



# Analysis of Critical Thinking Ability on Cocoa Featured Product Problem in High School Student in Jember

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**Abstract:** The implementation of this research is limited by setting the problem of critical thinking skills to the problem of superior products in Jember, namely Cocoa students in Jember. This research was carried out using local wisdom on the subject matter of fermentation in cocoa beans. Students' thinking ability is carried out through filling in the work on test questions in the form of descriptions. The research will be carried out in October-November. The results of the research are the critical thinking skills of vocational students with a score of 76.53 higher than high school students with an average score of 62.37 for critical thinking skills. This shows that vocational students understand more about Jember's superior product, namely cocoa. Being in a district with one of the leading products, namely cocoa, makes vocational high school students equipped with knowledge about cocoa commodities, such as cocoa seeds, cocoa product development and cocoa processing methods. Thus, it is hoped that high school and vocational high school students will be able to make a maximum contribution in efforts to develop local products so that they can increase the progress and welfare of the local area. Problem-based learning that links learning materials and local wisdom is needed to support the improvement of students' critical thinking skills.

**Keywords:** Cocoa; Critical Thinking Skills; High School Student

## Introduction

Science learning is an activity where there is a connection between the concepts of physics, chemistry, and biology and is accompanied by phenomena that often occur among students. Basically, science learning can be used to develop cognitive, psychomotor and affective abilities (Mundilarto, 2013). The era of the industrial revolution 4.0 had a significant influence on the world of education. Various kinds of challenges will arise in the future, so students must be equipped with qualified abilities to re-apply the learning that has been obtained (Yuliati et al., 2019).

Science learning which is very important for students to learn is related to an understanding of the superior products of the area where they live. The superior product that is identical with the city of Jember is cocoa. Cocoa (*Theorema Cacao L*) is a plantation commodity that plays an important role in increasing the country's foreign exchange (Manalu, 2019). Cocoa contains polyphenolic compounds which are natural

antioxidants and have a role as a basic ingredient for making chocolate (Sari et al., 2015). But in reality the people's cocoa production is still below the national cocoa production. Low cacao production is the impact of low cacao farming business actors.

Indonesian cocoa has characteristics including having a high melting point, containing cocoa butter and being able to produce cocoa powder with good quality (Aris et al., 2020). However, there are also several weaknesses in cocoa from Indonesia, namely the quality of cocoa beans exported by Indonesia is still relatively low (Rachmatullah et al., 2021). Some of the causes of the low quality of cocoa beans are the acidity of the beans followed by a weak taste, the quality consistency is not yet stable, especially when it is found that only a small portion of the beans has gone through the fermentation process (Ariyanti, 2017).

Jember is one of the areas in East Java which is known as the industrusti area, one of which is cocoa with various kinds of processed or raw materials. However, there are problems that arise related to superior cocoa

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products, one of which is the existence of cocoa which does not synergize with student knowledge. Students' understanding and sensitivity to the problems that occur around them, especially regional superior products, are needed to create an innovation in maintaining potential resources in the area, especially Jember Regency. Critical and sensitive nature is one of the basic abilities that must be possessed by students in facing the challenges of the times (Retnowati et al., 2016).

One of the goals of education is to realize students' critical thinking skills. The rapid development of technology has an impact on the fulfillment of thinking skills, one of which is the ability to think critically (Pradana et al., 2017). The ability to think critically is a form of higher-level thinking that is much needed in the learning process (Azrai et al., 2020).

Critical thinking can also be interpreted as a process of thinking more deeply in order to examine information obtained from experiments, investigations, explorations and so on with the aim of obtaining accurate conclusions and being able to build knowledge (Putra et al., 2015). The construction of knowledge in critical thinking can be built through several stages, namely interpretation, analysis, evaluation, and inference (Yustika et al., 2019).

Critical thinking skills must be possessed by students in order to support rational thinking patterns when facing the problems they are facing (Karim et al., 2018). Critical thinking is a persistent effort to find out and analyze a truth related to science and is supported by various scientific evidence so that conclusions can be drawn (Hamdani et al., 2012).

Several studies have shown that students' critical thinking skills have not yet reached the satisfactory category (Pradana et al., 2017; Rahman et al., 2021; Rosdiana et al., 2019). The level of students' critical thinking ability is influenced by various factors, namely 1) physical condition, 2) motivation, 3) emotional state, 4) intellectual development in responding to and solving a problem. Memorizing material is one of the problems that contributes to students' lack of critical thinking skills (Dores et al., 2020).

The ability to think critically is needed by students in facing challenges in the 21st century which is characterized by openness and globalization (Roudlo, 2020). The critical thinking skills possessed by students will guide students to think logically and be able to answer various kinds of problems by making rational decisions about what to do and believe (Susilawati et al., 2020).

Active involvement of students in various challenges that will be faced is very necessary in solving various environmental problems (Abdullah, 2018). Potential natural resources such as cocoa become one of the legacies that must be maintained and developed for quality. Students' skills and active involvement must be prepared early on so that students have a concern in

developing superior products in the Jember area. The ability to think critically that must be possessed by students plays a role in solving problems regarding seed production and quality so that Jember's superior products can be maintained and the community's economy can increase.

From the various problems that have been described above, the researcher is interested in studying further related to students' critical thinking skills when faced with the problems of natural resources around Jember, namely Cocoa. This study aims to determine the critical thinking skills of public high school and vocational high school students. Thus the formulation of the problem in this study is "are there differences in the ability to think critically about the problems of superior cocoa products among high school students in Jember?" This research is expected to contribute to determining appropriate learning media and models for students in order to improve students' critical thinking skills regarding the superior products of the Jember region so that students are expected to be able to develop the potential of local natural resources and be able to realize the welfare of the Jember area.

## Method

The research method used is descriptive. The subjects in this study were students at the senior high school and vocational high school levels in Jember. The research time is October 2022 with the research instrument used, namely a test in the form of a description of 10 questions with the following indicators:

**Table 1.** Critical Thinking Ability Indicators

General Indicators	Indicators
Interpretation	Understanding the problem by mentioning natural resources and explaining the processing of natural resources that have been mentioned appropriately
Analysis	Identify the relationship between the graph and the problem presented appropriately
Evaluation	Using the right strategy in linking previous answers to solve the problem correctly
Inference	Make and draw conclusions appropriately

The scores in the table above are then followed by a statistical comparison test with a statistical hypothesis:

Ho = There is no difference in the critical thinking skills of high school and vocational high school students

Ha = There are differences in the critical thinking abilities of high school and vocational high school students

With a real level of  $\alpha = 5\% = 0.05$ , the test criteria are:

Ho accepted if  $p > 0.05$  then Ha is rejected

Ho is rejected if  $p \leq 0.05$  then Ha is accepted

### Result and Discussion

Based on the results of the normality test as one of the prerequisite tests, it shows that the critical thinking ability scores of high school and vocational high school students have the following normal distribution:

**Table 2.** One-Sample Kolmogorov-Smirnov Test

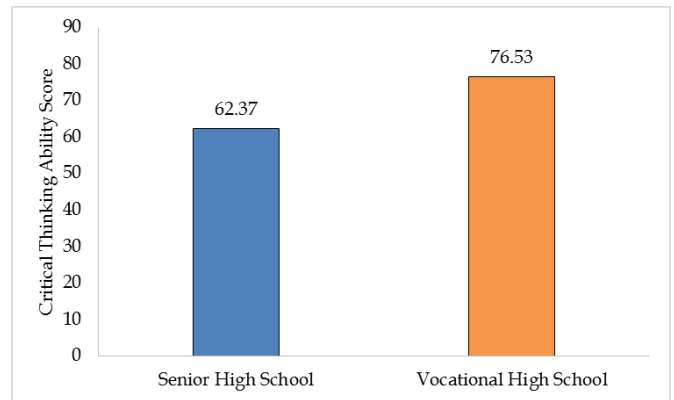
	Senior High School	Vocational High School
N	15	15
Mean	62.73	76.53
Std. Deviation	3.348	3.833
Absolute	.135	.140
Positive	.135	.116
Negative	-.132	-.140
Test Statistic	.135	.140

Table 2 above shows a significance value of more than 0.05, meaning that the data is normally distributed and the next statistical test can be continued.

**Table 3.** Comparative Statistical Test

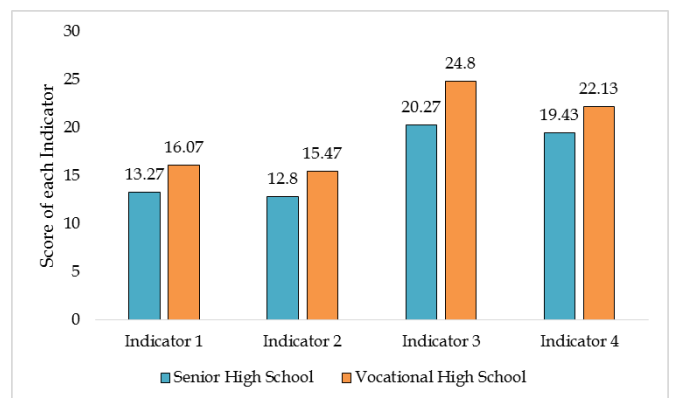
	F	Sig.	t	Sig (2-tailed)
Equal variances assumed	.625	.436	-10.501	.000
Equal variances not assumed			-10.501	.000

Based on the SPSS data table 3 above, it is known that the calculated F value is 0.625 with a probability of 0.436. Because the probability value is  $> 0.05$  then Ho is accepted or the two population variances are the same (homogeneous). Table 3 also shows that the 2-tailed sig value data is less than 0.05 so that Ho is rejected and Ha is accepted, that is, there are differences in the critical thinking abilities of high school and vocational high school students in Jember. The critical thinking ability of Vocational High School students is higher than that of High School students, presumably because Vocational High School students have been provided with learning materials that involve products that are in accordance with the chosen area of expertise. So that Vocational High School students better understand cocoa as one of the superior products in Jember. The average score of critical thinking skills for senior high school and vocational high school students is presented in the graph in figure 1.



**Figure 1.** Critical thinking ability scores of high school and vocational high school students

Based on figure 1, it is known that the critical thinking skills of Vocational High School students with a score of 76.53 are higher than those of High School students with an average critical thinking ability score of 62.37. This shows that Vocational High School students understand more about Jember's superior product, cocoa. Being in a district with one of the leading processed products, namely cocoa, makes Vocational High School students equipped with knowledge about cocoa commodities, such as cocoa seeds, cocoa product development and good cocoa processing methods. The critical thinking ability of high school students is lower than that of vocational high school students. When analyzed from several question indicators, the average high school student gives answers in general and does not point to any potential plantation commodities in Jember. Scores of students' critical thinking skills in each indicator are shown in figure 2.



**Figure 2.** Score of each indicator of students' critical thinking ability

Figure 2 shows the value of each indicator of critical thinking skills for high school and vocational high school students in Jember. The first indicator is that the interpretation for Senior High School is lower than for Vocational High School. The first indicator in the process of critical thinking in this study is interpretation with the ability to understand and express the meaning or

significance of personal experience. In the questions presented, Vocational High School students were able to name and explain potential products, one of which was cocoa, while High School students only gave general answers such as corn, rice and several other agricultural products.

Analysis as the second indicator shows that the critical thinking skills of high school students are lower than those of vocational high school students. Analyzing the relationship between graphs and several problems related to the availability and processing of cocoa, Vocational High School students tend to be better able to relate the data presented through graphics and associated with cocoa processing problems. Basically high school students give the correct answer, but do not relate it to the data that has been presented.

Assessing the credibility or representation of inferential relationships is one of the third indicators that emerge, namely evaluation. Figure 2 shows that the critical thinking skills of high school students are lower than those of vocational high school students. In the evaluation indicator, high school students can answer on the basis of some of the questions previously presented, so that the evaluation process based on the previous knowledge that has been obtained is well developed.

On the inference indicator, students are required to be able to reduce and make judgments, because Vocational High School students are better able to do analysis and evaluation well, High School students also tend to have higher critical thinking skills scores than High School students. In terms of inference, high school students tend to conclude only based on theory without involving solutions to the problems of superior cocoa products which have been illustrated in the analysis and evaluation indicators.

Critical thinking skills are not only needed by students when they are in the school environment, critical thinking is needed in the world of work, family environment and social environment (Franco et al., 2018). Critical thinking is a high level skill. In one of his works, Johnson (2007) explains that critical thinking is an integrated process and makes it possible to evaluate the evidence, assumptions, logic and language that underlie other people's thinking (Putra et al., 2015). The lack of critical skills at the senior high school level can be seen in the answers to indicator 1 where most of them only answered natural resources in agriculture and livestock, but did not mention the potential for plantations such as tobacco and cocoa. Unlike the case with Vocational High School students, because Vocational High School students are often directly involved in agriculture and plantations, Vocational High School students answered quite fully.

Knowledge that is directly focused on a particular field is one of the factors in the high thinking ability of Vocational High School students compared to Senior

High School in solving the problem of cocoa as a superior product in Jember. Basically high school students also have very broad knowledge, but in answering cocoa problems they are still focused on theory without involving real perceptions of the condition of cocoa plantations in the area where they live.

Meanwhile, students who are less than optimal in developing critical thinking skills raise various problems such as lack of confidence (Pradina et al., 2018). In an effort to increase the ability to think critically can be pursued with a variety of appropriate learning techniques. Educators view critical thinking skills as important for students to have (Huber et al., 2016). Education provides various kinds of facilities to support students in developing their knowledge (Kurniawan et al., 2021). It is hoped that the implementation of learning with critical thinking skills can prevent strange life events from occurring (Butler et al., 2017).

Based on some of the research findings above, high school students also need to know the superior potentials that exist around them, such as cocoa. Thus, it is hoped that both high school and vocational high school students will be able to make a maximum contribution in efforts to develop local products so that they can increase the progress and welfare of the local area. Problem-based learning that links learning materials and local wisdom is needed to support students' critical thinking skills (Alenyorege et al., 2019).

## Conclusion

Based on the research conducted, it can be concluded that the critical thinking skills of Vocational High School students with a score of 76.53 are higher than those of High School students with an average critical thinking ability score of 62.37. This shows that Vocational High School students understand more about Jember's superior product, cocoa. Thus, it is hoped that the students of both Senior High School and Vocational High School will improve their critical thinking skills in an active and sensitive manner in responding to problems that occur in the area where they live so that students can participate and contribute to efforts to develop local products to increase the progress and prosperity of the potential of the region.

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