

ANALYSIS OF STATIC FLUID CRITICAL THINKING TECHNIQUES

Bimal Sarangi¹, ²Pallavi parimita

¹Professor, Department of Mechanical Engineering, Raajdhani Engineering College,
Bhubaneswar, Odisha

²Assistant Professor, Department of Mechanical Engineering, Raajdhani Engineering College,
Bhubaneswar, Odisha

ABSTRACT

The purpose of this study was to identify the critical thinking abilities of senior high school pupils. In this study, 40 students in the XI grade of a senior high school in the Bogor District participated in a descriptive study to analyse the results of a test of their critical thinking abilities. Survey research is the technique employed, and a purposeful sampling technique was used to select the sample. The tool utilised is a test of five markers for critical thinking on issues that are both static and flowing. There are 11 sets of questions. It was created by researchers and approved by specialists. The findings revealed that students' critical thinking abilities are still lacking. Nearly all indicators of critical thinking ability only reach less than 30% of the population, 10% for the fundamentals of decisions and basic support, 28% for elementary clarification.

Keywords: *critical thinking, high school, static, flowing*

1.INTRODUCTION

Static fluid is a physics concept always related to daily life. Therefore, it takes Critical thinking (CT) to be able to understand the concept well. The pressure exerted by a static fluid depends only upon the depth of the fluid, the density of the fluid and acceleration of gravity. The pressure in a static fluid from the weight of the fluid and is given by the expression:

$P_{\text{static fluid}} = \rho g h = mgh/V$ because $V = Ah$, so $P_{\text{static fluid}} = \frac{m}{A} g$

CT is a method that tests a person's capacity for introspective, logical, rational thought in order to gather, interpret, and evaluate data in order to make a choice [2]. Reflective in this context refers to actively weighing all options thoroughly and deliberately before choosing one. Five

markers [7] exist for CT skill, which has grown to be an important part of modern education [4]. Therefore, having CT skills is crucial for everyone to be able to defend themselves, make informed decisions in daily life, and participate in the global market [1]. To produce graduates with critical, logical, and creative thinking skills is thus the most crucial ultimate goal in the 2013 curriculum [6]. The economy of the 21st century, has shifted into a service economy. The shift is due to the development of information, knowledge, and innovation. The economic shift caused all countries to compete globally. This completion spawned challenges that took place in the workplace and working communities. Because it is, demanding and encouraging everyone as citizens to have ingenuity, alertness and skill. To compete as a nation to advance the economy and its industry[1]. It is same as what Greenspan said in the global competition requires everyone to have 21st century skills to be able to hold new technology in order to survive in that era.

2. Experimental Method

In one of the senior high schools in the Bogor District, researchers conducted a descriptive study to evaluate the CT skills of 40 students in the XI grade. Students in the XI class who have not taken a static fluids course in senior high school are taking the topics. This research was done just once. Survey research is the technique employed, and a purposeful sampling technique was used to select the sample. A CT competency exam with five signs on static and flowing topics is the tool that was employed. Each question has ten sets of essays. A team of professionals designed and validated it. Meanwhile, to investigate score of CT skill using score the rubric was developed based on the answer each item and validated by experts (table 1). After scoring, the next step is do the percentage of each CT skill indicator, the percentage of the process id done by using the following formula:

$$\% = \frac{\text{score each indicator}}{\text{total score each indicator}} \times 100\%$$

There after do the performed categorization [11] for each indicator, namely grouping scores obtained by students in the category of very high, high, fair, low and very low. Guidelines for the categorization of students' CT skill such as in Table 1 below.

Table 1. Categorization of students' CT skills

Percentage score (%)	Category
81 – 100	Very high
61 – 80	High
41 – 60	Fair
21 – 40	Low
0 – 20	Very low

Data student score and the percentage will be used by the researcher to conduct descriptive analysis. Descriptive analysis was conducted to provide an overview and obtain complete information related to profile of CT skill.

3. RESULT AND DISCUSSION

Figure 1 below shows the average percentage of students' critical thinking skills on the concept of hydrostatic pressure, pascal principles, and Archimedes principles. At the time of learning related concepts are taught in high school but at least have been taught in the previous ladder. The average percentage of all indicators is still low. It is seen that the elementary clarification indicator is the highest indicator compared to other indicators. Followed by the basic for decisions / basic support, advanced clarification and strategy and tactics.

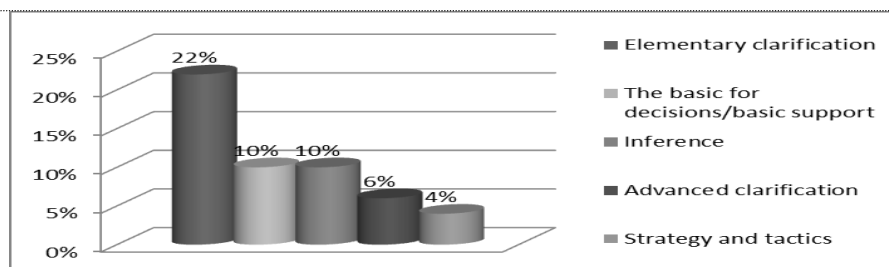


Figure 1: Percentage Of Average Students' Critical Thinking Skills For Each Indicator

Figure 2 shows the average percentage of students in answering each item. The average student can answer high enough for item 2 item compared to the result of student answer on other item. However, when compared to the total ideal value that should be in the value, this value is still relatively low. Problem 2 is a matter related to the concept of hydrostatic pressure. Meanwhile, very few items answered by the students are no 7 and no 11, which items that contain hydrostatic concepts with the basic indicators for the decisions and strategies and logic. These are questions that relate to the process of discovery.

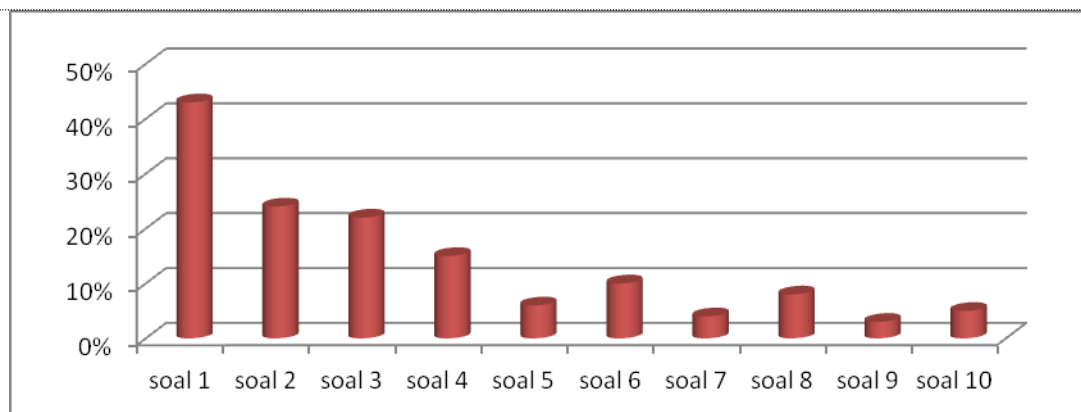


Figure 2: *Average percentage of students in answering each item*

High-level thinking abilities and 21st century skills both include critical thinking, and the best method to develop 21st century skills is to use discovery-based learning strategies that concentrate on actual world issues [8]. Similar to this, physics is viewed as a process, where natural phenomena are processed in the physical and empirical assessment that became known as the concepts, principles, law, and principles which then used its application in technology, so that physics can be said there Due to the process of the invention [1]. The Archimedes and Pascal concepts have at least been studied during lower levels of junior high school with regards to the idea of hydrostatic pressure, but that does not necessarily make them more accurate.

Is a challenge learning model (CBL), one of the instructional approaches that can help students get actively involved in the search for solutions to real-world issues (related to daily life). Because active learning encourages critical thinking and trains students' scientific reasoning, it is beneficial [8]. The education team at Apple Inc. created their first model with this one. This model is helpful in teaching students how to address real-world problems because it offers efficient and effective frameworks that are divided into three phases: engage, examine,

and act [9]. CBL is built on experimental learning that supports freedom. Collaborative and experiential learning, pushing students to recognise important ideas, asking thoughtful questions, recognising and resolving difficulties, improving the understanding.

4. CONCLUSION

One of the high schools in the Bogor district needs to teach kids how to think critically. And the greatest approach to put them into practise is by using active learning, namely CBL that is connected with the project and helps students in the process of discovering global challenges.

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