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Article

Student's Ability in Solving Mathematical Problems Based on Wankat-Oreovocz Theory Reviewed from Mathematical Logical Intelligence

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ABSTRACT:

Education is an important need for every human being. This is necessary so that students can develop their potential. To achieve this, students are expected to have the ability to solve problems. There are several problem solving theories developed by several experts. One theory of problem solving is based on the Wankat-Oreovocz theory. In this study problem-solving abilities will be assessed based on students' logical-mathematical intelligence in working on trigonometry problems. This study used a qualitative approach with the type of case study research conducted at MA Ma'aarif Udanawu Blitar with research subjects in class X. From 42 students, 6 students were selected as research subjects classified based on different levels of logical-mathematical intelligence. The data in this study will be obtained using written tests and documentation. Then the data will be analyzed through the stages of data collection, data reduction, data presentation, and conclusions. The research results obtained were students with high logical-mathematical intelligence were able to solve problems according to the sequence of steps of the Wankat-Oreovocz theory, students with moderate logical-mathematical intelligence were able to fulfill the six indicators of the Wankat-Oreovocz theory even though they were not optimal, while students with low logical-mathematical intelligence Have confidence and motivation to solve problems.

Keywords: Logical Intelligence, Problem Solving, Wankat-Oreovocz Theory

INTRODUCTION

Education is a primary need for every human being. Education itself is a structured effort in creating a learning atmosphere with learning activities so that students can increase their potential to have religious spiritual expertise, intelligence, control of personality, noble character, and the skills needed by themselves, society, nation and country (Darmadi, 2019). Education is needed as a basis for social life so that the nation's generation can continue to progress and develop.

Education can be obtained by a student through various channels, both formal and non-formal. One of the formal education is school education with programs that are arranged regularly and officially determined. Programs that have been determined in schools include subjects, subject matter, lesson plans, learning hours, and learning rules. The main subjects that will be taught in

schools consist of various subjects, one of which is mathematics. But in solving math problems there is no routine procedure that can be used quickly to solve the problem. This is a scourge for students who think that mathematics is abstract in nature, making it too difficult to solve (Meita Sari, Adna, & Dewi, 2020).

To solve math problems, students generally use the basics and principles in solving problems using rational thinking. In rational thinking students are required to use logic with the aim of students being able to analyze problems, solve problems, draw conclusions, and also obtain theoretical rules. In order to be able to solve problems well, students are expected to have problem solving abilities that are in accordance with the Wankat-Oreovocz theory. Where the problem-solving steps consist of I can, Define, Explore, Plan, Do It, Check, And Generalize.

Based on the research that has been done, it shows that students' mathematical problem solving abilities are still relatively low. There are two factors that influence this, namely external factors and internal factors (Uyun & Idi, 2021). External factors are factors that exist outside a person, while internal factors are factors that exist within a person. One of the internal factors that influence problem-solving ability is logical-mathematical intelligence (Nurul, Rubhan, & Siska, 2022). Mathematical logical intelligence relates to a person's ability to think logically, to analyze and solve numerical patterns, deductively or inductively, and to solve problems by thinking skills (Astuti, 2015).

Each student's ability to solve math problems is different. This happens because the level of mathematical logical intelligence possessed by each student is also different. The level of logical-mathematical intelligence can be classified into 3, namely high-level, medium-level, and low-level mathematical logical intelligence.

One of the mathematical materials that can be used to demonstrate students' ability to solve problems is trigonometry. Trigonometry is a science in mathematics that studies the angles and sides of a triangle as well as the basic functions that arise from these relations. By studying trigonometry students can practice problem solving skills. The high intensity in a student working on trigonometry questions can be utilized by a student by applying the ability to solve problems that occur in everyday life. Based on the explanation above, the researcher is interested in conducting research on the level of logical intelligence of class X students of MA Ma'arif Udanawu Blitar in order to find out the ability to solve problems based on the Wankat-Oreovocz theory.

METHODS

This research was conducted at MA Ma'aruf Udanawu Blitar. The first stage before conducting research is to ask permission to conduct research from the MA Ma'arif Udanawu Blitar principal. After obtaining permission, the researcher discussed with the school principal, deputy head of curriculum, and mathematics teacher regarding the research to be carried out. After that the researcher determines the class that will be used for the experiment. The research was conducted using a qualitative approach with a case study type of research. In this study the data were obtained by written test and documentation methods.

The test is one of the instruments in collecting data in the form of a series of exercises or questions that function as a tool to measure a person's skills, knowledge or abilities. The tests used in this study were carried out twice, namely a written test of mathematical logical intelligence used to group research subjects and a test of mathematical problem solving abilities according to the wankat-oreovocz theory to determine the subject's ability to solve mathematical problems.

Documentation is an instrument in collecting data by observing and perpetuating it in the form of documents obtained by researchers, subjects or others related to research. In this study the documentation was in the form of written results sheets done by the subject and pictures or photos during the research activities. After the data is collected, it will be analyzed by means of data reduction, data presentation, and drawing conclusions.

RESULTS AND DISCUSSION

The research was conducted in class X MIPS 2 where the class was selected based on the results of discussions between the researcher and the mathematics teacher with a total of 42 students. Before conducting the test, validation was carried out that the research class subjects had been taught trigonometry material. The first stage of the research is to provide logical mathematical intelligence test questions, then the researcher will provide mathematical problem solving tests according to the Wankat-Oreovocz theory. In order to make it easier for researchers to analyze data and maintain subject privacy, researchers use coding by giving initials to the names of students. After carrying out the mathematical logical intelligence test, the researcher processed the test results data and grouped the test result data into three levels, namely high, medium, and low. The results of grouping mathematical logical intelligence from all students of class X MIPS 2 MA Ma'aruf Udanawu Blitar, totaling 42 students, there are 13 students with high logical intelligence, 18 students with moderate logical intelligence, and 11 students with low logical intelligence. Of the 42 students who took the logical-mathematical intelligence test, the researcher chose 6 students for further research with the provision that 2 students with high logical-mathematical intelligence, 2 students with moderate logical-mathematical intelligence, and 2 students with low logical-mathematical intelligence as test subjects for problem solving questions mathematics. The following are names that were used as research subjects in the second phase.

Table 1. List of Research Subjects

No.	Student's Code	Subject's Code	Mathematical Logical Intelligence Level
1.	BEU	S_1	High
2.	DL	S_2	High
3.	HIS	S_3	Moderate
4.	ZHCN	S_4	Moderate
5.	AP	S_5	Low
6.	ZSM	S_6	Low

After getting the research subject, the second stage of the research was carried out, namely a test of the ability to solve mathematical problems by being given trigonometry material questions. The following are the test questions given to the selected subjects:

1. A ladder has a length of 10 m. The ladder is leaning against the wall of the house at an angle of 60 to the ground. Determine the height of the wall from the floor to the end of the stairs!
2. Dinda is 170 cm tall. He stood (measured to the eye) at a distance of 12 m from the foot of the flagpole. Dinda sees the top of the flagpole with an elevation angle of 45, then determine the height of the flagpole!

S1's Answer With High Mathematical Logical Intelligence

- Question Number 1

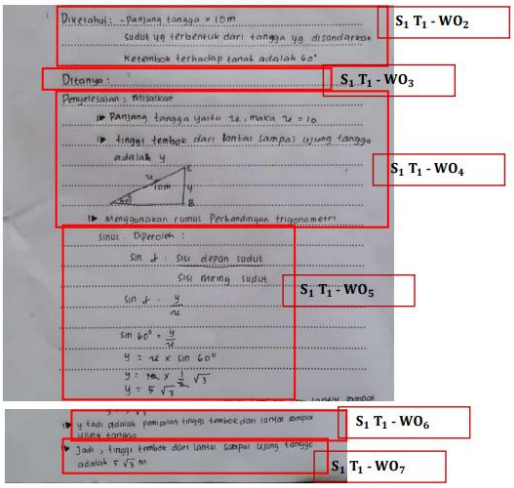

Figure 1. S1's Answer to Question Number 1

Based on Figure 1, S1 is able to solve question number 1 and can get the final answer correctly. This can be seen from S1 being able to write down things that are known from the questions given in full (S1T1 − WO2), but S1 did not write down what was asked (S1T1 − WO3. Based on the results of solving S1 can make a mathematical model by assuming the problem first on the question into variables then describe it in a right triangle and make a solution plan using the sine trigonometry ratio formula (S1T1 − WO4). checking by re-checking the examples of the variables obtained at the solving stage to the mathematical model that was created at the planning stage (S1T1 − WO6) S1 is able to interpret the answers obtained based on the concept of trigonometry comparisons in right triangles, namely by explaining the meaning of the results obtained according to the questions given (S1T1 − WO7).

- Question Number 2

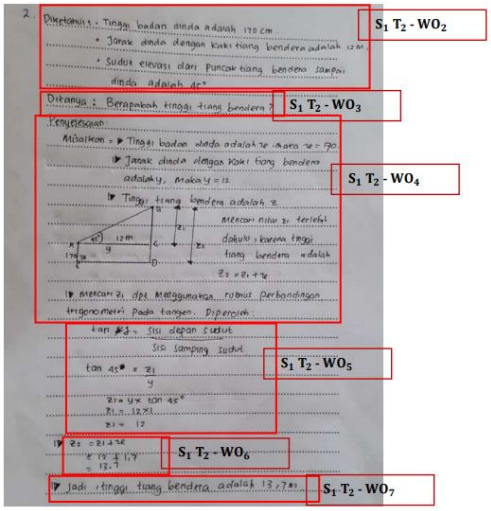

Figure 2. S1's Answer to Question Number 2

Based on Figure 2 S1 is able to solve question number 2 and can get the final answer correctly. This can be seen from S1 being able to write down things that are known from the questions given completely (S1T2 − WO2). S1 is able to write down what is asked in the questions (S1T2 − WO3). Based on the results of solving *S*1, you can make a mathematical model by first assuming the problems in the questions into variables, then depicting it in a right-angled triangle and making a settlement plan first looking for the value from the height of the flagpole to the top of the flagpole using the comparison formula tangent trigonometry (S1T2 − WO4). S1 is able to complete a plan

that has the correct final result (S1T2 − WO5). Then S1 checks by re-checking the variable examples obtained at the solving stage to the mathematical models that have been made at the planning stage (S1T2 − WO6). S1 is able to interpret the answers obtained based on the concept of trigonometry in right triangles, namely by explaining the meaning of the results obtained (S1T2 − WO7).

S2's Answer With High Mathematical Logical Intelligence

- Question Number 1

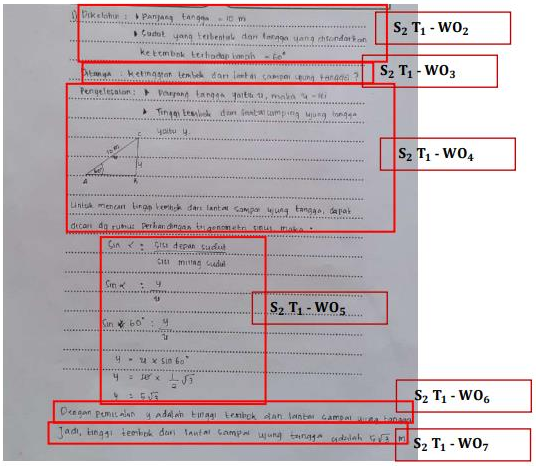

Figure 3. S2's Answer to Question Number 1

Based on Figure 3 S2 was able to solve question number 1 and was able to get the final answer correctly. This can be seen from S2 being able to write down things that are known from the questions (S2T1 − WO2). S2 is able to write down what is asked in the questions (S2T1 − WO3). Based on the results of solving S1, you can make a mathematical model by first assuming the problems in the problem into variables, then depicting them in right-angled triangles and making a solution plan using the sine trigonometry ratio formula (S2T1 − WO4). S1 is able to complete the plan that has been made so as to get the correct final result (S2T1 − WO5). Then S2 checks by re-checking the variable examples obtained at the solving stage to the mathematical model that was created at the planning stage (S2T1 − WO6). S2 was able to interpret the answers obtained based on the concept of trigonometry in right triangles, namely by explaining the meaning of the results obtained (S2T1 − WO7).

- Question Number 2

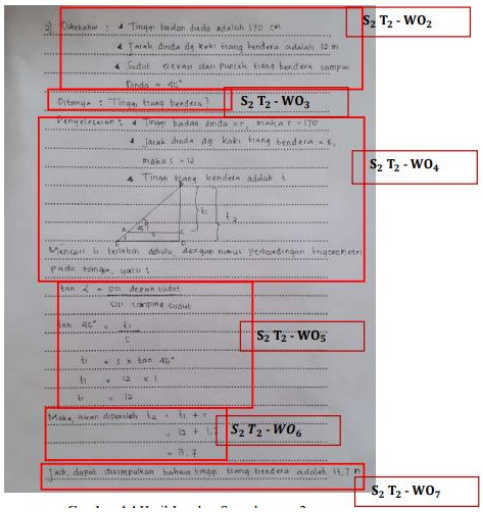

Figure 4. S2's Answer to Question Number 2

Based on Figure 4 S2 was able to solve question number 2 and was able to get the final answer correctly. This can be seen from S2 being able to write down things that are known from the questions given in full (S2T2 − WO2). S2 is able to write down what is asked in the questions (S2T2 − WO3). Based on the results of solving S2, you can make a mathematical model by first comparing the problem to the variables and then depicting it in a right-angled triangle and making a settlement plan first looking for the value from the height of the flagpole to the top of the flagpole using the comparison formula tangent trigonometry (S2T2 − WO4). S2 is able to complete a plan that has the correct final result (S2T2 − WO5). Then S2 checks by re-checking the variable examples obtained at the solving stage to the mathematical model that was created at the planning stage (S2T2 − WO6). S2 was able to interpret the answers obtained based on the concept of trigonometry in right triangles, namely by explaining the meaning of the results obtained (S2T2 − WO7).

S3's Answer With Moderate Mathematical Logical Intelligence

- Question Number 1

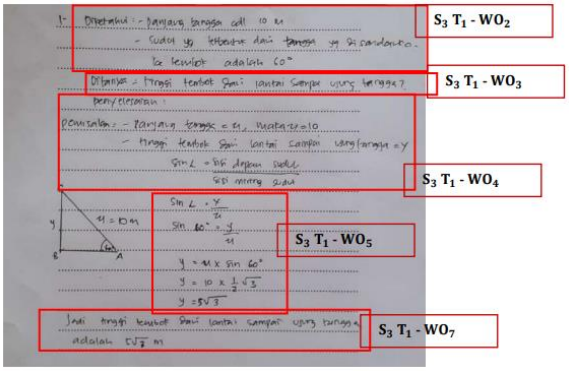

Figure 5. S3's Answer to Question Number 1

Based on Figure 5 S3 was able to solve question number 1 and was able to get the final answer correctly. This can be seen from S3 being able to write down things that are known from the questions given completely (S3T1 − WO2). *S*1 was able to write down what was asked in the questions (S3T1 − WO3). Based on the results of solving S3, you can make a mathematical model by first assuming the problems in the problem into variables, then depicting it in a right triangle and making a solution plan using the trigonometry sine ratio formula (S3T1 − WO4). S1 is able to complete the plan that has been made so as to get the correct final result (S3T1 − WO5). However, S3 did not check by re-checking the variable equations obtained at the solving stage to the mathematical models that had been made at the planning stage. S3 immediately interpreted the answers obtained based on the concept of trigonometry in right triangles by explaining the meaning of the results obtained (S3T1 − WO7).

- Question Number 2

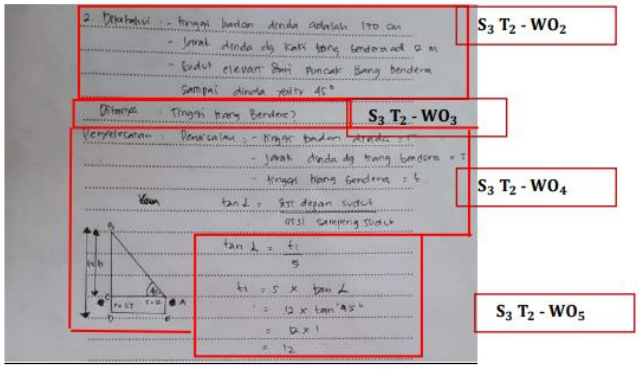

Figure 6. S3's Answer to Question Number 2

Based on Figure 6 S3 was able to solve question number 2, but in the final result S3 got an inaccurate result. This can be seen from S3 being able to write down everything that is known from the questions given in full (S3T2 − WO2). S3 was able to write down what was asked in the questions (S3T2 − WO3). Based on the results of solving S3, you can make a mathematical model by first assuming the problems in the questions into variables, then depicting it in a right-angled triangle and making a settlement plan to find the value from the height of the flagpole to the top of the flagpole using the trigonometry ratio formula tangent (S3T2 − WO4). S3 is able to complete the plans that have been made so as to get the correct final results (S3T2 − WO5). Furthermore, on the results of the test, S3 did not check by re-checking the variable equations obtained at the solving stage to the mathematical model that had been made and also did not interpret the answers based on the concept of trigonometry comparisons in right triangles.

S4's Answer With Moderate Mathematical Logical Intelligence

- Question Number 1

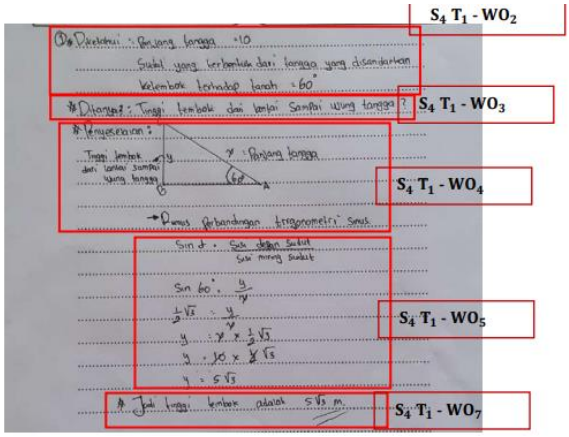

Figure 7. S4's Answer to Question Number 1

Based on Figure 7 S4 was able to solve question number 1 and was able to get the final answer correctly. This can be seen from S4 being able to write down things that are known from the questions given (S4T1 − WO2). S4 was able to write down what was asked in the questions (S4T1 − WO3). Based on the results of solving S4, you can make a mathematical model by for example the problem in the problem into variables then describe it in a right-angled triangle and make a solution plan using the trigonometry sine ratio formula (S4T1 − WO4). S1 is able to complete the plan that has been made so as to get the correct final result (S4T1 − WO5). However, S4 does not check by re-checking the variable equations obtained at the solving stage to the mathematical model that was created at the planning stage. S4 directly interprets the answers obtained based on the concept of trigonometry in right triangles (S4T1 − WO7).

- Question Number 2

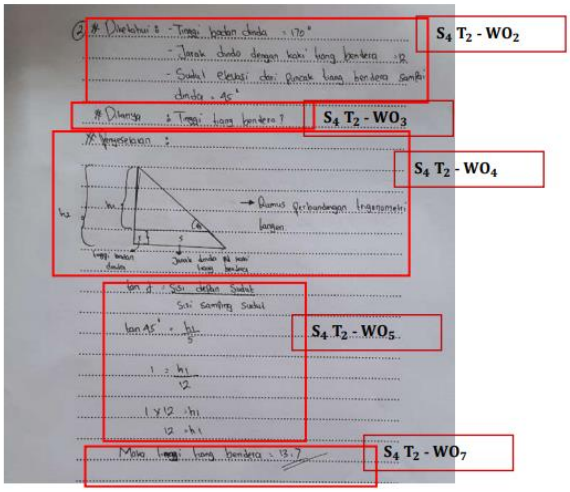

Figure 8. S4's Answer to Question Number 2

Based on Figure 8 S4 was able to complete question number 2 and get the right result. This can be seen from S4 being able to write down things that are known from the questions given in full (S4T2 − WO2). S4 was able to write down what was asked in the questions (S4T2 − WO3). Based on the results of the settlement that S4 can make a mathematical model by for example the problem in the problem into variables then depict it in a right triangle image and make a settlement plan to find the value from the height of the flagpole to the top of the flagpole using the tangent trigonometry ratio formula (S4T2 − WO4). S4 is able to complete the plans that have been made so as to get the correct results (S4T2 − WO5). Furthermore, on the results of the test, S4 did not check by re-checking the variable assumptions obtained at the completion stage to the mathematical model that had been made. S4 immediately interpreted the answers based on the concept of trigonometry in right triangles.

S5's Answer With Low Mathematical Logical Intelligence

- Question Number 1

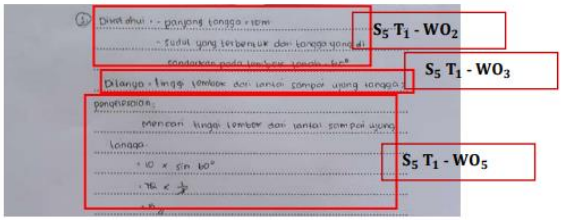

Figure 9. S5's Answer to Question Number 1

Based on the results of the completion carried out by S5, it can be seen that for question number 1 S5 was able to work on the problem with the correct problem solving steps. S5 writes down what is known in the problem correctly (S5T1 − WO2). S5 wrote down what was asked in the question correctly (S5T1 − WO3). Then S5 immediately carried out the work steps without making a plan beforehand, at the work stage the formula used to solve question number 1 was still not quite right so S5 got the wrong result (S5T1 − WO5). In the settlement results carried out by S5, it can be seen that for question number 1 S5 did not write down the steps for solving the math problem at the stage of checking back the answers that had been obtained and also at the stage of interpreting the results that had been obtained.

- Question Number 2

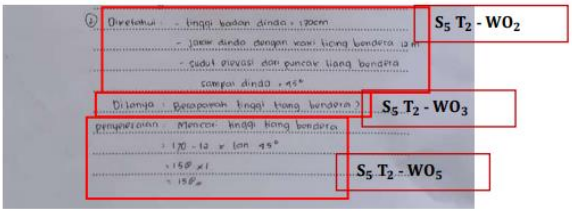

Figure 10. S5's Answer to Question Number 2

Based on the results of the completion carried out by S5, it can be seen that for question number 2 S5 was able to work on the problem with the correct problem solving steps. S5 writes down what is known in the problem correctly (S5T2 − WO2). S5 wrote down what was asked in the question correctly (S5T2 − WO3). Then S5 immediately carried out the work steps without making a plan beforehand, at the work stage the formula used to solve question number 2 was still not quite right so S5 got the wrong result (S5T2 − WO5). In the settlement results carried out by S5, it can be seen that for question number 2 S5 did not write down the steps for solving the math problem at the stage of checking back the answers that had been obtained and also at the stage of interpreting the results that had been obtained.

S6's Answer With Low Mathematical Logical Intelligence

- Question Number 1

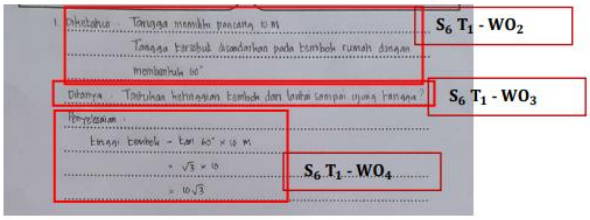

Figure 11. S6's Answer to Question Number 1

Based on the results of the completion carried out by S6, it can be seen that for question number 1 S6 was able to work on the problem with the correct problem solving steps. S6 writes down what is known in the problem correctly (S6T1 − WO2). S6 wrote down what was asked in the question correctly (S6T1 − WO3). Then S6 immediately carried out the work steps without making a plan beforehand, at the work stage the formula used to solve problem number 1 was still not quite right so S6 got the wrong result (S6T1 − WO5). In the settlement results carried out by S6, it can be seen that for question number 1 S6 did not write down the steps for solving the math problem at the stage of checking back the answers that had been obtained and also at the stage of interpreting the results that had been obtained.

- Question Number 2

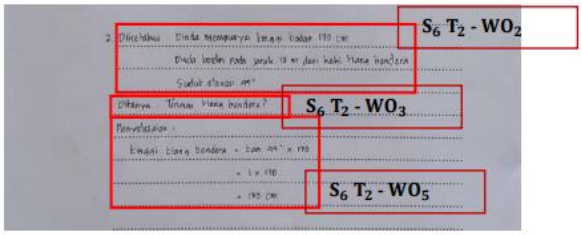

Figure 12. S6's Answer to Question Number 2

Based on the results of the completion carried out by S6, it can be seen that for question number 2 S6 was able to work on the problem with the correct problem solving steps. S6 writes down what is known in the problem correctly (S6T2 − WO2). S6 wrote down what was asked in

the question correctly (S6T2 − WO3). Then S6 immediately carried out the work steps without making a plan beforehand, at the work stage the formula used to solve question number 2 was still not quite right so S6 got the wrong result (S6T2 − WO5). In the settlement results carried out by S6, it can be seen that for question number 2 S6 did not write down the steps for solving the math problem at the stage of checking back the answers that had been obtained and also at the stage of interpreting the results that had been obtained.

Based on all the activities that have been carried out during the research with the title "Student's Ability in Solving Mathematical Problems Based on Wankat-Oreovocz Theory Reviewed from Mathematical Logical Intelligence" the researcher found several findings in the field related to problem solving abilities mathematics according to the Wankat-Oreovocz theory in terms of students' mathematical logical intelligence, among others:

Table 2. Student's Problem Solving Ability According to the Wankat-Oreovocz Theory

Level of Mathematical Logical Intelligence	Student's Code	Wankat Oreovocz Stages
High Level of Mathematical Logical Intelligence	BEU	I can
		Define
		Explore
		Plan
		Do
		Check
		Generalize
	DL	I can
		Define
		Explore
		Plan
		Do
		Check
		Generalize
Moderate Level of Mathematical Logical Intelligence	IHS	I can
		Define
		Explore
		Plan
		Do
		Generalize
	ZHCN	I can
		Define
		Explore
		Plan
		Do
		Generalize
Low Level of Mathematical Logical Intelligence	AP	I can
		Define
		Explore
	ZSM	I can
		Define
		Explore

Students' ability in solving mathematical problems is influenced by the level of mathematical logical intelligence. This is reinforced by the results of research conducted by Ratna Dumilah that

mathematical logical intelligence affects the ability to solve story problems on the subject matter of flat planes (Dumilah, 2013).

The following is a description of each student with a different level of intelligence based on the results of the tests that have been carried out, which will be described according to the Wankat-Oreovocz theory steps:

Student with High Logical-Mathematical Intelligence

1. I Can

Students with high logical-mathematical intelligence at this stage have the confidence to solve problems and be able to relate problems to mathematical concepts correctly. This is in accordance with what was stated by Masykur and Fathani that students being able to understand patterns of relationships is one of the characteristics of students with logical mathematical intelligence (Masykur, Moch, & Fathani, 2008). This research is also in accordance with the results of Prayogi and Anggun Badu Kusuma's research stating that students who have high self-confidence have confidence in their abilities so that students will defend their arguments strongly (Prayogi & Kusuma, 2019).

2. Define

Students with high logical-mathematical intelligence are able to write down what is known in the problem. Thus it can be said that students with high logical-mathematical intelligence are able to define questions. This is in accordance with the results of Wardatul Hasanah and Tatag's research that students who have high mathematical logical intelligence are able to classify the information contained in the questions (Hasanah, Wardatul, & Siswono, 2013).

3. Explore

Students with high logical-mathematical intelligence are able to write down what is asked in the problem. This is in accordance with the results of Choirotul et al.'s research that students with high logical-mathematical intelligence are able to identify the elements contained in the problem by writing down and mentioning information that is known in the problem completely and clearly (Umami, Choirotul, Mustangin, & Walida, 2021).

4. Plan

Students with high logical-mathematical intelligence are able to formulate a solution plan correctly, namely from the information contained in the questions in the form of important things that students know to make a mathematical model by first assuming the variables used. This is in accordance with the results of Choirotul et al.'s research that students who have high mathematical intelligence are able to compare and associate the information contained in the questions with their knowledge (Umami, Choirotul, Mustangin, & Walida, 2021).

5. Do

Students with high logical-mathematical intelligence are able to solve the problems given. Students with high logical-mathematical intelligence are able to solve problems correctly and think of logical solutions that can simplify the calculation process in solving problems. Choirotul's research results, et al show that students with high logical-mathematical intelligence are able to apply problem-solving strategies in detail, systematically, and according to planning (Umami, Choirotul, Mustangin, & Walida, 2021).

6. Check

Students with high logical-mathematical intelligence are able to check back the results they have obtained, where students can check and prove the results that have been obtained are correct. The results of this study are reinforced by the results of Choirotul et al.'s research that students with high logical-mathematical intelligence are able to correct the steps of working on problems that have been planned beforehand to ensure the answers they get are correct (Umami, Choirotul, Mustangin, & Walida, 2021).

7. Generalize

Students with high logical-mathematical intelligence are able to solve problems correctly, where students can interpret the results obtained. This is in accordance with the results of Choirotul et al.'s research that students with high logical-mathematical intelligence are able to interpret solutions by writing conclusions from the results of solving mathematical problems into a real context (Umami, Choirotul, Mustangin, & Walida, 2021).

Students With Moderate Logical-Mathematical Intelligence

1. I can

Students with mathematical logical intelligence are having confidence or are able to grow their confidence to be able to solve the given problem. Students with moderate logical-mathematical intelligence assume not only that they can solve the problems given, but students are also able to relate problems to mathematical concepts correctly and precisely. This is in accordance with what was stated by Masykur and Fathani that one of the components of logical-mathematical intelligence is having a component that involves sharpness in seeing patterns or relationships of problems (Masykur, Moch, & Fathani, 2008).

2. Define

Students with moderate logical-mathematical intelligence are able to define by writing down things that are known from the questions given. Based on the results of Choirotul's research, et al showed that students with mathematical logical intelligence were being able to understand the problem, it was seen that students could write down and mention information that was known in the problem completely and clearly (Umami, Choirotul, Mustangin, & Walida, 2021). This was reinforced by the research results of Wardatul Hasanah and Tatag that students with mathematical logical intelligence being able to classify the information contained in the problem (Hasanah, Wardatul, & Siswono, 2013).

3. Explore

Students with logical-mathematical intelligence are being able to explore by writing down the things that are asked of the questions that are given correctly. Based on the results of Choirotul's research, et al showed that students with a moderate level of logical intelligence were able to understand the problem given, it can be seen that students can clearly write down the information asked in the problem (Umami, Choirotul, Mustangin, & Walida, 2021).

4. Plan

Students with moderate logical-mathematical intelligence are able to plan by showing what to do before solving problems. Students are able to devise a settlement plan by creating a mathematical model for solving problems that will be used in solving problems. This is slightly different from the results of Choirotul et al.'s research that students with moderate logical-mathematical intelligence have not been able to use existing information to make it into a mathematical model which results in skills errors in solving problems (Umami, Choirotul, Mustangin, & Walida, 2021).

5. Do

Students with moderate mathematical logical intelligence are able to solve problems with the correct steps. Students are also able to provide logical solutions that make it easier for students in the calculation process to solve problems. This is in accordance with the results of Wardatul Hasanah and Tatag's research which states that students with moderate mathematical logical intelligence are able to perform calculations correctly (Hasanah, Wardatul, & Siswono, 2013).

6. Check

Students with mathematical logical intelligence are getting the correct answer. However, in the step of correcting the answers that have been obtained, students are unable to check and prove the correctness of the answers obtained. This can be seen from the test results of students who do not return temporary answers obtained to be returned to the plans that have been made and based on the results of interviews, students do not know way to check answers with plans that have been made before. The results of this study were strengthened by the results of Farah's research, et al which showed that students with logical-mathematical intelligence were not re-examining their answers (Faizah, 2017). However, this was different from the research by Wardatul Hasanah and Tatag which stated that students with logical-mathematical intelligence were being able to make temporary conjectures. solution to the given problem (Hasanah, Wardatul, & Siswono, 2013).

7. Generalize

Students with moderate mathematical logical intelligence are able to solve the given problem. It can be seen that students with moderate logical-mathematical intelligence can interpret the data that has been obtained and then interpret it based on the questions given. This is in accordance with the results of Choirotul et al.'s research which states that students with moderate mathematical logical intelligence are able to interpret answers by writing conclusions from the results of problem solving into real-world contexts (Umami, Choirotul, Mustangin, & Walida, 2021).

Students with Low Logical-Mathematical Intelligence

1. I can

Students with low logical-mathematical intelligence have confidence and assume they can solve problems without knowing the mathematical concepts related to the questions given. According to Prayogi and Anggun Badu Kusuma that students' mathematical logical thinking intelligence can continue to develop, one of which is influenced by high self-confidence, this is because in solving problems students must understand and analyze information to explore information that has not been presented (Prayogi & Kusuma, 2019).

2. Define

Students with low logical-mathematical intelligence are able to define by writing down things that are known from the questions given. The results of Choirotul's research, et al stated that students with low logical-mathematical intelligence were able to write down the information that was known in the problem completely (Umami, Choirotul, Mustangin, & Walida, 2021).

3. Explore

Students with low logical-mathematical intelligence are able to explore by writing down the things that are asked of the questions that are given correctly. The research results of Wardatul Hasanah and Tatag stated that students with low mathematical logical intelligence could classify the information contained in the questions (Hasanah, Wardatul, & Siswono, 2013).

4. Plan

Students with low mathematical logical intelligence do not understand well the questions given and do not know the mathematical concepts related to the problems given so that students are not able to write a solution plan properly. This is different from the results of Wardatul Hasanah and Tatag's research which stated that students with low mathematical logical intelligence were able to compare the relationship between existing information on the problem and their knowledge (Hasanah, Wardatul, & Siswono, 2013). The results of this study were reinforced by the results of

Choirotul et al.'s research which stated that students with low logical-mathematical intelligence at the solution planning stage, students were unable to plan appropriate solutions to overcome existing problems so as to get inaccurate results (Umami, Choirotul, Mustangin, & Walida, 2021).

5. Do

Students with low logical-mathematical intelligence are not able to solve problems properly. Students solve problems by guessing, namely by adding up several things that are known. This is because students do not know the mathematical concepts related to the questions so students only guess the answers by adding up some of the information contained in the questions without using the correct concepts and strategies in solving the problems. This is reinforced by the results of Wardatul Hasanah and Tatag's research which states that students with low mathematical logical intelligence experience conceptual errors which result in students being unable to develop and apply problem-solving strategies appropriately (Hasanah, Wardatul, & Siswono, 2013).

6. Check

Students with low logical-mathematical intelligence are not able to examine and prove the truth of the answers obtained. This is reinforced by the results of Wardatul Hasanah and Tatag's research which said that students with low mathematical logical intelligence abilities after obtaining alleged student answers were unable to re-examine their answers (Hasanah, Wardatul, & Siswono, 2013).

7. Generalize

Students with low logical intelligence are not able to interpret the answers that have been obtained. Meanwhile, based on the results of interviews with students with low mathematical logical intelligence at the generalization stage, they are unable and difficult to explain the results that have been obtained to be interpreted based on the questions given. This is different from the results of Choirotul et al.'s research which stated that students with low mathematical logical intelligence were able to interpret the results of problem solving by returning them to the real world context (Umami, Choirotul, Mustangin, & Walida, 2021).

CONCLUSION

Based on the results of the research and discussion that has been carried out, the following conclusions are obtained:

1. Students with high logical-mathematical intelligence can solve problems correctly and meet all problem-solving indicators based on the Wankat-Oreovocz theory.
2. Students with moderate logical-mathematical intelligence can solve problems correctly even though they only fulfill 6 problem-solving indicators based on the Wankat-Oreovocz theory.
3. Students with low logical-mathematical intelligence only meet 3 indicators of problem solving based on the Wankat-Oreovocz theory and are unable to solve problems.

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