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Mathematical Literacy of Junior High School Students in Solving HOTS Problems at the Curriculum 2013

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Abstract

Curriculum 2013 applies HOTS problems to improve students' high-level thinking skills. But in fact, teachers still familiarize students to solve problems with low levels, impacting the low mathematical literacy of students in Indonesia. Descriptive research with a qualitative approach aims to discover the mathematical literacy of State Junior High School 2 Kotapinang in solving HOTS problems applied to the curriculum 2013. Four students were selected using purposive sampling techniques as a research subject. Research instruments consist of mathematical ability tests, literacy tests, and interviews. Data collection uses triangulation techniques, while data analysis techniques use Miles and Huberman models. The results show that the mathematical literacy of State Junior High School students 2 Kotapinang in solving HOTS problems applied to the curriculum 2013 included enough categories because students only satisfied two stages of the mathematical process. By using an effective learning model to support the improvement of mathematical literacy of Junior High School students in solving HOTS problems.

Keywords: High-level thinking skills, HOTS as a learning assessment, Mathematical literacy, Problem-solving in mathematics.

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Introduction

Curriculum 2013 results from renewal and refinement of the curriculum KTSP 2006 (Setiadi, 2016; Mastur, 2017). The striking difference between the two lies in the emphasis on the learning realm (Setiadi, 2016). The characteristics in this curriculum emphasize character education and the complete mastery of competencies from aspects of attitude, knowledge, and skills (Andrian & Rusman, 2019).

In addition, the curriculum 2013 also applies a high-level assessment of thinking learning outcomes or known as Higher Order Thinking Skills (HOTS) which aims to encourage learners to reason in depth. HOTS is part of Taxonomy Bloom Revision by using active verbs consisting of analyzing (C_4), evaluating (C_5), and creating (C_6), which help solve problems. Thus, a teacher must know an expert to support his profession in developing high-level thinking skills (Fanani, 2018). The usefulness of HOTS is to develop new problem solving well so that students' reasoning skills will be increasingly developed (Wulandari, Hajidin, & Duskri, 2020). By involving HOTS in education, the stakeholders are ready to compete internationally. Thus, HOTS is intended to answer all globalization and national education problems. It is expected to align with the future and the international world (Sofyan, 2019).

However, hope with reality is still not well realized. The reason, based on data from State Junior High School 2 Kotapinang in 2020, shows that the results of National Examinations of students in mathematics subjects only get a score of 3.83 and are the lowest score of other topics. So, it can be said that students have a low ability in mathematics. In addition, found 8 (eight) student problems in the classroom, namely: (1) passive during learning, (2) 1 out of 15 students can't read fluently, (3) students have difficulty in doing different exercise problems with examples of problems given, (4) The application of basic mathematics concepts of students is still low, so that students have difficulty in solving given problems such as doing problems by applying the concept of multiplication and division, (5) have not been able to link one concept with another concept, (6) have not been able to solve mathematics problems with high-level thinking, (7) identifying, formulating, and writing answers is still not appropriate, (8) the level of accuracy of mathematical calculations is still wrong or incorrect.

Referring to the above statement, Prabawati (2018) and Bidasari (2017) stated that students are still used to solving low-level problems, causing low mathematical literacy in Indonesia. The results of the Programme for International Student Assessment (PISA) showed Indonesia was ranked 72nd out of 78th participating countries (Manoy & Purbaningrum, 2021), while the results of trends in the International Mathematics and Science Study (TIMSS) stated that Indonesia ranks 45th out of 50th TIMSS participating countries (Santia, 2018). In addition, the mathematical literacy skills of Junior High School students are still relatively low because students are still accustomed to using procedural answers and concrete nature. Still, students are not used to solving problems that require logical thinking, critical and applicable solutions. Hence, students still have difficulty solving problems in high-level mathematical reasoning categories (Muzaki & Masjudin, 2019; Rifai & Wutsqa, 2017). Thus, the need for efforts to improve mathematical literacy in Indonesia.

Mathematical literacy is students' ability to formulate, apply, and interpret mathematical problems in real-life contexts. Mathematical literacy aims to help students understand the role or usefulness of mathematics in real life and make informed decisions. Mathematical literacy is also one of the essential components that must be owned individually or personally in the field of education in the 21st century (Manoy & Purbaningrum, 2021). Indicators of mathematical literacy consist of 5 (five) elements, namely: (1) mathematical literacy involves the use of important mathematical content, (2) mathematical literacy involves authentic real-life context, (3) mathematical literacy involves problem-solving skills through previously unknown concepts, (4) mathematical literacy involves decision making and communication, and (5) mathematical literacy involves the use of content and skills that integrate with solving problems (Machaba, 2018).

Various mathematical literacy research has been conducted. Some of this research has been done in several countries, such as in America (Colwell & Enderson, 2016), South Africa (Machaba, 2018), and China (Kong & Cheung, 2016). On the other hand, some research in Indonesia has also been conducted. However, mathematical literacy problems usually use PISA models associated with various contexts, such as Jambi, Lampung, Quantity, Change and Relationship, Space and Shape, etc. (Charmila et al., 2016; Putra et al., 2016; Fadillah &

Ni'mah, 2019). In addition, mathematical literacy also uses ethnomathematics-based problems (Manoy & Purbaningrum, 2021; Hilaliyah et al., 2019; Hasanuddin, 2017). In line with this information, research on mathematical literacy in solving HOTS problems applied to the curriculum 2013 has never been done. This research needs to measure students' mathematical literacy skills using HOTS problems to assess learning outcomes in curriculum 2013. In addition, the findings obtained can be used as a basis for development research conducted in mathematics learning. The results can also develop HOTS problems in supporting mathematical literacy in Indonesia through real-life contexts. Therefore, this study aims to know the mathematical literacy of State Junior High School 2 Kotapinang in solving HOTS problems applied to the curriculum 2013.

The Research Methods

This research is descriptive research with a qualitative approach (Rahayuningsih & Jayanti, 2019) that aims to know the mathematical literacy of State Junior High School 2 Kotapinang students in solving HOTS problems applied in the curriculum 2013. The study was conducted from February 4 to 19, 2022. State Junior High School 2 Kotapinang School was chosen as a research location because it has the best school accreditation. This research population is the seventh-grade students of State Junior High School 2 Kotapinang. There are 7 (seven) classes in seventh grade with students who have abilities at different levels in this school. In addition, researchers also consider certain things as a foundation in sampling research. Therefore, the purposive sampling technique is chosen as a sampling technique. As a result, class VII-6 was selected as a research sample. In total, students in class VII-6 are 32 students with choose 4 (four) students who have high-level mathematical skills and satisfy the criteria as a research subject. To determine the study subject, researchers considered 5 (five) things: (1) aged 12 to 15 years, (2) had studied number matter, set, algebraic form, and equations & linear inequality of one variable, (3) scores of mathematical ability test are must more significant than 80, (4) at least to satisfy two stages of mathematical literacy processes in the results of their work, and (5) willing to be involved from the beginning to the end of the study.

Data collection techniques using triangulation techniques, i.e., participatory observations, interviews, and documentation conducted simultaneously so that the data collected can provide accurate information (Sugiyono, 2021). And then, data collection procedures, i.e., (1) making research instruments, (2) validation of research instruments, (3) jumping into the field, (4) mathematical ability tests, (5) mathematical literacy tests, (6) interview, (7) documentation, and (8) writing reports.

Data analysis techniques using the Miles and Huberman model data analysis, namely: (1) data collection, collected from mathematical ability test, literacy test, and interview, (2) data reduction, conducted after the results of the mathematical ability test and literacy test are carefully examined, (3) data presentation, interpreted into narrative text and Microsoft Excel to create graphic images, and (4) withdrawal of conclusion, made to answer the purpose of the study based on data obtained through mathematical literacy tests and interviews (Sugiyono, 2021).

Research instruments consist of primary and secondary instruments. The primary instruments are researchers. While for secondary instruments, use a mathematical literacy test and interview guidelines. The mathematical ability test consists of 10 (ten) multiple-choice questions and 5 (five) essay questions using cognitive levels of C_1-C_3. Then, the mathematical literacy test consists of 4 (four) essay questions using the cognitive level of C_4-C_6. The materials used in each test are integers, sets, algebraic forms, equations & linear inequalities of one variable. Furthermore, Manoy & Purbaningrum (2021) stated that interviews are conducted individually and alternately to obtain accurate information about the results of student work. In addition, research instruments have been validated by 2 (two) lecturers in mathematics education and 1 (one) mathematics teacher.

The mathematical literacy test problems consist of 4 (four) modified essay questions from Genta (2020). One of these questions will be shown through Figure 1. below:

In football, competence uses the results of the match as follows.

Team	Play	Won	Series	Lose	Insert goal	Conceded goal
PSMS Medan	14	9	2	3	24	19
PERSIJA Jakarta	14	6	3	5	21	15

The value-giving rule is that if a winning team gets an additional value of 5, the series gets a value of 2, and loses gets a reduction value −3. The obtaining value determines the final value then coupled with the goal difference (many inserts – many concedes). Calculate the number of values obtained by each team, then analyze the difference in the value of the two teams!

Figure 1. Mathematical Literacy Test (P1)

After knowing the mathematical literacy test, then we can describe the mathematical literacy indicators shown in Table 1. as follows:

Table 1. Indicators of Mathematical Literacy

Stages of the Mathematical Process	Indicators of Mathematical Literacy
Formulating the Problem (FP)	- Simplifying real situations by interpreting problems according to a proper understanding - Think of an initial idea to solve the problem. - Formulate problems that are given into mathematical models. - Design a problem-solving strategy directly.
Applying the Concepts (AC)	- Use mathematical concepts, facts, procedures, and reasoning. - Solve the problem correctly.
Interpreting Settlement Result (ISR)	- Interpret the results of the solution in an authentic context.

	- Conclude the most appropriate problem-solving outcome.

(Source: OECD, 2015)

Based on mathematical literacy indicators in Table 1. above, the category of mathematical literacy will be shown in Table 2. as follows:

Table 2. Category of Mathematical Literacy

Category	Indicators
Good	Fluently answering questions, appropriate calculations, and the development ideas are optimal.
Enough	Fluently answering questions, appropriate calculations, and development ideas are not optimal.
Bad	Fluently answering questions, improper calculations, and development ideas are not optimal.

(Source: Manoy & Purbaningrum, 2021)

The Results of the Research and the Discussion

The study used 3 (three) instruments: mathematics ability tests, literacy tests, and interviews. The whole story will be described as follows:

Categorization of students based on the results of the mathematical ability test will be shown through Figure 2. below:

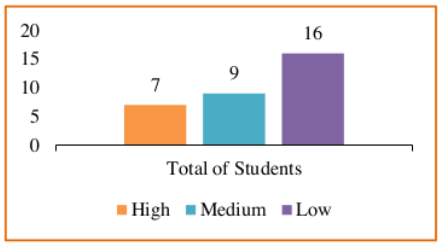

Figure 2. Result of Mathematical Ability Test (A1)

Based on A1, students who have high-level mathematics skills as many as 7 (seven) students, students who have moderate level mathematics skills as many as 9 (nine) students, and students who have low-level mathematics skills as many as 16 students. So, students with low-level mathematics skills are the most, with 16 students (Jailani & Wulandari, 2017). One of the main factors of a students' low mathematical ability is the inability to operate calculations in solving problems (Setyaningsih & Ekayanti, 2019). And then, this test is taken through 2

(two) sessions in class VII-6, with each session being 16 students. This happens because the government sets out to open schools, but by doing limited face-to-face learning to prevent the spread of COVID-19 in the school environment (Onde, Aswat, Sari, & Meliza, 2021).

The problem of mathematical literacy in P1 is a HOTS problem that has gone through a modified stage and includes the cognitive level of C_4, which is analyzing. Moreover, the material in this matter is an integer. Thus, the indicator of the problem is to examine an issue related to the operation of calculating integers through the context of daily life. Therefore, this problem aims to measure the ability of students to explore mathematical problems using high-level reasoning.

Referring to A1, selected 7 (seven) students with high-level mathematics skills. After 7 (seven) students took the mathematical literacy test, the researcher chose 4 (four) students as a research subject, taking into account 5 (five) things that have been set. After the test is conducted, the researcher conducts an in-depth analysis of mathematical literacy tests and interview to validate the required data. Based on the results of the mathematical literacy test, 4 (four) selected students are given the codes MLS1, MLS2, MLS3, and MLS4, which will be explained in full the results of the analysis below:

Mathematical Literacy of Subject 1 (MLS1)

The work result of MLS1 is illustrated in Figure 3. below:

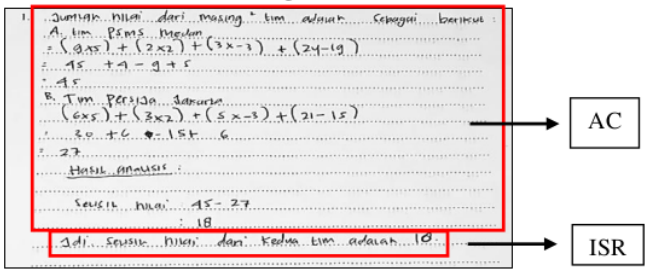

Figure 3. Work Result of MLS1

At the stage of formulating the problem (FP), the question asked in the interview relates to why the subject of MLS1 didn't write this stage on the answer sheet. This will be shown through excerpts of interviews conducted by researchers (R) with MLS1 below:

R : What do you know about this problem?
MLS1 : Value of winning, series, losing, including goals, conceding goals on team A and team B. And score succeeds, series, and fails.
R : Right. Besides, let's say what you're asked about this problem?
MLS1 : Calculate the amount of value obtained by each team, then analyze the difference in value between the two groups *(while reading a problem)*.
R : Good. Why don't you write it on your answer sheet if you know it?
MLS1 : I'm not used to writing it.

From the interview excerpt above, the subject of MLS1 can mention known and asked in the context of a problem but did not write on the answer sheet because it is not used. As such, the subject of MLS1 not already satisfies this stage.

Next is the stage of applying the concept (AC). The question asked in the interview relates to strategizing, using the idea, and solving problems appropriately. This will be shown through the interview excerpt below:

R : What strategy do you use to solve this problem?
MLS1 : First, I looked at it. Second, I'm looking for what I'm asked about. Third, I'm looking for answers that are asked about it.
R : What formula do you use to solve this problem?
MLS1 : Formula of multiplication, summation, and subtraction.
R : Do you explain the steps you take to solve the problem?
MLS1 : I multiply the value of wins, series, and loses by the score of winning, series, and failing, then subtracting many goals by conceding many goals. Once I got the results, I put everything in. Then, remove the amount of team value A and team B to get a difference in value from both teams *(while looking at the answer sheet)*.
R : Are you having trouble working on this? Why?
MLS1 : It's pretty hard. Because I have to find the amount of value first, I can see the difference in weight from both teams.

From the above quote, it appears that the subject of MLS1 can strategize accurately and solve the problem appropriately. Next to issues in P1 can solve using formulas of multiplication, addition, and subtraction to obtain proper calculations. However, the subject of MLS1 still finds it challenging to work on the matter. This is due to the solution of complex issues. However, the subject of MLS1 can solve this problem by using high-level reasoning to satisfy this stage quite well (Muzaki & Masjudin, 2019).

Finally, the stage of interpreting settlement results (ISR). Questions asked in the interview relate to how the subject of MLS1 concludes the results of solving the problem appropriately. In addition, the subject of MLS1 is required to interpret the settlement results precisely and clearly. As a result, the subject of MLS1 was able to decipher the results of the interpretation directly to satisfy the target at this stage (Prabawati, 2018). This is confirmed from the interview excerpt below:

R : What can you conclude from this problem?
MLS1 : I can conclude that if we look for the difference in each team, we have to look for points from each group and subtract the value of team A and team B to get the difference in weight on each team.
R : Good answer.

Mathematical Literacy of Subject 2 (MLS2)

The work result of MLS2 is illustrated in Figure 4. below:

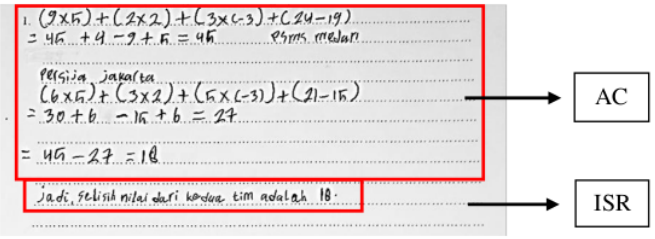

Figure 4. Work Result of MLS2

When formulating the problem (FP), the subject of MLS2 can understand the problem by mentioning the known and asking about the issue (Muzaki & Masjudin, 2019). However, to find such information must be dug deeper. Therefore, the subject of MLS2 does not satisfy this stage because it does not write on the answer sheet for reasons of haste. This is confirmed from the interview excerpt below:

R : What do you know about this problem?
MLS2 : Average score of each team.
R : Sure? Here we look for the difference in value instead of the average score.
MLS2 : No, it's wrong.
R : So, what's the truth?
MLS2 : Each team values winning, series, losing, and entering goals by conceding goals. Then, the team's score of wins, series, and fails.
R : Good. Besides, what do you ask about this problem?
MLS2 : Difference in value and calculates the number of values of both teams.
R : Good. Why don't you write it on your answer sheet if you know it?
MLS2 : Because in a hurry.

Next, at the stage of applying the concept (AC), the subject of MLS2 can strategize directly and complete. In addition, the subject of MLS2 can also solve the problem appropriately using formulas of multiplication, addition, and subtraction. The subject of MLS2 has no difficulty because it has thoroughly understood the problem's context (Manoy & Purbaningrum, 2021). Thus, the subject of MLS2 has fulfilled this stage quite well. This is confirmed from the interview excerpt below:

R : What strategies do you use to solve this problem?
MLS2 : Strategies to understand issues, calculate the amount of value between the two teams, and analyze the difference in weight.
R : What formula do you use to solve this problem?
MLS2 : Multiplication, subtraction, and summation.
R : Do you explain the steps you take to solve the problem?
MLS2 : Understand the problem first. Just start to arrange which values of each team. Then, to calculate the number of deals, I have to multiply the value of the team wins, series, and loses by the team's score that succeeds, series, and fails. Then, less include a lot of goals by conceding goals. After getting

the results, less the PSMS Medan value with PERSIJA Jakarta. Then came the difference in value between the two teams.

R : Are you having trouble working on this? Why?

MLS2 : No, because all the values in the match are already known in the matter.

Finally, the stage of interpreting settlement results (ISR). The subject of MLS2 can conclude the problem correctly. The same is shown on the subject of MLS1. Thus, the subject of MLS2 can satisfy this stage quite well. This is confirmed from the interview excerpt below:

R : What can you conclude from this problem?

MLS2 : Looking for the difference in value between the two teams.

R : Good.

Mathematical Literacy of Subject 3 (MLS3)

The work result of MLS3 is illustrated in Figure 5. below:

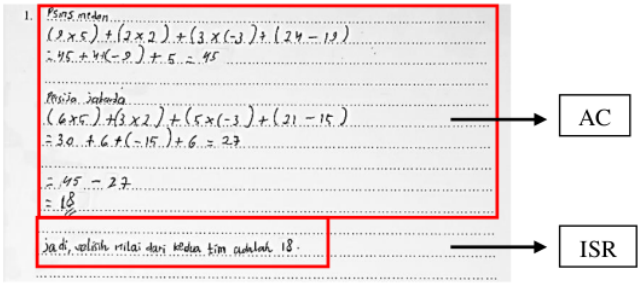

Figure 5. Work Result of MLS3

At the stage of formulating a problem (FP), the subject of MLS3 can answer the question appropriately. It is also by the answers to the subject of MLS1 and MLS2. However, the subject of MLS3 didn't write it down on the answer sheet because the time was limited, so I forgot to write it down. Therefore, MSL3 subjects are not able to meet this stage correctly. This is confirmed from the interview excerpt below:

R : What do you know about this problem?

MLS3 : Addition the value of the winning team and subtract the value of the losing team.

R : Are you sure?

MLS3 : Not sure *(while looking at the answer sheet)*.

R : So, what's the truth?

MLS3 : Value every team that wins, series, loses, inserts goals, and concedes goals. Then, score the team that wins, series, and fails.

R : Yes, right. Besides, what do you ask about this problem?

MLS3 : Calculate the values number of both teams and analyze the difference in value.

R : Good. If you know the answer, why not write it down?

MLS3 : Because the time is limited and forget to write it.

Stage of applying the concept (AC), the subjects of MLS3 devise strategies depending on formulas of integers to solve problems without using another method. The subject of MLS3 can understand how to solve problems appropriately, but MLS3 is less articulate when conducting interviews, so there is a misunderstanding of their delivery. After all, this subject has no difficulty working on the issue because it already understands the given situation. Thus, the subject of MLS3 has been able to meet this stage quite well. This is confirmed from the interview excerpt below:

R : What strategy do you use to solve this problem?
MLS3 : The strategy of getting the integer formula first.
R : Sure? Try to explain!
MLS3 : Sure. Because our material is related to integers.
R : Well. What formula do you use to solve this problem?
MLS3 : Integer formula.
R : Do you explain the steps you took to solve this problem?
MLS3 : To calculate the number of values, I first look for the formula and create a calculated form of operation. Then, subtract the total weight yield on each of these teams.
R : Right. Do you have difficulty working on this? Why?
MLS3 : No, because I understand the problem.

Stage of interpreting settlement results (ISR), the subject of MLS3 has been able to conclude the problem correctly (Santoso & Setyaningsih, 2020). The development aligns with the subject of MLS1 and MLS2, so this stage satisfies the target. This is confirmed in the interview excerpt below:

R : What can you conclude from this problem?
MLS3 : I finished calculating each team's value and the difference in both teams' value.
R : Good answer.

Mathematical Literacy of Subject 4 (MLS4)

The work result of MLS4 is illustrated in Figure 6. below:

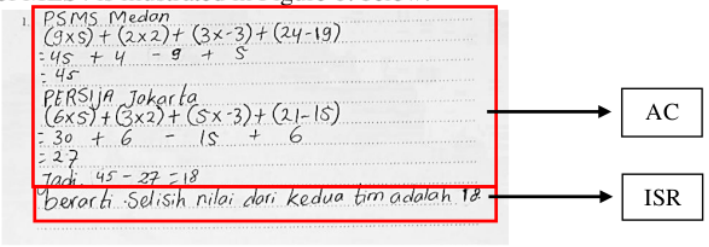

Figure 6. Work Result of MLS4

Stage of formulating the problem (FP), the subject of MLS4 can answer the question appropriately. It is also by the subject answers of MLS1, MLS2, and MLS3. However, the

subject of MLS4 didn't write it down on the answer sheet out of a hurry. Therefore, the subject of MLS4 can't satisfy this stage correctly. This is confirmed from the interview excerpt below:

R : What do you know about this problem?
MLS4 : PSMS Medan team value and PERSIJA Jakarta team value.
R : Besides, is there more?
MLS4 : There is. Each team has the value of wins, series, losses, insert and concede a goal. Then, the match score wins, series, and loses the problem rules *(pointing to tables and problem instructions)*.
R : Good. Besides, what do you ask about?
MLS4 : Calculates each team's number and analyzes the difference in value from both teams.
R : If you know it, why don't you write it?
MLS4 : Because I'm in a hurry to write it down.

When applying the concept (AC), MSL4 subjects strategize only by understanding and counting, without thinking about other strategies to get to the problem-solving phase. This happens because the subject of MLS4 is less able to provide arguments based on mathematical properties, so the resulting sentence is less precise (Santia, 2018). However, the subject of MLS4 can still solve the problem precisely using the formula of summation, multiplication, and subtraction. In addition, the subject of MLS4 has no difficulty working on the P1 problem because the calculation technique used is appropriate. Thus, the subject of MLS4 has fulfilled this stage quite well. This is confirmed from the interview excerpt below:

R : What strategy do you use to solve this problem?
MLS4 : Understanding and numeracy strategies.
R : Good. If so, what formula do you use to solve the problem?
MLS4 : Formula summation, multiplication, and subtraction.
R : Try to explain the steps you took to complete that?
MLS4 : I addition each team's value by multiplication and addition. After that, I reduce the deal amount to get the difference value of both teams.
R : Are you having trouble working on that? Why?
MLS4 : No, because the calculation technique I used was correct.

Stage of interpreting settlement results (ISR), the subject of MLS4 has been able to conclude precisely and by the problems given to P1. It is also by answers from MLS1, ML2, and MLS3. Thus, the subject of MLS4 has been able to meet this stage quite well. This is confirmed from the interview excerpt below:

R : What can you infer from this problem?
MLS4 : The difference in the value of both teams is obtained from the reduction in the number of values of both teams.
R : Good.

A summary of the results of Junior High School students' mathematical literacy test in completing HOTS problems in the curriculum 2013 will be shown in Table 3. below:

Table 3. Summary Result of the Mathematical Literacy Test

Stages of the Mathematical Process	Work Results of Subject			
	MLS1	MLS2	MLS3	MLS4
Formulating the Problem (FP)	Unwritten	Unwritten	Unwritten	Unwritten
Applying the Concepts (AC	Written	Written	Written	Written
Interpreting Settlement Results (ISR)	Written	Written	Written	Written

Table 3. shows the stage of formulating the problem (FP) on the subject of MLS1, MLS2, MLS3, and MLS4 has been able to mention known and asked in full according to the context of the problem (Muzaki & Masjudin, 2019). However, each subject does not write this stage on their answer sheet for some reason. For example, the subject of MLS1 does not write it down on the answer sheet because it is unfamiliar, the subject of MLS2 because of the hurry of time, the subject of MLS3 because it's hurried, and the subject of MLS4 because it is in a hurry so forget to write it on the answer sheet (Novferma, 2016). Thus, the subjects of MLS1, MLS2, MLS3, and MLS4 don't satisfy the stage of formulating problems (FP) in mathematical literacy indicators. Each subject does not write this stage on their answer sheet.

Next is the stage of applying the concept (AC). At this stage, the subject of MLS1 and MLS2 has been able to strategize completely to solve the problem appropriately (Wati et al., 2019). Conversely, on the subject of MLS3 and MLS4 have not been able to strategize well. The reason is the subject of MLS3, and MLS4 only thinks about a strategy to the extent of understanding the problem and counting, without thinking about other methods to solve the P1 problem. Nevertheless, the subject of MLS3 and MLS4 has been able to resolve the P1 issue precisely. And the subjects of MLS1, MLS2, and MLS4 use multiplication, summation, and subtraction formulas to solve P1 problems. However, the subject of MLS3 uses an integer formula drawn from the P1 problem, i.e., integers. This is not wrong because the subject of MLS3 can solve the problem correctly. Still, the resulting sentence is not appropriate because this subject cannot provide arguments based on mathematical properties (Santia, 2018). In addition, the subject of MLS1 is quite challenging to work on the P1 problem because the calculations are too complicated, but the subject of MLS1 can solve it well. The subject of MLS2, MLS3, and MLS4 has no difficulty because they have understood the context of the problem so well that there is no difficulty in solving it (Rifai & Wutsqa, 2017). So, the subjects of MLS1, MLS2, MLS3, and MLS4 at the stage of implementing the concept (AC) already satisfy the indicators of mathematical literacy. This is due to each subject having written down this stage precisely and clearly on their answer sheet.

The final stage is interpreting the completion results (ISR). At this stage, the subject of MLS1, MLS2, MLS3, and MLS4 has been able to conclude the P1 problem correctly (Santoso & Setyaningsih, 2020). So, the subject of MLS1, MLS2, MLS3, and MLS4 at the stage of interpreting completion results (ISR) are already able to meet mathematical literacy indicators. This is because each subject has written this stage precisely on their answer sheet.

Overall, each subject has fulfilled 2 (two) stages of mathematical processes, namely: (1) the stage of applying the concept (AC) and the set of interpreting the completion results (ISR). However, each subject could not meet the step of formulating the problem (FP) because it did not write it down on their answer sheet. Nevertheless, the subject has understood the P1 problem quite well. This is evidenced by the results of interviews that have been conducted by researchers with the subjects of MLS1, MLS2, MLS3, and MLS4.

This research is in line with Wati et al. (2019), who stated that Junior High School students with high-level mathematical skills have mathematical literacy skills with enough categories. Students have not been maximal in the mathematical literacy process stages, such as identifying the mathematical aspects of a problem context in real life, identifying known variables and asked in the context of the problem, and bringing the issue into the mathematics model. That way, students have difficulty understanding and solving problems in real contexts (Novferma, 2016). Thus, students need high levels of experience and reasoning to improve student mathematical literacy (Manoy & Purbaningrum, 2021).

Conclusion and Suggestion

From the presentation of the results and discussion above, it was concluded that the mathematical literacy of State Junior High School students 2 Kotapinang in solving HOTS problems applied to the curriculum 2013 included enough categories because students only satisfied two stages of the mathematical process, i.e., fluently answering questions and appropriate calculations. On the answer sheet, indicators that are not written by the research subject is indicator formulating problems because students are not used to writing down what is known and asked in questions. Hence, students often forget to write it on their answer sheet.

Through the findings obtained in this study, the mathematical literacy of Junior High School students in solving HOTS problems in the Kotapinang area is still relatively moderate. Therefore, the need to improve students' mathematical literacy in solving HOTS problems applied to the curriculum 2013. The curriculum 2013 requires teachers to continue sharpening their insights and teaching skills because teachers should show the quality of their profession in teaching. Furthermore, teachers should implement a fun learning model for students. It aims to increase students' interest and learning motivation in mathematics learning. Thus, applying an effective learning model can support the improvement of mathematical literacy of Junior High School students in solving HOTS problems that have been used in the curriculum 2013.

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