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Students' Higher Order Thinking Profiles in Completing Contextual Problems on Slerek Boat Used by Fishermen in Muncar Banyuwangi

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ABSTRACT

Higher Order Thinking Skills (HOTS) is an ability that can create students into critical and creative individuals. The ways that can be used to reveal students' high-level thinking skills by using contextual problems in learning. The purpose of this study was to discribe the profile of high order thinking of 8th grade students in solving contextual problems regarding slerek boat. This research is a type of descriptive research with a qualitative approach. The research subjects were 8thH grade students of SMPN 1 Muncar, which amounted to 28 students. Data retrieval using test questions and interview activities. From the results of data collection, the results show that the ability of 8thH grade students tends to be able to solve questions at the evaluation level. This can be seen from the results of the test questions where there are 1 student who can solve the question of creation level (C6), 22 students can solve the question of the level of evaluation (C5) and 5 students can solve the level of analysis (C4). Based on the results of interviews, students who can solve the question level C5 have good ability in analyzing problems, can explain the settlement process both orally and in writing, besides that it's also able to make a hypothesis and test the hypothesis made previously.

INTRODUCTION

Mathematics is a knowledge that underlies other branches of science, so it can be said that mathematics is a universal science. In education, mathematics is a science that can provide skills in critical attitude, logical thinking, and systematic. These skills are expected to facilitate students in improving their abilities. One of the abilities that needs

to be developed by students is Higher Order Thinking Skills (HOTS) in learning activities.

Higher order thinking skills is one of the mathematical thinking skills which consists of several aspects, that is logical thinking, critical, creative, reflective and metacognitive [1]. Logical thinking is a part of critical thinking, critical thinking can be interpreted as a process by someone with the aim of making rational decisions directed to decide whether to believe in doing something. These aspects are very important skills to developed by students, because they can create the character of students to be independent individuals, by relying on their ability to solve problems. *Higher Order Thinking Skills (HOTS) are thinking activities involving cognitive levels of high hierarchies from Bloom's Taxonomy* [2]. Bloom's taxonomy explains that there are six cognitive domains, that is remembering (C1), understanding (C2), applying (C3), analyzing (C4), evaluating (C5), and creating (C6). The three lower levels (C1, C2, C3) are Low Order Thinking Skills and the top three levels (C4, C5, C6) are High Order Thinking Skills [3]. The indicators that used in higher order thinking on this study can be seen in Table 1 below.

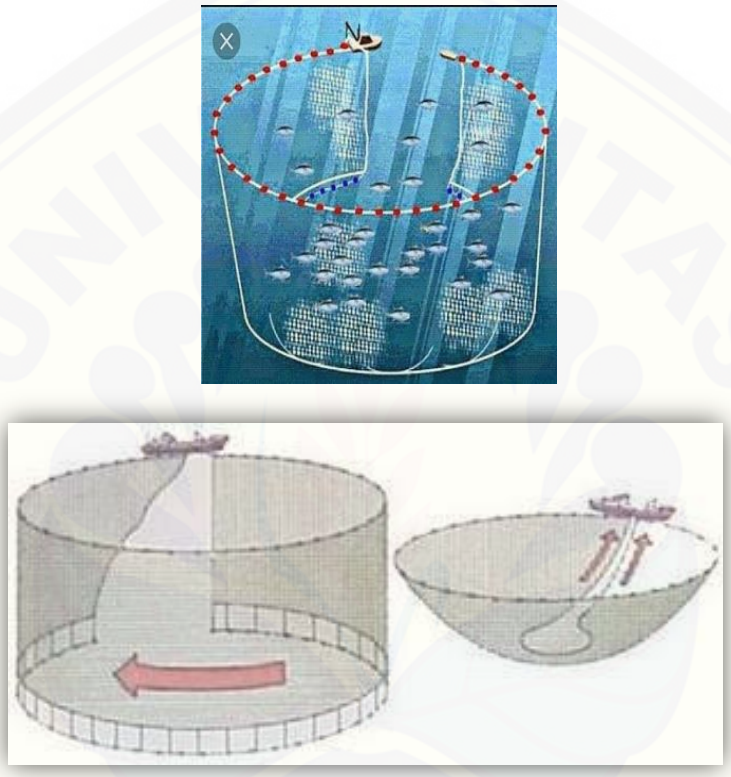
Table 1. Indicators of Higher Level Thinking Skills

Level of HOTS	Indicators of Higher Level Thinking Skills	
C4 (Analyzing)	4.a	Analyze incoming information and divide or structure information into smaller parts to identify patterns or relationships.
	4.b	Able to recognize and distinguish the causes and consequences of a complicated scenario.
C5 (Evaluating)	5.a	Provide an assessment of solutions, ideas and methodologies using suitable criteria or existing standards to ensure the value of effectiveness or benefits.
	5.b	Make hypotheses, criticize, and test.
	5.c	Accept or reject a statement based on established criteria.
C6 (Creating)	6.a	Organizing elements or parts into new structures that have never existed before.
	6.b	Design a way to solve problems.
	6.c	Make a generalization of an idea or perspective on something.

In learning activities, one of the ways that teachers can do to know and improve higher order thinking skills is by using contextual problems in learning. Learning by using contextual problems is a learning concept where the teacher presents the real world in learning [4]. Problem solving in contextual learning is a process that students do in finding answers to mathematical problems, which is mathematics is a process for modeling a phenomenon mathematically [5], so hopefully through this learning can improve students' mathematical skills. In addition, students can also learn in different ways, because students learn from the experiences they encounter not only memorize existing theories.

In this study the contextual issues raised about the slerek boat used by fishermen in Muncar, Banyuwangi. The slerek boat is a type of boat made of boards in the form of blades or layers of wood, this boat is also equipped with a broad hull, steering and run

with the help of a machine. When sailing this boat is in pairs, one large boat is in charge of carrying nets and crew, and small boats are in charge of spreading the nets. The type of net used by slerek boats was first introduced by an Italian named Fransisco Lugano who arrived in Indonesia in the early 1960s, and introducing boats and slerek nets to communities around the south coast [6]. The fishing technique in slerek boats using ring nets was done by monitoring the position of the fish first, then a small boat at high speed will circle the horde of fish while spreading the net, until at the end of the position the small boat will stop near a large boat to pull the net with the crew on a large boat, after that the rope on the net is drawn so that the bottom of the net which is initially circular will shrink to form a bag [7]. This is how the slerek boat works, consider Figure 1.



(a) (b)

Figure 1. How the slerek boat works
Source : (a) www.kotaikan.blogspot.com
(b) www.minapedia.online

The theme of the slerek boat is related to the circle material that has been studied by 8th grade students. The circle material is associated with the shape of the track that the slerek boat passes through when spreading the net, where the trajectory is circular. The circle is a collection of dots that form a closed arch, where the points on the arch are equidistant to a certain point, the particular point in question is called the center point [8]. There are several important elements in the circle, including the center point, radius, diameter, arc, etc. It is expected that through this study students will not only learn mathematics theory, but also can add insight into local wisdom in the surrounding environment. Based on the previous description, the formulation of the problem in this study is how 8th grade students' higher order thinking profile in solving contextual problems about slerek boat. The purpose of this study was to determine the 8th grade

students' higher order thinking profile in solving contextual problems about slerek boat used by fishermen in Muncar Banyuwangi.

METHODOLOGY

The research conducted was a descriptive study with a qualitative approach. The first step is to observe the slerek boat to Muncar fishermen, then continued with determining the place of research that is SMPN 1 Muncar with the subject 8th H grade students, amounting to 28 students. The next step is making research instruments in the form of test questions and interview guidelines. The test questions used contained three items that discussed contextual issues related to the slerek boat about circle material, time allocation for the processing question is 60 minutes. The research instrument in the form of an interview guide contains 10 questions that can show the profile of higher order thinking possessed by students.

The research instruments in the form of test questions and interview guidelines were validated by two validators,that is Lecturer in Mathematics Education, Faculty of Teacher Training and Education, Jember University. After the validation step, the data analysis is validated, where the average validity value is obtained (V_r) for test questions of 2.9 and interview guidelines of 2.8. These values state that the test instrument and interview guidelines have a very high level of validity, so the test instrument and interview guidelines are considered valid and can be used for data retrieval. Data retrieval was done by giving test questions to 28 of 8thH grade students to find out the level of thinking that students have. Then taken as many as 6 students to represent each class of students who can solve the problem of higher order thinking that is 1 student represents the class of students who can solve the level of creation problem (C6), 3 students represent the class of students who can solve the evaluation level problem (C5) and 2 students represent the class of students who can solve the level of analysis problem (C4) to conduct interview sessions. In the interview session the media used a voice recorder to record question and answer activities during the interview. It is intended that the results of the interview can be heard repeatedly for the sake of data analysis. The next step is the data analysis, where the collected data is then analyzed so that the profile of the high-level thinking of the students is obtained. The final step is to draw conclusions from data analysis activities. The research procedure can be seen in Figure 2.

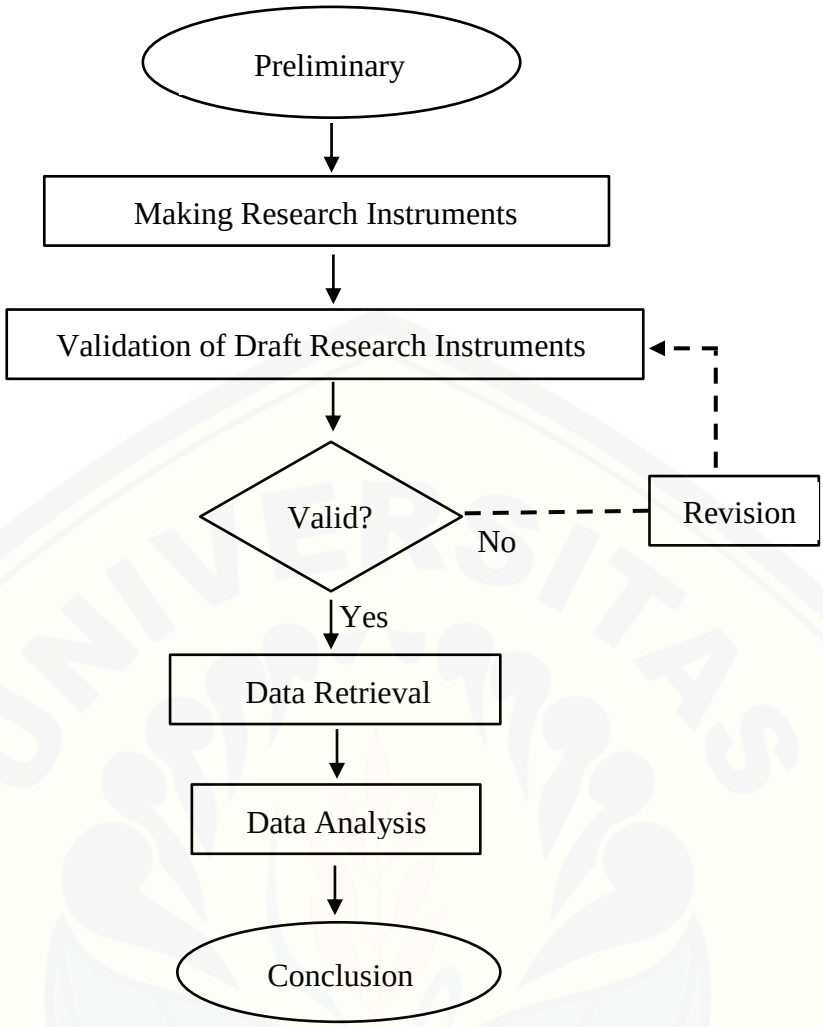
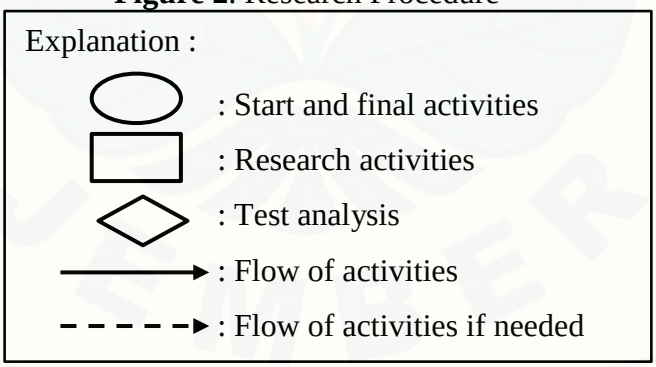


Figure 2. Research Procedure



RESULT AND DISCUSSION

Based on the results of data collection conducted on 28 8thH grade students at SMPN 1 Muncar using test questions, it was found that there were 1 student who could solve the creation level problem (C6), 22 students who could complete the evaluation level problem (C5) and 5 students who can solve the level of analysis level problem (C4). The next step is taken by taking students randomly as a sample, where 1 student is taken representing the group of students who can solve the level of creation problem (C6), 3 students representing groups of students who can solve the evaluation level problem (C5) and 2 students representing groups of students who can solve the level of

analysis problem (C4) to conduct interview sessions to obtain a deeper profile of student thinking.

Based on the results of the test questions, most of the VIIIH class students at SMPN 1 Muncar tend to master the evaluation level (C5). After the interview session, it was known the profile of students who were able to solve evaluation problem, that is students were able to analyze the problem quite well, this was evident from the way students wrote down some information that was known and what was asked even though it was still not too complete, so it needs to be asked again during the interview session. Students are also considered to be quite capable of explaining the relationships between known elements and the process of solving problems both orally and in writing. In addition, students are able to provide an assessment of information and also the methods used in solving problems. Students are considered capable of making hypotheses and testing the hypotheses they make.

The second group is a group of students who can solve the problem of the level analysis (C4) which consists of 5 students, students are able to solve 1 problem from the three problem given. This shows that the lack of good time management of students in working on the problem, so many unresolved problem within 60 minutes. Students are considered capable enough to analyze information that is known and what is asked even though it is still incomplete, so it needs to be asked again during the interview. There are some students who have not been able to work with coherence and there are still many stages of work that are passed, and when the interview session takes place students also have difficulty in explaining the analysis of the relationships between elements and the process of solving the problem that is done.

The group of students who can solve the creation level problem (C6) there is only one student, which according to mathematics teachers, these students are students who have high mathematical abilities among all 8^{th} grade students at SMPN 1 Muncar. Students are able to solve 3 problems given and most indicators of high-level thinking ability can be achieved well, this can be seen from the results of completion on the answer sheet and in the interview session, where during the interview students can answer the problems smoothly and confidently. Students are able to analyze the questions well, this is evident from the way students write and mention information that is known and what is asked about the problems. In addition, students are also able to determine the relationship between information that is known to get a solution to the problems given and can explain it clearly. Students are also able to provide an assessment of the methods used and information found on the problem, in addition students are able to make a hypothesis and carry out testing and are able to reject or accept the test results by revealing the reasons that cause the hypothesis or test results to match or not. Students are able to make a structure based on the information obtained which then the structure is used to make a problem solving, so students can produce a product / method based on the description given previously. However, there is one indicator that has not been reached at this stage, that is the indicator 6.c where students have not been able to convey the generalization of an idea or perspective on something. The imbalance in the number of students at each level is caused by the majority of students not yet accustomed to working on contextual questions that require mathematical abilities, namely the ability to model a phenomenon mathematically. In addition, the context of the problem used is also relatively new for students because it is

rarely or has never been used before, this is what causes students to experience difficulties when working on the questions given.

This type of research is new in the world of education, especially in mathematics learning. This is due to the use of slerek boat themes which are generally used in research related to shipping and fisheries, used in research in the field of mathematics education which is used to determine the profile of high-level thinking possessed by students.

CONCLUSION

Based on the analysis of the results and discussion, the conclusions of the profile of high order thinking students of class 8^{th} at SMPN 1 Muncar, concluding the following contextual boat slerek problems are as follows. From the results of the test questions that have been done, the high order thinking ability of class VIIIH students at SMPN 1 Muncar is dominated by students who can solve the level of evaluation problem (C5) which are 22 students, then students who can solve the level of analysis problem (C4) as many as 5 students and students who can solve the level of creation problem (C6) are only 1 student. Almost 79% of VIIIH grade students master the evaluation level problem (C5), so that the profile of high order thinking of 8^{th}H students is as follows. Students are able to complete 2 questions from 3 questions given. Students are considered capable of analyzing information that is known and what is asked even though it is still not too complete, so it needs to be asked again when the interview session. Students were also assessed as being able to analyze the relationships between known elements and the problem solving process during the interview session. Students are also able to provide an assessment of information and also the methods used in solving problems and are able to make hypotheses and conduct tests, as well as being able to reject or accept test results by revealing the reasons that cause the hypothesis or test results to match, even though the explanation given is not very complete and tend to be sober according to the abilities possessed by students.

Suggestions that can be given based on this research are for teachers, it is recommended to more often provide contextual learning to students. Because students don't just learn in theory but can learn from phenomena that exist in the surrounding environment. It is expected that contextual learning can improve students 'thinking skills, and also can improve students' mathematical abilities and can make students more familiar with the environment around them. It is expected that contextual learning can improve students 'thinking skills, and also can improve students' mathematical abilities and can make students more familiar with the environment around them. Suggestions for other researchers, in the future in conducting research are expected to more often raise themes themes related to local culture and wisdom in mathematical research, hoping to help introduce culture to the younger generation.

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