

## ANALYSIS OF STUDENTS' CRITICAL THINKING ABILITY OF JUNIOR HIGH SCHOOL IN NGAWI

Nurul Fathonah, Sentot Budi Rahardjo and Baskoro Adi Prayitno  
Universitas Sebelas Maret, Surakarta, Indonesia

### ABSTRACT

This study aims to determine the critical thinking ability in science 7th grade of junior high school in Ngawi. The method used in this research is quantitative descriptive. The sample of this research is taken by stratified random sampling technique. The initial profile of critical thinking ability is analyzed from 51 state junior high schools in Ngawi with sampling proportion 10% in each strata. The sample which were used were 93 students from 3 schools which is include high categorized (SMPN 2 Ngawi), medium categorized (SMPN 2 Karangjati, SMPN 3 Karangjati, SMPN 1 Pangkur) and low categorized (SMPN 3 Ngawi). Technique of data collecting was written test in form of essay. The result of this research from aspect critical thinking ability (Facione, 2015) was: interpretation was equal to 26,68%, inference was equal to 21,79%, analysis was equal to 20,31%, explanation was equal to 28,10%, evaluation was equal to 36,39% and self-regulation was equal to 36,79%. From those data, can be concluded that all of the aspect critical thinking ability of students in 7th grade junior high school in Ngawi needs to be improved.

**KEYWORDS:** Initial profile, Critical Thinking Ability, Science

### INTRODUCTION

The problem of students' critical thinking showed that The Program for International Student Assessment (PISA) data suggest that Indonesia ranked 60th out of 65 participating countries in 2009, 64th of 65 participating countries by 2012, and 69th rank of 75 participating countries in 2015 (OECD, 2010; OECD, 2014). These results indicate that Indonesian students have not yet been trained to think high levels. This problem also happened in America, The National Assessment of Educational Progress (NAEP) data suggest that student outcomes in American education are a little better and in some cases worse than they were 30 years ago. NAEP data and International Educational Achievement (IEA) studies suggest that students are not learning how to think. In other words, although student learning of facts and basic skills has improved slightly over the past three decades, the development of more advanced reasoning abilities has declined (Lunenburg, 2011).

Developing critical thinking skills is one of the goals of education, as stated in the 2013 curriculum (Kementerian Pendidikan dan Kebudayaan, 2016) which states that one of the goals of the 2013 curriculum is to improve the mindset related to learning that develops critical thinking skills. Each State has an educational standard as one of the goals of science development, some of which also include the development of critical thinking skills in the national education curriculum. A framework for 21st century learning developed by the Partnership for 21st Century Skill outlines a vision of a

successful student functioning in the new global economy. This framework presents an overview of 21st century teaching and learning techniques and explores relevant outcomes across three key areas: 1) content knowledge, 2) specific skills and 3) expertise and literacies (Thaiposri & Wannapiroon, 2015).

The 21st century classroom needs students to face real world problems that engage them in higher-order thinking skills creativity, innovation, communication, collaboration, critical thinking and problem solving (Zivkovic, 2016). Critical thinking skills are needed more than ever in order to aid individuals in becoming more adaptable, flexible and better able to cope with this rapidly evolving information. This review investigates existing theoretical frameworks of thinking skills and educational objectives, as well as cognitive models situated in empirical research; and aims to develop an integrated framework of learning outcomes based on the integration of these extant frameworks with recent conceptualisations of critical thinking (Dwyer, Hogan & Stewart, 2014).

Critical thinking is an important part in all aspects of one's life. Critical thinking is used in various situations and opportunities in the effort to solve life problems. It is therefore important that one learns about how to think critically, because one will not necessarily be able to think critically without going through the learning process (Phan, 2010). Capability of critical thinking is highly required for some profession in our life, by critical thinking capability owned by individual. From some descriptions above it may be concluded that learning for critical thinking each time in our life is any necessity if we want both to make decision and direct change which will shape our future (Nadaek, 2015). Factually, we had found the different in site, individual dislike studying for increasing their critical thinking capability.

Critical thinking skills include the abilities to analyze facts, awaken and organize ideas, defend opinions, make comparisons, draw conclusions, evaluate arguments and solve problems (Murti, 2017). Some opinions of experts on the concept of critical thinking skill are proposed by Facione (2015) who argues that "Critical thinking in terms of cognitive skills in interpretation, analysis, evaluation, inference, explanation and self-regulation". Mainali says that critical thinking can enhance students' understanding, ability to solve problems, think creatively and communicate their ideas clearly and effectively (Mainaili, 2011). In other words, critical thinking can improve the quality of education. Bonney et al (2014) defines critical thinking as a thought that occurs when individuals or groups use accurate evidence to evaluate and assess what they are learning and thinking about. This is reinforced by research done by Clifton (2010), which concludes that the critical thinking in learning provides an opportunity for teachers to know how far their students' ability to ask and reason in the academic context, so that students' meta-cognitive skills and learning can be improved.

According to (Miele & Wigfield, 2014) there are two factors that can influence the students' motivation to engage in critical thinking skills, as follows: 1) The existence of beliefs, achievements, and goals of studying influence the relationship between motivation and critical thinking, it also encourages

students whether highly motivated to do critical thinking with persistent effort, and 2) The different desires, whether the students prefer to engage in critical thinking in their own way and different from their friends do. From the above description, it shows that critical thinking skills can be developed on the materials that have been available in the curriculum that have characteristic critical thinking skills. This study aims to determine the profile critical thinking ability in science 7th grade of junior high school in Ngawi.

## **MATERIALS AND METHODS**

This research was a descriptive quantitative research that described the profile of student critical thinking ability of classification of matter and its changes. The sample of this research is taken by stratified random sampling technique, because the sample comes from several strata. Determination of high, medium and low strata based on the national exam score in 2017. The score national exam can be seen in application called PAMER UN developed by education ministry of Indonesia. Schools with score national exam above of average score national exam of ngawi districts +1/2 standard deviation are included in high category, and schools having score national exam under of average score national exam of ngawi districts - 1/2 standard deviation are included in low category, the rest included in medium category schools.

The initial profile of critical thinking is analyzed from 51 state junior high schools in Ngawi with sampling proportion 10% in each strata. Subjects of the research were 93 students of 7th grade from high, medium and low categorized school in Ngawi at the academic year 2017/2018. State junior high schools in Ngawi was included high categorized are 8 schools, medium are 30 schools and low are 13 schools. From the high categorized was taken one school, medium categorized was taken 3 schools, and low categorized was taken one. This selection schools of this study are high categorized (SMPN 2 Ngawi), medium categorized (SMPN 2 Karangjati, SMPN 3 Karangjati, SMPN 1 Pangkur) and low categorized (SMPN 3 Ngawi).

Data of the research was obtained from the result student's test using essay test. This instrument consist of 6 question that were based on the learning indicator on a syllabus. The instrument used in internal validation by 2 lecturers refers to the aspect of the critical thinking ability used. The data were obtained from the analysis of student answers. The data were obtained by coding each student's answer and scoring each student's answer based on the assessment rubric. Scores obtained by students were then converted in percentage form show in Table 1.

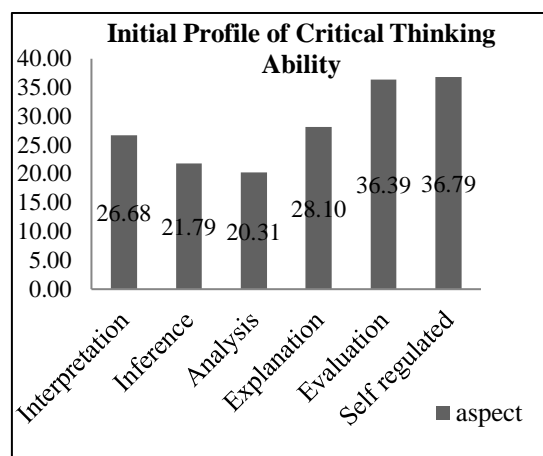
**Table 1. Criteria of critical thinking ability’s analysis result interpretation**

Score Range	Category
0%-20%	Poor
21%-40%	Fair
41%-60%	Moderate
61%-80%	Good
81%-100%	Very good

The analysis score of critical thinking ability at junior high school student  $\geq 61\%$  indicate good result (Riduwan, 2010)

**RESULT AND DISCUSSION**

The score of critical thinking ability at junior high school students are presented in Figure 1 below.



**Figure 1. The Percentage of the Students' Critical Thinking Ability Aspects**

The result of the student’s critical thinking ability test as shown in Figure 1 shows that all of aspects get fair category there are: interpretation was equal to 26,68%, inference was equal to 21,79%, analysis was equal to 20,31%, explanation was equal to 28,10%, evaluation was equal to 36,39% and self-regulation was equal to 36,79%. The average of the result critical thinking ability above is 28,34% showed fair category.

The student's critical thinking ability in the aspect of interpretation was equal to 26,68% shows fair category. Interpretation means comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria (Facione, 2015). The test results showed that aspects of interpretation need to be trained more to the students.

The aspect of analysis was equal to 20,31% shows fair category. Analysis means identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, or opinions (Facione, 2015). The result showed that aspect of analysis must be trained more by the learning model which can be improved it.

The aspect of inference was equal to 21,79% shows fair category. Inference means identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to reduce the consequences flowing from data statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation (Facione, 2015). The result showed that aspect of inference needs extra trained to improved that. Learning model which constructivism bases may a solution for this problem.

The student's critical thinking ability in the aspect of evaluation was equal to 36,39% shows fair category. Evaluation means assess the credibility of statements or other representations which are accounts or descriptions of a person's perception, experience, situation, judgment, belief, or opinion; and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions or other forms of representation (Facione, 2015). Evaluation is done by examining the source of information to assess its quality as a basis for decision-making based on identified criteria (Stobaugh, 2013).

The aspect of explanation was equal to 28,10% shows fair category. Explanation being able to present in a cogent and coherent way the results of one's reasoning. This means to be able to give someone a full look at the big picture: both "to state and to justify that reasoning in terms of the evidential, conceptual, methodological, criteriological, and contextual considerations upon which one's results were based; and to present one's reasoning in the form of cogent arguments" (Facione, 2015).

The aspect of self-regulation was equal to 36,79% showed fair category. Self-regulation means self-consciously to monitor one's cognitive activities, the elements used in those activities, and the results educed, particularly by applying skills in analysis, and evaluation to one's own inferential judgments with a view toward questioning, confirming, validating, or correcting either one's reasoning or one's results. It was found that the students have been able to deliver their opinions or judgments to regulate themselves through the problems presented. This self-regulation becomes a key aspect to master because it is an ability to watch over one's cognitive activities and to make sure that one self is involved in thinking critically or not (Facione, 2015).

In another study showed that students' critical thinking skills in senior high school Surakarta on evaluation and self-regulation are in good criteria with 78% and 66% acquisition while 52% interpretation, 56% analysis, 52% inference and 42% explanation indicate sufficient criteria (Saputri, Sajidan & Rinanto, 2018). The result of it relate with aim this study, self regulation have high

percentage than others. But, all of aspect need extra trained in classroom activity. Critical thinking skills of students can be trained through five ways, namely; simple observation; work in groups; the delivery of something observed; testing through experimentation and acceptance of all explanations as "something right" for the moment (Etkina & Planinsic, 2015). The skills to think critically can be improved and developed by way of practice (Fahim, 2012). Students may not be able to think critically when their teachers are unable to integrate sufficient critical thinking into the practice of daily learning (Choy & San, 2012).

## CONCLUSION

Based on the result of the research can be concluded that the critical thinking ability measured in this research there are 6 aspect. There are interpretation, inference, analysis, explanation, evaluation and self-regulation showed fair categories. To improve students' critical thinking knowledge, skills, and dispositions, educators can use learning model purposeful learning activities that encourage critical thinking abilities. Students must be taught how to think critically, and frequent and explicit teacher modeling of critical thinking skills.

## REFERENCES

- Choy, S. C. & San, O.P. (2012). Reflective Thinking and Precursor for Incorporating Critical Thinking into the Classroom? *International Journal of Instruction*, 2, 167-182.
- Clifton, G. (2010). Supporting the Development of Critical Thinking: Lessons for Widening Participation. *Widening Participation and Lifelong Learning Journal*, 14, 2.
- Dwyer, C.P, Hogan, M. J., & Stewart, I.(2014). An Integrated Critical Thinking Framework for 21st Century. *Thinking Skills and Creativity*. 43-52
- Etkina, E. & Planinsic, G. (2015). Defining and Developing "Critical Thinking" Through Devising and Testing Multiple Explanations of the Same Phenomenon. *The Physics Teacher*, 53, 432.
- Facione, P. A. (2015). *Critical Thinking: What It Is and Why It Counts California: The California Academic Press*
- Fahim, M.(2012). Manipulating Critical Thinking Skills in the Test Taking. *International Journal of Education*, 4, 153-160.
- Kementerian Pendidikan & Kebudayaan.(2016).Kurikulum 2013 Silabus Mata Pelajaran Matematika Sekolah Menengah Pertama (SMP)/ Madrasah Tsanawiyah (MTs)
- Lunenburg, F.C.(2011).Critical Thinking and Constructivism Techniques for Improving Student Achivement. *National Forum Teacher Education Journal*, 21 (3), 1-9.
- Mainali, B. P.(2011). Critical Thinking for Quality Education *Academic Voices a Multidisciplinary Journal* 1 1
- Miele, D. & Wigfield, A. (2014). Quantitative and Qualitative Relations Between Motivation and Critical-Analytic Thinking. *Education Psychology Review*, 26, 519-541
- Murti, B. (2017).Berpikir Kritis "Critical Thinking". Makalah Seminar Nasional, Oktober 2017. Ilmu Kesehatan Masyarakat UNS.

- Nadaek, B. (2015). Correlation Between Knowledge, Experience and Common Sense, with Critical Thinking Capability of Medical Faculty's Student at Indonesia Christian University. *Journal Education and Practice*, 32, (6), 45-55
- OECD. (2010). *PISA 2009 Results: Learning Trends: Changes in Student Performance Since 2000*, 5,1
- OECD. (2014). *PISA 2012 Results: What Students Know and Can Do – Student Performance in Mathematics, Reading and Science*
- Phan, H.Y. (2010). Critical thinking as a Self-Regulatory Process Component in Teaching and Learning *Psicothema*, 22 (2), 284-292
- Riduwan.(2010). *Skala Pengukuran Variabel-Variabel Penelitian* (Bandung: Alfabeta)
- Saputri, A. C., Sajidan, & Y Rinanto. (2018). Critical Thinking Skills Profile of Senior High School Student in Biology Learning. *Journal of Physic Conference Series*. 1006 012002
- Stobaugh, R. (2013). *How to Teach Students to Evaluate Information: a Key Common Core Skill* (New York: Eye on Education)
- Thaiposri, P & Wannapiroon, P. (2015). Enhancing Students' Critical Thinking Skills Through Teaching and Learning by Inquiry-Based Learning Activities Using Social Network and Cloud Computing *Procedia - Social and Behavioral Sciences*, 174, 2137-2144
- Zivkovic, S. (2016). A Model of Critical Thinking as an Important Attribute for Success in the 21st Century *J Social and Behavioral Sciences*,102-108.