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Implementing 'De KeLuVa' Media Based on the Tri-N Approach to Improve Cognitive Learning Outcomes of Fourth Grade Elementary Students

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ABSTRACT

Education plays an important role in developing students' character, intellectual abilities, and problem-solving skills, particularly in mathematics education. However, mathematics learning in elementary schools is often dominated by teacher-centered instruction, resulting in low student engagement and cognitive learning outcomes. Therefore, this study aimed to analyze the implementation of De KeLuVa media based on the Tri-N approach (Niteni, Nirokke, and Nambahi) to improve fourth-grade students' cognitive learning outcomes in mathematics, especially on the topic of perimeter and area of plane figures. This study employed Classroom Action Research (CAR) using the Kemmis and McTaggart cyclical model consisting of planning, acting, observing, and reflecting stages. The subjects of the study were 28 fourth-grade students of Mekarwangi Elementary School selected purposively based on their low mathematics learning achievement. Data were collected through cognitive achievement tests, classroom observations, and documentation. The research instruments were validated through expert judgment and content validity review. The results showed a significant improvement in students' cognitive learning outcomes after the implementation of De KeLuVa media. The average score increased from 38.40 in the pre-cycle stage to 63.57 in Cycle I and reached 81.43 in Cycle II. In addition, students became more active, collaborative, and confident during mathematics learning activities. The findings indicate that the integration of De KeLuVa media and the Tri-N approach provides meaningful and deep learning experiences by encouraging students to observe, imitate, and modify mathematical problem-solving strategies. In conclusion, the implementation of De KeLuVa media based on the Tri-N approach effectively improved students' cognitive learning outcomes in mathematics. This study implies that innovative and student-centered mathematics learning media can support deep learning processes and enhance elementary students' conceptual understanding.

KEYWORDS

De KeLuVa Media
Tri-N, Cognitive
Learning Outcomes
Fourth Grade Students
Elementary School

1. Introduction

Education is a fundamental effort to foster the development of students' character (inner strength and moral values), intellect, and physical abilities. This concept was emphasized by Ki Hajar Dewantara, who viewed education as the cultivation of cultural seeds that must be aligned with both the nature of learners and the demands of the era (Susanti, 2023). In this perspective, students possess inherent potential that can be developed in accordance with their contextual environment and time.

Education also functions as a means for individuals to fulfill their life and achieve a meaningful existence. According to Law No. 20 of 2003, the purpose of education is to develop individuals who are intellectually capable, morally upright, physically and mentally healthy, independent, and socially responsible (Susanti, 2023). Therefore, education plays a crucial role in developing individual quality, potential, and talents.

Mathematics education is not only aimed at improving students' computational abilities but also at developing logical thinking, critical reasoning, creativity, and problem-solving skills in everyday life (Firmansyah & Husnia, 2025; Handayani, 2019; Hattie, 2012). In elementary schools, mathematics learning should provide meaningful learning experiences that encourage students to actively construct knowledge through exploration and interaction. However, many students still perceive mathematics as a difficult and abstract subject, resulting in low learning motivation and cognitive achievement.

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Students exhibit diverse characteristics, which require active participation in the learning process. This aligns with the principles of 21st-century learning, which emphasize a student-centered approach. Schools are therefore expected to design learning objectives that incorporate essential competencies such as critical thinking, creativity, communication, and collaboration (Wiratna et al., 2024). These competencies can be achieved through effective teaching and learning processes involving teachers, students, and supporting elements.

The learning process involves various components and requires collaboration between teachers and students. Learning activities should be designed to be engaging in order to stimulate students' curiosity and motivation to explore new knowledge. Effective learning environments encourage students to think critically, broaden their perspectives, and solve real-life problems.

In response to current educational demands, Indonesia has implemented the *Merdeka Curriculum*, introduced by Nadiem Makarim, which promotes the concept of *Merdeka Belajar* (Freedom to Learn). The implementation of the Merdeka Curriculum encourages the application of deep learning in classroom instruction (Fullan et al., 2018). Deep learning refers to meaningful learning processes that allow students to understand concepts comprehensively, connect prior knowledge with new experiences, and apply concepts in real-life situations (Iriawan et al., 2025). This approach emphasizes flexible learning environments that support student expression and teacher creativity in designing meaningful learning experiences (Anggraini & Wiryanto, 2022; Awaludin & Yulianto, 2024).

The Merdeka Curriculum also focuses on developing the *Pancasila Student Profile*, which includes six key competencies: faith and piety, independence, collaboration, global diversity awareness, critical reasoning, and creativity (Azwar & Haridza, 2025; Ernawati & Rahmawati, 2022). These competencies are rooted in the educational philosophy of Ki Hajar Dewantara, which emphasizes independence and creativity in learning (Sulistyorini, 2020).

Creativity is one of the essential competencies in 21st-century learning. It refers to the ability to respond to and solve problems through innovative thinking and discovery processes (Diella et al., 2019; Lusiana & Fatmawati, 2022; Syaodih et al., 2019). According to Torrance and Guilford, creativity includes four indicators: fluency, flexibility, originality, and elaboration (Aliyyah et al., 2017; Aziz & Yasin, 2020). Students with high creativity tend to demonstrate better problem-solving abilities, particularly in mathematics learning.

Mathematics plays a significant role in developing logical reasoning and problem-solving skills in daily life (Julia et al., 2020; Linda* et al., 2021; Magdalena et al., 2021). However, mathematics is often perceived as a difficult subject by students, which affects their learning motivation and achievement (Susanti et al., 2023). International assessments such as TIMSS and PISA reveal that Indonesia's mathematical literacy remains relatively low, indicating the need for improvements in teaching strategies (Isromi et al., 2022) (Rosmauli & Watini, 2022).

These challenges are partly caused by suboptimal teaching practices that do not fully support students' creative thinking (Verger et al., 2025). Teachers are required to adopt appropriate instructional strategies that accommodate diverse student characteristics and learning styles (Ni'mah & Sukartono, 2022; Putri et al., 2020). The Merdeka Curriculum emphasizes the importance of facilitating individual learning needs, thereby shifting the focus from teacher-centered to student-centered learning.

To support student-centered learning, appropriate instructional models are necessary. One such model is the Tri-N model (Niteni, Nirokke, and Nambahi) (Krishantari et al., 2025), developed by Ki Hajar Dewantara, which emphasizes observing, imitating, and modifying as key learning processes (Abyan & Nursyam, 2024; Anggraini & Wiryanto, 2022; Niteni et al., 2021; Prastiwi et al., 2025) . This model is expected to enhance student engagement and learning effectiveness by integrating cognitive and physical aspects of learning (Budiati et al., 2018).

De KeLuVa media is an innovative mathematics learning media designed to support elementary students in understanding geometric concepts concretely and interactively. The media integrates visual elements, manipulative activities, and collaborative learning processes based on the Tri-N approach, namely Niteni (observing), Nirokke (imitating), and Nambahi (modifying)(Nisa et al., 2019). Through

these stages, students are encouraged not only to memorize formulas but also to explore, analyze, and develop their own understanding of mathematical concepts.

Based on observations and interviews conducted with fourth-grade students and teachers at Mekarwangi Elementary School, several issues were identified in mathematics learning, particularly in the topic of perimeter and area of plane figures. These include limited instructional media, low student engagement, teacher-centered learning, and students' difficulties in understanding mathematical concepts. Many students relied on memorizing formulas without understanding their application, leading to incorrect problem-solving.

Furthermore, students' learning outcomes were relatively low, with only 42% of students achieving scores above the minimum mastery criteria. Students often felt unprepared and experienced difficulties in solving mathematical problems, particularly those involving complex calculations. These findings indicate a gap between actual learning conditions and the expected outcomes, where students should demonstrate creativity and effective problem-solving skills (Mukti et al., 2020a; Wilda & Ekawati, 2017).

To address these issues, the use of instructional media is essential. Learning media can enhance student engagement, provide concrete learning experiences, and improve understanding (Magdalena et al., 2021). In elementary education, where students are still in the concrete operational stage, the use of visual and interactive media is particularly important (Ayu et al., 2025; Suryanti et al., 2020).

Audio-visual media can make learning more engaging and meaningful. Previous studies have shown that the implementation of the Tri-N approach can enhance students' creativity and learning outcomes (Mukti et al., 2020a; Nisa et al., 2019). Therefore, integrating innovative learning media with the Tri-N model is expected to improve students' cognitive learning outcomes in mathematics.

Previous studies indicate that interactive and visual learning media significantly improve students' motivation, engagement, and mathematics learning outcomes (Suryanti et al., 2020; Magdalena et al., 2021; Ayu et al., 2025). Furthermore, Tri-N-based learning has been proven to enhance students' creativity, participation, and conceptual understanding. Therefore, the integration of De KeLuVa media and the Tri-N approach is expected to support deep learning and improve students' cognitive learning outcomes in mathematics education.

2. Method

This study employed Classroom Action Research (CAR) using the Kemmis and McTaggart model, which consists of planning, acting, observing, and reflecting stages conducted in two cycles (Kemmis et al., 2014). The subjects of this study were 28 fourth-grade students of Mekarwangi Elementary School. The participants were selected using purposive sampling (Sugiyono, 2015), because the class demonstrated low mathematics learning outcomes and limited student engagement during the learning process. The research focused on improving students' cognitive learning outcomes in mathematics, particularly in the topic of perimeter and area of plane figures.

The instruments used in this study included cognitive achievement tests, observation sheets, and documentation. The cognitive tests were used to measure students' mathematics learning outcomes, while the observation sheets were used to evaluate students' participation and classroom activities during the implementation of De KeLuVa media. All instruments were validated through expert judgment and content validity review (Fraenkel et al., 2012) by mathematics education experts and elementary school teachers to ensure content validity and suitability with the learning objectives.

Data collection techniques included tests, classroom observations, and documentation. Quantitative data were analyzed descriptively using percentage and mean score analysis techniques (Arikunto, 2018) by calculating students' average scores and learning mastery percentages in each cycle. Qualitative data from classroom observations were analyzed descriptively following the stages of data reduction, data display, and conclusion drawing (Miles et al., 2014) to identify changes in students' engagement and participation during the learning process.

The categorization of students' cognitive learning outcomes was determined as follows:
Low Category : 0–59

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Moderate Category : 60–74
High Category : 75–100

Data analysis in this study employed both quantitative and qualitative descriptive approaches. The research was conducted in cycles, consisting of two cycles rather than a single implementation. Each cycle comprised three main stages as follows:

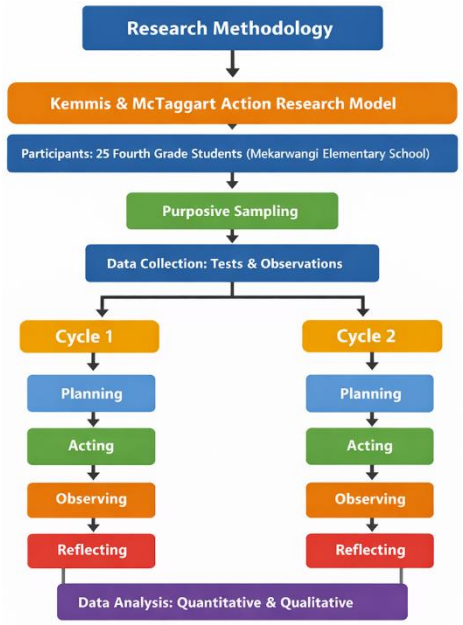

Fig. 1. Flowchart of the Research Methodology

The implementation of De KeLuVa media in classroom learning followed the Tri-N approach stages:

1. Niteni (Observing): Students observed visual representations and demonstrations related to perimeter and area concepts.
2. Nirokke (Imitating): Students practiced solving mathematical problems by following examples demonstrated using De KeLuVa media.
3. Nambahi (Modifying): Students modified problem-solving strategies and solved contextual mathematics problems independently and collaboratively.

3. Results and Discussion

3.1. Results

Students' Assignment Scores on the Topic of Perimeter and Area of Plane Figures at Mekarwangi Elementary School

Table 1. Students' Assignment Scores

No	Interval Skor	Frekuensi Pra-Cycle	Frekuensi Cycle I	Frekuensi Cycle II
1	21–30	11	1	0
2	31–40	6	1	0
3	41–50	9	3	0
4	51–60	1	10	1
5	61–70	1	5	2
6	71–80	0	4	14
7	81–90	0	3	9
8	91–100	0	1	2
Jumlah		**28**	**28**	**28**

The students' assignment scores were classified into three categories to describe the development of their cognitive learning outcomes in each cycle. The categorization was based on predetermined score ranges, namely Low for scores between 0–59, Moderate for scores between 60–74, and High for scores between 75–100. This classification was applied to the scores obtained in the Pra-Cycle, Cycle I, and Cycle II in order to identify the distribution of students' achievement levels and to observe the improvement of their learning outcomes throughout the learning process.

Table 2. Distribution of Students' Cognitive Learning Outcomes by Category

Category	Score Range	Pra-Cycle Frequency	Pra-Cycle Percentage	Cycle I Frequency	Cycle I Percentage	Cycle II Frequency	Cycle II Percentage
Low	0–59	27	96.43%	12	42.86%	1	3.57%
Moderate	60–74	1	3.57%	8	28.57%	2	7.14%
High	75–100	0	0%	8	28.57%	25	89.29%
Total		**28**	**100%**	**28**	**100%**	**28**	**100%**

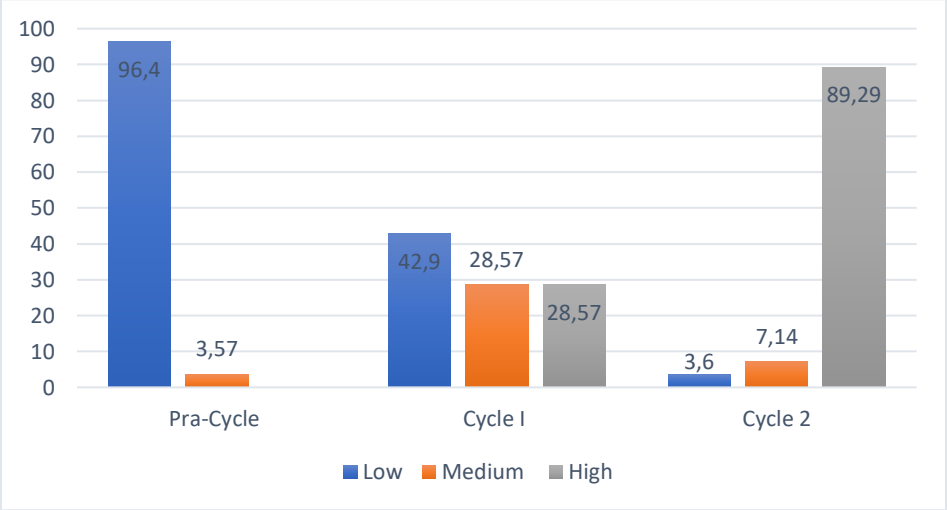

Fig. 2. Distribution of Students' Cognitive Learning Outcomes by Category

Based on the learning outcomes of 28 students, a clear improvement can be observed from the Pre-Cycle stage to Cycle I and Cycle II. In the Pre-Cycle stage, the total score was 1,075 with an average of 38.40, indicating that students' initial abilities were relatively low and had not yet reached the expected level of learning mastery. This condition suggests the need for more effective instructional interventions to enhance students' understanding of the material.

After the implementation of actions in Cycle I, the total score increased to 1,780 with an average of 63.57. This improvement indicates that the instructional strategies applied in the first cycle began to have a positive impact on students' understanding and learning outcomes, although some students had not yet achieved optimal performance.

In Cycle II, the improvement in learning outcomes became more significant, with the total score reaching 2,280 and the average increasing to 81.43. Nearly all students demonstrated substantial progress, and the majority achieved the minimum mastery criteria. The increase in the average score from the Pre-Cycle to Cycle II indicates that the continuous improvements in instructional practices across each cycle were effective.

The improvement in students' mathematics learning outcomes was supported by quantitative data obtained from each cycle. In the pre-cycle stage, only 21.43% of students achieved the minimum mastery criteria. After the implementation of De KeLuVa media in Cycle I, the percentage increased to 53.57%. In Cycle II, 85.71% of students successfully achieved the minimum mastery criteria. These findings demonstrate that the use of De KeLuVa media had a positive effect on students' cognitive learning outcomes.

These findings are consistent with previous studies indicating that interactive learning media and student-centered instructional approaches significantly improve mathematics learning outcomes and students' conceptual understanding (Fitri & Sari, 2019; Mukti et al., 2020b). Previous research also revealed that Tri-N-based learning activities encourage students to actively participate in meaningful learning experiences and support deep learning processes (Krishantari et al., 2025; Nisa et al., 2019).

Thus, it can be concluded that the implemented instructional interventions significantly and consistently improved students' learning outcomes and successfully achieved the intended learning objectives.

3.2. Discussion

The findings of this study indicate a significant and continuous improvement in students' cognitive learning outcomes from the Pre-Cycle stage to Cycle II. The average score, which was initially categorized as low (38.40), increased to a moderate level in Cycle I (63.57), and eventually reached a high category in Cycle II (81.43). This improvement demonstrates that the implemented instructional interventions were effective in addressing the weaknesses of the initial learning process and in providing more meaningful learning experiences for students.

The increase in both total scores and average scores across each cycle indicates that the systematic and reflective improvement process, in accordance with the principles of Classroom Action Research, was successfully implemented. This finding is consistent with the Kemmis and McTaggart Model, which emphasizes improving instructional practices through iterative cycles of planning, acting, observing, and reflecting

The improvement in learning outcomes is also consistent with the findings of (Guo et al., 2024; Mansell & Kirksey, 2025), who states that knowledge is actively constructed by students through meaningful learning experiences. When learning is designed to be more active, contextual, and student-centered, students become more engaged in the learning process, leading to improved conceptual understanding. Similarly, (Zuraidah et al., 2020) argue that learning becomes more effective when instructional materials are connected to students' prior knowledge and presented systematically. The instructional strategies applied in this study enabled students to relate their learning experiences to the material being studied, which contributed to the improvement of their cognitive learning outcomes.

Furthermore, the results of this study are supported by several previous studies. (Primadianningsih & Sumarni, 2023) found that systematically and reflectively designed instructional practices within Classroom Action Research significantly improve student learning outcomes. In addition, (Fadilatunnisa et al., 2021) reported that active and innovative learning approaches enhance student engagement, which directly contributes to improved learning outcomes. Another study by (Sari et al., 2025) also revealed that instructional improvements through Classroom Action Research cycles can enhance students' learning mastery both individually and collectively.

Therefore, the findings of this study reinforce previous research, indicating that appropriate, continuous, and student-centered instructional interventions are effective in improving students' cognitive learning outcomes.

4. Conclusion

The implementation of De KeLuVa media based on the Tri-N approach effectively improved fourth-grade students' cognitive learning outcomes in mathematics learning. The improvement was reflected in the increase in students' average scores from 38.40 in the pre-cycle stage to 81.43 in Cycle II. In addition, students demonstrated better participation, collaboration, and conceptual understanding during classroom learning activities.

The findings indicate that the integration of interactive learning media and the Tri-N approach supports meaningful and deep learning processes in mathematics education. Through observing, imitating, and modifying activities, students were encouraged to actively construct mathematical concepts and apply problem-solving strategies independently.

This study implies that innovative and student-centered mathematics learning media can improve elementary students' cognitive learning outcomes and engagement in mathematics learning. However,

this study was limited to one class and one mathematics topic. Therefore, future research is recommended to involve larger samples, different educational levels, and various mathematics topics to obtain broader findings regarding the effectiveness of De KeLuVa media.

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References

Abyan, G., & Nursyam, H. (2024). *Application of CORE Learning Model (Connecting , Organizing , Reflecting , and Extending) Based on Tri N (Niteni , Nirokke , Nambahi) on Mathematical Critical Thinking Skills of Students at SMPN 1 Yogyakarta*. *December*, 103–122.

Anggraini, G. O., & Wiryanto, W. (2022). Analysis of Ki Hajar Dewantara's Humanistic Education in the Concept of Independent Learning Curriculum. *Jurnal Penelitian Ilmu Pendidikan*, *15*(1). https://doi.org/10.21831/jpipfip.v15i1.41549

Awaludin, K., & Yulianto, S. (2024). *Penggunaan Media Flipbook Terhadap Hasil Belajar Siswa Mata Pelajaran IPAS Materi Membangun Masyarakat Yang Beradab*. *8*(1), 72–79.

Ayu, G., Widiantari, P., Antara, P. A., & Yudiana, I. K. E. (2025). *Development of Interactive Media Assisted by Articulate Storyline 3 to Stimulate Learning Engagement in Science in Grade III Elementary Schools Students*. *8*(3), 659–671.

Azwar, I., & Haridza, R. (2025). *Jurnal Pendidikan Kewarganegaraan Volume 9 Nomor 1 Edisi Juni 2025 Citizenship Project Model To Develop Pancasila Student Profile In Civic Education*. *9*(2014), 392–403.

Budiati, N., Istiqomah, Purnami, A. S., & Agustito, D. (2018). Penerapan konsep 3N (niteni, nirokke, nambahi) dalam pembelajaran matematika. *Prosiding Seminar Nasional Pendidikan Matematika Etnomatnesia*, 486–490.

Diella, D., Ardiansyah, R., & Suhendi, H. Y. (2019). Pelatihan Pengembangan LKPD Berbasis Keterampilan Proses Sains (KPS) dan Penyusunan Instrumen Asesmen KPS bagi Guru IPA. *Jurnal Publikasi Pendidikan*, *9*(1), 7–11.

Ernawati, Y., & Rahmawati, F. P. (2022). Analisis Profil Pelajar Pancasila Elemen Bernalar Kritis dalam Modul Belajar Siswa Literasi dan Numerasi Jenjang Sekolah Dasar. *Jurnal Basicedu*, *6*(4), 6132–6144. https://doi.org/10.31004/basicedu.v6i4.3181

Fadilatunnisa, A., Khasanah, N., & Rahayu, S. H. (2021). *Bermain Lego sebagai Pembelajaran Harian untuk Mengembangkan Kreatifitas Anak Usia Dini*. *3*. https://doi.org/10.35473/ijec.v3i2.1005

Firmansyah, & Husnia. (2025). Membangun Fondasi Matematika Dasar Melalui Kebijakan Pembelajaran Mendalam Pada Siswa Kelas 4-6. *Examinations: Jurnal Pendidikan Guru Sekolah Dasar*, *1*(2), 62–75. https://doi.org/10.65118/exam.v1i2.9

Fitri, N. M., & Sari, S. R. (2019). Jurnal Silogisme. *Jurnal Silogisme: Kajian Ilmu Matematika Dan Pembelajarannya*, *4*(2), 68–73.

Fullan, M., Quinn, J., & McEachen, J. (2018). *Deep Learning Engage the World Change the World*. Corwin Press.

Guo, R., Jantharajit, N., & Thongpanit, P. (2024). *Enhancing Analytical and Critical Thinking Skills through*

Refl ective and Collaborative Learning : A Quasi-Experimental Study. *11*(2), 200–223.

Handayani, I. (2019). Meningkatkan Kemampuan Berpikir Kritis Matematis Melalui Model Pembelajaran CORE Ditinjau Dari Kemampuan Awal Matematika. *UNION: Jurnal Pendidikan Matematika*, *7*(1), 37–47.

Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. Routledge.

Iriawan, S. B., Hartati, T., & Robandi, B. (2025). Implementation of the Deep Learning Approach in Elementary School Mathematics Learning. *Al-Ishlah: Jurnal Pendidikan*, *17*, 6372–6385. https://doi.org/10.35445/alishlah.v17i4.8834

Isromi, A., Malik, A., & Maru, R. (2022). Development of Character-Based Student Worksheets in Online Learning in Geography Subjects. *AL-ISHLAH: Jurnal Pendidikan*, *14*(4), 5241–5252. https://doi.org/10.35445/alishlah.v14i4.1915

Julia, J., Dolifah, D., Afrianti, N., Isrokatun, I., Soomro, K. A., Erhamwilda, E., Supriyadi, T., & Ningrum, D. (2020). Flipped classroom educational model (2010-2019): A bibliometric study. *European Journal of Educational Research*, *9*(4), 1377–1392. https://doi.org/10.12973/eu-jer.9.4.1377

Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The Action Research Planner: Doing Critical Participatory Action Research*. Springer.

Krishantari, D. Y., Nisa, A. F., Havifah, B., Khosiyono, C., Masjid, A. Al, & Cahyani, B. H. (2025). *Enhancing Students ' Critical Thinking and Creativity through Local Wisdom-Based Literacy Projects Incorporating Tri Nga and Tri N*. *9*(2), 230–241.

Linda*, R., Zulfarina, Z., Mas'ud, M., & Putra, T. P. (2021). Peningkatan Kemandirian dan Hasil Belajar Peserta Didik Melalui Implementasi E-Modul Interaktif IPA Terpadu Tipe Connected Pada Materi Energi SMP/MTs. *Jurnal Pendidikan Sains Indonesia*, *9*(2), 191–200. https://doi.org/10.24815/jpsi.v9i2.19012

Lusiana, N., & Fatmawati, L. (2022). PBL and PJBL Comparative Study on Critical Thinking Ability in Blended Learning. *International Journal of Elementary Education*, *6*(3), 682–690. https://doi.org/10.23887/ijee.v6i4.48458

Magdalena, I., Nabilah, N., & Lestari, L. (2021). Analisis Pengembangan Model Pembelajaran terhadap Kemampuan Berfikir Kreatif Siswa Kelas 3 SD Secara Daring/Online. *Yasin*, *1*(2), 304–320. https://doi.org/10.58578/yasin.v1i2.136

Mansell, K. E., & Kirksey, J. J. (2025). *Exploring the Effectiveness of Solution Tree ' s PLC at Work ® Process in Texas Schools*. *December*, 1–61.

Mukti, Y. P., Masykuri, M., & Sunarno, W. (2020a). Analysis effect of creativity on the learning outcome of middle-school students in the earth structure and layer topic. *Journal of Physics: Conference Series*, *1567*(4). https://doi.org/10.1088/1742-6596/1567/4/042042

Mukti, Y. P., Masykuri, M., & Sunarno, W. (2020b). Analysis effect of creativity on the learning outcome of middle-school students in the earth structure and layer topic Analysis effect of creativity on the learning outcome of middle- school students in the earth structure and layer topic. *Journal of Physics: Conference Series*, *1567*. https://doi.org/10.1088/1742-6596/1567/4/042042

Ni'mah, A., & Sukartono. (2022). Upaya Guru dalam Meningkatkan Kreativitas Berpikir Peserta Didik di Sekolah Dasar. *Jurnal Penelitian Dan Pengembangan Pendidikan*, *6*(2), 173–179. https://doi.org/10.23887/jppp.v6i2.48157

Nisa, A. F., Prasetyo, Z. K., & Istiningsih. (2019). TRI N (NITENI, NIROAKE, NAMBAHAKE) DALAM MENGEMBANGKAN KREATIVITAS SISWA SEKOLAH DASAR. *El-Midad: Jurnal PGMI*, *11*(2), 101–116.

Niteni, R. K., Dari, N., & Ki, A. (2021). *PENSA E-JURNAL : PENDIDIKAN SAINS*. *9*(1), 1–6.

Prastiwi, S. D., Havifah, B., Khosiyono, C., Praheto, B. E., & Temitope, J. (2025). *Developing a Tri-N*

Integrated Project-Based Learning Module to Enhance Primary Students ' Creativity in Indonesian Language Learning. *17*, 8322–8334. https://doi.org/10.35445/alishlah.v17i4.8401

Primadianningsih, C., & Sumarni, W. (2023). *Systematic Literature Review : Analysis of Ethno-STEM and Student ' s Chemistry Literacy Profile in 21st Century*. *9*(2), 650–659. https://doi.org/10.29303/jppipa.v9i2.2559

Putri, R. A., Magdalena, I., Fauziah, A., & Azizah, F. N. (2020). PENGARUH GAYA BELAJAR TERHADAP PEMBELAJARAN SISWA SEKOLAH DASAR. *Cerdika: Jurnal Ilmiah Indonesia*, *1*(2), 157–163.

Sari, G. A., Ratnasari, Y., & Irvani, A. I. (2025). *Enhancing Elementary Students ' Cognitive Skills on Time Units Through the NHT Cooperative Learning Model with Analog Clock Media*. *1*(1), 1–11.

Sugiyono. (2015). *Statistika Untuk Penelitian*. Alfabeta.

Suryanti, S., Mariana, N., Yermiandhoko, Y., & Widodo, W. (2020). Local wisdom-based teaching material for enhancing primary students' scientific literacy skill. *Jurnal Prima Edukasia*, *8*(1), 96–105. https://doi.org/10.21831/jpe.v8i1.32898

Susanti, R. (2023). Pengaruh Metode Pembelajaran Berbasis Proyek Terhadap Prestasi Belajar Matematika Siswa Sekolah Dasar. *Jurnal Review Pendidikan Dan Pengajaran*, *6*, 3997–4007.

Syaodih, E., Kurniawati, L., Handayani, H., Setiawan, D., Suhendra, I., & Hermita, N. (2019). Critical Thinking Skills Of Fifth Grade Elementary School Students In Bandung City On The Topic Of Water Cycle In Natural Science Subjects. *Journal of Physics: Conference Series*, *1351*(1), 12073.

Verger, N. B., Bressoux, P., Nú, F., Batruch, A., Bouet, M., Bressan, M., Brown, G., Butera, F., Cherbonnier, A., Demolliens, M., Place, L. De, Desrichard, O., Goron, L., Brivael, H., Huguet, P., Jamet, E., Mazenod, V., Mella-barraco, N., Michinov, E., … Paolo, E. (2025). *How teacher autonomy support and student creativity jointly contribute to self-regulated learning : a dynamic , person-environment fit perspective*. *58*(August 2024).

Wilda, S., & Ekawati, S. (2017). Pengaruh kreativitas dan minat belajar terhadap hasil belajar matematika siswa. *Pedagogy: Jurnal Pendidikan Matematika*, *2*(1), 134–160.

Zuraidah, S., Syamsi, K., & Ashadi, A. (2020). Improving the story-telling skill of grade 1 students through the use of hand puppet media. *Jurnal Prima Edukasia*, *8*(2), 166–176. https://doi.org/10.21831/jpe.v8i2.33831