

BEGINNING CRITICAL THINKING SKILLS FOR V ELEMENTARY SCHOOL STUDENTS IN BANDUNG

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ABSTRACT

The purpose of the study was to describe the initial critical thinking skills of elementary school students in Bandung city. Descriptive qualitative method was used in this research by involving 64 fifth grade students from three elementary schools in Bandung, West Java in learning natural science of air material. The data was collected using an instrument in the form of a description test that includes all critical thinking indicators assisted by *Google form*. The data were analyzed by calculating the percentage scores of the students' answers and categorizing them into *very high*, *high*, *moderate*, *low*, and *very low*. The results showed that in general, the students' initial critical thinking abilities were included in the low category. There were 27 students (42.19%) in *very low* category. *Low* category had 27 students (42.19%); *moderate* category had 9 students (14.06%); and there were only 1 student in *high* category (1.56%). Based on critical thinking indicators, the aspect of *Advanced Clarification* and *Strategies & Tactics* fell into *very low* category with an average percentage value of 21.25% and 33.44%, the aspect of *Elementary Clarification* fell into *low* category (46.34%), the aspect of *Basic Support* was in *moderate* category (58.77%), while the aspect of *Inferring* was in *high* category (79.17%). In general, the critical thinking aspect of several elementary schools students in Bandung is still in the low category (47.88%). These results indicate the need to improve the critical thinking aspects of students through habituation of these aspects in learning and the need for information on the impact of their effects through a follow-up study.

Keywords: Initial Skill, Critical Thinking, Elementary School, and Natural Science.

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INTRODUCTION

The 21st century is a century which demands quality and capable human resources in having global competitiveness (Nuraini, 2017). In addition, in this century humans are also required to have high-order thinking skills (Makhrus, Harjono, Syukur, Bahri, & Muntari, 2018). Education in the 21st century goes hand in hand with the use of digital technology and 21st century learning proficiencies. These skills are known as the 4Cs consisting of *creative thinking*, *communication*, *collaboration*, and *critical*

thinking (Jannah & Atmojo, 2022). One of the important skills that the students in the 21st century must possess is critical thinking (Nasution, 2018).

Critical thinking is the ability to analyze an existing fact and make an idea and defend that idea to be used as a comparison (Vera & Wardani, 2018). It can also be defined as the ability to think deeply and reflectively to make decisions and solve problems by analyzing situations, evaluating arguments, and making appropriate conclusions (N. P. S. Wahyuni, Widiastuti, & Santika, 2022). This is in line with other opinions which state that critical thinking skill is the skill from one's thought process to evaluate, analyze evidence, provide assumptions, and logic based on one's ideas (Nasution, 2018).

Critical thinking is also defined by Beyer which states that there are 7 abilities in it; namely, the ability to determine the credibility of a source, the ability to distinguish facts from research, the ability to identify, and the ability to evaluate unspoken assumptions. In addition, it is also related to the ability to identify habits that occur, the ability to identify various points of view, and the ability to evaluate the evidence offered to support an idea (Danial, Gani, & Husnaeni, 2017).

Critical thinking has some characteristics; namely, the ability to draw conclusions from observations, the ability to identify an assumption, the ability to think deductively, the ability to make a logical interpretation, and the ability to evaluate an opinion to determine the weak and the strong (Marudut, Bachtiar, Kadir, & Iasha, 2020).

Ennis stated that there are 12 indicators of critical thinking which are grouped into 5 indicators (Marudut et al., 2020); namely:

1. Providing an *Elementary Clarification*; focusing questions, analyzing opinions/arguments from questions, and asking and answering questions.
2. Building *Basic Support*; whether or not the source can be trusted, and observing and considering the report of operation result.
3. Making *Inferences (Inferring)*; deducing and considering the results of deduction, inducing and considering the results of induction, and forming judgments.
4. Making *Advanced Clarification*; defining terms and assumptions.
5. Arranging *Strategies and Tactics*; determining an action and interacting with other people.

Critical thinking skill refers to the student' ability to analyze a complex problem, conduct investigations about statements that do not have clear answers, evaluate various points of view of information sources, and draw conclusions from the evidence that has been found and the reasons (Wayudi, Suwatno, & Santoso, 2020). Through critical thinking skills, a person will have good endurance to compete superiorly (Sulianto, Cintang, & Azizah, 2018).

Critical thinking skill is related to several aspects. They are closely related to problem solving abilities where the higher the problem solving ability, the higher the critical thinking skills and vice versa (Susilowati, Hartini, Suyidno, Mayasari, & Winarno, 2020). This can happen because through critical thinking, a person can solve a problem optimally which will be able to look at the problem from various perspectives (Sulianto et al., 2018).

In addition, critical thinking skill also has a relationship with learning motivation where learning motivation is the driving force for students to learn and motivation can also ensure the continuity of learning activities and provide direction for these learning activities. So, this motivation is quite important for students to achieve learning goals (A. J. Nugraha, Suyitno, & Susilaningsih, 2017). Another thing that is no less important is to understand the concept. Critical thinking skills also have a relationship with understanding concepts (Alatas, 2014). This causes critical thinking skill to also have an influence on student learning outcomes (Prasasti, Koeswanti, & Giarti, 2019).

Therefore, critical thinking skill is very important for students, including those still at the elementary school level. However, the fact is that the thinking skill of elementary school students in Indonesia is still in the low category (Ariyani & Prasetyo, 2021). This is evidenced by the low scientific achievement of Indonesian students as evidenced by the PISA and TIMSS rankings which are quite low. Indonesian students are only able to answer questions at level 1 and level 2. Meanwhile, the highest level on PISA and TIMSS questions is level 6 and Indonesian students have not been able to answer questions at that level (Marudut et al., 2020). Thus, critical thinking skills of students in Indonesia are still relatively low.

One of the ways to improve students' critical thinking skills is to train these abilities. This is in line with other opinions which state that critical thinking skill can be measured, trained, and developed (Susilawati, Agustinasari, Samsudin, & Siahaan, 2020). Therefore, it needs training especially since primary education level (Zubaidah,

2017). Critical thinking skill training can be carried out during the learning activities carried out. One of the subjects that can be used to train students' critical thinking skill is Natural Science.

Natural Science is a collection of knowledge about an object or natural phenomenon resulting from the thoughts and investigations of scientists through a skill of experimenting using a scientific method (Hisbullah & Selvi, 2018). It is also defined as the science that studies the universe and its contents and the events that occur in it and is the result of the development of scientists through the scientific process (Sujana, 2014). In addition, it can also be defined as a subject that discusses natural phenomena that have been systematically arranged based on the results of research and human observations. Science is one of the subjects given to elementary school students (Nahdi, Yonanda, & Agustin, 2018).

One of the goals of learning science is to require students to think critically (S. Wahyuni, 2011). This is in line with another opinion which states that through science learning, students are required to observe objects, the surrounding environment, and listen and communicate effectively. In addition, students are also asked to respond and solve problems effectively. Thus, through science learning, students will be instilled with critical thinking skills (Aprilia, 2021). In this research, air material would be applied in science learning in class V of Elementary School. It was chosen because currently there are many issues or problems related to air which is very closely related to the daily lives of students.

Based on the results of the description above, to prove this in a more in-depth and precise manner, this study conducted a preliminary critical thinking skill test for elementary school students. Initial ability itself is an ability that is expected to be mastered before students learn new concepts related to the concepts that have been studied (Widayati, 2018). Therefore, this study aims to determine the initial critical thinking skills of fifth grade students in several elementary schools in the city of Bandung in learning science on air.

METHOD

The method used in this study is a descriptive method with a qualitative approach. Descriptive research is research that aims to accurately describe the nature of an individual, situation, or frequency that has a certain relationship between a symptom

and another one (Zellatifanny & Mudjiyanto, 2018). Descriptive research can also be defined as a study in which it provides an overview of a variable, symptom, and situation that is actually or what it is (Suryana, Sopandi, Sujana, & Pramswari, 2021).

Meanwhile, a qualitative approach is a research based on a qualitative paradigm, strategy, and model implementation (Khairani & Ariesa, 2019). Qualitative approach can also be interpreted as research that has a phenomenological foundation and constructivism paradigm in developing knowledge (Muslim, 2015).

This research was carried out in three elementary schools located in Bandung City, West Java, with the research subjects consisting of 64 class V students. It was carried out in June 2022. The object of this research is the students' initial critical thinking skills in learning science in air. Data collection techniques from their initial critical thinking skills were collected through test questions in the form of descriptions with the help of *Google form*. Indicators of critical thinking skills assessment are based on several indicators described in **Table 1**.

Table 1. Indicators of Critical Thinking Skills

No.	Indicators
1.	Providing <i>Elementary Clarification</i>
2.	Building <i>Basic Support</i>
3.	Making inferences (<i>Inferring</i>)
4.	Making <i>Advanced Clarification</i>
5.	Organizing <i>Strategies and Tactics</i>

The test questions given to measure the students' critical thinking skills are in the form of description questions with a total of 10 questions that already cover all indicators of critical thinking. Provide information related to item validity and test reliability. There needs to be a description of the aspects of the critical thinking skills indicator in Table 1 with the distribution of the number of questions. The assessment category of each question varies depending on the difficulty of the question with a total correct score of 38.

The data analysis technique used is descriptive statistical technique where the students' critical thinking skills are analyzed by determining the percentage score of each student's answer. After the assessment of each item is carried out, the average calculation is carried out based on the aspects of the critical thinking indicators in Table

1 and expressed in percentage form according to the formula stated by Sudijono (in (Fajriah & Asiskawati, 2015)) sebagai berikut.

$$P = \frac{f}{N} \times 100\%$$

Explanation:

P = Percentage Score

f = Frequency whose percentage is being looked for

N = the number of frequency/total students

After that, the average percentage scores that have been generated are categorized as in **Table 2** below.

Table 2. The Category of the Students' Creative Thinking Skill

Scores	Categories
$\leq 40\%$	Very Low
41 – 57%	Low
58 – 75%	Moderate
76 – 92%	High
$\geq 93\%$	Very High

RESULTS AND DISCUSSION

Based on the results of research that has been carried out regarding the initial critical thinking skills of elementary school students, it can be seen in Table 3 that their initial critical thinking ability in some elementary schools in Bandung City is still in the low category. Based on the results of the study, only 1 student had initial critical thinking skills in the high category. While the rest, there are 9 students who fall into the medium category, 27 students who fall into the low category, and 27 other students who fall into the very low category. There are no students who fall into the very high category.

Tabel 3. The Test Result of the Students' Initial Critical Thinking Skill

Scores	Categories	Total
$\leq 40\%$	Very Low	27
41 – 57%	Low	27
58 – 75%	Moderate	9
76 – 92%	High	1
$\geq 93\%$	Very High	0

Overall, based on each aspect of the critical thinking indicators presented in **Table 4**, the students' initial critical thinking ability was still low which had an average percentage score of 47.78%. This was evidenced by the average percentage score of each aspect; only one aspect was included in the *high* category, namely the *Inferring* aspect. While the other aspects; namely, the *Basic Support* was in the *medium* category, the *Elementary Clarification* aspect is in the *low* category, and the *Strategies and Tactics* aspect and the *Advanced Clarification* aspect were in the *very low* category which are explained in detail from each item in **Figure 1**.

Table 4. The Test Result of the Students' Initial Critical Thinking Skill based on Indicators

Indicators	Percentage (%)	Categories
<i>Elementary Clarification</i>	46.34	Low
<i>Basic Support</i>	58.77	Moderate
<i>Inferring</i>	79.17	High
<i>Advanced Clarification</i>	21.25	Very Low
<i>Strategies and Tactics</i>	33.44	Very Low



Figure 1. The Graphic of Test Result of the Students' Initial Critical Thinking Skill from Every Test Items

From Figure 1, it can be seen that the only aspect that falls into the high category is Number 10 which is the *Inferring* aspect. This aspect has the highest percentage value, which is 79.17%. This can happen because students are well able to consider the conditions in the surrounding environment about public awareness of the occurrence of air pollution. Students are also able to provide relevant and precise explanations. This proves that students are able to identify the consequences of a problem (Wayudi et al., 2020). So, the initial critical thinking skills on the *Inferring* aspect are good.

The aspect that has the second highest percentage score was the *Basic Support* on questions Numbers 4, 5, and 6 with the average percentage score of the three questions respectively 52.34%, 74.48%, and 49.48% which if averaged becomes 58.77 % and fall into the *moderate* category. This could happen because the students were good enough in considering the credibility of a source where in this research, they are asked for their opinions about their agreement with the information contained in the info-graphic.

The students were also very good at making observations and considering the results of observations which can be seen in question Number 5 which has a fairly high average percentage score of 74.48%. In this study, they were also asked to make observations about air pollution that occurred in their environment and identify the pollutant sources that caused the greatest air pollution in the surrounding environment. So, in the aspect of *Basic Support*, their initial critical thinking skills are quite good, but efforts still need to be made to improve so that they can be even better.

One of the efforts that can be made to improve the students' critical thinking skill in the *Basic Support* aspect is to teach them about what expert indicators can be trusted and what cannot be trusted. In addition, they must identify other sources of search results, such as articles whether they can be trusted or not. Through the ability to think critically in this aspect, a student would be able to form or consider more carefully about something whether it is acceptable, needs to be rejected, or needs to be delayed when receiving information (Wayudi et al., 2020).

The aspect that fell into the *low* category was *Elementary Clarification* on questions Numbers 1, 2, and 3 with the average percentage score of the three questions are 66.67%, 40.31%, and 32.03% which if averaged becomes 46.34 %. This could happen because the students still had difficulty in answering questions regarding an explanation or challenge which can be seen in Number 3 where in this study, they were asked to provide opinions about a fact that was contained in the info-graphic. The results showed their achievement was still low at this number.

Number 4 had a low percentage because the students still had difficulty in analyzing an argument. In this problem, they were asked to analyze what would happen if air pollution was allowed. The results showed that they were only able to name 1-2 causes without providing an explanation. In this aspect, their initial critical thinking ability was quite *low*. Their low critical thinking ability in this aspect was thought to

occur because they were not accustomed to focusing questions and conducting analysis in advance about the test items presented (Wayudi et al., 2020).

There were two aspects of critical thinking skill in this study; namely, the aspects of *Strategies and Tactics* and aspects of *Advanced Clarification*, that fell into the *very low* category. The aspect of *Strategies and Tactics* which are questions Number 8 and 9 had a very low average percentage score of 36.56% and 30.31%, respectively, which if averaged becomes 33.44%. This could happen because the students had difficulty in deciding an action or formulating a solution. In this study, they were asked to determine other efforts to overcome air pollution and other effects of air pollution other than those listed in the info-graphic. Many of them only repeated what had been listed in the info-graphic. As a result, their critical thinking skill in this aspect was still low. This proved that they still had difficulty making decisions about a problem.

The last aspect is the one that had the lowest average percentage score; namely, the *Advanced Clarification* aspect on Number 7 with an average percentage score of 21.25%. This could happen because the students still had difficulties to make or consider a decision result where in this study, they were asked to provide an opinion whether it was appropriate or not regarding the air pollution solution listed in the info-graphic. They were only able to answer "Yes" or "Not yet" without being able to give reasons why it was correct or not.

The results above illustrated that the students were not accustomed to thinking critically about something. As a result, their initial critical thinking ability in this aspect was *very low*. A solution is needed to improve critical thinking skills in this aspect. One way that can be done to improve critical thinking skills in this aspect is by guiding the students to build and evaluate independently (Wayudi et al., 2020).

The results of this study are in line with the results of previous research stating that the initial critical thinking ability of the fourth grade elementary school students in science learning is in the *low* category (W. S. Nugraha, 2018). It is in line with another study stating that the initial ability to think critically in elementary school students in science learning is still relatively *low*. This is marked by the students still having difficulties in expressing opinions, asking questions, concluding, or solving a problem (Aprilia, 2021). Other research also stated that, based on the results of the analysis of the students' initial critical thinking ability, as many as 75.82% of the students had *low* critical thinking skills (Retnosari, Susilo, & Suwono, 2016). The low initial critical

thinking ability is also evidenced by other studies stating that the students' initial critical thinking abilities are in the *very low* category (Haryati, Andayani, & Al Idrus, 2019).

The students' low critical thinking skills can be caused by the habit of critical thinking that has not become a tradition in Indonesian schools. This causes the students to become unfamiliar with critical thinking questions. They feel strange when asked to work on questions that require them to think critically because they are not used to it (Novtiar & Aripin, 2017). Lack of interest in reading is also one of the factors causing low critical thinking skills. Through reading, they will have broad insight and can increase their knowledge. Learning that begins by asking them to read can help them to be able to build their knowledge obtained from the reading results (Haryati et al., 2019).

In addition, learning method also affects the low critical thinking ability of students where the method that is often used by teachers in Indonesia is the conventional method or the lecture method. One of the impacts of using this method is that students' critical thinking skills are not well honed. They become less active in the learning process because they are still in *teacher-centered* method (Satria & Sopandi, 2019). Not applying innovative learning models can also affect students' low critical thinking skills because by using innovative learning models, they will be required to apply critical thinking to learning activities. In addition, they will be more active during the implementation of learning activities.

There are several factors that affect a person's critical thinking ability, namely physical conditions because people with ill conditions will have difficulty concentrating properly to consider a decision or make a decision to solve a problem. Motivation can also influence because it will give encouragement to someone to carry out a predetermined goal. In addition, anxiety is also able to reduce the quality of one's thinking which makes it difficult to think critically (Wayudi et al., 2020).

The followings are the characteristics of individuals who have critical thinking skills proposed by Fisher, namely having the ability to see things thoroughly and in detail, being able to analyze ideas or ideas to get a more thorough and detailed explanation, being able to analyze ideas or ideas to get more accurate explanations, and able to think openly and broadly (Zubaidah, 2017).

Therefore, a solution is needed to improve students' critical thinking skills because critical thinking skills really need to be possessed by them all. Through the

ability to think critically, a person will be able to solve problems optimally because they are able to see a problem from various perspectives. This is what causes a person to be able to have various alternative solutions that are most appropriate to solve a problem (Sulianto et al., 2018).

The solution that can be done to improve critical thinking skills in students is to familiarize them to always think critically when carrying out learning activities. This can be done with the help of learning models. There are several learning models that are proven to be able to improve critical thinking skills, one of which is the RADEC learning model. The stages of the RADEC model, namely Read, Answer, Discuss, Explain, and Create are able to build critical thinking skills (Pratama, Sopandi, & Hidayah, 2019).

Meanwhile, on the other hand, the Problem Based Learning (PBL) model is proven to be able to stimulate the development of students' critical thinking because through the PBL model, they will have the experience to find a new concept (S. Wahyuni, 2011). Through the use of constructivist learning models, the implementation of student-centered learning activities is more effective rather than teacher-centered (Bonk & Smith, 1998; Paul, 1992). Through learning activities that apply *student-centered*, it is hoped that students will be more active during the learning activities carried out and learning activities will become more meaningful. They will relate the latest information based on previous information and later influence experiences and alternative problem solving according to available opportunities (Meyers, 1986).

Interactive learning media is also proven to be able to improve students' critical thinking skills because it can help them to analyze, criticize, and draw conclusions or considerations carefully (Zulhelmi, Adlim, & Mahidin, 2017). In addition, digital media is also proven to be able to support the mastery of 4C skills, one of which is critical thinking skills. Digital media is able to provide convenience for students to understand the subject matter (Jannah & Atmojo, 2022).

By increasing students' critical thinking skills, it is expected to be able to have a good influence on the quality of learning in schools. If they have good critical thinking skills, they are expected to be able to have good learning motivation, be able to understand concepts well, have good problem solving skills, have good creative thinking skills, and produce good learning outcomes and are expected to be able to improve Indonesian students' learning achievement.

CONCLUSION

Critical thinking is the ability to think deeply reflectively to make decisions and solve problems by analyzing situations, evaluating arguments, and making appropriate conclusions. Critical thinking skills are very important for students, including elementary school students. Based on the results of the study, the students' initial critical thinking skills were in the *low* category where 27 of them were in the *very low* category, 27 of them were in the *low* category, 9 students were in the *moderate* category, and 1 student was in the *high* category.

Based on critical thinking indicators, the *Advanced Clarification* and *Strategies & Tactics* aspects fall into the *very low* category with an average percentage score of 21.25% and 33.44%, respectively. *Elementary Clarification* aspect falls into the *low* category with an average percentage score of 46.34 %, the *Basic Support* aspect is in the *moderate* category with an average presentation score of 58.77% and the *Inferring* aspect is in the *high* category with an average percentage score of 79.17%.

So, overall, the initial critical thinking ability of students at several elementary schools in Bandung is still in the *low* category. This can happen because the habit of critical thinking has not become a tradition that is applied in schools and causes students to become unfamiliar with critical thinking questions. In addition, low critical thinking skills can also be caused by a lack of interest in reading to add to a wider knowledge and by conventional learning methods which apply teacher-centered learning so that the students are not required to think critically and they become less active during learning activities.

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