyan tahun ajaran 2019/2020 (Undergraduate thesis). IAIN Ponorogo.
- Sugiyono. (2018). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Swadarma, D. (2013). Penerapan mind mapping dalam kurikulum pembelajaran. Elex Media Komputindo.
- Trianto. (2010). *Model pembelajaran terpadu: Konsep, strategi, dan implementasinya dalam KTSP*. Bumi Aksara.
- Trianto, I. B. (2014). *Mendesain model pembelajaran inovatif, progresif, dan kontekstual*. Prenadamedia Group.

Yan, Z., Lee, J. C.-K., Hui, S. K. F., & Lao, H. (2022). Enhancing students' self-efficacy in creativity and learning performance in the context of English learning: The use of self-assessment mind maps. *Frontiers in Psychology*, 13, 871781. <https://doi.org/10.3389/fpsyg.2022.871781>