Analysis of the Difficulties of Junior High School Students in Solving PISA Model Mathematics Problems

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Abstract: Analysis of the Difficulties of Junior High School Students in Solving PISA Model Mathematics Problems. Objectives: This study aimed to analyze the difficulties of students in working on PISA-model-math problems in Junior High School. **Methods:**The samples used in this qualitative research were 24 students of SMP Negeri 1 Padang Bolak class IX-A and 11 students of SMP Negeri 2 Padang Bolak class IX-B. The data collection technique used in this study was a written test of 6 essay questions that had been declared valid and reliable as well as interviews. **Findings:** Some of difficulties experienced by students were understanding the meaning of the problem, converting the problem into mathematical sentences, planning and implementing the problem solving, and logically concluding the problem's solution. **Conclusions:** The mathematical ability to answer PISA at the level 1, 2, and 3 questions was good, while those for levels 4, 5, and 6 were still in the low category.

Keywords: students' difficulty analysis, PISA, Mathematics.

Abstrak: Analisis Kesulitan Siswa SMP dalam Menyelesaikan Soal Matematika Model PISA. *Tujuan: Penelitian ini bertujuan untuk menganalisis kesulitan-kesulitan siswa dalam mengerjakan soal matematika model PISA di SMP.* ***Metode:*** *Sampel yang digunakan dalam penelitian kualitatif ini adalah siswa SMP Negeri 1 Padang Bolak kelas IX-A sebanyak 24 siswa dan siswa SMP Negeri 2 Padang Bolak kelas IX-B sebanyak 11. Teknik pengumpulan data yang digunakan adalah tes tertulis sebanyak 6 soal uraian yang telah dinyatakan valid dan reliabel serta wawancara.* ***Temuan:*** *Beberapa kesulitan yang dialami siswa adalah memahami maksud dari soal, mengubah soal ke dalam kalimat matematika, merencanakan dan melaksanakan penyelesaian soal, serta menyimpulkan penyelesaian soal dengan tepat.* ***Kesimpulan:*** *Kemampuan matematika siswa dalam menjawab soal PISA level 1, 2, dan 3 sudah baik, sedangkan untuk level 4, 5, dan 6 masih berada pada kategori rendah.*

Kata kunci: *analisis kesulitan siswa, PISA, Matematika.*

To cite this article:

■ **INTRODUCTION**

Mathematics is a subject that always exists at every level of education. At all times, mathematics is often used in everyday life. Mathematics is always related in every subject, whether in biology, chemistry, physics, social sciences, politics, and many more. In the socio-economic development of a country, mathematics is very closely related to it because there is knowledge of the technology needed (Fafre & Na, 2019). The role of mathematics is always needed. For this reason, an effort is required in order to see the extent to which students' mathematics learning outcomes are.

One of the international student assessment programs is PISA (*Programme for International Student Assessment*) organized by *The Organization for Economic Co-operation and Development* (OECD) (Mammadov & Çimen, 2019). PISA is a test to see the learning outcomes of 15-year- old students whose participants are countries that have joined PISA. PISA was first implemented in 2000 and is carried out every three years (OECD, 2019). This program aims to motivate countries that have joined in improving the education system in schools to be better and more comprehensive (*Ministry of Education and Culture*, 2019). PISA is carried out to measure students' level of understanding and proficiency in Mathematics (Zulfah, 2019). One of the functions of PISA is to evaluate the education system of a country that participates in the program in the fields of reading, mathematics, and science (*Ministry of Education and Culture* 2016). Average math problems related to real life, it is same with focus PISA about the knowledge ability of students that can be applied in everyday life (Haerani et al., 2021; Anderson et al., 2010). PISA can also be a measuring tool to assess the extent of the education system in a country in mathematics, science, and literacy (Fuadi et al., 2020).

Government Regulation of the Republic of Indonesia Number 13 of 2015 concerning National Education Standards states that assessment of learning outcomes for primary and secondary education is determined by educators, educational institutions, and the government (*Ministry of Education and Culture*, 2015). The government plays a role in regulating the National Education Standards in Indonesia. Determining the assessment of student learning outcomes is one of the goals of PISA. Thus, the goals of PISA are in line with the government's goals on the determination of education standards in Indonesia. Countries with good education systems have excellent quality human resources and critical and creative reasoning to keep pace with current educational developments (Kurniati et al., 2016).

In solving PISA problems, a high level of reasoning is needed to understand mathematical concepts closely related to real life (Setiawan et al., 2014). From the results of PISA (which is conducted every 3 (three) years, the level of education of the countries that are members of PISA can be seen. If the results are great, the country's educational standards have proven to be able to match the needs of global society standards. On the other hand, if a country is still at the lower level, the country's educational standards are not yet in line with the needs of global society standards (Pratiwi, 2019).

Indonesia has joined PISA since 2000. The results obtained by Indonesia while participating in PISA are still in the lower level (Fenanlampir et al., 2019). Indonesia has participated in the PISA program for 7 times, but the results have not been satisfactory. In PISA 2012, Indonesia was ranked 64th out of 65 participating countries. At the PISA 2015, Indonesian students' mathematics literacy was ranked 63 out of 70 countries. In 2018, Indonesia has not been able to obtain satisfactory results because it is ranked 73 out of 79 participants. PISA in mathematics

is applied to be able to see students' mathematical reasoning abilities so that they can describe, apply, and understand the events around them (Hewi & Shaleh, 2020). By this aim, it can be seen that the level of mathematical ability of Indonesian students based on PISA results from 2012 to 2018 tends to have no increasing. So, Indonesian students need to improve their math skills on international test such as PISA (Kandeel, 2021). The PISA test results for Indonesian students in mathematics from 2000 to 2018 can be seen in Figure 1.
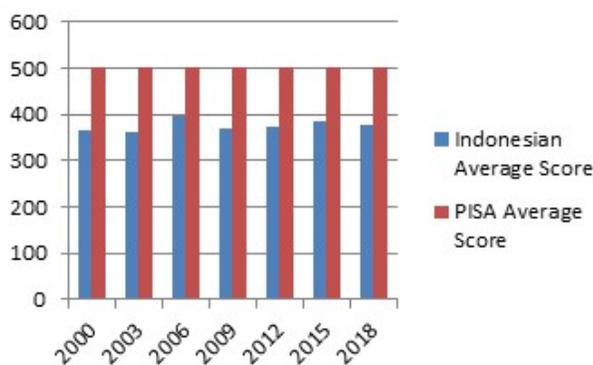
Figure 1. PISA test results for Indonesian

Table 1. PISA mathematics for Indonesian

Year	Participating Countries	Indonesian Ranking
2000	41	39
2003	40	38
2006	56	50
2009	65	61
2012	65	64
2015	70	63
2018	79	73

Based on the data obtained in Figure 1, Indonesia's average score is always below the average score of all countries participating in PISA. In addition, Table 1 also shows the position of Indonesia's ranking in PISA from 2000 to 2018, which is still very low because it is always in the last 6 positions. Thus, it needs to be improved. The factor causing the low ranking (level) of Indonesian students in PISA is the number of errors and difficulties experienced by students in doing math problems, especially the case for PISA with a more complex level of completion so that the results obtained are still unsatisfactory (Teresa et al., 2020).

Students' failure to obtain less than optimal learning out comes is caused by students' difficulties in solving mathematical problems (Novferma, 2016). Analyzing, translating, and applying the problems are needed by every student in answering PISA questions, depending on the condition of the questions given (Lutfianto et al, 2013). In order to be able to answer PISA questions correctly, students need to get used to practicing on questions that are equivalent to PISA (Charmila et al., 2016).

Analyzing difficulties faced by students in solving mathematics problems using the PISA model can be done based on the Newman error

category (NEA). There are similarities between Newman's errors and mathematical stages in PISA (Wijaya et al, 2014). NEA are steps made to analyze errors in solving math problems in the form of story questions (Oktaviana, 2017). These difficulties are: (a) *Understanding*. The difficulty of students in understanding the intent or purpose of the questions; (b) *Changes*. The difficulty of students to change the real form of the problem into a mathematical sentence; (c) *Process Capability*. The difficulty of students in solving math problems; (d) *Concluding*. The difficulty of students to provide solutions to problems correctly.

There are previous studies that discuss student errors in answering PISA questions, namely: (1) Maria Maleta Simalongo, Darmawijoyo, and Nyimas Aisyah (2018) in the journal titled "*Kesulitan yang Dialami Siswa Dalam Menyelesaikan Soal-Soal PISA Pada Konten Change and Relationship*". The difficulty faced by students in answering PISA questions is understanding the problem, converting real problems into mathematical form, solving mathematical problems, and concluding solutions. (2) Teresa Helyana, Zubaidah, and Nursangaji Asep (2020) in the journal titled "*Kemampuan Menyelesaikan Soal PISA pada Konten Change and Relationship*". In answering PISA questions, students have not been able to understand the questions correctly. Students also have not been able to identify and select relevant information since they have difficulty in providing arguments for each step of completion in providing conclusions. (3) Agatha Indy Candra Dewi, Zulkardi, and Muhammad Yusuf (2017) in the journal titled "*Kesulitan Siswa dalam Menyelesaikan Soal PISA Tahun 2012 Level 4, 5, dan 6 di State Junior High School 1 Indralaya*". The difficulty is in understanding the problem, converting real problems into mathematical form, solving mathematical problems, and making conclusions.

The interesting things in this study compared to the previous study are that there has been no research on analyzing student difficulties in answering PISA questions in the North Sumatra area, and the questions tested have covered all levels of questions and categories of questions on PISA.

The low PISA result of Indonesian students, it was happened because students were not used to answering about PISA with context and real life (Efriani, et al., 2018). This is shown by the ability of Indonesian students in answering the PISA questions which are still below of the OECD average (Sari & Valentino, 2016; Wulandari & Jailani, 2018). One of the students' mistakes in answering the PISA model math problems is the students' answers are much different from what is asked in the question (Hendroanto, 2018). Students' error in answering questions are caused by students lacking in thinking skill to solve problems (Heong et al., 2020). For this reason, it is required to do further research.

This study analyze student's difficulties in answering the PISA model of Mathematics. Based on the description above, it is necessary to conduct research with the title *"Analysis of The Difficulties of Junior High School Students in Solving PISA Model Mathematics Problem"*.

■ **METHODS**

This research is a qualitative descriptive research. The population used is junior high school students in the Sub-district of Pasar Gunung Tua, namely SMP Negeri 1 Padang Bolak and SMP Negeri 2 Padang Bolak. The total number of class IX at SMP Negeri 1 Padang Bolak is 76 students and at SMP Negeri 2 Padang Bolak is 65 students. The sample of this study are 24 students of SMP Negeri 1 Padang Bolak and 11 students of SMP Negeri 2 Padang Bolak. All of samples are 15 years old. The sampling technique used is cluster random sampling.

The data collection is done mathematically based on the results of the instrument test. The instrument is adapted from Brigita Florensia Rusmiyati Uba Ina (2020) which is a PISA-based math questions for junior high school then developed further. The instrument test consists of 6 essay questions, which of each has a different level of difficulties starting from level 1 to level 6.

The questions have been validated by the teachers of the subject of SMP Negeri 1 Padang Bolak and SMP Negeri 2 Padang Bolak and have been declared valid with a correlation value. 0.7. Before the test questions are used, the questions are first tested on students of SMP Negeri 1 Padang Bolak class IX-B with a reliability score of 0.6. Then, the interviews are conducted to several students to explore the difficulties experienced by the students based on their mistakes.

The answers that are checked are the students' correct answers by making a percentage value of the number of questions. The analysis is conducted by tabulating each student's errors in their answers according to Newman's errors. Every answer of the students is checked and the percentage of correct answers based on 4 categories theorized by Newman.

■ **RESULT AND DISCUSSIONS**

There are 6 questions that are tested with different levels of difficulty for each question. Question number 1 is for PISA level 1 questions, question number 2 is for PISA level 2, question number 3 is for PISA level 3, question number 4is for PISA level 4, question number 5 is for PISA level 5, and question number 6 is for PISA level 6. The following are the answers' results of students of State Junior High School 1 Padang Bolak and students of State Junior High School 2 Padang Bolak, with a total research subject of 35 students.

Table 2. The result of student answer per question

Question Number	Answer			Total
	Correct	Wrong	No Answer	
1	27	7	1	35
2	30	2	3	35
3	32	0	3	35
4	9	6	20	35
5	1	5	29	35
6	2	0	33	35
Total	101	20	89	210
Percentage	48,10%	9,52%	42,38%	100%

Based on Table 2, students who could answer the questions correctly were 48,10%, students who answered incorrectly were 9,52%, and students who did not answer the questions were 42,38%. From Table 2, it was known that the Mathematics ability for level 1 was 77,14%, for level 2 was 85,71%, for level 3 was 91,43%, for level 4 was 25,71%, for level 5 was 2,86%, and for level 6 was 5,71%. Furthermore, the difficulties experienced by students as subjects according to *Newman's* errors were analyzed. The results obtained are listed in Table 3.

Table 3. Difficulties experienced by students

No.	Students	Test					
		Number 1 (Level 1)	Number 2 (Level 2)	Number 3 (Level 3)	Number 4 (Level 4)	Number 5 (Level 5)	Number 6 (Level 6)
1.	UM	-	B	-	-	A, B, C, D	A, B, C, D
2.	RH	A, C	B	B, C, D	A, B, C	A, B, C, D	A, B, C, D

3.	NWS	A, C	B	-	A, B, C	A, B, C, D	A, B, C, D
4.	RMY	A, C	B	-	C	A, B, C, D	A, B, C, D
5.	RS	A, C	A, B, D	-	-	A, B, C, D	A, B, C, D
6.	R	-	B	-	-	A, C, D	A, B, C, D
7.	R	-	B	-	A, B, C	A, C, D	A, B, C, D
8.	A	-	B	-	-	C, D	A, B, C, D
9.	EE	A, C	B	-	A, B, C	A, B, C, D	A, B, C, D
10.	ISP	-	B	B, C, D	A, B, C	A, B, C, D	A, B, C, D
11.	YS	C	A, B, D	B, C, D	A, B, C	A, B, C, D	A, B, C, D
12.	NAS	-	B	-	A, B, C	A, B, C, D	A, B, C, D
13.	TAP	-	B	-	A, B, C	A, B, C, D	A, B, C, D
14.	AK	-	-	-	A, B, C	A, B, C, D	A, B, C, D
15.	PA	-	B	B, C, D	A, B, C	A, B, C, D	A, B, C, D
16.	NHM	A, C	B	-	A, B, C	A, B, C, D	A, B, C, D
17.	DRA	-	-	-	-	A, B, C, D	A, B, C, D
18.	RS	-	-	-	-	A, B, C, D	A, B, C, D
19.	F	-	-	-	-	A, B, C, D	A, B, C, D
20.	WRH	-	-	-	-	A, B, C, D	A, B, C, D
21.	MRS	-	A, D	-	A, B, C	A, C, D	A, B, C, D
22.	N	-	-	-	A, B, C	A, B, C, D	A, B, C, D
23.	DIP	-	-	-	A, B, C	A, B, C, D	A, B, C, D
24.	AA	-	-	-	A, B, C	A, B, C, D	A, B, C, D
25.	GR	-	-	-	A, B, C	A, B, C, D	A, B, C, D
26.	RAM	-	-	-	A, B, C	A, B, C, D	A, B, C, D
27.	N	-	B	-	A, B, C	A, B, C, D	A, B, C, D
28.	A	A, C	A, B, D	-	-	A, B, C, D	A, B, C, D
29.	NAH	-	-	-	A, B, C	A, B, C, D	A, B, C, D
30.	R	-	A,B , D	-	A, C	C, D	A, B, C, D
31.	FMH	-	B	-	A, B, C	A, B, C, D	A, B, C, D
32.	SS	-	B, D	-	A, B, C	A, B, C, D	A, B, C, D
33.	SE	-	D	-	C	D	-
34.	YAP	-	D	-	C	D	-
35.	FZ	-	D	-	A, B, C	A, B, C, D	A, B, C, D

Notes:
a) Difficulty in understanding the meaning of the question;
b) Difficulty in converting into mathematical sentences;
c) Difficulty in solving math problems;
d) Difficulty in providing the correct solution to the problem;

Table 4. Student's difficulties based on Newman's error

Level	Category A	Category B	Category C	Category D
1	7	-	8	-
2	5	20	-	9
3	-	4	4	4
4	23	22	24	-
5	31	28	33	35
6	33	33	33	33

From Table 3, the results of students' answers were obtained, determined based on Newman's rules. Based on Table 4, student errors for level 1 category A were 7 students, category B were none, category C were 8 students, and category D were none. Student errors for level 2

category A were 5 students, category B were 20 students, category C were none, and category D were 9 students. Student errors for level 3 category A were none, category B were 4 students, category C were 4 students, and category D were 4 students. Student errors for level 4 category A were 23 students, category B were 22 students, category C were 24 students, and category D were none. Student errors for level 5 category A were 31 students, category B were 28 students, category C were 33 students, and category D were 35 students. Student errors for level 2 category A were 33 students, category B were 33 students, category C were 33 students, and category D were 33 students. The data obtained was that students experienced the most difficulties in questions 4, 5, and 6. This was supported by the results of PISA in Mathematics from 2000 to 2009, showing that Indonesian students can only answer level 1 to level 3 questions and few students are able to answer level 4 questions (Edo et al., 2013).

Analysis of Question Number 1

Based on the analysis of the answer sheet results from 35 students, there were 27 students who answered the question correctly, 7 students answered incorrectly, and 1 student did not answer the question. In question number 1, students were asked to read the data and have the ability to process mathematics to get the correct answer. The difficulty of students when working on this problem was an error in counting. Lack of accuracy when working on mathematical arithmetic operations is an error in completing the work process on the problem (Murwati et al., 2020).

The examples of students' difficulties in answering question number 1 for PISA level 1 questions
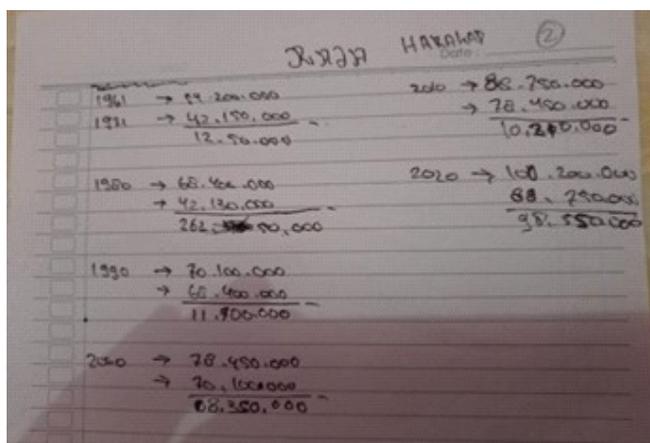
Figure 2. Subject RH's answer to question number 1

Based on Figure 2, it can be seen that subject RH was wrong in the calculation operation. This can be seen in the reduction operations in 1990, 2010, and 2020. In 1990, RH answered that 70.100.000– 68.400.000 = 11.700.000. Meanwhile, the correct answer should be 1.700.000. In 2010, RH answered that 88.750.000– 78.450.000 = 10.210.000. meanwhile, the correct answer should be 10.300.000. In 2020, RH answered that 100.200.000– 88.750.000 = 98.550.000. Meanwhile, the correct answer should be 11.450.000. Based on the analysis of students' difficulties according to the PISA level 1 indicator, there are still some students who are wrong in arithmetic operations. Students often miscalculate in answering math questions, this is because they believe when answering the questions can make

them confused and afraid (Safari, 2021). Mathematical arithmetic operations are one of the important components that students should master because the next material will be interconnected (Safriani et al., 2019).

Analysis of Question Number 2

In question number 2, students were asked to provide inductive reasoning according to the data provided by the question. 30 students were able to identify the mathematical concept and scored correctly. Although 1 student almost answered the question correctly, the student was wrong in solving the question for the final answer, so the answer was wrong. Students were required

to be able to understand and convert problems into mathematical sentences, such as making comparisons to get the value of x. Students were also required to be able to conclude the meaning of the question. Almost all students can solve the problem correctly, which means that only a few students have difficulty in working on this problem. The students' mistake when answering the questions was that they did not fully answer what they asked for. Thus, they did not provide complete answer information (Indahsari & Fitrianna, 2019).

The examples of students' difficulties in answering question number 2 for PISA level 2 questions:
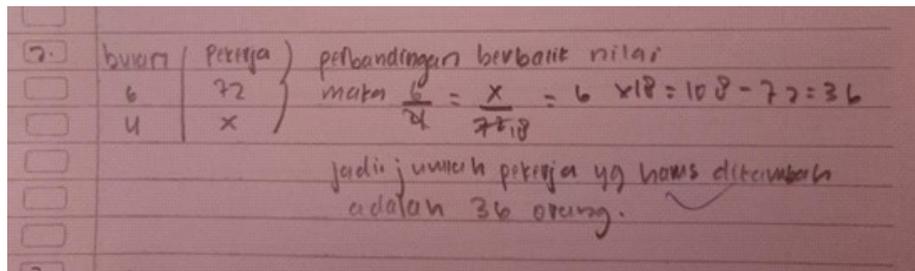
Figure 3. Subject NAS's answer to question number 2

Subject NAS had answered the question correctly according to the calculation for comparing scores. However, subject NAS did not answer all the questions in the problem. There were 2 questions, namely how many workers must be added and on what day the shophouse is finished. NAS only answered the number of workers that must be added, so his answer was wrong. This error is caused because students do not understand the concept of the problem in the question (Shantika & Istiyono, 2019). Based on the analysis of student difficulties refer to the PISA indicator level 2, the students should remember and understand the formulas in mathematics to get the right answer (Altýntaþ & lgün, 2017).

Analysis of Problem Number 3

Question number 3 was categorized in inductive reasoning. Students were required to be able to draw conclusions based on the data

provided on the question by being able to find patterns in the question. 32 students could answer the question correctly; there were no students who answered the question incorrectly, and there were 3 students who did not work on this question. The ability to solve a problem in a mathematical problem can be seen from being able to understand the meaning of the problem and being able to work on the problem correctly according to mathematical operating procedures. (Sari & Masri, 2020). Based on the analysis of the students' difficulties refer to the PISA indicator level 3 is the students who are lacking in solving mathematical questions are caused by a lack of understanding of mathematical concepts (Al-Mutawah et al., 2019). The students ought to focus on making mathematical problem solving strategies to solve the qustions correctly.

Student's answer sheet in answering question number 3 for PISA level 3:
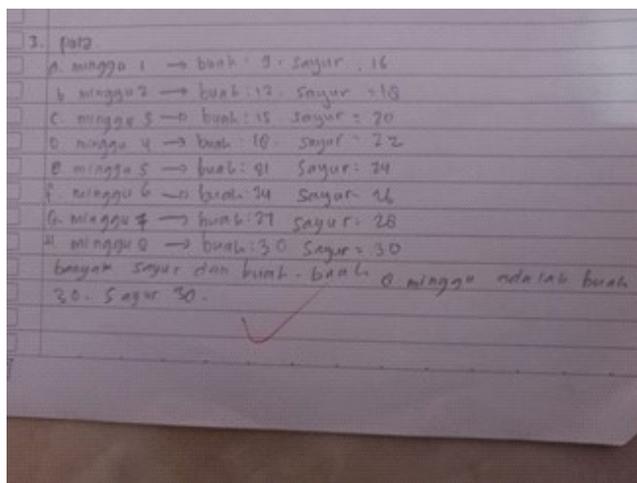
Figure 4. Subject RAM's Answer to Question Number

Subject RAM could make patterns to determine the number of fruits and vegetables at week 8. The pattern made by him was for fruit every week plus 3, while for vegetables, it was increased by 2 every week. The number of vegetables at week 8 was 30 and for fruit was 30.

Analysis of Question Number 4

Question number 4 required students to make an analogy to mathematics. This means that students need to identify mathematical concepts by making mathematical models to get the values of x and y by using calculations based on applicable mathematical formulas or rules. The difficulties experienced by students were in the process of operating mathematics. They were wrong in finding the values of x and y since they did not eliminate one of the variables so that the answers they got are not correct. Of the 35 students, only 9 students answered the question correctly and 6 students answered incorrectly. For the rest, they did not answer this question. When working on math problems about SPLDV (Two-Variable Linear Equation System), students often get it wrong; such as not answering the question completely as to what the problems contained in the question and wrong in making mathematical modeling in problems (Rahayuningsih & Qohar, 2014). Mathematical modeling is a concept of mathematical problems to be able to solve problems correctly, therefor it is useful for developing the understanding of students' thought (Salha & Qatanani, 2021).

The examples of students' difficulties in answering question number 4 for PISA level 4:
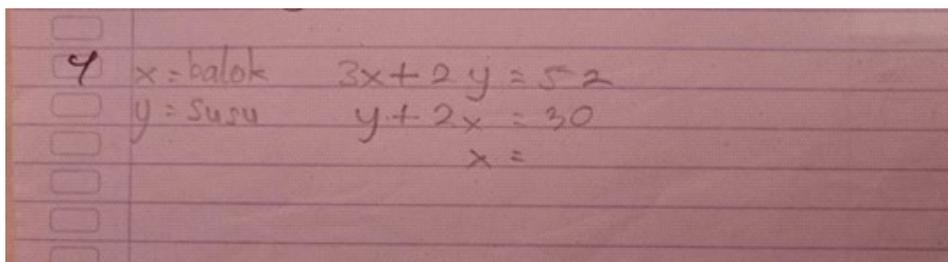
Figure 5. Subject R's answer to question number 4

Subject R was able to change the problem into a mathematical sentence by assuming x as a block and y as milk. However, subject R did not complete the operation to be able to determine the values of x and y. The operation required in problem number 4 was to use the Two-Variable Linear Equation System (SPLDV). Thus, the value of x should be 12 and y should be 12. Hence, the length for the 3rd arrangement was supposed to be 30   cm.

Analysis of Question Number 5

Based on question number 5, only 1 student was correct; the rest were wrong and did not answer the question. The difficulty faced by the students in this problem was that it was difficult to understand the meaning of the question, the

changes in the requested data, the process of working on the problem, and concluding what the question meant. Students found it difficult to plan problem-solving and problem-solving implementation. The students should think realistically and systematically to solve mathematical problem solving so that they can answer the questions correctly (Rinawati et al, 2019). The low understanding of students in understanding the meaning of the question, lack of understanding of concepts, and understanding of the material is one of the factors causes the students have difficulty in answering math questions (Adilla et al., 2020).

The examples of students' difficulties in answering question number 5 for PISA level 5 questions:

Figure 6. Subject YAP's anwer to question number 5

Subject YAP did not get a score because he had not finished answering question number 5. The problem of question number 5 was how many jars the factory produces in 2 weeks, where every sunday the factory is closed. On subject YAP's answer sheet, he only answered up to a factory-produced jar in 10 minutes. In fact, he had been looking for how many minutes of working time the factory has. Subject YAP's error in answering this question was inconsiderable; he only had to make an equivalent comparison to

get the number of jars in 2.880 minutes. So, the correct answer was 3.168 jars.

Analysis of Question Number 6

Of the 35 students, only 2 students answered the question correctly; the rest 33 students did not work on the question. This question required inductive reasoning. Students were asked to have reasoning about how to solve this question first since the data provided by the question were interconnected until the end. Hence,

it took sufficient concentration to answer this question. One of the difficulties faced by the students in answering this question so that only a few students were able to get it right was the difficulty of students in understanding the purpose of the question. Students found it difficult to understand the analysis of the problem-solving process and conclusions based on mathematical concepts. In PISA level 6 questions, students are asked to be able to create concepts and utilize information from the data provided by the

questions. Students can also think advanced mathematically (Kamaliyah et al., 2013). There are two students make mistakes in understanding the questions because of less than optimal mastery of the questions and the mistakes made are not because they have not mastered understanding the questions but the causes such as carelessness, lack of accuracy in reading or arithmetic, and in a hurry (Pomalato et al., 2020).

The examples of students' difficulties in answering question number 6 for PISA level 6:
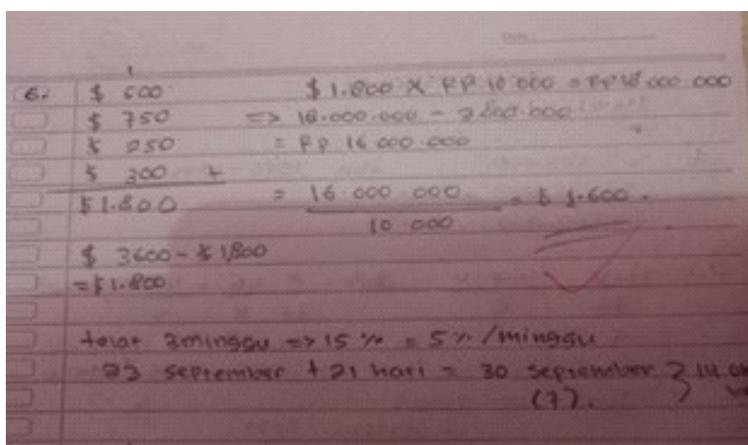
Figure 7. Subject SE's answer to question number 6

Only 2 students could answer question number 6 correctly; the rest did not answer it; one of them was subject SE. He could understand the meaning of the question, convert the question into a mathematical sentence, solve the problems in the question, and make conclusions from the question. The first step he took was to find out how much Putra spends in 1 month and then convert it to Rupiah. After that, subject SE looked for what week Putra pays his sister's school fees. Thenceforth, Putra's remaining money after helping his sister's school fees can be found, and subject SE only needed to change Rupiah into dollars because the question was in the form of dollars.

Based on the results of the answer sheets obtained by students in answering the PISA model

Mathematics questions as many as 6 questions in the form of descriptions, it can be seen from the data that there are still many students who have not been able to answer the questions correctly. One of the factors causing the low mathematical problem-solving ability of students is that students are not accustomed to answering questions (Murni, 2013). Therefore, the results of PISA-based mathematics for junior high school students in Pasar Gunung Tua Village based on the answer sheets obtained are still lacking, or there are still many students who have difficulty in working on these questions.

The mistakes made by the students in answering PISA level 1 to level 6 questions are broadly due to the lack of problem solving and students' thinking skills. The ability of problem

solving is an ability that should be improved to achieve optimal mathematics learning because the understanding of the students in mathematics is the main core of solving math problems (Sutrisno, 2019; Minarni et al., 2016). In addition, the students' creative thinking ability is one of the goals of learning mathematics (Damayanti & Sumardi, 2018). The efforts of improving students' thinking skills require things related to the student skills first so they can be directed in selecting suitable methods to improve students' thinking skills (Anwar, 2021). One of the way to improve mathematical skills is to strengthen students' mathematical concepts and attract students' interest in mathematics as a basis for continuing to understand further mathematical concepts (Ishak et al., 2021). Another strategy is to introduce problem solving to the students by exploring their ideas to be able to understand, analyze problems, and find solutions to the problems given. During this process, the teacher acts as a facilitator throughout the process to help the students to facilitate the knowledge (Siniguian, 2017). So, used learning strategy very important to improve students' thinking skills (Al- Hassawi et al., 2020)

■ CONCLUSIONS

In accordance with the data obtained, it can be concluded that students of State JHS 1 Padang Bolak and State JHS 2 Padang Bolak class IX have many difficulties in answering PISA model math problems number 4, 5, and 6. Based on the answer sheet, only 48,10% of students could answer the questions correctly. Students who answered the questions incorrectly were 9,52%, and students who did not answer the questions were 42,38%. Error conclusions were made based on NEA.

The limitation of this research is the questions are not tied to the same material , so if teacher wants to use question she can't used in one lesson. In the future, this research is helpful for teachers who find similar cases so that they can see what difficulties are faced by students in answering PISA questions. Hence, the teacher concerned can overcome the causative factors. It is hoped that Indonesian students can compete to improve Indonesia's ranking position in the PISA program, especially in the field of mathematics.

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