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STUDENTS' MATHEMATICAL LITERACY IN SOLVING HIGHER ORDER THINKING SKILL PROBLEMS ON MATRIX MATERIAL

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Abstract

This qualitative descriptive study aims to describe students' mathematical literacy skills in solving Higher Order Thinking Skills (HOTS) questions on matrix material. The method used in this research is qualitative method. The subjects of this study were 6 students of class XI IPA SMA Al-Azhar Jambi. The instrument used is the initial ability test which contains 5 items, the Higher Order Thinking Skills (HOTS) written test which contains 3 essay questions and interview guidelines. Data analysis techniques include domain, taxonomy and componential analysis. The results of this study are: 1) It shows that all subjects meet the communication indicators (except S6), S1, S2, S3, S4 almost meet the indicators of mathematization, problem solving strategies and the use of formal and symbolic language, technical and operational languages, S5 and S6 do not meet the three indicators, and 2) the factors that affect mathematical literacy skills are: students' perceptions of the importance of mathematics, self-confidence in mathematical abilities, teacher quality in teaching, teacher character in teaching, models, media, strategies, approaches used in teaching, learning, limited time in working, level of HOTS questions and student interest in solving problems.

Keywords: ability, higher order thinking skill, literacy, mathematical

1. Introduction

Changes that occur in the 21st century today are not only technology that is developing rapidly, but also changes in mindsets and perspectives are also growing rapidly. One of the growing points of view is related to the definition of society needed in today's century. Today, people need not only those who have in-depth knowledge, but also people who have the ability to open networks, find new concepts, analyze, think logically, and are able to solve problems and think critically.

Sumarmo (Asmara et al., 2017) provides an explanation that mathematics education essentially has two bearings for improvement, namely to overcome problems that are currently occurring and those that may occur. To overcome current problems, mathematics learning encourages students to acquire mathematics and various sciences. Meanwhile, future needs have a broader meaning, in particular providing the ability to think intelligently, methodically, critically, logically and reasoning that is not biased and open which is very useful in everyday life. What's more, facing an ever-evolving future.

Responding to these challenges, literacy is one thing that can help. Literacy ability in question is mathematical literacy ability. mathematical literacy ability in PISA (2018) is defined as an individual's ability to formulate, use, and interpret knowledge mathematics on various type context. It can be simplified that mathematics used in all aspects of life is called mathematical literacy ability.

Literacy mathematics no only covers use technique or concept, but need information and capabilities fundamental as well as courage for apply information it's in life everyday. Someone who has ability literacy mathematics could assess, describe information, handle problem life daily, graph, or state mathematical, reasoning by mathematics, and convey with use knowledge math.

Padmadewi (2018) states that there are many sciences related to mathematics, such as physics, chemistry, biology, engineering, computers, medicine and others. M. Rukli & Baharun (Akasah, 2021) argue that mathematics has a role in developing the ability to think, find, use formulas and calculate problems in everyday life with the concepts being taught.

Ability literacy mathematics same importance with read and write. With thus, level ability literacy mathematics studentvery need is known. The more good literacy mathematics student, then will the more good also ability which he have on moment complete problem math. In fact, ability literacy mathematics capable make student as generation which productive, brave take decision life and participate active in society (Abdussakir, 2018).

Students' mathematical literacy ability can be seen with 4 indicators, namely communication indicators, mathematization, problem solving strategies and the use of formal and symbolic language, technical language and operating language (Azhar, 2020).

Mathematical abilities are very important for Indonesian people, but in fact the mathematical literacy skills of Indonesian students who are part of the community are still far behind from other countries, this is based on the results of the 2018 PISA (*Program for International Students Assessment*. Survey PISA from 19 March to 19 April 2018 involving 12,098 students from 397 schools in Indonesia obtained that score literacy read Indonesia exists ranked 72 out of 77 countries, then score literacy mathematics is in the rankings 72 out of 78 countries, and scores literacy science is ranked 70 out of 78 countries (Pusat Penilaian Pengembangan Balitbang Kemdikbud, 2018)

Remember ability literacy mathematics very needed in life, then government especially the Ministry of Education and Culture try increase quality learning and competence graduate. Part of business it is with apply learningbased on HOTS (*Higher Order Thinking Skills*). Base main question HOT applied in learning is existence relationship with ability literacy mathematics (Simamora & Tilaar, 2021).

According to Onosko and Newman, HOTS is not a new system or problem that has never been thought of by students before, which is a challenge in using the mind to solve it (Nugroho, 2018), but a problem that is manipulation of previous problems so that they are not monotonous. Problems in this form are problems that stimulate the process of higher-order thinking skills (Helmawati, 2019).

Puspendik (Toheri & Muehyidin, 2019) classifies 3 cognitive levels used in national exam questions since 2015/2016. The groupings are: level 1 (knowledge and understanding aspects); level 2 (application aspect); and level 3 (aspects of analyzing, evaluating and creating). Level 1 and 2 groups are LOTS (Lower Order Thinking Skills) type questions and level 3 groups are HOTS (Higher Order Thinking Skills) type questions.

Alice Thomas and Glenda (Hamidah, 2018) say that higher order thinking is a thinking process that is not just remembering or memorizing a fact to others exactly as it is memorized, but a thinking process that knows the facts, their relationship and the possible completion process. Irawati & Maheasy (Astuti, 2018) categorizes that question that said *High Order Thinking* (HOT) is at levels C4-C6, while question *Low Order Thinking* (LOT) is at levels C1–C3. As the ability to formulate, use, and interpret students use in solving problems problem is a mathematical literacy ability, then students can say capable complete problem if able to transfer science in everyday life. Ability transfer it is the ability to think level tall or *higher Order Thinking* (HOT).

Mathematical literacy skills and higher order thinking skills have a linear relationship with 3 type competence which needed in century 21st this. Competence the namely: a) have character which good (religious, nationalist, integrity, mutual cooperation and independent); b) have ability 4C (*critical thinking*, *creativity*, *collaboration*, and *communication*); c) literation i includes Skills think use sources knowledge in form digital, visual, print and auditory. Presentation question in form HOTcould practice student for hone ability and Skills literacythe math in accordance with demands competence century 21st the (Widana, 2018).

Iin Kusnianti (2018) in research that discusses about literacy mathematics student school medium first through solution expression questions algebra. Show results analysis and discussion, reviewed from ability literacy mathematics in complete question concluded that, understanding participant educate not yet fully capable understandproblem presented, formulation problem question no fully written , reasoning participant educate not yet capable use concept, fact and procedure, and participant educate already capable communicate results solution problem.

Based on explanation that 's completely show aboutlow literacy mathematics student and see from side PISA survey which shows that several levels of students who have been the subject of his research are no longer able to become the subject of his research. This is because PISA conducts its research every three years. For example students class XI this year 17 years old can not be the subject of the PISA study, even though the student was the subject of the last PISA study in 2018, remember his age in lower or same with 15 year. So researcher moved for researching ability literacy mathematics student class XI in solving HOTS questions. This qualitative descriptive study aims to describe students' mathematical literacy skills in solving Higher Order Thinking Skills (HOTS) questions on matrix material.

2. Method

Study this is study qualitative. Study this aim describe ability literacy mathematics student in complete question *Higher Order Thinking Skills* (HOTS) on material matrix at SMA Al-Azhar Jambi. Study this conducted in odd semesters year high school 2021/2022 lesson Al-Azhar Jambi, on 9 November until 18 December 2021.

The technique of taking research subjects is a *purposive sampling technique*, namely taking subjects based on certain considerations. These considerations include: 1) Participants educate has get learning with tree discussion matrix, 2) is participant educate class XI IPA odd semester year lesson 2021/2022, 3) Participants educate has follow test ability beginning Theory matrix. Test ability the intended beginning in the form of test question matrix consist of 5 questions shaped description or essays. Test results participant educate will grouped based on level ability high , medium and low. Subject on study this is student class XI IPA which consists of 6 students with rician 2 students capable height, 2 students capable medium and 2 students capable low. Instruments used in study this in the form of question matrix, which will measure ability beginning students and HOTS questions that will measure ability literacy mathematics students.

Data collection techniques through observation, interview and documentation. Observation used researcher in study this there are 2, namely observation direct and not straight away. Observation directly meant by the researcher is with observe student in work question matrix based on a given HOTS. The HOTS question consists of 3 essay questions where number 1 is the HOTS level C_4 question with the content of space and form and scientific context. Question number 2 is a HOTS level C_4 question with content that has content uncertainty and data, context C_4 cognitive level work, and questions number 3 has content uncertainty and data, context C_5 cognitive level work.

In Thing this researcher no involved live with what to do student, will but researcher pay attention and observe the process carried out students. Temporary observation no directly meant is researcher listen explanation of the people

involved live with subject study related related things with ability literacy mathematics students. The interview technique was carried out after the students worked on the HOTS questions. Documentation technique means that documentation in all respects is a complement to this research. The type of documentation in this study is photos/images f students answers.

Data analysis techniques used is Spradley model data analysis includes (1) domain analysis, carried out for get description general or thorough from object research (Sugiyono, 2016). In domain analysis, researchers determine the domains involved in achievement ability literacy the mathematics referred to by the researcher, (2) analysis taxonomy, is analysis to the entire data collected is based on the domain that has been determined (Sugiyono, 2016).

More simple could understood that analysis taxonomy this describe domains that have been determined previously Becomes more detail again with do observation focused, and (3) componential analysis, intended for look for characteristic specific to each of the domains that have been spelled out by detailed on analysis taxonomy. Required data in analysis componential could obtained with do observation, interview and documentation selected (Sugiyono, 2016)

3. Result and Discussion

3.1 Result

This research was conducted on 6 students who had been selected as research subjects after conducting an initial ability test on the matrix material. The results of the initial ability of class XI science students can be seen in the following table.

Table 1. Results of Students' Initial Mathematics Ability

No	Student's Name	Score	Ability
1	NFS	95	High
2	FTS	90	
3	FZW	90	
4	MR	90	
5	NDFP	90	
6	ZBM	90	
7	DA	80	Middle
8	FAZ	80	
9	FR	80	
10	FIM	80	
11	MRH	75	
12	MT	65	Low
13	RDP	65	
14	FR	60	
15	RO	60	
16	AHR	55	
17	AH	45	
18	MISN	45	
19	TNFA	40	

Table 1 is the score of the results of the students' initial abilities tested to classify students' ability levels. This initial ability test is in the form of five essay questions on matrix material. The results obtained there are 6 students who have a high level of initial ability, 5 students who have moderate/ middle-level abilities and 8 students who have low-level abilities. For the next step, the researcher took each category of initial ability level as much as 2 students to study their mathematical literacy skills and continued with interviews.

The results of student answers in solving HOTS questions in terms of literacy skills students' mathematics can be seen in the following table.

Table 2. Achievement of Mathematical Literacy Ability Test

No	Subject	Question number 1				Question number 2				Question number 3				Level
		I 1	I 2	I 3	I 4	I 1	I 2	I 3	I 4	I 1	I 2	I 3	I 4	
1	S1	√	√	√	√	√	-	-	√	√	-	-	-	High
2	S2	√	√	√	√	√	-	-	√	-	-	-	-	
3	S3	½	√	½	½	½	½	½	½	½	-	-	-	Middle
4	S4	½	½	½	½	½	-	-	-	½	-	-	-	
5	S5	-	-	-	-	½	-	-	-	½	-	-	-	Low
6	S6	-	-	-	-	-	-	-	-	-	-	-	-	

Description:

I 1 : Communication indicator
I 2 : Mathematics indicator
I 3 : Strategy Indicators to solve problems
I 4 : Indicators of the use of symbolic language and formal, technical and operational
√ : Achieved
½ : Almost done

– : Not Achieved
C_4 : Analyzing question level
C_5 : Level of Evaluating questions

Table 2 shows the results of mathematical literacy skills that have been analyzed based on indicators of mathematical literacy abilities. Indicators of mathematical literacy are indicators of communication, mathematization, problem solving strategies and the use of symbolic and formal, technical and operational language.

Communication indicators include the ability is the ability to communicate problems. This ability involves the ability to understand and recognize a problem, then be able to understand, formulate and clarify a problem. During the search for solutions, interim results need to be presented.

Mathematising, meaning the ability used to describe a problem. This literacy ability includes the ability to formulate mathematical models into real life or transform problems from the real world into mathematical forms. Strategies for solving problems, meaning the ability to use strategies to solve problems that are highly involved in mathematical literacy skills. Each problem has a different strategy. There are problems that only use simple strategies and there are also those that use complex solving strategies.

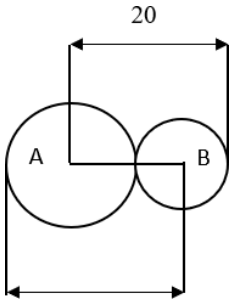
Using symbolic, Formal and Technical Language and Operation, meaning the ability to use symbolic, formal and technical language involves the ability to understand, interpret, manipulate, and create symbolic expressions in a mathematical context (including expressions of arithmetic operations) which are controlled by mathematical rules and conventions.

Table 2 shows that the ability of students' mathematical literacy in solving HOTS questions on matrix material: In solving HOTS questions on the Matrix material, all subjects meet the communication indicators (excluding S6), S1, S2, S3, S4 almost meet the mathematization indicators, problem solving strategies and the use of symbolic and formal language, technical and operational language and S5 and S6 did not fulfill the three indicators.

The following is an explanation of students' literacy skills based on high, medium and low ability categories consisting of 6 students.

Question Number 1

The relationship between gear A and gear B as shown below. Calculate the radius of each wheelby using the matrix!



Question Number 2

The "Harum" bakery company has 3 factories, each of which produces a different type of bread. Every day the company markets its products between three branches of the factory in a total of 50 boxes (each box contains 500 packs of bread) and returns the damaged bread to the manufacturer. Here's the bread returns per box

Pengirim \ Tujuan	Pabrik 1	Pabrik 2	Pabrik 3
Cabang pabrik 1	0	2	3
Cabang pabrik 2	4	0	2
Cabang pabrik 3	1	3	0

Count the amount of bread each branch received after deducting the spoiled bread! Solve with the matrix!

Question Number 3

Mrs. Lia will make 2 types of cakes. He has a stock of 3000 kg of flour and a supply of 2000 kg of sugar. The ingredients for making the cake have been prepared, namely 3 kg of flour and 2 kg of sugar. Type A cakes require 150 grams of flour and 50 grams of sugar, while type B cakes require 100 grams of flour and 100 grams of sugar. Mrs. Lia's initial capital is Rp. 20,000; and the cake will be sold by Mrs. Ani at a price of Rp. 3000 each; from the sales between Mrs. Lia and Mrs. Ani of 70% 30%, namely Mrs. Lia got a profit of Rp. 32,000; Is that statement true? Explain your reasons! Answer in every way you can!

a. Frist subject (S1)

The answers to the first subject in solving the HOTS questions are as follows.

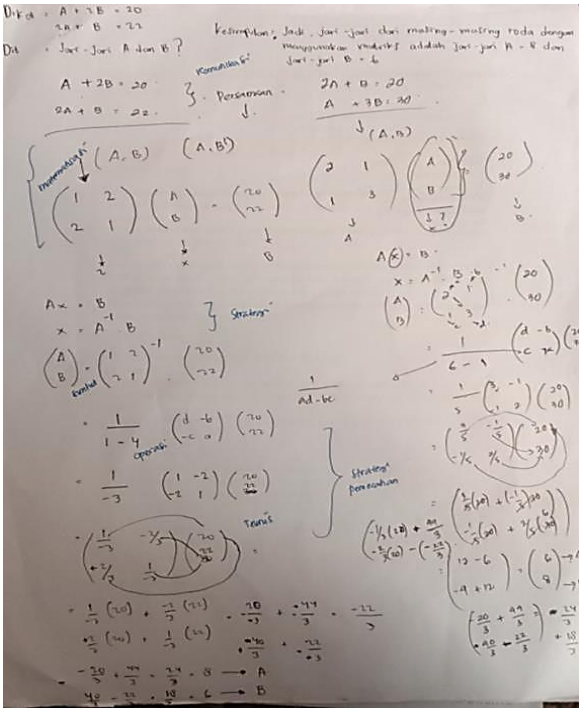
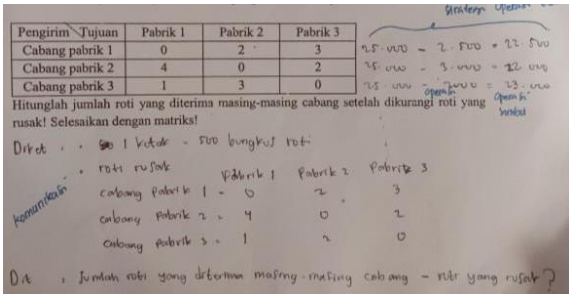


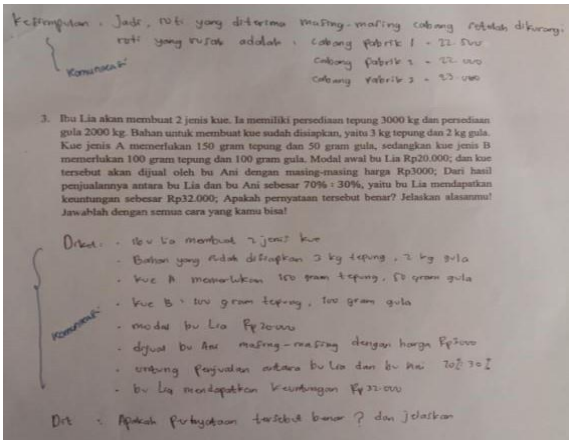
Figure 1. Answer S1number 1



Pengirim \ Tujuan	Pabrik 1	Pabrik 2	Pabrik 3
Cabang pabrik 1	0	2	3
Cabang pabrik 2	4	0	2
Cabang pabrik 3	1	3	0

Hitunglah jumlah roti yang diterima masing-masing cabang setelah dikurangi roti yang rusak! Selesaikan dengan matriks!

Figure 2. Answer S1number 2



3. Ibu Lia akan membuat 2 jenis kue. Ia memiliki persediaan tepung 3000 kg dan persediaan gula 2000 kg. Bahan untuk membuat kue sudah disiapkan, yaitu 3 kg tepung dan 2 kg gula. Kue jenis A memerlukan 150 gram tepung dan 50 gram gula, sedangkan kue jenis B memerlukan 100 gram tepung dan 100 gram gula. Modal awal bu Lia Rp20.000; dan kue tersebut akan dijual oleh bu Ani dengan masing-masing harga Rp3000; Dari hasil penjualannya antara bu Lia dan bu Ani sebesar 70% : 30%, yaitu bu Lia mendapatkan keuntungan sebesar Rp32.000; Apakah pernyataan tersebut benar? Jelaskan alasanmu! Jawablah dengan semua cara yang kamu bisa!

Figure 3. Answer S1number 3

The results of S1's answer in Figure 1 show that S1 meets the communication indicators, this is because all the information, problems and conclusions needed are written correctly. S1 fulfills the indicators of communication, mathematization, problem-solving strategies and the use of formal and symbolic language, technical language and operating language. This is because S1 is able to write down what is known and asked and provide conclusions on the results obtained (communication). S1 is also able to model information on problems in the form of equations and matrices. After modeling, S1 solves the problem by using matrix and inverse operations which involve the use of symbols, techniques and operations. In Figure 2, S1 meets the communication indicator, this is because all the skills required for this indicator are met. S1 almost meets the mathematization indicators, namely using an algebraic approach. The problem-solving strategy used is not in accordance with the matrix strategy, but the results obtained are correct. The use of formal and symbolic language, technical language and operations is correct. Figure 3 shows that S1 only fulfills the communication indicators, although it is not yet complete. This is because S1 does not provide a conclusion. The indicators of mathematization, problem solving strategies and the use of formal and symbolic language, technical language and operating language have not been met.

b. Second subject (S2)

The following are the results of the second subject's answers in solving the HOTS questions.

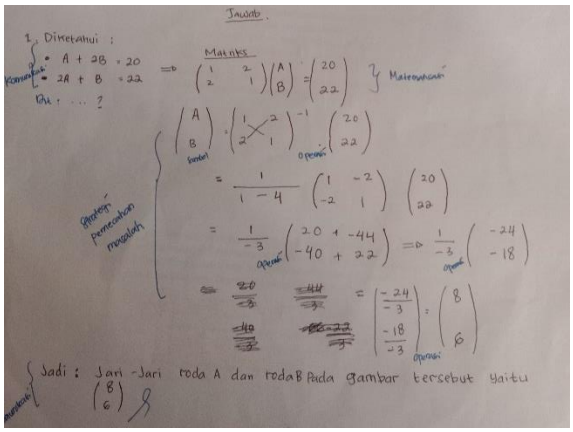


Figure 4. Answer S2 number 1

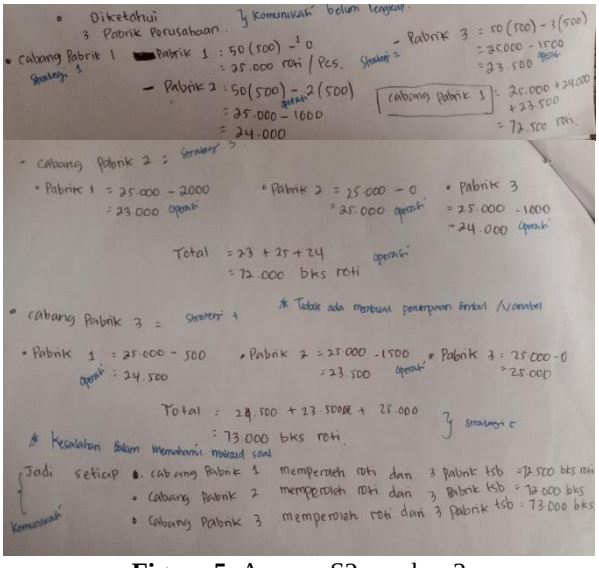


Figure 5. Answer S2 number 2

The results of S2's answer in Figure 4 show that S2 fulfills the communication indicators, this is because all the information, problems and conclusions needed are written correctly. Master's degree meets the indicators of mathematization, problem-solving strategies and the use of formal and symbolic language, technical language and operating language. In Figure 5, S2 almost fulfills the communication indicators, this is because S2 is only able to find out information and problems in the questions, while S2's conclusions make mistakes.

S2 almost meets the mathematization indicators, namely using an algebraic approach. The problem-solving strategy used is not in accordance with the matrix strategy, but S2 tries to present it in detail. The use of symbolic and formal language, technical language and operations still contains errors. In question number 3 S2 did not provide an answer, but after the researcher made it clear by conducting interviews, Master said he understood the meaning of the question, he was just lazy to do it. Here's an excerpt.

Researcher	*: Why is question number 3 not answered, deck?*
S2	*: Yes, if it is understood, maybe we can answer it, Sis. But, we are lazy, sis, because of our headaches. It's complicated, sis. Haha. There are many problems, sis.*
Researcher	*: But, do you know the information on this question, dek?*
S2	*: You know, Sis. That is, there are two types of bread, Sis, then there are supplies of the ingredients, flour and sugar. Then, Lia's mother's capital is Rp. 20,000; the selling price is Rp. 3000 each; Mrs. Lia and Mrs. Ani's profit is* 70%: 30%. *So, the problem is, is Mrs. Lia'sprofit of Rp. 32,000?*
Researcher	*: Do you know the solution?*
S2	*: No, Sis, the problem is complicated, Sis.*

c. Thrid subject (S3)

The following is the answer to the third subject in solving HOTS questions.

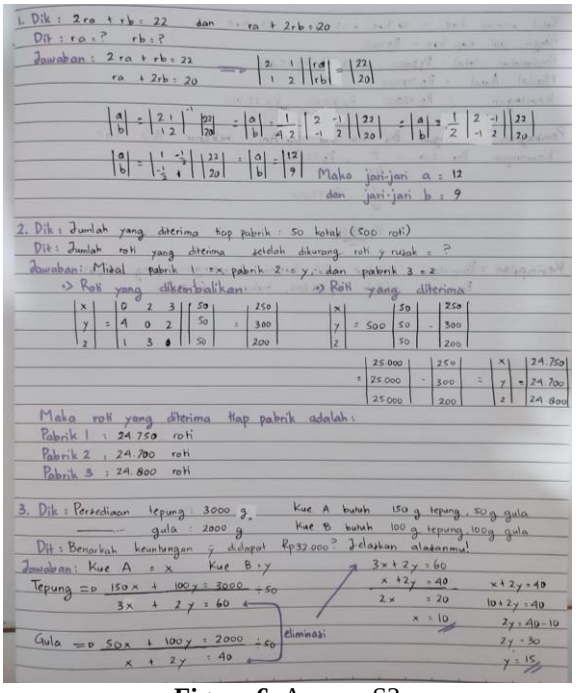


Figure 6. Answer S3

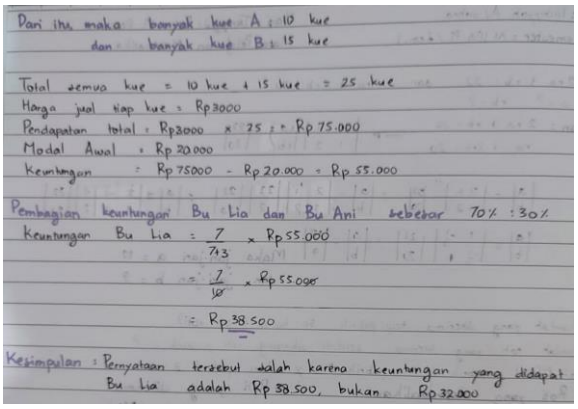


Figure 7. Next answer S3

The results of the S3 answers in Figure 6 for questions number 1, 2 and 3 show that S3 almost fulfills the communication indicators, this is because all the information and problems contained in the questions have been known, but are still wrong in giving conclusions. In the mathematization indicator for question number 1, S3 has met the indicators, on question number 2 it has almost fulfilled the indicator and on question number 3 it has almost fulfilled the indicator. In the indicators of problem solving strategies and the use of formal and symbolic language, technical language and operating language for questions number 1, 2 and 3 (can be seen in Figures 6 and 7) S3 still made mistakes in problem solving operations. S3 errors at this stage lead to wrong conclusions.

d. Fourth subject (S4)

The following is the answer to the fourth subject in solving HOTS questions.

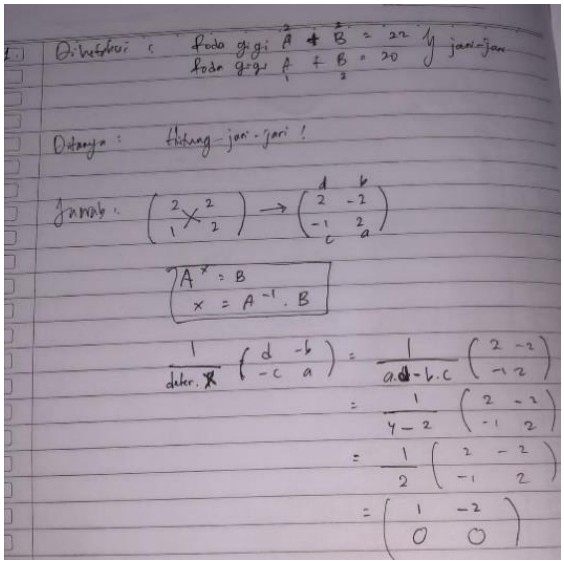


Figure 8. Answer S4 number 1

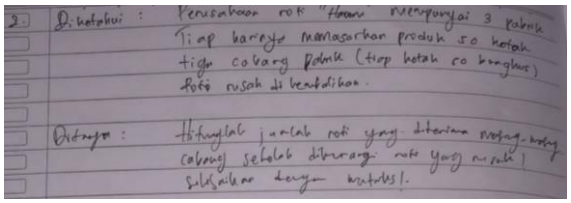
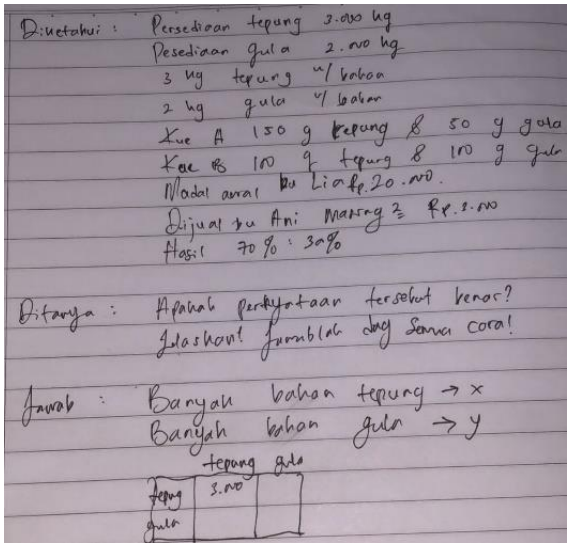


Figure 9. Answer S4 number 2



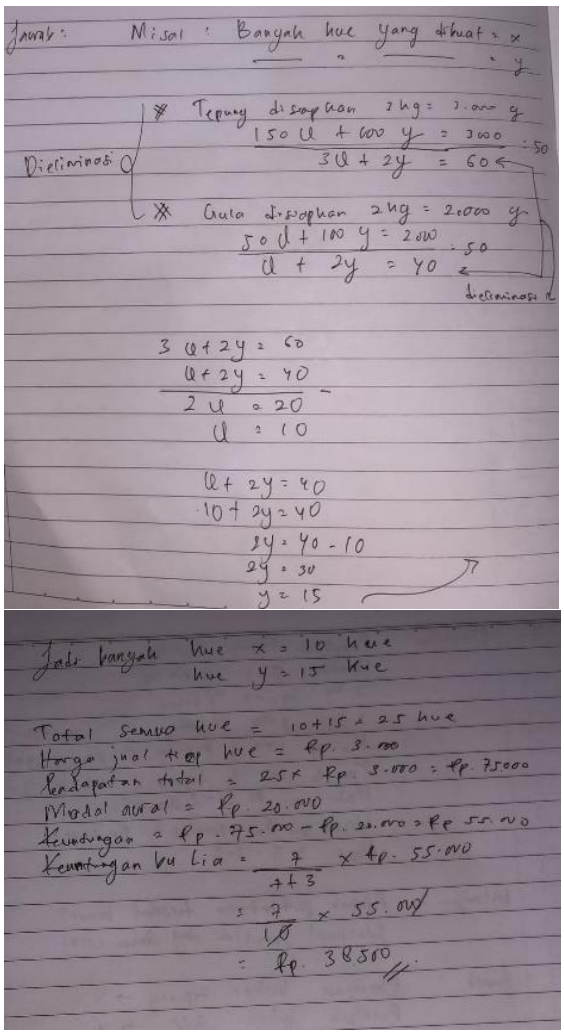


Figure 10. Answer S4 number 3

The results of S4's answer in Figure 8 for question number 1 show that S4 almost meets the communication indicators, this is because the problems contained in the questions have been known, although they are still wrong in writing information and conclude that there is none. In the mathematization indicator for question number 1, S4 was wrong in mathematizing, this was due to an error at the beginning. Problem solving strategies and the use of symbolic and formal language, technical language and operating language are still wrong. In question number 2, S4 only almost fulfilled the communication indicators, it can be seen in Figure 9 that S4 was able to write down all the information and problems correctly, but did not conclude.

The indicators of mathematization, problem solving strategies and the use of formal and symbolic language, technical language and operating language have not been met. For question number 3, it shows that S4 almost fulfills the communication indicators, this is because the problems contained in the questions are already known, although they are still wrong in writing down the information and conclude that there is

none. In the mathematization indicator of question number 4, S4 is incomplete in mathematizing, this is because the table has not been completed. Problem solving strategies and the use of symbolic and formal language, technical language and operating language are still wrong.

e. Fifth subject (S5)

The following are the results of the fifth subject's answers in solving HOTS questions.

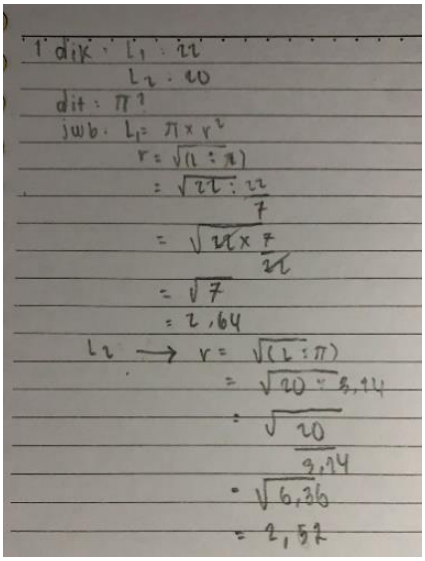


Figure 11. Answer 1

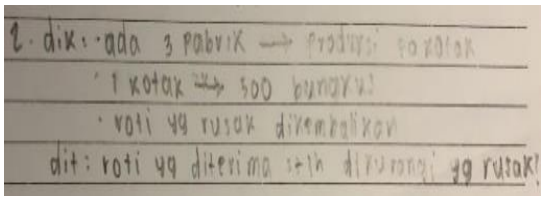


Figure 12. Answer 2

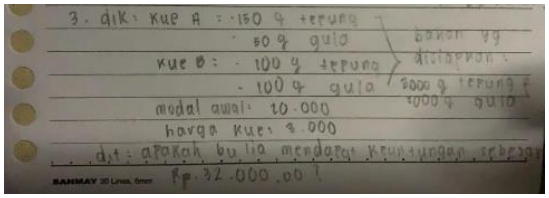


Figure 13. Answer 3

The results of S5's answer can be seen in Figure 11 for question number 1. In this answer, S5 is wrong in knowing information, problems, and conclusions. Thus, the S5 does not meet the communication indicators. The indicators of mathematization, problem solving strategies and the use of formal and symbolic language, technical language and operating language have not met the indicators. As for figure 12 (question number 2) and picture 13 (question number 3), it can be seen that S5 only writes information on the questions and problems to be solved. Thus, S5 almost fulfills the communication indicators in questions 2 and 3. As for the indicators of mathematization, problem solving strategies and the use of formal and symbolic language, technical language and operating language, S5 has not met the indicators.

f. Sixth subject (S6)

In this sixth subject, researchers found uniqueness. This is because S6 did not provide answers from question number 1 to question number 3. Seeing this, the researcher deepened it again by conducting interviews. Here's an excerpt.

Researcher	*: Do you understand the meaning of questions number 1, 2, and 3?*
S6	*: No, as.*
Researcher	*: Have you ever come across similar questions of all kinds?S6: Belum, as.*
Researcher	*: The reason for not understanding what, deck?*
S6	*: Don't understand working with the matrix method, sis.*

It can be concluded that S6 does not meet the indicators of communication, mathematization, problem solving strategies and the use of formal and symbolic language, technical language and operating language for all HOTS questions tested.

3.2 Discussion

Based on the analysis, it was found that the mathematical literacy abilities of class XI IPA SMA Al-Azhar Jambi in solving HOTS questions on the Matrix material belonged to almost all subjects meeting the communication indicators and only a few subjects meeting the indicators of mathematization, problem solving strategies and the use of symbolic and formal language, technical language and surgery.

These results are not much different from the research conducted by Azhar (2020), based on the results of the HOTS-based SPLDV test, only the dominant communication skills were owned by all subjects. While strategies for solving problems, using operations and symbolic language, formal language, and technical language, as well as reasoning and giving reasons are abilities that not many students have. The conditions above indicate that students' mathematical literacy skills are still very low.

In this study, it turned out that there was a relationship between the level of HOTS questions and students' mathematical literacy skills. From the results it was found that S1 and S2 (high-level ability subjects) were able to answer HOTS level C4 questions (analyze) and were unable to answer HOTS level C5 questions (evaluate). S3 and S4 (subjects with moderate ability) did not correctly

answer HOTS level C4 questions (analyzing) and C5 level HOTS questions (evaluating). While S5 and S6 (subjects with low ability were unable to answer HOTS level C4 questions (analyze) and C5 level HOTS questions (evaluate).

This is also in accordance with Azhar (2020), that in fact there is a link between the difficulty level of the HOTS-based SPLDV questions and the high and low levels of students' mathematical literacy abilities. It is proven by the literacy ability of subject S2 which belongs to very high category (ST) in question number 1 with C4 cognitive level (analysis), but in low category (R) in question number 2 with C5 cognitive level (evaluation). Likewise with the mathematical literacy ability of the S3 subject which is in the medium category (S) in question number 1 with the cognitive level C4 (analysis), but in the very low category (SR) in question number 2 with the cognitive level C5 (evaluation).

Specifically, it can be explained that the achievement of mathematical literacy skills is in accordance with the indicators of mathematical literacy abilities as follows (Azhar, 2020):

a. Communication indicators

In communication indicators that focus on question number 1, it is known that S1 and S2 meet the indicators, S3 and S4 almost meet the indicators, errors occur when concluding, S5 and S6 do not meet the indicators because they wrote wrongly and did not write down at all for S6. In question number 2, S1 meets the communication indicator, S2 and S3 almost meets the indicator, an error occurs in concluding, S4 and S5 almost meet, this does not provide a conclusion, and S6 does not meet the indicator. As for questions number 3, S1, S2, S3, S4 and S5 almost meet the communication indicators, errors occur because they do not provide conclusions. S6 does not meet the indicators.

b. Mathematization indicators

In the mathematization indicators, questions number 1, S1, S2, S3 fulfill this indicator. S4 is almost compliant, the error occurred due to an error in the initial error. The S5 and S6 do not meet this indicator. In question number 2, S1 and S2 meet the mathematization indicators, only using an algebraic model instead of a matrix. S3 meets the mathematization indicators. S4, S5 and S6 did not meet the mathematization indicators, because the three subjects did not provide answers. In questions number 3, S1, S2, S5 and S6 do not meet the mathematization indicators, S3 and S4 almost meet the mathematization indicators.

c. Indicators of problem solving strategies

In the problem solving indicators for questions number 1, S1 and S2 meet the indicators, S3 and S4 almost meet the indicators, errors occur in operations, S5 and S6 do not meet the indicators. In question number 2, S1 fulfills this indicator even though it uses an algebraic model, S2 almost meets, this is an error in the logic of thinking, S3 almost meets, an error occurs in operations, S4, S5 and S6 do not meet this indicator. Questions number 3, S1, S2, S5 and S6 did not meet this indicator, because there was no answer, S3 and S4 almost met, errors occurred in the wrong systematic strategy and strategic planning.

d. Indicators of using formal and symbolic language, technical language and operating language

In question number 1, S1 and S2 meet the indicators, S3 and S4 almost meet. S5 and S6 do not meet the indicators. In question number 2, S1 meets the indicators, S2 and S3 almost meet the indicators, an error occurred in the calculation operation, S4, S5 and S6 do not meet this indicator. In questions number 3, S1, S2, S5 and S6 do not meet this indicator, because there is no answer, S3 and S4 almost meet, an error occurs in the wrong operation.

The factors that influence students' mathematical literacy skills in completing HOTS questions are as follows.

1) Students have the ability to solve problems in daily life according to the talent they have.
2) Students are able to recognize the importance of mathematics in everyday life and explain its uses, where this can train students to solve problems in the form of questions.
3) Students often solve problems in the form of stories.
4) The quality of mathematics teachers in teaching the material has not been maximized, there are still students who do not understand the concept of the matrix, students complain that they are not satisfied and enough with the material they get, the media used is still monotonous, namely only textbooks and the learning model used has not led to mathematical reality.
5) Students enjoy learning mathematics, although some do not understand the material, this is because the mathematics teacher is not scary, on the contrary friendly, funny and very friendly.
6) The hours of mathematics lessons are widely used by school activities, so the

material presented by the teacher is not optimalas expected.

7) There are students who have never worked on HOTS-based math problems, so they have difficulty in solving problems formulate the meaning of the question.
8) Regarding the level of HOTS-based questions. The higher the level, the smaller the abilitystudents' mathematical literacy.

4. Conclusion

Students' mathematical literacy skills in solving HOTS questions on matrix material are classified as almost all subjects meeting communication indicators and only a few subjects meeting indicators of mathematization, problem solving strategies and the use of symbolic and formal language, technical language and operations. The factors that affect students' mathematical literacy skills in solving HOTS questions on matrix material: students' perceptions of the importance of mathematics, self-confidence in mathematical abilities, teacher quality in teaching, teacher character in teaching, models, media, strategies, approaches used in teaching. learning, limited time in working, the level of HOTS questions and student interest in solving problems.

This is evidenced by 2 research subjects being able to answer question number 1 based on HOTS, 3 subjects almost able to answer question number 1 based on HOTS, 1 student did not answer question number 1. 1 subject was able to answer question number 2, 2 subjects were almost able to answer question number 2 , and 3 subjects were unable to answer question number 2. 2 students were almost able to answer question number 3 and 4 students were unable to answer question number 3. From the results of the study, the researcher gave suggestions for students to be more active in asking questions if they did not understand the material being taught and students have to do exercises independently, especially about HOTS questions so that by getting used to doing them, students are accustomed to solving problems that exist in life.

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