The profile of critical thinking skills students on science learning

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Abstract. Critical thinking skills are an important and necessary skill to confront the challenges in the 21st century. Critical thinking define as basic skills that should be owned by someone to be able to develop thinking skills at a more complex level. This research is aimed to determine junior high school students’ critical thinking skills in science learning. This research is descriptive qualitative research using instruments developed based on aspects of critical thinking skills according Ennis which include elementary clarification, basic support, inference, advanced clarification and strategies and tactics. The subjects in this research were 30 students in grade eight of a junior high school in Bandung which was chosen using purposive sampling technique. The results of the study show that the average percentage of the five aspects of critical skills received by students is 45 and falls into a very low category. The conclusion from this skill of the students still was in a low category, so that needed a way to enhance on indicators of students’ critical thinking skills.

1. Introduction
21st Century National Education to realize the ideals of the nation, namely the people of Indonesia who are prosperous and happy, with an honourable and equal position with other nations in the global world, through the formation of a society consisting of qualified human resources, namely independent individuals, willing and capable of realizing the ideals of his nation [1]. Life in the 21st century requires a variety of skills that must be mastered by someone so that it is expected to help students master the various skills in order to become successful individuals in life.

In the 21st century, high-quality human resources with expertise are needed. One of the thinking skills that must be approved in the 21st century according to the US-based Partnership for 21st Century Skills (P21) is critical thinking. These 21st century skills can help by improving the quality of learning, helping students develop participation, encourage collaboration, increase participation and develop student-centered learning [2].

In the 2013 curriculum, science learning consists of materials from the fields of physics, chemistry, biology and earth and space sciences which are presented as a forum that provides complete insight for middle school students about the knowledge base that discusses the universe. One characteristic of the 21st century is to solve complex problems and complicated life problems that require effective and efficient solutions. One solution is through critical thinking skills [3]. Critical thinking skills about basic skills must be possessed by someone to develop thinking skills at a more complex level.
Science learning is expected to train students to be able to solve problems. The ability to solve problems can be improved by training critical thinking skills [4]. Critical thinking is logical and reasonable thinking that is focused on making decisions about what is trusted and done [5-6].

However, critical thinking skills in students according to some research results in the world are still in the low category. The low thinking ability of Indonesian students can also be seen from the results of the Program for International Student Assessment (PISA) study. The results of a one-year study using instruments to test scientific literacy that are closely related to high-order thinking skills show that Indonesia ranked 60th out of 65 participating countries in 2009, 64th out of 65 countries in 2012, and ranked 75 out of the 75 countries that participated in 2015 [7-9]. These results indicate that Indonesian students have not been trained for high-order thinking since the junior high school level, causing the results of each test held by PISA to still place Indonesia below and still below the Organization's average score for Economy, Cooperation and Development (OECD).

Critical thinking is a skill that is not inherent in humans from birth. Critical thinking skills must be trained in the learning process. Indicator aspects of critical thinking are grouped into five according to Ennis [5]: elementary clarification, basic support, inference, advanced clarification and strategies and tactics. Fisher emphasized that indicators of important critical thinking skills include: identifying the elements in the case considered in particular the reasons and conclusions; identify and evaluate assumptions; clarifying and interpreting statements and ideas, assessing exclusivity especially credibility; evaluating arguments of various types; analyze, evaluate, and produce explanations and make decisions and draw conclusions. Critical thinking is a type of thinking that requires logical and evaluative consistency in order to recognize bias and wrong reasoning so it is very important to be taught to students [10].

How much students' skills in critical thinking need to be assessed / measured. This assessment is crucial because there are several goals to be achieved, especially in science learning. Critical thinking skills are needed because in understanding science material more reasoning is needed [11]. The importance of critical thinking assessment according to Ennis is being able to diagnose the level of critical thinking skills of students, provide good feedback and motivation to students to become better critical thinkers and provide information to teachers about how much they try to teach critical thinking skills to students [5]. Based on this background, this study was conducted to determine students' critical thinking skills in science learning in junior high schools.

2. Method
This research is a quantitative descriptive study that is expected to be able to analyze the critical thinking skills of class 8 students. The subjects in this study were 30 eighth grade students of junior high school in Bandung who were selected through a purposive sampling technique. The instrument of critical thinking used in this study uses essay questions developed based on core aspects of critical thinking skills according to Ennis which include elementary clarification, basic support, conclusions, advanced clarification, and strategy and tactics [5].

Data obtained from the analysis of student answers. Data is obtained by accessing each student's answer based on the assessment rubric. Scores obtained by students are then converted in percentage form.

3. Result and discussion
The results of student critical thinking skills tests as shown in Figure 1 show that all aspects get low criteria, namely elementary clarification of 40%, basic support 56%, inference 49%, advanced clarification 49%, and strategy & tactics 35%. The average percentage of students' critical thinking skills from the five aspects shown in Figure 1 shows the number 45 which is categorized as very low.
Figure 1. The percentage of the students' critical thinking skills aspects.

The results of the analysis show that the average results of the tests of critical thinking skills of 8th grade students are very low at 45%. This is in line with other studies which state that the critical thinking skills of junior high school students are in the low category [12]. In addition, based on the answers to students' questions, it is known that most students are still confused in applying the knowledge and concepts that they already have to apply in solving problems in the critical thinking problems they encounter. Although students know a concept, they are not necessarily able to apply how to use it [13].

The highest results of the critical thinking ability test were found on the basic support aspect of 56%. In this aspect, students are asked to observe and consider the results of observations made. Critical thinking directs students to see these things directly from various perspectives and then evaluate them through intellectual activity [14]. The activity can produce empirical evidence depending on experiments or experiments [15]. Although some students have good basic support, the overall percentage in this aspect is still relatively low.

Students' critical thinking skills in advanced clarification aspects of 49%. Advance clarification means defining terms and considering definitions using the right criteria. Test results show that this aspect is still relatively low, this is possible because students have difficulty defining the right terms.

In the inference aspect, the figure is 45%. The answers given by students in this aspect are still largely inaccurate, the flow of thinking of students is still not good. It is possible to make generalizations, conclusions are still low and unfamiliar. The concept they have is still lacking in focus so the answer is less specific.

The test results showed that the aspect that has the lowest score is the elementary clarification aspect of 40%. On the basic clarification aspects researchers analyse critical thinking skills in the form of focusing questions and asking questions and answering questions that need explanation. Students learn to think critically in stages through trained habits in the form of formulating problems and answering questions that require explanation [15]. The results obtained in this aspect include the low category. The low yield is possible because of the lack of trained students' ability to identify or formulate questions and the ability of students to identify and formulate criteria to consider answers.

The last aspect that gets the lowest number is strategies & Tactics by 35%. These results are classified as low, it is possible for students to lack understanding and difficulty in defining problems and formulating alternative solutions.

In general, the average of all aspects of critical thinking skills shows a low category with an average of 45%. This is because students are not used to facing questions that require them to think critically or
think high. This is relevant to the results of the three-year PISA study from 2009 to 2015 for Indonesia which showed low results because students were less familiar with high-level thinking. In addition, the results shown from the test results are also caused by several other factors such as the learning process that takes place in the class that is not accustomed to practicing critical thinking skills in accordance with the demands of the 21st century. The low level of critical thinking skills of students is due to lack of activity and training and limited resources, time that limits the environment in developing critical thinking skills [16].

In learning activities, you should not prioritize memorization [17]. Learning should make students analyze, synthesize, evaluate information to solve problems and make decisions [18]. Collaboration and collaboration are also emphasized in solving problems in the learning process [19,20]. Learning must also change learning that is familiar with low-level thinking skills into learning that emphasizes high-level thinking skills [21-23].

Students' critical thinking skills are strongly influenced by the learning experiences that students get. If during the learning process students are often given training or activities to carry out critical thinking activities, students will have good development of critical thinking skills. Therefore, critical thinking skills need to be trained to students at the beginning of the learning process in school and become priority learning goals and teachers must find learning methods that can involve students in training students' critical thinking skills [24,25].

4. Conclusion
The results showed that the profile of students' critical thinking skills gave different results on each indicator and was still in the low category. Therefore, a method is needed to improve critical capabilities on each indicator.

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