Analysis of 4C-Based HOTS Assessment Module on Critical Thinking Ability

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Abstract. This study aims to analysis of 4C-based HOTS assessment module on critical thinking ability of sixth grade elementary school children. This research type is correlational non-experimental research with the form of ex post facto. The sampling technique used is the type of cluster random sampling. The data were obtained using a student and teacher response questionnaire. Data analysis using descriptive method. The results showed that 83.2% of students and 80% of teachers gave positive responses to the use of the 4C-based HOTS assessment module. Learning using the 4C-based HOTS assessment module is more guiding students to think critically in solving problems.

1. Introduction
The challenges of the 21st century require a person to have some skills. Skills to master include critical thinking and problem solving skills, creativity, innovation, collaboration and communication (4C). In this case, schools that are educational institutions play an important role in equipping students with these skills. By having 4C skills, students are expected to think critically about solving the problems that occur around teachers through creativity and innovation. By collaborating, the work becomes more effective and efficient to do and with effective communication there is no mistake in conveying the point of mind to the teacher.

Critical thinking skills have been defined as a set of abilities or cognitive skills related to logical analysis and evaluation of arguments [1]. Critical thinking is a skill that is more than just acquiring knowledge but the application of knowledge gained in context taking into account a variety of factors, justifying actions and reflecting such actions [2]. Critical thinking is an intellectual process that is actively and skillfully conceptualizing, applying, analyzing, synthesizing, and or evaluating information collected, or produced by observing, reflecting, considering, or communicating, as a guide to trust and do [3]. Thinking is defined as the ability to make comparisons, analyze, synthesize, understand connections and forms. In other words, thinking is the regulation and evaluation of the conceptualizing, practicing, analyzing and evaluating the information obtained by thinking, observation, experience, intuition, reasoning and the other ways [4].

The success of mastery of a concept will be achieved when students are able to think highly, where students can not only remember and understand a concept, but students can analyze and synthesize, evaluate, and create a concept well, the concept that has been understood can be inherent in the student's memory for a long time, so it is very important for students to have high-level thinking skills or HOTS. Higher Order Thinking Skills (HOTS) are critically developed in the education system to prepare students for 21st century situations and develop the potential that
students have [5]. Abdullah also mentioned that high-level thinking is a widely accepted application that requires students to interpret, analyze or manipulate information to solve problems [6]. Higher order thinking skills in the field of education play a strategic role in helping students to construct the knowledge and information learned by students, which in turn are improving students' achievements [7]. Aspects of evaluating are the abilities to make decisions, to express opinions, or to judge based on certain criteria. The domain indicators of evaluating comprise of judging, concluding, contrasting, criticizing, interpreting, and something. The aspects of creating are the abilities to rearrange the elements into new structures or produce new products. Indicators of the realm create the skills of planning, designing, formulating, and formulating hypotheses [8]. One way to find out if students already have high levels of thinking skills is by doing assessments. Assessments in the form of tests can be used to hone students' thinking skills, and are influential in determining students' thinking skills. Students should continue to be trained to have high levels of thinking skills, in order for students to understand well-studied materials [9].

The improvement of the 2013 curriculum, among others, is enriched by the need for students to think critically and analytically in accordance with international standards, while the assessment standards make room for the development of assessment instruments that measure high levels of thinking. Assessment of learning results is expected to help students to improve their higher order thinking skills (HOTS), because high-level thinking can encourage students to think widely and deeply about the subject. HOTS-oriented assessment is not a new form of assessment for teachers in conducting assessments [10]. But this HOTS-oriented assessment maximizes the teacher's skills in conducting assessments. Teachers in this assessment should emphasize on assessing attitudes, knowledge and skills that can improve the skills of students in the HOTS-oriented learning process. HOTS assessment will be more optimal when integrated with 21st century skills namely problem solving, creativity, innovation, collaboration and communication. Inventive thinking means the ability to manage complexity, curious, creativity and risk-taking, and higher-level thinking and sound reasoning. Effective communication is referred to as the ability in teaming, collaborating and interpersonal skills, accountable in personal and social responsibility, and using technology in interactive communication [11]. High productivity describes an individual's ability to prioritize planning with the use of real-world technology and produce quality work that is able to solve problems [12].

The 4C-based HOTS assessment module is expected to improve students' critical thinking skills in elementary school Grade VI math learning. So students can find solutions to solve problems and dare to make decisions. Students are also expected to analyze problems well, think systematically, are curious, mature in thinking, and can think independently.

2. Methods
This research is included in nonexperiental correlational research and is ex post facto. The research was conducted to find out how teachers and students respond to the 4C-based HOTS assessment module to students' critical thinking abilities. The research was conducted in grade VI of SD 1 Klumpit, SD 3 Klumpit, SD 5 Klumpit, and SD 6 Klumpit with a sample of 100 students. The data analyzed is student response questionnaire and teacher response questionnaire. Data is processed and analyzed using descriptive analysis to answer research questions.

3. Result and Discussion
The data obtained in this study comes from teacher response questionnaires and student response questionnaires to the use of 4C-based HOTS assessment modules against students' critical thinking abilities. Both polls are arranged according to the indicator stipulated as in Table 1 below.
Table 1. Percentage of Teacher Response Questionnaires and Student Response Questionnaires

| Teacher Response Questionnaire | Percentage of Positive Responses | Student Response Questionnaire | Percentage of Positive Responses |
|-------------------------------|---------------------------------|-------------------------------|---------------------------------|
| Completeness of learning materials | 75%                             | Serving                        | 84%                             |
| Accuracy of learning materials  | 75%                             | Withsany                       | 82%                             |
| Activities that support learning materials | 75%                             | Stimuli against critical thinking | 86%                             |
| Material up-to-date             | 75%                             | Creative motivation             | 80%                             |
| Efforts to improve student competency | 75%                             | Motivation for cooperation      | 82%                             |
| Material organizing follows scientific systematics | 75%                             | Communication motivation        | 86%                             |
| Material developing skills and thinking skills | 75%                             | Motivational challenges         | 81%                             |
| Materials stimulate students to think critically | 75%                             | Motivational curiosity          | 87%                             |
| General presentation            | 75%                             | Export motivation               | 81%                             |
| Conformity with the characteristics of the subjects | 75%                             | Motivation of the present era   | 83%                             |
| EYD compliance                  | 75%                             |                                |                                 |
| Language clarity                | 100%                            |                                |                                 |
| Sentence conformity with student development | 75%                             |                                |                                 |
| Module sedation                 | 100%                            |                                |                                 |

The results of the study in Table 1 above show that for teacher response questionnaires as much as 75% of teachers give a positive response to the indicator of completeness of learning materials, 75% give a positive response to the indicator of accuracy of the learning material, 75% give a positive response to the indicator of the accuracy of the learning material, 75% give a positive response to the latest indicators of the material, 75% gave a positive response to the indicator of efforts to improve student competency, 75% gave a positive response to the indicator, 75% gave a positive response to the material organizing indicator following the scientific systematics, 75% gave a positive response to the material indicator developing skills and thinking ability, 75% gave a positive response to the material indicator stimulating students to think critically, 75% gave a positive response to the presentation indicator in general, 75% gave a positive response to the indicator of conformity with the characteristics of the subjects, 75% gave a positive response to indicators of conformity with EYD, 100% gave a positive response to the language clarity indicator, 75% gave a positive response to the indicator, 75% gave a positive response to the indicator of sentence suitability with student development, and 100% gave a positive response to the module's attention indicator. The average positive response given from teacher questionnaires is 80%.

84% gave a positive response to the presentation indicator, 82% gave a positive response to the interest indicator, 86% gave a positive response to the stimulus indicator to critical thinking, 80% gave a positive response to creative motivation indicators, 82% gave a positive response to the motivational indicator of cooperation, 86% gave a positive response to the communication motivation indicator, 81% gave a positive response to the motivational indicator of the challenge, 87% gave a positive response to the motivation indicator of the current era, and 83% gave a positive response to
the motivation indicator of the current era. The average positive response given from the student questionnaire was 83.2%.

The results showed respondents appreciated and were very enthusiastic about the HOTS assessment module based on 4C. This is known from the positive response that respondents give to each indicator contained on the provided questionnaire sheet. Specifically in the student response questionnaire stimulation indicator to critical thinking 86% of students gave a positive response, the second highest percentage after the student curiosity motivation indicator as much as 87%. This suggests the 4C-based HOTS assessment module can lead students in students' critical thinking.

Some relevant research on the use of 4C instruments, HOTS, and critical thinking skills conducted by Hanifah on the development of Higher Order Thinking Skill (HOTS) assessment instruments in elementary schools states that the success of mastery of a concept will only be obtained if the learner has a high level of thinking ability, since the concept that has been understood will be inherent in the memory of the learner for a long time, so it is important for students to have high-level thinking skills or HOTS (High Order Thinking skills) [13]. Influence of the 4C-based Project based learning Learning Model on learning independence and comprehension reading ability in elementary school fourth graders [14]. Results of research understanding the concepts and critical thinking abilities of students who follow math learning with better guided method of discovery than students who follow conventional learning reviewed at school level, most students show a positive attitude towards math learning with guided method of discovery [15]. Similar research was conducted by Saputri et al, in their study it was mentioned that stimulating Higher-OrderThinking Skills (Stim-HOTs) models applied to cell metabolism topic can improve students' critical-thinking skills [16]. Widana, et al in his research also concluded that the use of HOTS assessment in mathematics learning has a significant effect on students' critical thinking skills in learning mathematics. Thus, the use of HOTS assessment in mathematics learning is proven to effectively improve students' critical thinking skills, unlike HOTS assessments can train and develop important aspects of critical thinking skills. Therefore, it is suggested to math teachers using HOTS assessment as an alternative assessment to improve students' critical thinking skills, especially in mathematics learning[17]. Yanti pointed out that It has developed an instrument to measure students' critical thinking skills in electricity topics (dynamic and static electricity) [18]. Feriyanto & Putri explains mathematics module based literacy and HOTS questions to train critical thinking ability that meet the validity criteria with valid categories, fulfill practical criteria with a very practical level. As well as meeting the module's effectiveness criteria by having students' critical thinking ability either high or high [19]. Astutik et al, in their research explained that HOTS student worksheet can be to identifies of scientific creativity skills, critical thinking skills and creative thinking skills in physics learning [20].

This research has constraints such as, among other things, the duration of time in the implementation of hots-based 4C assessment module takes a relatively long time in measuring students' critical thinking abilities.

4. Conclusion

Based on the results of the study after analysis and discussion in accordance with the relevant theory, it can be concluded that learning using the HOTS assessment module based on 4C further leads students in critical thinking. Proven in the student response questionnaire stimulation indicator to critical thinking 86% of students gave a positive response, the second highest percentage after the student's curiosity motivation indicator of 87%.

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