

# Improving Critical Thinking Skill of Elementary School Students through Children Learning In Science Learning Model on Science

Faiq Jazuri<sup>1</sup>, Ana Andriani<sup>2</sup>  
{faiq.jazz17@gmail.com<sup>1</sup>, ana.andriani@gmail.com<sup>2</sup>}

<sup>1</sup>SD Negeri 1 Pengadegan, <sup>2</sup>Universitas Muhammadiyah Purwokerto

**Abstract.** The attitude of students who are usually not involved and causes their critical thinking to be low indicates that they lack critical thinking skills. Therefore, this research is expected to be able to further develop critical thinking skills through the Children Learning in Science (CLIS) learning model for class IV students. This research is a Classroom Action Research (CAR) with research subjects being class IV students at SD Negeri 1 Pengadegan with a total of 42 students consisting of 22 male students and 20 female students. Data was collected using test, observation and documentation methods. Data analysis technique that combines descriptive analysis with percentage techniques. Based on the findings of this study, the application of the Children Learning In Science learning model can further improve the critical thinking skills of Grade IV students at SD Negeri 1 Pengadegan during the 2022/2023 school year, especially those related to science subjects.

**Keywords:** Critical Thinking Skill, Children Learning In Science Learning Model, Science

## 1. Introduction

The developmental progress of the 21st century is characterized by a rapid increase in science and innovation. Especially in national development, especially in the field of education. As a result, students need to be taught how to become proficient in science and innovation, as well as how to think critically, creatively, and consistently. The dominant thinking skill that is strongly needed in this 21st century is critical thinking skill [1]. Understanding the importance of a learning framework to develop student' thinking skills, it is imperative to have learning that engages student more effectively in the educational experience itself.

Science learning in elementary school aims to teach individuals to make valid judgments of the values of scientific and other knowledge [2]. Critical thinking in Science means that students are able to analyze, evaluate, and synthesize the information provided, so that they can make the right conclusions and decisions based on accurate evidence. Critical thinking also involves the ability to ask questions, collect data, and evaluate relevant arguments and evidence. Student can also use critical thinking to solve problems related to science and to develop broader thinking skills.

Science learning carried out at every level of education should emphasize the provision of direct experience. This is because science is a science that is oriented towards observing and testing natural phenomena that occur around us. The natural, social, and cultural environment around the school is a very strong resource for student learning materials [3]. Therefore, science learning that only focuses on theory and verbal explanation of concepts will not be effective enough to understand science concepts. This is very much in line with elementary school students' mental development, which is at the concrete, operational stage of thinking. At this stage, understudies start to have the option to think consistently and foster a more conceptual comprehension, yet are as yet restricted to substantial ideas and can't make expansive speculations.

The results of observations made by researchers at SD Negeri 1 Pengadegan show that science learning is carried out in the classroom where the teacher explains the material then students are given the task of recording the material displayed on the power point or given the task of summarizing the material at home, besides that students are given the task of doing questions.

In direct learning experiences, teachers dominate in learning so that students are less active in learning activities. The observation results of critical thinking skill through comprehension tests of class IV students of SD Negeri 1 Pengadegan are still low, which is 43.75%. Students have not been able to formulate a problem, have not been able to find alternative answers when the teacher asks questions and students cannot answer.

There needs to be a change in the learning approach from teacher-centered to learner-centered. A learner-centered learning approach is very important in developing student' critical thinking skill. Learner-centered learning allows student to be more active in building their knowledge, so they can develop critical thinking skill independently. Therefore, learning models such as Children Learning In Science can be an appropriate alternative to encourage student to think critically.

The Children Learning In Science learning model was developed by a group of children learning in science in the UK led by Driver. The series of learning phases in the CLIS model by Driver is named the general structure of a constructivist teaching sequence, while Tyler calls it constructivism and conceptual change views of learning in science. The implementation stages of the Children Learning In Science learning model are:

- 1) Orientation;
- 2) Elicitation of ideas;
- 3) Restructuring of ideas;
- 4) Application of ideas;
- 5) Review of changes in ideas [4].

These stages greatly support the creativity and activeness of students in the classroom during the learning process. because with these five stages students become more open and dare to convey their ideas in front of the class. Students can also have critical and logical thinking so that students better understand the conception of learning material [5].

The Children Learning In Science learning model makes students more active so that learning becomes meaningful [6]. In this model, students are given the opportunity to gain direct experience through experimentation, observation, and reflection. The CLIS model also engages students in conversations and submits work to further develop critical reasoning skills and interactive abilities. Students can understand science ideas better because they are closely related to developing experiences and can understand how these science ideas are applied in everyday life.

Based on the description of the background that has been mentioned, the author considers it necessary to conduct research with the title "Improving Critical Thinking Skill of Elementary School Students through Children Learning In Science Learning Model on Science".

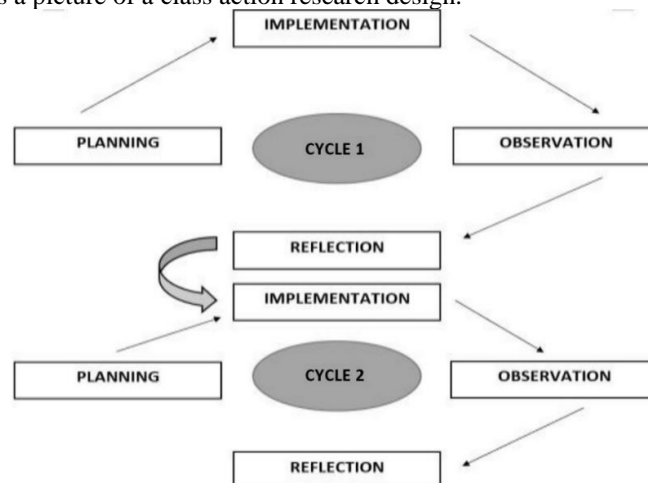
## 2. Methods

The research method used in this research is classroom action research (CAR) adapted from the Kemmis and Taggart CAR model, according to Suharsimi Arikunto, that in outline classroom action research is carried out through four main steps, namely planning, implementation, observation and reflection [7]. This activity research approach is portrayed as follows:

- 1) Planning:  
Researchers used the Children Learning In Science learning model to make lesson plans, observation sheets, and critical thinking skills tests at this planning stage.
- 2) Implementation  
At the implementation stage the teacher implements learning according to the lesson plan made.
- 3) Observation  
Researchers observe and record the results of observations of students' critical thinking skill.
- 4) Reflection  
Researchers reflect after making observations. the researcher conveyed the teacher's weaknesses in planning learning. When teachers use good and correct CLIS learning models, researchers help them communicate their weaknesses.

Classroom Action Research will be very conducive to making teachers more sensitive and responsive to the dynamics of learning in the classroom [8]. In line with Tampubolon, classroom action research is research conducted by both educators and prospective educators to improve performance regarding the quality of the learning process and improve student learning outcomes through reflection actions in the form of cycles [9].

The following is a picture of a class action research design.



**Figure 1.** Kemmis and MC Taggart's action research design model in Arikunto (2008: 16).

The research took place from October to November 2022. The subjects of the research were 42 students in class IV of SD Negeri 1 Pengadegan, Wangon District, Banyumas Regency. Of these, there were 22 male students and 20 female students.

To get complete data, researchers used several techniques. The techniques used include observation, critical thinking skill test and documentation:

- 1) According to Sutrisno Hadi in Sugiyono, the observation technique is a data collection method that involves making observations and taking notes about the state or behavior of the target object [10]. The observation technique involves systematic observation and recording of the investigated symptoms. In cycle 1 and cycle 2, observation was carried out by going directly to the field actively in order to obtain a real picture as well as information regarding the teacher's ability to apply the CLIS learning model in class IV SD Negeri 1 Pengadegan, Wangon District, Banyumas Regency.
- 2) The test, according to Nurgiyantoro, is the right tool or system to measure examples of behavior [11]. Using tests of students' critical thinking skills in this study.
- 3) The documentation technique as explained by Sugiyono (2018: 240) is the recording of past events.

The data analysis technique uses descriptive analysis with percentage techniques.

### **3. Results and Discussion**

#### **3.1. Description of Research Implementation**

In the early stages of the research, researchers conducted observations and interviews to obtain information about the learning process, students' activities, and students' critical thinking skill. These observations and interviews can provide an initial picture of classroom conditions and become the basis for researchers to plan appropriate actions.

Utilizing the Children Learning In Science learning model, researchers planned cycle 1 after completing initial observations and interviews with participants. CLIS learning comprises of five phases, specifically direction, thought age, thought adjustment, thought application, and thought adjustment. Students are encouraged to participate actively and critically in the learning process at each stage.

After implementing cycle 1, researchers evaluated the learning that had been done and made the necessary improvements for cycle 2. This evaluation was carried out based on the activeness of students and students' responses to the learning that had been carried out.

In cycle 2, researchers made improvements and changes that were expected to work in improving the quality of learning in the classroom. During this cycle, the researcher also looks at what students have learned, how engaged they are, and how they react to what they have learned.

#### **3.2 Research Result Data**

Observation sheets and critical thinking skills test questions were used to collect data for this study. Observations were made of students' activities in class action research, cycle 1 and cycle 2. In this class action research, it was realized that students were less active in learning. Student rarely ask questions, seek clarification on problems, or express opinions. When the teacher asked about the material, students were silent. Student will answer questions from the teacher whenever mentioned by the teacher. When working on exercise questions, not all student work on their own. There are some students who only copy the answers of their friends.

### 3.2.1 Pre Cycle

Researchers observed the critical thinking skills of class IV students based on plant parts in the Pre Cycle. Observations revealed that most students still had difficulty analyzing and synthesizing information related to the material. Students have an average Critical Thinking Skill of 43.75 percent. As a result, the researchers decided to use the Children Learning In Science learning model to boost students' critical thinking skills.

### 3.2.2 Cycle 1

Planning at the first cycle stage is based on identifying the causes of problems in the pre cycle stage, then the researcher plans the action by making a lesson plan. In the implementation of this learning, researchers divided learning activities into 3 stages of learning, namely initial activities, core activities, and closing activities.

In cycle 1, researchers started learning by using the CLIS learning model. This model teaches students to observe, describe, and classify plant parts and their functions. In addition, this model also encourages learners to ask questions and propose hypotheses about the parts of plants observed. The following is a description of the observation results of the assessment per group obtained from each group:

- a. Group I  
In making observations, students look skilled and enthusiastic then in writing conclusions students cooperate with each other and the timeliness used in completing LKPD (Learner Worksheet) is appropriate, when explaining students look active in explaining the results of their LKPD conclusions. However, there is still 1 learner who is silent when given a question.
- b. Group II  
Learners look skillful in making observations to find answers to the truth with observations and look cooperative in writing conclusions then the timeliness used by students in completing LKPD (Learner Worksheets) is still late and students look active in explaining reports on the results of the conclusions of their LKPD. However, there is still 1 learner who has not been able to work together and is less active.
- c. Group III  
Learners look skillful in making observations to find answers to the truth with observations in working on LKPD (Learner Worksheet), but learners are less cooperative and rely on each other in their group. The time in completing the LKPD used is quite appropriate and students look active in explaining the report on the results of the LKPD conclusion.
- d. Group IV  
Learners look skilled in making observations and are very visible in their cooperation in writing conclusions then the timeliness used in completing the LKPD (Learner Worksheet) is appropriate and students also look active in explaining the report on the results of the conclusion of the LKPD. Although there are 2 students who are silent when given questions.
- e. Group V  
Students in making observations look skillful students cooperate with each other in writing conclusions then the time in completing LKPD (Learner Worksheet) is used still late and students look active in explaining the report on the results of the conclusion of their LKPD. However, there is still 1 learner who only plays when observing plant parts.

f. Group VI

Learners look skilled in making observations, but do not seem to cooperate with each other in writing conclusions of observations to complete LKPD (Learner Worksheet), the time used is appropriate. In explaining the LKPD report, students look active in explaining their conclusions, although only 1 student.

From the results of observations in cycle 1, there was a significant increase in the critical thinking skills of students. Learners' critical thinking skills increased, with an average of 66.83%. Learners become more skilled in analyzing and synthesizing information related to plant parts material. However, there are still some learners who need further assistance in developing their critical thinking skills. Some learners are silent when asked questions. Learners are also not used to working in groups. Group work is still dominated by one or two people. When given exercise questions, there were still some learners who did not do it and only copied their friends' answers. Then the researcher reflects on a series of cycle 1 actions. The feedback plan that will be carried out by researchers is to make plans to improve learning.

### 3.2.3 Cycle 2

Based on the reflection of cycle 1, then plan improvements that will be made by researchers as teachers by making lesson plans.

In the implementation of this learning, researchers divide learning activities into 3 stages of learning, namely initial activities, core activities, and closing activities. Observation activities were carried out during the implementation of the action where researchers observed the activities of students during the learning process. Just like cycle 1 in observation activities, students are divided into 6 study groups in making observations through the steps of the CLIS model, the following is a description of the results of the assessment observations per group obtained from each group:

a. Group I

In making observations, students look skilled and enthusiastic, then in writing conclusions, students look very cooperative and the timeliness used in completing LKPD (Learner Worksheets) is very appropriate, when explaining students are very active in explaining the conclusions of their LKPD. All students are able to answer questions well and correctly.

b. Group II

Learners are very skillful in making observations to find answers to the truth with observations and look cooperative in writing conclusions then the timeliness used by students in completing LKPD (Learner Worksheets) is very appropriate and students look active in explaining reports on the results of LKPD conclusions. Learners are also able to answer the questions asked.

c. Group III

Students look skillful in making observations to find answers to the truth with observations, then in working on LKPD (Learner Worksheet) students are very cooperative. The time in completing the LKPD used is appropriate and students are very active in explaining the report on the conclusion of their LKPD.

d. Group IV

Students are very skilled in making observations and are very visible in their cooperation in writing conclusions then the timeliness used in completing the LKPD (Learner Worksheet) is appropriate and students are also very active in explaining the report on the results of the conclusion of the LKPD. However, there is still 1 student who is silent when given a question.

- e. Group V  
Students in conducting experiments are very skillful and students look cooperative in writing conclusions then the time in completing LKPD (Learner Worksheet) the time used is very precise and students are very active in explaining the report on the results of the conclusion of their LKPD.
- f. Group VI  
Students look skilled in making observations and students are quite cooperative in writing conclusions of observations then the timeliness in completing LKPD (Learner Worksheet) the time used is appropriate. In explaining the report on the results of the LKPD conclusion, students look active. Although there is one learner who is silent when given a question.

The results of observations in cycle 2, researchers continued to use the CLIS learning model and provided further assistance to students who were still having difficulty. In addition, researchers also provide exercises that are more challenging and require higher critical thinking skills. From the observation results in cycle 2, there was a more significant improvement in the critical thinking skills of students. Learners became more skillful in analyzing and synthesizing information related to plant parts material. In addition, learners also became more active in asking questions and proposing hypotheses related to the material studied. When given exercise questions, there was only 1 learner who still copied his friend's work. The level of critical thinking ability of students in cycle 2 was 78.42%.

### 3.2.4 Research Discussion

The discussion that will be described is related to the activities of researchers as planned, the system of presenting this discussion starts from the implementation of the pre cycle, cycle 1 and cycle 2.

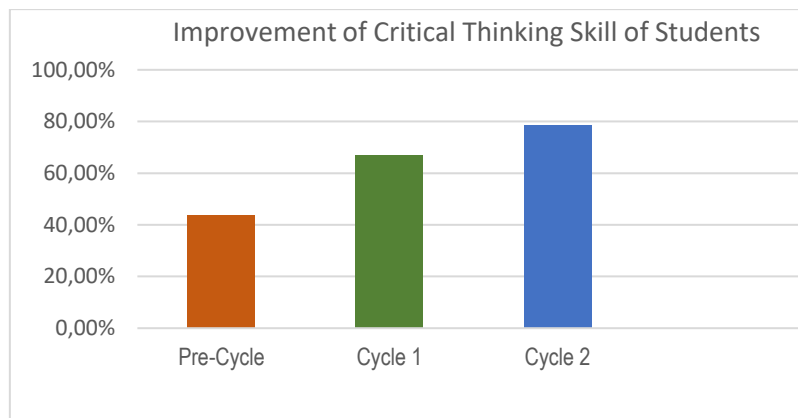
Cycle 1 is the implementation of the results of a previously prepared action plan, namely the researcher acting as a teacher conducting learning using the Children Learning In Science (CLIS) learning model. The actions taken by the research in the learning process in the classroom are adjusted to the steps of the activities in the lesson plan that have been made. The cycle 2 stage is the implementation of the results of the action plan that has been made by paying attention to the improvements from cycle 1 that have been carried out. The implementation of actions in this cycle 1s the implementation of the results of the previously prepared plan, namely to implement learning activities so that the critical thinking skills of students can improve properly by using the Children Learning In Science (CLIS) learning model.

Consequences of determining reasoning ability tests using the CLIS model in science learning can also foster students' determinant reasoning abilities in each cycle. Repetition of reasoning skills that determine students in each cycle 1 is presented in table 1 as follows.

**Table 1.** Recapitulation of Concept Understanding Test Results at Pre Cycle, Cycle 1 and Cycle 2

Cycle	Pre Cycle	Cycle 1	Cycle 2
<b>Average</b>	43,75%	66,83%	78,42%

Figure 2 illustrates the increase in students' critical thinking skills to help clarify the information in the table above.



**Figure 2:** Improvement of Critical Thinking Skill of Students

In Children Learning In Science, students are directed to be more active in learning and build their own understanding of scientific concepts through direct experience. Thus, student' critical thinking skill can be trained because students are taught to gather information, identify problems, analyze data, and make conclusions based on the evidence found.

Learning in CLIS also emphasizes problem solving and critical thinking, so students are given the opportunity to practice in solving real problems. Student are also taught to connect the concepts they have learned with real-world situations and apply them in everyday life.

In CLIS learning, students are also taught to work together in small groups to do tasks and projects together, so it can help student in improving social skills and teamwork. It also helps student to learn from each other and develop a better understanding of the concepts being learned.

Based on the implementation of class action research in class IV SD Negeri 1 Pengadegan in carrying out learning by applying the Children Learning In Science learning model to improve students' critical thinking skills on the material of plant parts and their functions, it has gone well, because stage by stage learning has changed with the increase in students' learning outcomes for the better, it is said that it is sufficient to conduct only 2 cycles of research because in cycle 2 the value of students has increased well.

#### **4. Conclusion**

The results showed that from Pre Cycle, cycle 1 to cycle 2, students' critical thinking skills increased significantly. The CLIS learning model allows students to build their own understanding of science concepts through direct experience, resulting in a significant increase. In addition, learning at CLIS emphasizes critical thinking and problem solving, giving students the opportunity to practice solving real problems. So it is concluded that the application of the Children Learning In Science learning model can improve the critical thinking skills of fourth grade students of SD Negeri 1 Pengadegan, Wangon District, Banyumas Regency, especially in science subjects.



## References

- [1] Kharbach, M. *The 21st-century skills teachers and student need to have*. Halifax: Creative Commons Attribution Mount Saint Vincent University. (2012)
- [2] Fitria, Y. *Landasan Pembelajaran Sains Terintegrasi (Terpadu) untuk Level Dasar*. Sukabina Press. (2019)
- [3] Suadnyana W, Putra D.K.N.S, Ganing N.N. Pengaruh Model Pembelajaran CLIS Berbantuan Media Lingkungan Terhadap Kompetensi Pengetahuan IPA. *Indonesian Journal Of Educational Research and Review*. 2020 April; 3 (1): 28-39
- [4] Samatowa, Usman. *Pembelajaran IPA di Sekolah Dasar*. (Jakarta: Indeks, 2016), h. 74. (2011)
- [5] Dewi N.L.I.S, Siniasih N.W. Peran Pembelajaran CLIS Menggunakan Media Animasi Bagi Kompetensi Pengetahuan IPA. *Jurnal EDUTECH Universitas Pendidikan Ganesha*. 2020 July 15; 8 (1): 112-122
- [6] Krismayoni P.A.W, Suarni N.K. Pembelajaran IPA dengan Model Pembelajaran Children Learning In Science Meningkatkan Hasil Belajar Ditinjau Dari Minat Belajar. *JP2*. 2020; 3 (2): 138-151
- [7] Arikunto, Suharsimi. *Penelitian Tindakan Kelas*. Jakarta: Bumi Aksara. (2009)
- [8] Fitria H, Kristiawan M, Rahmat N. Upaya Meningkatkan Kompetensi Guru Melalui Pelatihan Penelitian Tindakan Kelas. *Abdimas Unwahas*. 2019 April 1; 4 (1): 14-25
- [9] Tampubolon, M Saur. *Penelitian Tindakan Kelas Sebagai Pengembangan Profesi Pendidik dan Keilmuan*. Jakarta: Erlangga. (2014)
- [10] Sugiyono. *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta. 2018.
- [11] Nurgiyantoro B. *Penilaian Pembelajaran Bahasa*. Yogyakarta: BPFE. 2010.