



Analysis of High School Students' Difficulties in Solving HOTS Problems Using the Two-Tier Test Method

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Abstrak: Higher Order Thinking Skills (HOTS) are high-order thinking skills that should be owned and improved by Indonesian students to catch up with other countries, especially in the field of mathematics. This study aims to identify and describe students' difficulties in solving HOTS questions through the two-tier test method at MAN 3 Aceh Tengah. This research is a qualitative-research with document data sources on test answers, questionnaires, and interviews. The research subjects in this study were three subjects from class XII at MAN 3 Central Aceh. Analysis of the validity of the data used triangulation techniques, namely identifying and describing the difficulties faced by students when solving HOTS questions by analyzing the results of test answers, questionnaires, and interviews. The results of the study show specifically and descriptively that students when completing questions on the analytical indicators feel anxious, lack of confidence and are unable to process information into the form of mathematical conclusions. On the evaluation indicator, students are not sure they can solve the given questions, so students fail to understand the concept of solving the presented questions. Meanwhile, in the creating indicator, students still have difficulty developing their own ideas. Furthermore, students are only monotonous in what their teacher teaches, without developing creativity to solve the given problem. By using a two-tier test, the results of this research are able to provide a comprehensive picture of students' understanding of open-ended questions, especially HOTS problems.

Keywords: Student Difficulties; HOTS problems; Two Tier Test

Analisis Kesulitan Siswa SMA dalam Menyelesaikan Soal HOTS menggunakan Metode Two-Tier Tes

Abstract: Higher Order Thinking Skill (HOTS) merupakan kemampuan berpikir tingkat tinggi yang semestinya dimiliki, dan ditingkatkan oleh pelajar Indonesia untuk mengejar ketertinggalan dengan negara lain khususnya pada bidang matematika. Penelitian ini bertujuan untuk mengidentifikasi dan mendeskripsikan kesulitan siswa dalam menyelesaikan soal HOTS melalui metode *two-tier* tes di MAN 3 Aceh Tengah. Penelitian ini merupakan penelitian kualitatif dengan sumber data dokumen hasil jawaban tes, angket, dan wawancara. Subjek penelitian di ambil dari kelas XII di MAN 3 Aceh Tengah. Analisis keabsahan data menggunakan triangulasi teknik yaitu mengidentifikasi dan mendeskripsikan kesulitan yang dihadapi siswa saat menyelesaikan soal HOTS dengan menganalisa hasil jawaban tes, angket dan wawancara. Hasil penelitian menunjukkan secara spesifik dan deskriptif bahwa siswa saat menyelesaikan soal pada indikator analisis merasa cemas, kurang percaya diri dan tidak mampu mengolah informasi ke dalam bentuk penyelesaian matematika. Pada indikator mengevaluasi, siswa tidak yakin mampu menyelesaikan soal yang diberikan, sehingga siswa gagal memahami konsep penyelesaian soal yang disajikan. Pada indikator mencipta, siswa masih kesulitan mengembangkan idenya sendiri. Selanjutnya, pada indikator mencipta siswa hanya monoton pada apa yang diajarkan gurunya saja, tanpa mengembangkan kreatifitasnya untuk memecahkan masalah yang diberikan. Penelitian yang menggunakan metode *two-tier* tes ini mampu memberikan gambaran menyeluruh tentang pemahaman siswa terhadap soal-

soal cerita, khususnya soal HOTS.

Kata Kunci: Kesulitan Siswa; Soal HOTS; Two-Tier Tes

INTRODUCTION

Mathematics develops a person's competitiveness, trains precision, accuracy and way of thinking so that by learning mathematics is able to deal with technological developments that support progress in the field of education (Yudha, 2019). Mathematics is taught in elementary schools to the upper-advanced level to train the ability to think logically, analytically, systematically, critically, and creatively (Mauliyda, 2019). In the process of mathematics, there is a higher-order thinking ability (HOTS), which will influence a person in solving problems that continues when making decisions and becomes an important aspect of education (Tanujaya et al., 2017), because it will have an impact on the development of human resources. The ability to think at a high level in mathematics can be reflected in the results of the 2018 PISA (program for international student assessment) out of 79 countries, Indonesia is ranked 73 with an average score of 379 (Schleicher, 2019), with the category being at level 1 which means students are only able to answer questions if the information provided on the questions is fully available with questions and how to answer them using routine procedures (OECD, 2018). In addition, based on the 2015 TIMMS (trend in international mathematics and science studies) assessment, Indonesia was ranked 44 out of 49 countries with a score of 397, which means it is still at a low level (Mullis et al., 2015). Indonesia's ranking, both in PISA and TIMMS, is really concerning; this shows that Indonesia has not been able to reach the gap, especially in Mathematics.

When solving PISA math literacy questions, students are asked to be able to formulate, interpret, and predict a problem through reasoning based on mathematical concepts, procedures, and phenomena in order to be able to make judgments and decisions (OECD, 2018). TIMMS consists of content domains (fractions, decimals, equations, measurements, geometric shapes, and probability) and cognitive domains (knowledge, application and reasoning) which have the characteristics of questions with a high index of difficulty (Hadi, 2019). Both of these are in line with HOTS characteristics, which require students to use higher-order thinking processes (Wardani & Ibrahim, 2020) which measure the ability to solve problems, critical thinking, creative thinking, reasoning, and decision-making (Widana et al., 2018), which is a development on the Bloom taxonomy at the level of analyzing, evaluating, and creating (Saraswati & Agustika, 2020). These skills are needed by students because they include problem-solving skills, being able to analyze situations accurately and carefully, and being able to make choices and make decisions independently. With this ability, students dare to argue about a problem, both criticizing, assessing, and providing solutions to the problems they face. Thus, students are not just a container of knowledge; they are also able to create ideas in a more tangible form in their daily lives.

In order to get used to solving HOTS questions, the government is trying to include 10% of HOTS problems in the national exam starting in 2018 (Umar & Ahmad, 2019), there are 3-4

HOTS questions out of 40 questions. HOTS is not a problem that has one solution; problem solving is not fixated on the same strategy or must be taught by the teacher, but students are able to use their own language, their own way, and their own strategy in measuring their ability to solve high-order thinking skill-type questions. Furthermore, the following is a recapitulation of the average student mathematics national exam scores at one of the high schools in Central Aceh (Puspendik, 2019).

Table 1. Recapitulation of the Average National Examination Scores of the Central Aceh

Level	Average Math Score
National	34,17
Province	30,91
District/City	33,05
MAN 1 Aceh Tengah	35,58
MAN 2 Aceh Tengah	34,27
MAN 3 Aceh Tengah	29,32

Source: Puspendik Kemendikbud 2019 National Exam Results

It can be seen that the low national exam score is allegedly caused by the emergence of HOTS questions on the national exam questions and an increase in the integrity of UNBK implementation (Gradini et al., 2018), which means that the implementation of the exam runs smoothly and the level of cheating decreases, while the emergence of HOTS questions makes the level of difficulty of the questions higher (Umar & Ahmad, 2019). With such a national UN average of mathematics, it is difficult to solve mathematical issues while the government is trying to adapt them so that Indonesia does not lag behind other countries. From the table above, it can be concluded that there are difficulties faced by students when solving math problems; moreover, with the inclusion of HOTS questions in the 2019 national exam. MAN 3 Central Aceh is the school with the lowest national exam results among other madrasahs. Based on the results of an interview with one of the teachers MAN 3 Aceh Central obtained that the teacher was trying to use interesting methods to get students interested in studying mathematics, but the student's varied background could be one obstacle. Parental involvement greatly contributes in a variety of ways to children's learning outcomes in all domains (Kaukab, 2016). The low national examination score at the school was the main reason for researchers to take research subjects at MAN 3 Central Aceh.

It is possible for students to have difficulty solving mathematics national exam questions because students do not master the material and do not understand the objects of learning mathematics (Wasida & Hartono, 2018). When students often misunderstand the information given in the problem, it results in an inability to identify the contents of the problem that should be solved. It was reinforced that students had difficulty adapting to questions that were in the HOTS category because they were not routinely given by the teacher, so they students felt unfamiliar with these problems (Gradini et al., 2018). In addition, mathematics lessons become difficult because of errors in calculations; it is difficult to find the data needed in calculations and cannot apply formulas (Pramesti & Prasetya, 2020). Sometimes teachers who teach mathematics in the abstract and directly use formulas, so that they can become an

inhibiting factor for students in solving math problems (Lisnani et al., 2020). The process experienced by these students can lead to boredom and even stress when doing excessive assignments. If students' difficulties are known, it can be a new contribution for the government to develop appropriate learning methods, so that trained students work on HOTS. Students are able to practice with HOTS, become accustomed and subsequently do not close the possibility of students to be able to improve access to the National Examination.

Based on this data and information, it was the initiative of the researcher to explore the various difficulties faced by students when solving HOTS category problems. The categories of difficulties that will be reviewed are students' difficulties in analyzing, evaluating, and creating. Therefore, teachers must carry out a variety of approaches, methods, and certain diagnoses, one of which is by using the two-tier test. This method is used because the two-tier test method can indirectly explore students' difficulties because the form of the questions to be presented is two-tier questions. The question consists of choosing or multiple choice questions, and the next level is the reason students choose that answer (Syahana & Andromeda, 2021). The analysis was carried out based on the results of students' answers to the first tier and second tier with the answers to the given items (Bayrak, 2013). This means that students' reasons for choosing these answers are limited based on certain categories. In contrast to Beyza, the researcher did not restrict students from giving reasons for choosing an answer for each item being tested. This aims to identify and describe the patterns of students' difficulties in solving HOTS questions through the two-tier test method. So that the research subjects have the freedom to give reasons for choosing answers in the first tier.

Treagust introduced two-tier testing, a commonly used diagnostic testing method (Treagust, 1988). It involves examinations with a series of multiple-choice, two-tier questions. The first tier evaluates students' factual or descriptive understanding of the phenomenon under examination, while the second tier looks at the rationale behind the students' first-tier selections. Some research finds that two-tier tests can measure high-level thinking abilities (HOTS). The two-tier test HOTS instrument has been developed and is particularly effective in testing students' higher order thinking skills (Girsang et al., 2020). Students are stimulated to think at a high level when two-tier instruments are used; they respond to the stimulation by choosing an option from the available possibilities (Rintayati et al., 2020). Two-tier tests are therefore seen as a useful and practical method of evaluation since they provide insight into students' thought processes, validate students' responses, reduce fictitious responses, facilitate large-scale application, and make scoring simple (Sibiç et al., 2022). The study's two-tier test could get around the drawbacks of the current approaches. It comprised two tiers: the first tier (answer-tier) evaluates topic knowledge; and the second tier (reason-tier) evaluates the rationale behind the first-tier response (Chou et al., 2007; D.-C. Yang & Li, 2013). It offered a chance to examine students' thought processes regarding number sense in addition to analyzing their comprehension of number sense. Specifically, the general understanding is that number sense is a type of higher order thinking (Sood & Mackey, 2014). The results demonstrated the efficacy of the suggested strategy for assisting students in learning calculus at a higher cognitive level: the two-tier exam technique considerably

increased the students' learning achievement, particularly in solving the application level questions (T. C. Yang et al., 2017). Therefore, the two-tier test method supports measuring higher order thinking.

It is hoped that giving questions through the two-tier test method can find out students' difficulties in solving HOTS questions. Besides that, HOTS questions are very important to improve students' high-level thinking skills so that students in Indonesia are not left behind in the field of education compared to other countries. If student difficulties are known, of course, it can be a new contribution for the government to develop appropriate learning methods, so that students are trained to work on HOTS questions. Students are able to practice with HOTS questions, become accustomed to them, and, furthermore, it is possible for students to improve national exam achievements as well as TIMSS and PISA rankings in the future.

METHOD

This study focuses on identifying and describing students' difficulties in solving HOTS questions through the two-tier test method in class XII MAN 3 Aceh Tengah. The approach used is qualitative with a descriptive method. The data population studied was taken from class XII, with subjects to analyze students' difficulties. Subjects were selected based on category scores of 0–10 (low), 11–20 (medium), and 21–30 (high). Students will be given a question instrument using the two-tier test method with a total of 3 questions, taken from the modified 2019 National Examination, but using material and question indicators representing HOTS. As for 2 items in the form of multiple choice with answer options accompanied by reasons for choosing these answers with the cognitive domain C4 (quadratic functions), C5 (application of maximum/minimum value derivatives), and 1 item in the form of a description with answers accompanied by reasons so students can develop ideas and their creativity in solving problems in the C6 cognitive domain (three-dimensional). To strengthen the data, 30 questionnaire items were given, which had to be filled in by the subject to be studied, and as many as 11 interview questions would be asked to students after completing the HOTS questions. This instrument had previously been validated in content and construct (Yusup, 2018) by two experts. The data analysis used is reduction, data display, and conclusion. To check the validity of the data, the researcher uses technical triangulation (Yusup, 2018) by analyzing the results of students' answers to the test questions being tested, and the researcher will analyze the results of the questionnaire answers and interviews.

RESULTS AND DISCUSSION

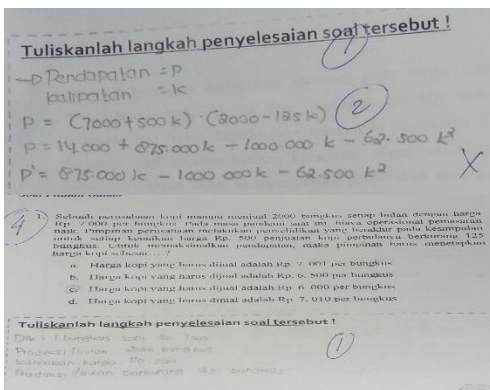
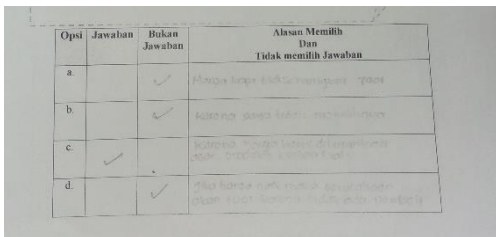
The selection of subjects other than based on category is also seen by the subject getting a score on each item, which can be seen in the following table.

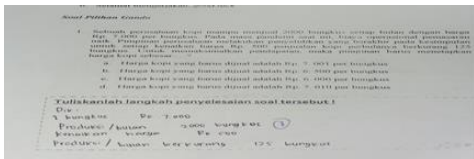
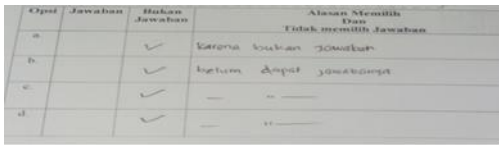
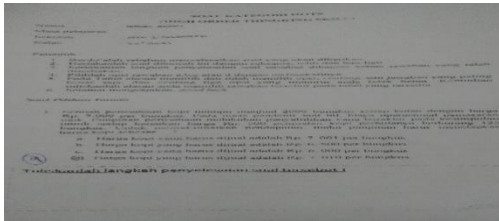
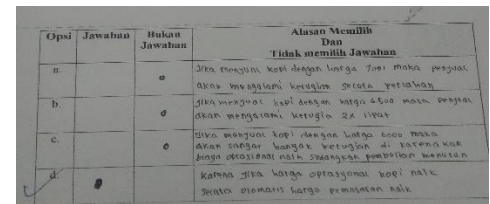
Table 2. Subject Scores

Subject	Item Score			Total Score	Category
	C4	C5	C6		
S1	4	1	0,5	5,5	Low
S2	8	2	1,5	11,5	Medium
S3	9	11	6	26	High

Students who were selected as subjects were then given a questionnaire and interviewed to find out the reasons and difficulties in answering the questions. As for the results of student answers from questions, questionnaires, and interviews, the indicators are presented. The following is an explanation of students' difficulties in completing HOTS questions for each subject.

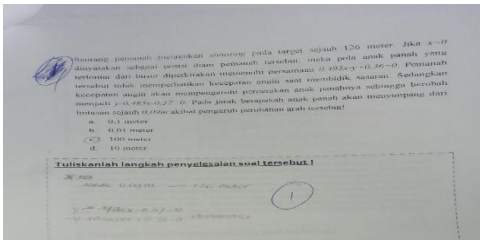
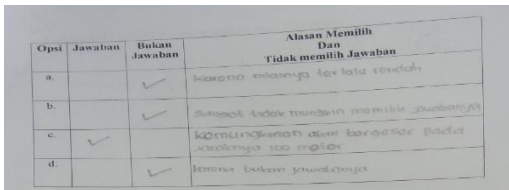
Table 3. Student Difficulties Completing HOTS Questions on Analyzing Indicators (C4)

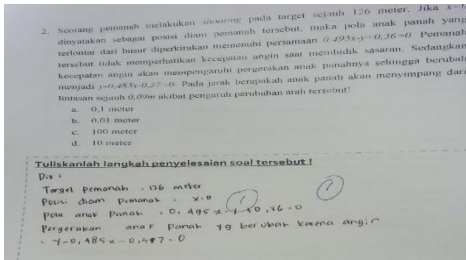
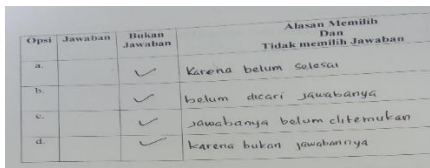
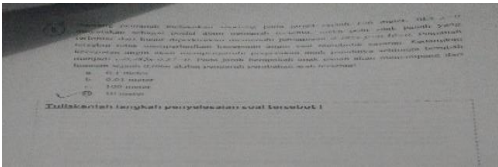
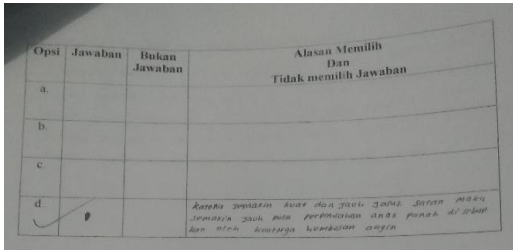
Subject	Method		Findings
	Test Results	Interview	
S1	First Tier  <p>S1 is already able to find out information and shows efforts to solve problems, even though they still answer half of the problem-solving steps and have difficulty completing the steps or stages of problem-solving.</p>	S1 is able to find out the information in the problem by reading it repeatedly, even though the form of the question being tested has just been encountered and relies on instinct.	S1 has difficulty understanding information and knowing the problems that must be solved.
	Second Tier  <p>S1 gives reasons for choosing or not choosing an answer to the given options.</p>		

Subject	Method		Findings
	Test Results	Interview	Questionnaire
S2	First Tier	S2 is able to know the information contained in the problem. Meanwhile, his explanation of the questions was ignored without any answers.	S2 has difficulty understanding the information in the problem and has difficulty knowing the problem to be solved.
	 <p>Tuliskanlah langkah penyelesaian soal tersebut!</p> <p>Jawab: $P = 7000 \times 5000 = 35.000.000$</p> <p>$P = 2 \times (7000 + 5000) = 2 \times 12.000 = 24.000$</p>		
S2	Second Tier	S2 does not answer questions, and it is difficult to make decisions to complete and choose the right answer.	
			
S3	First Tier	S3 stated that he was unable to demonstrate his knowledge, because he answered only using logic. This means that S3 indicated difficulty in understanding the HOTS problem.	The response of the S3 subject after reading the questions given was that they still did not know anything, had difficulty understanding the information in the questions, and had difficulty knowing the problems that had to be solved.
			
S3	Second Tier		1. Difficulty knowing the problem that must be solved in the problem. 2. Overcoming difficulties by maximizing the potential possessed by the subject, stating that the subject solves problem number 1 using only instinct.
			

Subject	Method		Findings
	Test Results	Interview	Questionnaire
	Logically, the reason for the subject of S3 is correct, because if the operational price increases, the marketing price will automatically increase.		<p>3. It is difficult to solve HOTS problems in their calculations using formulas, and it is difficult to model mathematics.</p> <p>4. Overcoming difficulties by maximizing the potential that the subject has and stating that the subject solves problem number 1 using instinct alone.</p>

Table 4. Student Difficulties Completing HOTS Questions on Evaluating Indicators (C5)

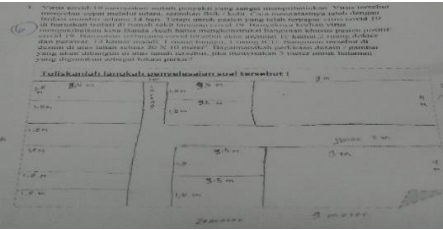
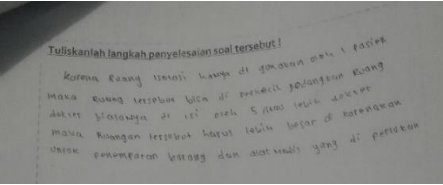
Subject	Method		Findings
	Test Results	Interview	Questionnaire
S1	<p>First Tier</p>  <p>S1 seemed hesitant to write answers, even though he had thought of eliminating the equations that had been written. This means that S1 has difficulties choosing, deciding, and evaluating questions correctly.</p> <p>Second Tier</p> 	<p>S1 has difficulty determining formulas and solving problems because S1 does not know how to solve problems.</p>	<p>S1 feels unable to solve problems, as indicated by the difficulty of using the right formula to solve and evaluate.</p> <p>1. Not able to determine how to solve the problem.</p> <p>2. Difficulty in choosing, deciding, and evaluating questions correctly.</p>

Subject	Method		Findings
	Test Results	Interview Questionnaire	
	<p>S1 in the answer options indicates being able to assess the possibilities that may occur, even though the answer chosen is not the correct answer key.</p>		
S2	<p>First Tier</p>  <p>S2 appeared to have difficulty solving problems using the correct formula and problem-solving flow.</p> <p>Second Tier</p>  <p>S2 did not choose an answer option; the reason is still the same because it is not finished and the answer has not been found.</p>	<p>S2 was unsure of himself when solving the problem and did not know how to solve the problem.</p> <p>S2 failed to understand the information from the problem so it was difficult to use the right formula to solve the problem.</p>	<ol style="list-style-type: none"> 1. Difficulty defining the problem; 2. Subject S2 difficult to make a decision to choose the right answer; 3. It is difficult to solve problems using the formula and the correct problem-solving flow; 4. It is difficult to evaluate, make decisions and follow up on solving problems.
S3	<p>First Tier</p>  <p>Second Tier</p>  <p>The two pictures above describe that S3 was unable to solve the problem properly. S3 subjects only use instinct to</p>	<p>S3 is difficult to solve problems in calculating using formulas, difficult to model mathematics, and difficult to maximize the potential that the subject has.</p> <p>S3 failed to understand the concept of solving the problem and felt unable to solve it after reading the questions.</p>	<ol style="list-style-type: none"> 1. It is difficult to know the problem that must be solved. 2. After reading the questions, S3 felt unable to solve the questions. 3. Failed to understand the concept to solve the problem.

Subject	Method		Findings
	Test Results	Interview	Questionnaire
	choose answers and give reasons related to questions; the farther the target distance, the further the arrow displacement is caused by the strong wind gusts.		

Table 5. Student Difficulties Solving HOTS Questions on the Creating Indicator (C6)

Subject	Method		Findings	
	Test Results	Interview	Questionnaire	
S1	First Tier	S1 is not used to working on non-routine questions, especially in the HOTS category, has not been able to understand questions correctly, and is not able to analyze questions, so that S1 has difficulty solving questions.	S1 identified that this was the first-time doing HOTS questions, so that the subject had not been able to develop his own ideas to find the right strategy and formula.	<ol style="list-style-type: none">1. Not being able to create the subject's own ideas for solving problems.2. Not being able to take responsibility for solving the problem, the subject only knows without understanding the information that has been given in the problem.3. The reason for the difficulties experienced was because it was the first-time solving HOTS questions.
	Second Tier			
S2	First Tier	S2 has difficulties solving problems and knowing the formulas and strategies to be used. In addition, when the subject is confused, the subject will not continue working on the answer again.	S2 is only used for the solution taught by the teacher and causes confusion when developing strategies for solving problems.	<ol style="list-style-type: none">1. It is difficult to specify the problem, not careful in solving the problem and in a hurry to solve it.2. The subject did not show his ability to create ideas for solving problems.
	Second Tier			

Subject	Method			Findings
	Test Results	Interview	Questionnaire	
	S2 did not show his ability to create ideas and knowledge for solving problems. The subject only followed orders to describe the building design without adding creativity to the answers.			<div>3. The subject has not been able to solve the problem in his own way because he is used to the method taught by the teacher.</div> <div>4. Subject has not been able to finish the answer and is confused using the formula.</div>
S3	<div>First Tier</div>  <div>Second Tier</div>  <p>Based on the two pictures, S3 was able to answer questions but was not specific, not detailed, and had unclear information.</p>	S3 has difficulty when calculations and numbers are too many.	S3 has difficulty finding ways to fulfill the steps to solve problems, and when the teacher gives new material, the subject only accepts the material without finding anything that can be developed from the new material.	<div>1. Difficulty in fulfilling the steps to solve the problem.</div> <div>2. When the teacher gives new material, the subject only accepts it without finding things that can be developed.</div> <div>3. Not yet able to use the formula, then stop solving the problem according to the ability that the subject has.</div>

The explanation above can identify student difficulties based on HOTS indicators in the following table.

Table 6. Identification of Student Difficulties Based on HOTS Indicators		
No	HOTS Indicator	Student Difficulties
1	Analyzing (C4)	<div>a. It is difficult to analyze and understand the information contained in the problem</div> <div>b. It is difficult to translate information into language and mathematical modeling</div>

No	HOTS Indicator	Student Difficulties
		<ul style="list-style-type: none"> c. Difficulty operating math problems such as adding, subtracting, multiplying, and dividing. d. The student's perspective that the questions faced are difficult so that students are doubtful and afraid of answering the questions wrong
2	Evaluating (C5)	<ul style="list-style-type: none"> a. It is difficult to evaluate and not ready to solve problems with the subject's own ideas b. It is difficult to determine the formula to use c. It is difficult due to errors in reading the questions so that the subject fails to understand the questions to be solved d. The subject is not able to execute the question in detail e. The subject does not have good self-confidence f. The subject has difficulty making decisions to complete and choose the right answer
3	Creating (C6)	<ul style="list-style-type: none"> a. Subjects are still monotonous, using routine methods limited to what is taught by the teacher only b. The subject is not able to use the subject's own ideas. It is difficult to show his skills in designing answers and developing his creativity c. It is difficult to arrange the stages of the right solution d. Not being able to create an independent way of solving.

Mathematical difficulties have certain characteristics, namely difficulties in processing information, difficulties related to language and reading skills, and mathematics anxiety (Waskitoningtyas, 2016). In accordance with that opinion, the students' difficulties when dealing with HOTS questions were the difficulty in understanding the information about the questions, misreading the questions, failing to translate the information in the form of mathematical modeling, and not being sure of being able to solve the questions; in this case, they felt anxious if the answers were wrong.

Students have difficulty working on open-ended questions because they are not careful in reading and understanding sentence by sentence, as well as what is known in the problem, what is being asked, and how to solve the problem quickly (Dwidarti et al., 2019). Based on the results of the subject's answers to the tests given, as well as the interview answers, it showed that some of the students did not understand what should be known and the things that were asked in the questions. Besides that, the research subjects when solving the questions were not careful and thorough in understanding the question sentences so that errors occurred in solving the questions. This happened allegedly because the questions given were in the form of open-ended questions, so the research subjects had difficulty analyzing the questions presented. When working on the open-ended questions, students are confused and sometimes do not understand the meaning of the question (Utari et al., 2019).

The results of this study indicate the factors or causes of the difficulties experienced by students when solving the HOTS questions that have been given, 1). Students are not used to solving HOTS questions, 2). Students rarely find questions in the HOTS category, 3). Students are not confident when solving HOTS questions. The causes of these difficulties are incomplete

mastery of number facts, weakness in performing calculations, difficulty transferring knowledge, weakness in making connections, lack of understanding of the language of mathematics, difficulties in understanding visual and spatial, and difficulties in spatial abilities (Aji et al., 2015). That definition is in accordance with the research subjects found in the field. Substantively, the subject that has been studied is difficult to operate in mathematics, in this case using the concepts of addition, subtraction, division, and multiplication. Difficulties in understanding spatial and visual are also experienced by students in creating problems. Category C6 is in the form of open-ended questions that require the subject's reasoning and critical thinking skills to build ideas and design them in the form of questions. In addition, the questions on the creating indicator that have been given are not tied to one answer but depend on the students' visual abilities. However, students have not been able to complete it carefully and precisely. Besides that, some students also expressed their difficulty in modeling mathematics, meaning that they did not understand the language of mathematics contained in the questions. Therefore, students find it difficult to analyze the problem and find the solution.

Another factor that causes the inability of students to solve HOTS questions comes from outside the student. The results showed that there was a crisis of students' self-confidence when solving questions, doubts when solving questions were given, perceptions of HOTS were questions with more complicated difficulties. As a result, students in this case give up more easily and fail to understand the questions properly. In addition, the way students work is also still monotonous, limited to using methods only taught by the teacher. This is a failure that is quite worrying because students are not able to develop their own ideas to solve problems related to mathematics. It is as if students are only programmed to follow routine, ordinary, and structured ways from generation to generation without finding new ways that are broader and more straightforward. This situation becomes very detrimental when students are actually faced with mathematics problems that are more real in life because they are unable to solve the problem independently.

The use of a two-tier test makes it easy to see students' understanding of the answers. Besides that, the positive value of using the two-tier test is that researchers are able to see the mindset of students when choosing answers. However, it is still very unfortunate that some of the students who studied answered by guessing the options in the multiple-choice questions. After conducting research using the two-tier test, it is certain that this type of question can be used in the HOTS and multiple-choice questions because it requires a more detailed solution than other routine questions. So that it can be known whether its use is effective or not and can reduce the probability of guessing the answer to only 4% (Rositasari et al., 2014). This can be identified based on the way students issue their reasons in the second-tier table. Through the use of a two-tier test, researchers can find out the percentage of students choosing answers by adding the reasons, so that students can analyze each indicator question item, which is very useful and easy to do.

CONCLUSION

Based on the results of the research, students in class XII MAN 3 Central Aceh are still very unfamiliar with HOTS Category questions. The difficulties faced by students are also diverse and, at the same time, have similarities, 1). It is difficult to analyze information on the problem of analyzing indicators. When solving questions on the C4 indicator, they feel anxious, lack self-confidence, and are unable to process information into the form of mathematical solutions, 2). In the evaluating indicator, students are not sure they can solve the questions given, so they fail to understand the concept of solving the problems presented, 3). Meanwhile, in creating indicators, students still have difficulty developing their own ideas. The way students are only monotonous in what the teacher teaches without developing their creativity to solve the problems given.

In addition, the number of respondents can also determine the quality of the research findings. The use of the two-tier test method will be more effective if it is intended for more than 20 respondents. This is because the method requires reasons at the second tier; it is much better if the next researcher adds a choice of direct reasons. Therefore, students can choose the right reasons for the questions in the first tier.

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