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Analysis of High Levels of Thinking Ability on Students of State Viii Junior High School in the City of Padang

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Abstract:- This research is a descriptive study. Samples were taken using simple random sampling technique. Data were collected using a valid and reliable higher order thinking ability test and supported by interviews. The results show that the results of high-order thinking skills of class VIII students based on total scores, basic competencies, and cognitive levels indicate that class VIII students of SMPN 1 Padang, students of VIII of SMPN 8 Padang, and students of VIII of SMPN 7 Padang are included in the poor category.

Keywords:- *2013 Curriculum, Higher Order Thinking Skills, Cognitive Level, Science Learning.*

I. INTRODUCTION

Curriculum 2013 is a curriculum that strives to provide the best service to students to be able to think creatively, independently, and innovatively. The implementation of learning based on the 2013 Curriculum 2013 is closely related to *higher order thinking skills.* The need for higher-order thinking skills is continuously needed by students in carrying out learning, both to gain an understanding of the learning material or to be able to solve problems as an evaluation of the learning carried out [14]

The process to achieve the ability of students to think at a higher level is assisted by the teacher's role. Teachers also have a very important role to be able to prepare future students to meet future needs [11]. Higher order thinking skills require students to do something based on facts, so that in this case students must be able to relate the facts obtained, categorize, manipulate, place them in new contexts, and be able to make solutions so that the problems they face can be solved [8]. Therefore, this thinking ability is very important to be applied since students are still in elementary school, because every graduate is required to have competence in creating solutions to solve the problems at hand. This thinking ability is needed by students in the learning process, especially in science learning.

Science learning according to the Kementerian Pendidikan dan Kebudayaan (2017) is complex learning, because science learning does not only contain knowledge in the form of facts, concepts, and principles. However, science learning is related to how to find out about nature systematically or related to the discovery process. Natural Sciences (IPA) in the 2013 curriculum is one of the lessons that has an important role in developing all aspects of the learning process. Learning science on the respiratory system and excretory system contained in the science material for class VIII SMP.

Based on the results of interviews with three teachers at public junior high schools in the city of Padang, the learning pattern in accordance with the demands of the 2013 curriculum in the three schools has been implemented. The learning evaluation used in the learning process has also referred to the demands of the 2013 Curriculum learning. In the evaluation questions used by the teacher, the researchers found that the learning evaluation used did not meet the cognitive level of higher order thinking abilities. In addition, the question is still at the same level as C1 and C2.

Previous research that has been carried out by Olyvia (2015) shows that the thinking skills of class XI State Senior High School students in Padang City are in the low category, the low high-level thinking ability of students of class XI State Senior High Schools in Padang City is because students are not used to answering questions with the type of HOTS (Higher Order Thinking Skill). Research on higher-order thinking skills conducted by Yusuf (2018) shows that students' higher-order thinking skills are still categorized as being at a low level, the factors that influence the low results obtained are interests, abilities, study habits, and tests given by the teacher.

Based on the information presented, the researcher analyzed the higher-order thinking skills of class VIII students in science learning. The achievement of higher-order thinking skills is important to analyze in order to find out the factors that influence the results of the higher-order thinking ability test and the efforts made t o improve students' higher-order thinking skills so that they can provide appropriate solutions to the problems faced, especially in science learning.

II. RESEARCH METHOD THIS

Type of research is descriptive research. In this study, variable manipulation was not carried out, but it was explained that the achievement of students' higher-order thinking skills on the material of the respiratory system and excretory system in Padang City was in accordance with the actual conditions. The population in this study were all class VIII SMPN students in the three schools in Padang City

who were actively enrolled in the even semester of the 2020/2021 academic year. Samples were taken using simple random sampling technique, 100 students from class VIII were randomly selected from each school.

In this study, the researcher used an instrument in the form of a question script in data collection to analyze higher order thinking skills.

The techniques and instruments used in this study are listed in Table 1.

Table 1. Details of Data Collection Techniques and InstrumentsData collection

No.	Techniques Data	Collection Tools	Types of data	Data Source
1	Higher order thinking ability test	Instruments for assessing higher-order thinking skills in the form of questions	Essay ability achievement higher-order thinking and a description of students' answers to each question	Student
2	Interview with students	Interview guide.	Students perceptions of their achievements and difficulties in working on a script about higher order thinking skills.	Student
3	Interviews with teachers.	Interview guidelines.	Teachers' perceptions of the achievements and difficulties of students in answering the text about higher order thinking skills	Teacher
4	Question of students readiness in answering questions of higher order thinking skills.	Questionnaire	Knowing the reason for the learner to the answers given to each question tests the ability to think critically	Student
5	Documentation	Manuscript test questions daily respiratory system	achievement of learners in answering test questions given by the teacher	Teacher

III. RESULT AND DISCUSSION

RESULT

Research data in the form of interviews obtained from respondents The research was on students and science teachers at SMPN 1 Padang, SMPN 7 Padang, and SMPN 8 Padang. These results indicate that the achievement of students' higher order thinking skills is less. This can be seen from the average value obtained based on the total value, basic competence, cognitive level (analyzing, evaluating, and creating).

Results Higher-Order Thinking Ability Test

a. Result of high-level thinking skills test based Value

Table 2. Achievement of Higher-Order Thinking Ability of Students BasedValue

No	School	Average Score	Average Value	Category
1	SMPN 1	17.45	34.9	Less
2	SMPN 7	15.83	31.66	Less
3	SMPN 8	15.96	31.92	Less
Average		16.26	32.82	Less

b. High-level Thinking Ability Test Results Based on Basic Competencies

Table 3. Achievement of higher order thinking ability test results based on basic competencies

No	Competency Basic	Average Score			An average
		SMPN 1	SMPN 7	SMPN 8	
1	Respiratory System	29.84	30.28	31.68	30.6
2	Excretion System	38.36	33.04	32.16	34.52
Total		68.20	63 , 32	63.48	65.12
Average		34.10	31.66	31.92	32.56
Categories		Less	Less	Less	Less

c. Test results of high level thinking skills by analyzing the cognitive level

Table 4. Thinking Skills achievement of high level based on the level of cognitive analyzes

No.	School	Average Score	Average Value	Category
1	SMPN 1	9.48	33.86	Less
2	SMPN 7	9.07	32.39	Less
3	SMPN 8	9.09	32.46	Less
Average		9.21	32.90	

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d. Test results for high-level thinking skills by evaluating cognitive level

Table 5 Achievement of Higher Order Thinking Skills Based on Cognitive Levels Evaluating

No	School	Average Score	Average value	Category
1	SMPN 1	6,43	33,84	Less
2	SMPN 7	6,15	32,37	Less
3	SMPN 8	6.00	31,58	Less
Average		6,19	32,60	

e. The results of the higher order thinking ability test based on the cognitive level of creating

Table 6. Achievement of Higher Order Thinking Based on the Cognitive Level Creating

No	School	Average Score	Average Value	Category
1	SMPN 1	0.62	20 ,67	Less
2	SMPN 7	0.61	20.33	Less
3	SMPN 8	0.87	29.00	Less
Average		0.70	23.33	Less

Based on the results of the research described above, it shows that the achievement of higher order thinking ability test results class VIII students based on the total score, aspects of basic competence, cognitive level (analyzing , evaluate, create) shows that the grade VIII students of SMPN 1 Padang get the highest average score compared to students in SMPN 7 and SMPN 8 Padang. However, in the three schools the category of higher order thinking skills is still in the poor category.

DISCUSSION

Higher order thinking skills are the ability to interpreted, analyze or manipulate information, and transform their knowledge and experience. Students are able to develop higher-order thinking skills when students are faced with problems or practice questions that train students in higher-order thinking, if students are only faced with familiar practice questions or understanding exercises, then students will not develop higher-order thinking. but students are only at a low level of thinking [12]. The low level of higher order thinking skills of students is caused by several factors. Viewed from the learning process, the entire learning process must be expanded towards creative, critical and innovative thinking and these activities should be included in the learning process as part of the overall acquisition of knowledge and the framework for its use. This explains that the teaching and learning process plays an important role in gaining knowledge towards higher order thinking [1].

The assessment instrument used affects students' higher-order thinking skills, higher-order thinking assessment instruments with cognitive levels C4-C6 can train students' high-level thinking skills, so that students' higher-order thinking skills can develop. Assessment instruments with cognitive levels C4 - C6 require students to be able to think at a higher level, because high-level thinking is not just memorizing facts or conveying something to others exactly as received but able to think at a higher level [6].]. Higher order thinking ability is a thinking process that involves mental activity in an effort to explore complex, reflective, and creative experiences that are carried out consciously to achieve a goal, namely obtaining knowledge which includes levels of analytical, evaluative, and synthetic thinking [7].

The cognitive level of analyzing based on the data, the highest average score of students is at the cognitive level of analyzing while the lowest average value is at the cognitive level of creating/creating. Cognitive level questions belonging to analyzing require students to break down the material into parts. The arrangement and detect the relationship between the parts, and their relationship to the overall structure and purpose. Problems with the cognitive level of analyzing there are stimuli in the form of pictures, narrations, graphs, and tables [9].

The ability to think analysis is still low because students are not accustomed or rarely trained to solve analytical problems. In addition, it is also caused by several factors, both internal and external. Internal factors are factors that come from within students such as physical conditions, students will not be able to concentrate and think quickly if their physical conditions are not good. Motivation, students cannot follow the learning process properly if they do not have the motivation to learn within themselves. Age, junior high school students aged 11-14 years have entered the stage of concrete operational intelligence. Ideally, the age of students is directly proportional to their analytical thinking ability. The other factors that influence are external factors related to the process of learning in schools, including models, methods, learning approaches used, teacher competencies and facilities and infrastructure [10]. In a study conducted by Khairani (2021) learning in schools still uses conventional teacher-centered methods. This causes monotonous learning, students tend to be passive and students cannot develop abilities in thinking, especially analytical thinking, to improve analytical thinking skills, students must get used to solving analytical problems [2].

Problem with evaluating the cognitive level ($C_{5),}$a matter which requires students to take a decision based on certain criteria [9]. To improve students' higher-order thinking skills, teachers should familiarize students with assessment instruments that are at a high cognitive level, so that students are not only trained to memorize and recount what they have memorized, but students are able to solve problems in new situations, think critically. , as well as directly transforming knowledge and experience [6]. Accordingly, the hope for education in Indonesia is to create high-level thinking students so that they can improve the quality of Indonesian education [6].

The ability to create is related to the ability to design how to work on questions and make new work steps. HOTS level students are able to design a way of working to answer some questions correctly. These students design a method by considering the initial analysis on what is known and asked about the problem, so that the right way of working is obtained [3]. In research conducted by Kurniati, et al (2016) can be seen the ket**e**rkaitan between creating capabilities with the ability to analyze and evaluate. This creative ability will not be able to stand alone, in the sense that this creative ability is influenced by the students' analytical and evaluation abilities. Students who have moderate analytical and evaluation skills, result in students' creative abilities being at a moderate level as well. Conversely, if students have low analytical and evaluation abilities, they tend to have low creative abilities as well.

Research conducted by Wijaya, et al (2019) regarding the analysis of items in the preparation for the 2018 SMP/MTS Science national exam based on Bloom's Taxonomy after analyzing the 2018 National Examination questions was dominated by the aspect of remembering C1 where in this aspect it only trained students to draw knowledge information stored in long-term memory (memorization) that has been studied previously. Learners get more types of conceptual questions in the form of definitions, understanding, special characteristics, nature, categories, classifications, linkages between one category and other categories, laws, theories, and principles [13].

In conclusion, the measured cognitive level of students is still in the Low Order Thinking Skill (LOTS) category. Students do not get the types of questions with a high level of HOTS which include aspects of critical thinking skills, creative thinking skills, and problem solving skills. Critical and creative thinking in question is contained in the ability to analyze, evaluate, and create aspects that aim to solve a problem. Assessment by emphasizing Higher Order Thinking Skills (HOTS) provides benefits for students, namely increasing achievement, motivation, and positive (affective) attitudes. Familiarizing students to think at higher levels can be done through a learning process and assessment based on higher-order thinking skills [5].

IV. CONCLUSION

This research was conducted using an instrument in the form of a higher order thinking ability test that describes the higher order thinking skills of eighth grade students of SMPN 1, SMPN 7, and SMPN 8 Padang. The results of this study can provide input for schools to improve students' thinking skills. Problems based on higher order thinking skills can be used by teachers as a guide in making High Order Thinking Skill (HOTS) questions to improve students' higher order thinking skills. Questions based on higher order thinking skills can also be used by students for practice in order to hone thinking skills so that students will get used to working on analytical questions.

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