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Implementation of the Children Learning in Sciences (CLiS) Learning Model to Improve Students' Science Learning Outcomes

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Abstract: This study aims to explain the application of the Children Learning in Science (CLiS) model in improving the science learning outcomes of fourth-grade students at SD Inpres 1 Tondo. This study uses the Classroom Action Research (CAR) method, which focuses on improving the quality of learning in the classroom. This model follows four stages of the Kemmis and McTaggart cycle: (1) Planning, (2) Action, (3) Observation, and (4) Reflection. This study was conducted during the 2024/2025 academic year, involving 28 fourth-grade students as research subjects. Data were collected using test and non-test techniques. Non-test methods include interviews, classroom observations, and documentation, while the test method uses multiple-choice questions to assess students' understanding of science material. In Cycle I, the percentage of students achieving The classical approach was used to In Cycle I, student achievement using the classical approach increased to 64.29%, compared to 50% in the pre-action phase, showing an increase of 14.29%. In Cycle II, the percentage reached 100%. This shows an increase of 35.71% compared to Cycle I. These results indicate that the CLiS learning model has a significant influence on improving students' science learning outcomes. Therefore, the application of the CLiS model can be said to be an effective strategy to improve the learning achievement of fourth-grade students of SD Inpres 1 Tondo.
Keyword: Children Learning in Science, Learning Outcomes, Science Subject

Abstrak: Penelitian ini bertujuan untuk mendeskripsikan penerapan model Children Learning in Science (CLiS) dalam meningkatkan hasil belajar IPA siswa kelas IV SD Inpres 1 Tondo. Penelitian ini menggunakan metode Penelitian Tindakan Kelas (PTK) yang berfokus pada peningkatan kualitas pembelajaran di kelas. Model ini mengikuti empat tahap siklus Kemmis dan McTaggart: (1) Perencanaan, (2) Tindakan, (3) Observasi, dan (4) Refleksi. Penelitian ini dilaksanakan pada tahun ajaran 2024/2025, dengan melibatkan 28 siswa kelas IV sebagai subjek penelitian. Data dikumpulkan dengan menggunakan teknik tes dan non-tes. Metode non-tes meliputi wawancara, observasi kelas, dan dokumentasi, sedangkan metode tes menggunakan soal pilihan ganda untuk menilai pemahaman siswa terhadap materi IPA. Pada Siklus I, persentase siswa yang mencapai KKM sebesar 64,29%, dibandingkan dengan 50% pada tahap

pra-tindakan, yang menunjukkan peningkatan sebesar 14,29%. Pada Siklus II, persentasenya mencapai 100%. Hal ini menunjukkan peningkatan sebesar 35,71% dibandingkan dengan Siklus I. Hasil tersebut menunjukkan bahwa model pembelajaran CLiS memiliki pengaruh yang signifikan terhadap peningkatan hasil belajar IPA siswa. Oleh karena itu, penerapan model CLiS dapat dikatakan sebagai strategi yang efektif untuk meningkatkan prestasi belajar siswa kelas IV SD Inpres 1 Tondo.
Kata Kunci: Children Learning in Science, Hasil Belajar, Mata Pelajaran IPAS.

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Introduction

Education is the main foundation for the development and progress of a nation. Through education, society acquires the intellectual abilities, skills, and knowledge needed to face the challenges of the ever-evolving era. (Isma et al., 2023; Aryani et al., 2024). One of the most basic elements in education is teaching and learning activities, where learning outcomes are indicators of achieving learning goals. In this process, teachers play an important role as facilitators who create an effective learning environment and determine the right learning models and methods to achieve meaningful learning experiences (S. Kaymak et al., 2021; Thomson & Hillman, 2019; Hermalia et al., 2025).

Along with the development of the national curriculum, there has been a change in the approach to learning Natural Sciences (IPA) and Social Sciences (IPS), which were previously taught separately. In the Independent Curriculum, these two subjects are combined into one group of subjects called Natural and Social Sciences (IPAS), which are taught starting from the elementary school level. This combination aims to form a holistic understanding of students towards natural and social phenomena around them, through a contextual, integrative, and flexible approach (Putri1, 2023; Aziz et al., 2023; Tegeh, 2024).

IPAS has two main characteristics. First, IPAS is flexible and dynamic because the content of the material always follows the development of science and technology. Second, IPAS uses an interdisciplinary approach, where students are invited to understand a phenomenon through the perspective of various fields of science, both natural and social (Rosiyani et al., 2024; Ritonga & Siregar, 2022). For this reason, the science learning process requires teachers to be able to present learning experiences that build active student involvement and deep conceptual understanding (Utami* et al., 2022).

However, in practice, various studies show that science learning still faces many obstacles. One of them is the use of conventional methods such as lectures,

which limit student interaction and activity, resulting in low understanding of important abstract concepts (Hidayatullah, et al., 2024; Cahyani, 2023; Widodo et al., 2021). Study Saarinen et al., (2021) even emphasizing the importance of scientific literacy and critical thinking skills in 21st-century learning, which can only be developed through active and experiential learning (Taher et al., 2023; Fatmawati et al., 2023).

The results of initial observations conducted at SD Inpres 1 Tondo in March 2024 showed similar conditions. Of the 28 fourth-grade students, there were 10 students who did not achieve the Learning Objective Completion Criteria (KKTP) in the science and education material. The ongoing learning process was still dominated by monotonous lectures, minimal active student participation, and impaired concentration in learning due to student behavior that was not involved in learning activities. Although the data was obtained from observations at one school with a limited number of samples, the problem of low science and education learning outcomes due to the conventional approach has been widely reported in various studies (Khairani et al., 2017; Widiyatmoko, 2013; Wahyuni, 2016) so that these findings can be used as an initial representation of the general problems experienced in science learning in elementary schools.

To overcome these problems, it is necessary to implement innovative learning models that can increase student engagement and understanding constructively. One relevant model is Children Learning in Science (CLiS). The CLiS model is a constructivism-based approach that emphasizes the importance of building and reconstructing student knowledge through exploration, discussion, and direct experience (Salim, 2023; Hi Rahman et al., 2022). This model consists of five stages of learning, namely: (1) orientation, (2) emergence of students' initial ideas, (3) restructuring ideas based on scientific evidence, (4) application of ideas in new contexts, and (5) consolidation of ideas. The advantages of the CLiS model lie in the active involvement of students in the entire learning process, collaboration between students in building meaning, and the creation of a fun and meaningful learning atmosphere. In addition, this model has proven effective in helping students correct misconceptions and build a more accurate scientific understanding (Rositayani & Surya Abadi, 2019; D. F. Aryani & Sartika, 2024) .

Methods

This study uses a Classroom Action Research (CAR) design based on the Kemmis and McTaggart model. This model includes four main components, namely: planning, acting, observing, and reflecting. Initial observations of problems in grade IV of SD Inpres 1 Tondo were conducted in March 2024, while the implementation of research actions was carried out throughout March 2025.

This study was conducted in two stages, with each stage covering two meetings. The focus of this study is on grade IV students at SD Inpres 1 Tondo.

This study involved 23 students from grade IV of SD Inpres 1 Tondo. Data sources were obtained through observations of teacher and student activities, as well as learning outcome tests. Observations were made using observation sheets to record activities during the learning process, while learning outcome tests in the form of multiple-choice questions were conducted at the end of each cycle to measure student achievement. Data analysis was conducted qualitatively and quantitatively. Qualitative data were obtained from observation results and analyzed descriptively to determine student responses and the effectiveness of the learning process. Quantitative data in the form of student learning test results were analyzed by calculating the percentage of learning completion using the following formula:

$$Value = \frac{Total\ Assessment\ Score}{Total\ Maximum\ Score} \text{x } 100\%$$

$$Learning\ Success = \frac{Number\ of\ Students\ Completed}{Total\ Number\ of\ Students} \text{x } 100\%$$

The description of classical completion is measured by assessing the results obtained. If the percentage of students who achieve completion is 75% or more, then the learning can be considered classically complete. Conversely, if the number of students who complete is still below 75%, then the learning has not been achieved through classical completion. The criteria for the success of the action are determined based on classical completeness. An action is considered successful if at least 75% of students achieve the Minimum Completeness Criteria (KKM) score. This 75% threshold refers to the general standard used in various classroom action studies to determine the effectiveness of learning interventions. (Kurniati, 2021).

Results And Discussion

Result

This research is a Classroom Action Research (CAR) conducted in class IV of SD Inpres 1 Tondo. The aim is to optimize the learning outcomes of science by implementing the Children Learning in Science (CLiS) learning model. 23 students are the subjects of the research, which is carried out in two learning cycles, each consisting of four stages: planning, implementation, observation, and reflection.

Student Learning Outcomes in Each Cycle

Cycle	Number of Students	Completed Students	Students Incomplete	Classical Completion Percentage
Pre Cycle	28	14	14	50%
Cycle I	28	18	10	64,29%

Cycle II	28	28	-	100%

The results of the study showed a significant increase in student learning completion after the implementation of the Children Learning in Science (CLiS) learning model. In the pre-cycle, before the action was taken, only 14 out of 28 students, or 50%, achieved learning completion, indicating that learning was not yet effective. After cycle I, there was an increase in the number of students who completed it to 18 students or 64.29%. Although there was an increase, this figure is still below the classical completion standard of 75%, so follow-up is needed in the next cycle. In cycle II, all students, namely 28 out of 28 students, managed to achieve completion scores with a completion percentage of 100%. This increase indicates that the implementation of the CLiS model is very effective in significantly improving student learning outcomes. This success shows that the use of the CLiS model is able to improve the quality of learning and increase the understanding of science concepts of grade IV students of SD Inpres 1 Tondo optimally. Contributing factors of CLiS:

CLiS components	**Explanation**	**Impact on Learning Outcomes**
Initial Concept Exploration	Students express their initial understanding openly	Activate prior knowledge, be better prepared
Cognitive Conflict	The teacher gives challenging questions/phenomena	Students become reflective and critical
Knowledge Reconstruction	Discussion, experiments, observations	There is a formation of deeper meaning
Reflection and Evaluation	Students reflect and revise their understanding	Improve metacognition and memory

Table of Percentage of Teacher and Student Activities in Learning

Cycle	Meeting	***Teacher Activity %***	***Student Activities %***	Category
Cycle I	1	73,14%	71,42%	Enough
Cycle I	2	78,57%	76,19%	Good
Cycle II	1	85,34%	83,72%	Very Good
Cycle II	2	89,84%	89,51%	Very Good

Table 4.2 presents data on the percentage of teacher and student activities in the learning process in each research cycle. The data shows a significant increase in both teacher involvement and student involvement along with the implementation of the Children Learning in Science (CLiS) learning model. In the pre-cycle stage, teacher activity only reached 58.33%, and student activity was at 50.78%. Both are still in the "sufficient" category, which indicates that learning at that time was still taking place conventionally, with the dominant role of teachers in delivering the material.

After the implementation of CLiS in Cycle I, there was a significant increase. Teacher activity increased to 75% and student activity reached 72.91%, both of

which were already in the "good" category. This indicates that the CLiS approach has succeeded in creating a more interactive space in the learning process. Teachers began to act as facilitators who guide students to explore and reflect on their knowledge. Meanwhile, students began to show active involvement in learning activities such as discussing, conveying ideas, and trying to understand concepts through direct experience.

A more striking increase occurred in Cycle II, where teacher activity reached 91.67% and student activity reached 88.54%, both of which were classified as "very good". This shows that the learning process has taken place in a very interactive and participatory manner. Teachers can facilitate learning well, while students show high enthusiasm in participating in learning activities. This increase in activity illustrates the success of the CLiS model in changing the classroom atmosphere to be more active, exploratory, and student-centered.

Qualitatively, this success is supported by the typical stages in CLiS, such as eliciting ideas (exploring students' initial ideas), restructuring ideas (reconstructing concepts through experiments and discussions), and reflection and application in everyday life. Teachers no longer only deliver materials, but trigger students' critical thinking through open-ended questions and investigative activities. Based on interviews, teachers stated that students became more enthusiastic and active in following the lessons. One teacher said, "The children looked more enthusiastic when they were asked to guess or try it themselves before I explained it." This was reinforced by student statements, as expressed by one of the students: "I understand better because we find out for ourselves first, then it is explained."

Thus, quantitative and qualitative data show that the implementation of the CLiS model significantly improves the quality of interaction in learning, both from the teacher and student side. This increase in activity is in line with the increase in learning outcomes that have been analyzed previously, confirming that CLiS is an effective learning model to increase active participation and in-depth student understanding.

Discussion

This study shows that the implementation of the Children Learning in Science (CLiS) learning model in two action cycles successfully improved the science learning outcomes of fourth-grade students of SD Inpres 1 Tondo. As a Classroom Action Research (CAR), the main objective of this study is not merely to prove the effectiveness of the model, but to see concretely how certain learning actions have a direct impact on real classroom situations that were previously problematic.

Quantitative data showed that in the pre-cycle, only 50% of students achieved completion. This result is in line with the observation results, which showed that

learning tended to be teacher-centered, with minimal exploration activities, and students were only passive recipients of information. Intervention through the CLiS model in Cycle I began to show changes: teacher and student activity increased, and learning completion increased to 64.29%. However, based on reflection, it was found that some students still had difficulty following group discussions and were not used to expressing their opinions. In response, actions in Cycle II focused on strengthening teacher scaffolding and simplifying discussion instructions. As a result, both student activity (89.51%) and learning completion (100%) increased significantly. This shows that the CLiS mechanism is effective when supported by classroom context-based instructional adaptations, not just because of the model itself.

In response, actions in Cycle II focused on strengthening teacher scaffolding and simplifying discussion instructions. As a result, both student activity (89.51%) and learning completion (100%) increased significantly. This shows that the CLiS mechanism is effective when supported by classroom context-based instructional adaptations, not simply because of the model itself.

The results of this study show that the application of the Children Learning in Science (CLiS) model has a significant impact on improving the science learning outcomes of grade IV students of SD Inpres 1 Tondo. This model is based on the theory of constructivism, which emphasizes that knowledge is actively constructed by students based on their own experiences (Suparno, 2013). In the context of science learning, this approach is very relevant because it encourages students to explore scientific concepts through meaningful activities that are in accordance with the context of their daily lives.

In the pre-cycle, the low learning outcomes (50%) reflect the still dominant expository learning that does not provide space for students to reconstruct their knowledge. This is by the findings Ginanjar et al., (2019), which states that conventional learning often makes students passive and unmotivated. When the CLiS model began to be applied in Cycle I, although there were still many students who had not achieved completion (64.29%), there was an increase in learning activity. This is in line with the study Krismayoni & Suarni, (2020) which shows that active involvement in group discussions can encourage students' interest and understanding in science learning.

Significant improvement occurred in Cycle II, where learning completion reached 100%. This success was not only due to the implementation of the CLiS model itself, but also to the teacher's adaptive strategies, such as simplifying discussion instructions and providing scaffolding. This strengthens the view Darsanianti et al., (2024) The effectiveness of CLiS is highly dependent on the teacher's ability to adapt the model to the characteristics and readiness of the

students. The involvement of the teacher as an active facilitator is what allows for optimal conceptual reconstruction.

The working mechanism of CLiS in this study can also be seen from the increase in student activity, which reached 89.51% in Cycle II. This indicates that the learning process is not only focused on achieving results, but also on the involvement of scientific thinking processes such as observing, asking questions, and making their own conclusions—a characteristic of the CLiS model. (Ginanjar et al., 2019) Therefore, CLiS not only improves academic scores, but also forms a scientific mindset in students.

Compared with previous studies, such as research by (Kurniawati & Atmojo, 2025) which also shows an increase in learning outcomes through CLiS, this study provides further contributions in the context of elementary school and science subjects. If in previous studies the emphasis was placed on the aspect of understanding concepts through experiments, then in this study the reinforcement lies in students' scientific communication skills through group discussions. This difference in approach confirms that the CLiS model is flexible and adaptive to various classroom conditions, as emphasized by Amal (2021).

However, it should be noted that this success cannot be separated from the reflection space provided in Classroom Action Research (CAR). Flexibility of time to analyze problems, design solutions, and continuously improve approaches is the key to success in implementing the CLiS contextually. This is also a note that in regular settings, outside of CAR, time challenges and curriculum burdens can affect the quality of the implementation of this model (Karsini, 2020).

Thus, it can be concluded that the CLiS model is able to significantly improve students' science learning outcomes through student-centered teaching strategies, based on constructivism, and supported by the flexibility of the teacher's approach in adjusting learning to students' needs.

Conclusion

This study shows that the implementation of the Children Learning in Science (CLiS) learning model can significantly improve the science learning outcomes of fourth-grade students of SD Inpres 1 Tondo. Learning completion increased from 50% in the pre-cycle to 64.29% in cycle I, and reached 100% in cycle II from a total of 28 students. This increase is not only seen in the cognitive aspect but also in the involvement of students and teachers in a more active, collaborative, and exploratory learning process. These results indicate that the CLiS model is able to create a more constructive and enjoyable learning situation, in accordance with the principles of constructivism-based learning and active learning that are the characteristics of the Merdeka Curriculum.

However, conclusions regarding the effectiveness of the CLiS model need to be delivered proportionally. The success achieved cannot be separated from the characteristics of Classroom Action Research (CAR) itself, which provides space for teachers to continue to reflect, adjust strategies, and adapt learning according to the classroom context. In addition, this study is limited in terms of the number of participants (only one class in one school) and has not tested other variables that can affect learning outcomes, such as students' socio-economic background, initial literacy level, or teacher skills in applying a scientific approach. Thus, the results of this study are contextual and cannot be generalized to a wider population without further, more representative research.

To strengthen these findings, further research is recommended to be conducted on a wider scale with a comparative quantitative approach or pure experiment, so that the effectiveness of the CLiS model can be tested more objectively and systematically against other learning models. In practice, teachers need to implement CLiS gradually by considering the readiness and characteristics of students and providing consistent scaffolding at each stage. Schools and policymakers are also advised to hold special training on CLiS implementation so that teachers are more skilled in integrating this model with curriculum needs and classroom realities. This is in line with the vision of the Independent Curriculum, which emphasizes the importance of contextual, active, and student-centered learning.

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