# Analysis Of Student's Reflective Thinking Ability In Solving PISA Based Mathematic Problems Of SPLDV Based on Critical Thinking Skills

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**Abstrak**

SPLDV merupakan salah satu materi yang sesuai dengan aspek kemampuan berpikir reflektif dimana siswa dituntut untuk dapat memecahkan masalah sesuai dengan pemahaman dan konsep berpikir reflektif. Sehingga kemampuan berpikir reflektif siswa menjadi satu hal penting dalam memecahkan soal SPLDV. Sedangkan, kemampuan berpikir reflektif dapat diasah dengan menyelesaikan soal berbasis PISA dengan memperhatikan langkah – langkah penyelesaian. Penelitian ini bertujuan untuk mengetahui kemampuan berpikir reflektif siswa dalam memecahkan soal matematika berbasis PISA materi SPLDV untuk siswa dengan kemampuan berpikir kritis. Penelitian ini merupakan penelitian deskriptif kualitatif. Subjek penelitian ini adalah siswa kelas VIII A SMP Negeri 10 Semarang yang terdiri dari 3 siswa, 1 siswa dengan kemampuan berpikir kritis tinggi, 1 siswa dengan kemampuan berpikir kritis sedang, dan 1 siswa dengan kemampuan berpikir kritis rendah. Pemilihan subjek berdasarkan hasil tes kemampuan berpikir kritis pada materi SPLDV. Teknik pengumpulan data yang digunakan pada penelitian ini yaitu tes, wawancara dan dokumentasi. Teknik analisis data yang digunakan pada penelitian ini yaitu reduksi data, penyajian data, dan penarikan kesimpulan. Teknik pemeriksaan keabsahan data dengan menggunakan triangulasi metode. Hasil penelitian ini menunjukkan bahwa siswa dengan kemampuan berpikir kritis tinggi dapat memenuhi 4 indikator kemampuan berpikir reflektif. Siswa dengan kemampuan berpikir kritis sedang dapat memenuhi 3 indikator kemampuan berpikir reflektif. Sedangkan, siswa dengan kemampuan berpikir kritis rendah memenuhi 2 indikator kemampuan berpikir reflektif.
**Kata Kunci**: Berpikir reflektif, SPLDV, PISA, Berpikir kritis

***Abstract***

*SPLDV is one of the materials that corresponds to aspects of reflective thinking skills where students are required to be able to solve problems according to the understanding and concept of reflective thinking. So that students' reflective thinking skills become an important thing in solving SPLDV problems. Meanwhile, the ability to think reflectively can be honed by solving PISA-based questions by paying attention to the steps for solving them. This study aims to determine students' reflective thinking skills in solving PISA-based math problems in SPLDV material for students with critical thinking abilities. This research is a qualitative descriptive study. The subjects of this research were class VIII A students of SMP Negeri 10 Semarang consisting of 3 students, 1 student with high critical thinking ability, 1 student with moderate critical thinking ability, and 1 student with low critical thinking ability. The selection of subjects was based on the results of critical thinking skills tests on the SPLDV material. Data collection techniques used in this study were tests, interviews and documentation. The data analysis technique used in this study is data reduction, data presentation, and drawing conclusions. Techniques for checking the validity of the data using the triangulation method. The results of this study indicate that students with high critical thinking skills can fulfill 4 indicators of reflective thinking skills. Students with moderate critical thinking skills can fulfill 3 indicators of reflective thinking skills. Meanwhile, students with low critical thinking skills meet 2 indicators of reflective thinking skills.*
***Keyword**: Reflective thinking, SPLDV, PISA, Critical thinking*

## INTRODUCTION

Mathematics is a basic science that is studied at all levels of education in Indonesia. This shows the importance of learning and understanding mathematics. By improving and developing students' understanding of mathematics can help improve the quality of education in Indonesia (Rahmah, 2018). Mathematics is abstract in terms of concepts, principles, facts, and symbolic language. Because mathematics is abstract, individuals often say that mathematics is a difficult subject. In studying mathematics, one must think in order to understand a mathematical concept and be able to solve various problems in mathematics.

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One of the thinking skills that must be possessed and developed by students is the ability to think reflectively mathematically which makes it easier for students to face and solve problems in mathematics. Students need to have the ability to think reflectively, because it encourages students' thinking processes in solving problems so that they can explore the form of problems by identifying related mathematical concepts, using various alternative strategies, being able to build ideas, being able to draw conclusions, and re-examining solutions (Puspitasari, 2019). Especially in solving problems reflective thinking prioritizes students' ability to solve problems and links between the knowledge that students already have and the knowledge that students learn in analyzing to get a clear solution to the problems that have been given (Fuady, 2016). Based on this, when it is related to PISA based on the OECD (2019), PISA questions in mathematics have a close relationship with the ability to interpret mathematical things in a variety of different contexts and assist students in learning the important role of mathematics in everyday life for assessment and decisions.

In solving PISA questions students are required to think at a higher level by paying attention to the step by step that must be done. To measure students' reflective thinking skills, certain questions are needed that require the ability to analyze, evaluate and create (Setiawan, Davik, & Lestari, 2014). Questions that require the ability to analyze, evaluate and create are questions based on PISA (Program for International Student Assessment). The researcher will use PISA level 4 questions which are HOTS (Higher Order Thinking Skills) questions because in reflective thinking skills students are required to solve level 4 PISA questions and their completion requires higher order thinking skills, namely students' reflective thinking skills Suharna (2018).

One of the materials that become students' problems in mathematics is the Two Variable Equation System (SPLDV). where SPLDV is also one of the materials studied in class VIII. This material is often used because the material uses word problems related to the application of everyday life. Researchers use this material, it is hoped that students will find it easier to solve problems on SPLDV math problems. In studying SPLDV material students are expected to be able to apply it in everyday life. By facing SPLDV math problems, students will try to solve problems using their own way. The choice of SPLDV material in this research is due to the fact that there are various problems in the form of problem-solving abilities that can assist researchers in analyzing students' thinking abilities. Students who have difficulty working on Algebra problems, especially on SPLDV material. This shows that there are still many students who cannot understand the SPLDV material, causing many mistakes or errors to occur in solving the problem. SPLDV material is one of the materials that is difficult to understand because the questions in the form of story questions make students think directly related to abstract and rote concepts (Disnawati & Nahak, 2019). Therefore, in this case the researcher took SPLDV material with the aim of accustoming students to reflective thinking by working on non-routine questions or PISA-based questions on SPLDV material. And students need to carry out a thought process that will be based on their abilities or clear evidence to get the right answer. In the process of students' reflective thinking skills in solving mathematical problems is closely related to critical thinking skills, in the reflective thinking process students certainly have different ways of solving by cultivating an understanding of SPLDV material requiring high-level thinking skills by understanding deeply and consistently in critical thinking and able to link concepts to solve problems in determining the right answer.

Critical thinking ability is a very important cognitive ability for students to master in learning because this understanding is an effort to improve the quality of students at school (Hidayanti, et al in Kempirmase, 2019). If students are trained in solving problems on a regular basis then students are able to make decisions so that students become skilled in solving a problem starting from collecting relevant data, analyzing data, and understanding so that students can research and re-evaluate the results that have been obtained (Widjajanti & Bondan, 2009). Through learning students are trained to understand problems, carry out problem evaluations and determine intentions and can draw conclusions to train students to use their reflective thinking skills. Therefore, students' critical thinking skills in learning mathematics are very necessary.

Based on all of the descriptions above, the researcher will conduct a study that aims to describe the reflective thinking of students with high, medium, and low critical thinking abilities in solving PISA-based math problems on SPLDV material.

## METHOD

This research is a descriptive qualitative research. This research was conducted at SMP Negeri 10 Semarang in the academic year 2022/2023. The subjects used in this study were 3 students taken from 32 students in class VIII G who were given a reflective thinking ability test after the critical thinking test was carried out. Subjects were selected based on students' initial mathematical ability and the criteria for selecting subjects that had been determined by the researcher. The reason the researcher chose the subject based on students' initial abilities was because differences in students' initial abilities were also very decisive in the process of reflective thinking. The selection of research subjects was based on students' critical thinking skills, including 1 student with high-level critical thinking skills, 1 student with medium-level critical thinking skills and 1 student with low-level critical thinking skills. In this study, the researcher acts as the main instrument because it is the researcher who plans, designs, implements, collects data, analyzes data, draws conclusions and compiles research reports. In addition, the supporting instruments in this study were the SPLDV material critical thinking ability test instrument, the PISA-based reflective thinking ability test instrument SPLDV material and the interview guide. The questions have been validated by two expert lecturers from the Mathematics Education Study Program, Universitas PGRI Semarang and one mathematics teacher from SMP Negeri 10 Semarang. And the results are in the "good" category.

The interview guide was prepared by the researcher as a tool for collecting data in the field. This interview guide is semi-structured with the aim that the subject can express his opinions and ideas regarding solving the problems that have been made. In this study the data obtained were in the form of notes on the results of students' work in solving problems in writing and the results of interviews with students after working on math problems. The research data were analyzed based on the data analysis proposed namely data reduction, data presentation, and drawing conclusions. Data reduction activities carried out are analyzing the results of students' answers in solving critical thinking test questions, analyzing the results of interviewing subjects on completing critical thinking tests, comparing the results of critical thinking tests and interviews with subjects with other sources, and compiling transcription results so that it makes it easier for researchers when analyzing data. At the data presentation stage, the data presented is in the form of critical thinking test results and data from interviews with the subject. The data is categorized based on initial mathematical abilities and presented in the form of narrative text. Classification of data is presented based on subject criteria. At the conclusion drawing stage, the researcher describes the thinking processes used by students in solving critical thinking problems by examining the thinking processes.

**Table 1. Reflective Thinking Ability Test Indicators and Questions.**

| Question | Indicator | Process Indicator |
|---|---|---|
| It is known that Doni has a vehicle rental business in Semarang that provides sedans and vans. The cost of renting a sedan car is Rp. 400,000/day and a van of Rp. 600,000/day. If one day, the total rental income from Doni's vehicle rental business is Rp. 17,000,000 by renting 36 vehicles, determine how many sedans and vans have been rented on that day? | Habitual Action | Think about and describe the problems that have been given, such as by writing down what is asked clearly and precisely and being able to describe the meaning or meaning in the problem. |
| a What's on your mind after reading the question?<br>b How do you understand the sketch of the condition? | Understanding | Understand and capture the stimulus given and be able to have a sketch of the problem given. |
| c How is the relation between the questions above and the | Reflection | Develop higher-order thinking skills to relate new knowledge to |

| Question | Indicator | Process Indicator |
|---|---|---|
| SPLDV problems that you have faced?<br><br>What are your steps in solving this problem? And why use the workaround? | | previously encountered problems. |
| | Critical Reflection | Decide or conclude and solve the settlement. |

**Table 2. Critical Thinking Indicators**

| Indicator | Process Indicator |
|---|---|
| Clarification | 1. Students can analyze the scope of the problem.<br>2. Students can identify the main assumptions of the problem.<br>3. Students can identify the relationship of parts of the problem.<br>4. Students can identify relevant terms. |
| Assessment | 1. Students can collect and assess relevant information.<br>2. Students can give or ask for reasons that the evidence submitted is valid or relevant.<br>3. Students can make value judgments on assessment criteria or arguments or context. |
| Strategies | 1. Students can propose specific steps to produce a solution,<br>2. Students can discuss appropriate steps,<br>3. Students can evaluate the appropriate steps, and<br>4. Students can predict the results of the proposed steps. |
| Inference | 1. Students can make appropriate conclusions from the results discussed,<br>2. Students arrive at well-thought-out conclusions,<br>3. Students can make generalizations from relevant results, and<br>4. Students can connect between various parts of the problem. |

## RESULTS AND DISCUSSION

The discussion in this study aims to provide an overview and results obtained to determine the analysis of students' reflective thinking skills in solving PISA-based mathematics problems SPLDV material in class VIII G students of SMP Negeri 10 Semarang in terms of students' critical thinking skills. Based on the results of the critical thinking ability test, it was obtained 8 students with high-level critical thinking skills, 9 students with medium-level critical thinking skills, and 15 students with low-level critical thinking skills were obtained as shown in table 3.

**Table 3. Value Range**

| Understanding Level | Value Range | The number of students |
|---|---|---|
| High | 74 – 100 | 8 |
| Moderate | 62 – 74 | 9 |
| Low | 0 – 62 | 15 |

Based on table 3, 3 students were selected as subjects, 1 student with high-level critical thinking skills, 1 student with medium-level critical thinking skills, and 1 student with low-level critical thinking skills. Based on data from the results of critical thinking skills tests, reflective thinking skills tests, and student interviews. The following is a discussion of students' reflective thinking skills:

**1. Reflective Thinking Ability with High Level Critical Thinking Ability**

From the results of the analysis that has been carried out, S1 subjects (QA) with high-level critical thinking skills, when working on a PISA-based reflective thinking test on SPLDV material, it is known that S1 subjects (QA) are able to solve problems well. The following results of the reflective thinking ability test are shown in Figure 1

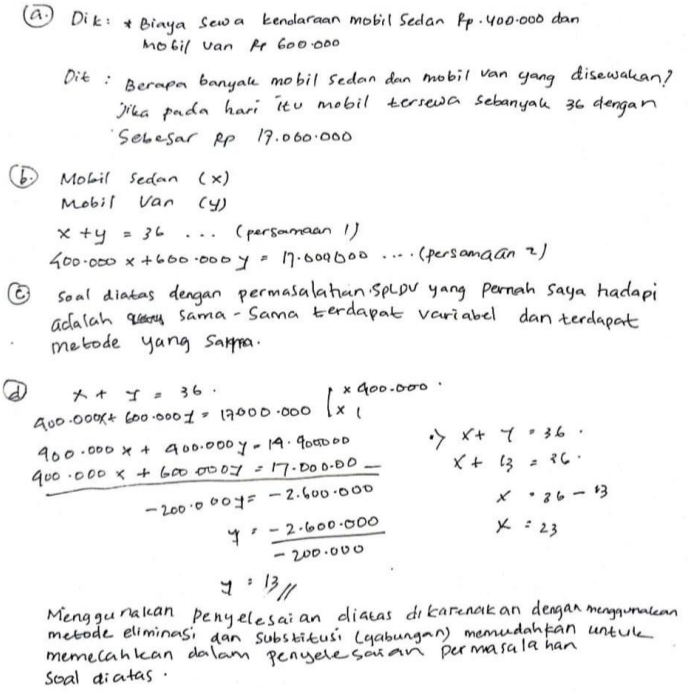



Figure 1. S1 answer sheet (QA)

Subjects in the high category were able to fulfill all indicators (Kember et al., 2000). This is proven from the results of the research data analysis which explains that subjects with high-level critical thinking abilities are able to fulfill 4 indicators of reflective thinking, namely Habitual Action, Understanding, Reflection and Critical Reflection. Subjects with high levels of critical thinking skills have the highest level of reflective thinking skills among subjects with medium and low levels of critical thinking skills. Judging from the subject, they are able to think about and describe the problems that have been given, such as by writing down what is being asked clearly and precisely and being able to describe the meaning or meaning in the problem. The subject is able to understand and capture the given stimulus and can have a sketch of the given problem. As well as the subject is able to develop high-level thinking skills to relate new knowledge to problems that have been encountered. And the subject is able to resolve and decide or conclude from the problem. In connection with the data analysis of the results of the reflective thinking test by S1 subjects on point A of the Habitual Action aspect, the researcher conducted interviews with the selected subjects. Following are the results of interviews with S1 subjects on aspects of Habitual Action listed in the following transcript.

P : "Have you ever worked on questions that are similar or of the same type as this question before?"

S1 : "It seems that you have encountered questions like this, it's just a little different from this".

P : "What's the difference?".

S1 : "This question is difficult because I forgot to remember the material. In fact, a lot is known but there are also many questions asked, and the answers are also long, so it takes a lot of understanding and time."

P : "Even though you think it's difficult, were you able to do it or not?"

S1 : "You can, sis, but I don't know if it's true or not, because I remember how to do it in the middle of doing it."

P : "Thank God I can still do it. Okay, let's start discussing the questions that I read earlier, starting from point A first. What's on your mind after knowing this question?".

S1 : "After learning about this problem, at first I was confused, but I understood and immediately wrote down what I knew from the problem, namely the cost of renting a sedan car Rp. 400,000 and a van Rp. 600,000".

P : "Excellent, then do you understand what is being asked in the problem?"

S1 : "Yes, I understand the question, so what is being asked from the question is how many sedans and vans are rented if on that day there are 36 cars rented for Rp. 17,000,000".

The results of interviews with S1 subjects for question point A show that the subject can explain the information that is known and the purpose asked in the problem. Thus, S1 can be stated to meet the indicators of reflective thinking ability in the Habitual Action aspect according to the results of the written test that has been carried out by the S1 subject. Furthermore, data analysis on the results of reflective thinking tests by S1 subjects on point B questions on the Understanding aspect, the researcher conducted interviews with the selected subjects. The following are the results of interviews with S1 subjects on the Understanding aspects listed in the following transcript.

P : "Okay, then we will proceed to question point B, shall we?"
S1 : "Okay sis".
P : "Next, try to tell what picture you have in mind when you already know the information in the problem?".
S1 : "So, from that question Doni, who has a vehicle rental business, namely sedans and vans, then it is known that the cost of renting a sedan is Rp. 400,000/day and a van is Rp. 600,000/day. And one day, the total rental income from Doni's rental business was IDR 17,000,000 by renting out 36 vehicles. Then suppose the sedan (x) and the van (y) will then become the equation x+y=36 as equation (1) and 400,000x+600,000y=17,000,000 is as equation (2) ".
P : "Very good, do you understand what you are explaining?"
S1 : "Understood sis".
P : "Okay, now try to write down the sketch that you explained earlier!"
S1 : "Like this sis?".
P : "Yes, that means you really understand the problem, don't you?"
S1 : "Yes sis".

The results of interviews with S1 subjects for point B questions show that S1 subjects can explain and sketch the intent of the information that is already known in the problem. Thus, S1 subjects can be declared to fulfill the indicators of reflective thinking ability in the Understanding aspect according to the results of the written test that has been carried out by S1 subjects. Then the data analysis results of the reflective thinking test by S1 subjects on point C questions on the Reflection aspect, the researcher conducted interviews with the selected subjects. Following are the results of interviews with S1 subjects on the Reflection aspect listed in the following transcript.

P : "Continue to question point C, OK?"
S1 : "Okay sis".
P : "Previously, what is the relationship between these questions and the questions you have faced?"
S1 : "The problem with the SPLDV problem that I have faced is that there are both variables and there are the same solving methods." P : "Excellent, then how does the above question relate to the SPLDV problems you have faced?"
S1 : "Related to the problems that I have faced and the problems in the questions above are the same, I have to look for a mathematical model first. Furthermore, the solution method uses the elimination method, the substitution method and the combined method.
P : "Wow, that's great, I still remember it."
S1 : "Hehe".

The results of the interview with the S1 subject for point C showed that the S1 subject was able to solve the problem by explaining the purpose of the relationship between the problems in the problem and the problems that had been faced correctly. Thus, S1 subjects can be declared to fulfill the indicators of reflective thinking ability in the Reflection aspect according to the results of tests that have been carried out by S1 subjects. Meanwhile, the data analysis of the results of the reflective thinking test by S1 subjects on point D questions on the Critical Reflection aspect, the researchers conducted interviews with the selected subjects. Following are the results of interviews with S1 subjects on the Critical Reflection aspect listed in the following transcript.

P : "Okay, are you ready to go to the last point, question D?".
S1 : "It's ready sis".
P : "Try how do you step in solving the problem?".
S1 : "If I solve the problem using the method of elimination and substitution".

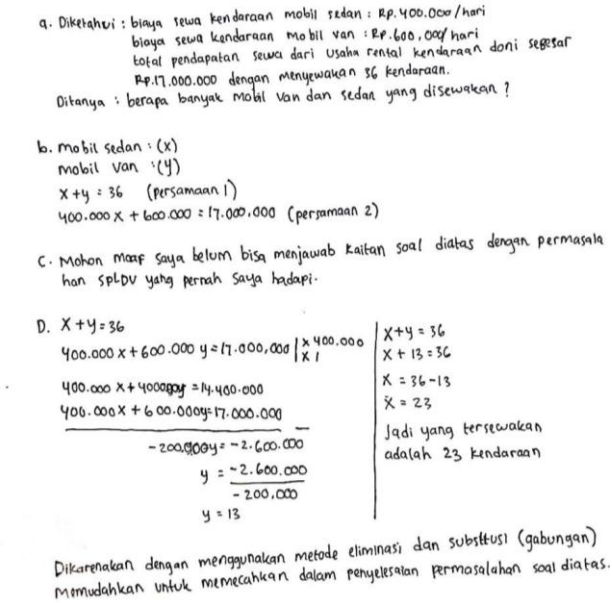
P : "Okay, can you explain the process steps at a glance?"
S1 : "First, I write down things that are known and asked in the questions to make it easier for further work. Then I suppose a sedan as a variable (x) and a van as a variable (y) and make it into the form of a mathematical model. After I got the mathematical model I immediately started calculating. Everything went smoothly until the next question about why you use this solution. I thought long enough until finally I was able to solve the problem until it was finished.
P : "Excellent explanation. Please try to write down what you explained earlier, I want to see it!"
S1 : "This is my answer sis".
P : "Okay, let's continue, shall we?"
S1 : "Okay sis".
P : "Then explain why you chose that to solve the problem?"
S1 : "Because I use the method of elimination and substitution (combined) to make it easier to solve in my calculations when solving the problem above."
P : "Okay then the reason. Then apart from the method you used in point D, are there other alternatives to solve the problem?"
S1 : "Yes sis, but I use the method of elimination and substitution".
P : "Then what is the reason for using this method?" S1: "I chose to use the elimination and substitution method because I still remember and it's easier for me to understand and it's more sequential sis."
P : "Okay, that's great, that's enough to answer the last point. And I'm done for the interview session. I personally apologize for causing trouble and I am also very grateful for wanting to help me succeed in my research and for taking the time to take part in this series of tests and interviews.
S1 : "Okay, you're welcome."

The results of the interview with the S1 subject for point D showed that the S1 subject was able to solve the problem by writing and explaining the intent of the problem in a way that was done to find the results of the sedan (x) that was rented and the van (y) that was rented in accordance with the answers from the question referred to in the problem. As well as S1 subjects can explain the selection of the method used in the settlement. Thus, S1 subjects can be declared to fulfill the indicators of reflective thinking skills in the Critical Reflection aspect according to the results of tests that have been carried out by S1 subjects.

**2. Reflective Thinking Ability with Moderate Critical Thinking Ability**

From the results of the analysis that has been carried out, the master's degree subject (AAER) with moderate critical thinking ability, when working on the PISA-based reflective thinking test on SPLDV material, it is known that the master's subject (AAER) is still able to solve problems quite well. The following results of the reflective thinking ability test are shown in Figure2

Figure 2. Master's Answer Sheet (AAER)



Subjects in the moderate category were able to meet the indicators of Habitual Action, Understanding, and Critical Reflection but lacking in Reflection (Kember et al., 2000). This is evidenced from the results of the research data analysis which explains that subjects with medium-level critical thinking abilities are able to fulfill 3 indicators of reflective thinking, namely Habitual Action, Understanding, and Critical Reflection, but the Reflection indicator (Reflection) the subject has not met these indicators. Subjects with moderate level of critical thinking ability fulfill 3 of 4 indicators of reflective thinking. Judging from the subject, they are able to think about and describe the problems that have been given, such as by writing down what is being asked clearly and precisely and being able to describe the meaning or meaning in the problem. The subject is able to understand and capture the given stimulus and can have a sketch of the given problem. However, the subject has not been able to develop high-order thinking skills to relate new knowledge to problems that have been encountered. And the subject is able to resolve and decide or conclude from the problem.

The subject is able to solve problems by thinking reflectively with 3 stages, namely Habitual Action, Understanding, and Critical Reflection while Reflection is not seen in the completion process and the subject still needs improvement in learning. There is no significant difference between students' reflective thinking skills with high and moderate critical thinking skills. Because seen from the results of the analysis, students' reflective thinking skills are limited to the Reflection aspect. In the sense that the subject has not been able to develop high-order thinking skills to relate new knowledge to problems that have been encountered. In connection with the data analysis of the results of the reflective thinking test by the S2 subject on point A of the Habitual Action aspect, the researcher conducted interviews with the selected subjects. Following are the results of interviews with S2 subjects on aspects of Habitual Action listed in the following transcript.

P : "Have you ever worked on questions that are similar or of the same type as this question before?"
S2 : "You have, sis." P : "Good, where have you ever found this kind of problem?"
S2 : "Material on the practice questions that the teacher gave, but a little different."
P : "Wow, that's great. Okay, let's continue, shall we? ".
S2 : "Confused, then I understood a little - a little until I understood from the problem explained to look for many sedans and vans that have been rented out if on that day there were 36 cars rented for IDR 17,000,000".
P : "Then, is there anything else you can think of other than what you got?"
S2 : "The cost of renting a sedan car is IDR 400,000 and a van is IDR 600,000".

P : "Good job. Do you understand what is being asked in the question?"
S2 : "Determining the number of sedans and vans that have been rented out".
P : "Okay, that means you understand the problem, right?"
S2 : "You understand sis".

The results of interviews with subject S2 for question point A show that the subject can explain the information that is known and the purpose asked in the problem. In the interview session the S2 subject can answer the researcher's questions by understanding the questions presented. Thus, the master's degree subject can be declared to fulfill the indicators of reflective thinking ability in the Habitual Action aspect according to the results of the written test that has been carried out by the master's subject. Furthermore, data analysis on the results of reflective thinking tests by S2 subjects on point B questions on the Understanding aspect, the researcher conducted interviews with the selected subjects. The following are the results of interviews with S2 subjects on the Understanding aspects listed in the following transcript.

P : "Then we will proceed to question point B, shall we?"
S2 : "Okay sis".
P : "Ok, next from what is already known and asked, may I ask for help to sketch it?".
S2 : "Written on paper sis?".
P : "Yes you can".
S2 : "So it's like this, Sis, it's a form of a mathematical model." (while showing the sketch that has been written on paper)
P : "Okay, can you explain in words the meaning of the sketch?"
S2 : "From the sketch explained first, I will first make an example for a sedan with a

variable (x) and for a van with a variable (y). then, make it in the form of a mathematical model, namely x+y=36 as equation (1) and 400,000x+600,000y=17,000,000 as equation (2)".

The results of interviews with subject S2 for question point B show that subject S2 can explain and sketch the meaning of the information that is already known in the problem. Thus, the master's degree subject can be declared to fulfill the indicators of reflective thinking ability in the understanding aspect according to the results of the written test that has been carried out by the master's subject. Then, analyzing data from the results of the reflective thinking test by the S2 subject on point C questions on the Reflection aspect, the researcher conducted interviews with the selected subjects. Following are the results of interviews with S2 subjects on the Reflection aspect listed in the following transcript.

P : "Okay, let's continue with point C, OK? Try what is the relationship between this question and the questions you have faced."
S2 : "This question is more difficult and confusing sis."
P : "Oiya, then how does the above question relate to the SPLDV problem that you have faced?"
S2 : "Hehe, I don't know sis".

The results of the interview with the S2 subject for point C showed that the S2 subject could not solve the problem and could not explain the meaning of the relationship between the problems in the problem and the problems that had been faced correctly. Thus, the Master's degree subject can be declared as not fulfilling the indicators of reflective thinking skills in the Reflection aspect according to the results of the tests carried out by the Master's subject. Analysis of the results of the reflective thinking test by S2 subjects on point D questions on the Critical Reflection aspect, the researcher conducted interviews with the selected subjects. Following are.

the results of interviews with S2 subjects on the Critical Reflection aspect listed in the following transcript.

P : "Yes, let's just move on to the last question on point D, shall we?"
S2 : "Okay sis".
P : "Okay. What are your steps in solving the problem?"
S2 : "If I solve the problem using the combined method, Sis."
P : "That's great, can you explain the process steps at a glance?"
S2 : "First, I write down what is known and ask about the problem to make it easier to work on. Next, I take for example a sedan (x) and a van (y) and then make them into a mathematica

model. Then I immediately started counting and got the sedans that were rented and the vans that were rented. Next, answer the question asking my opinion, why use this solution more or less like that, sis.

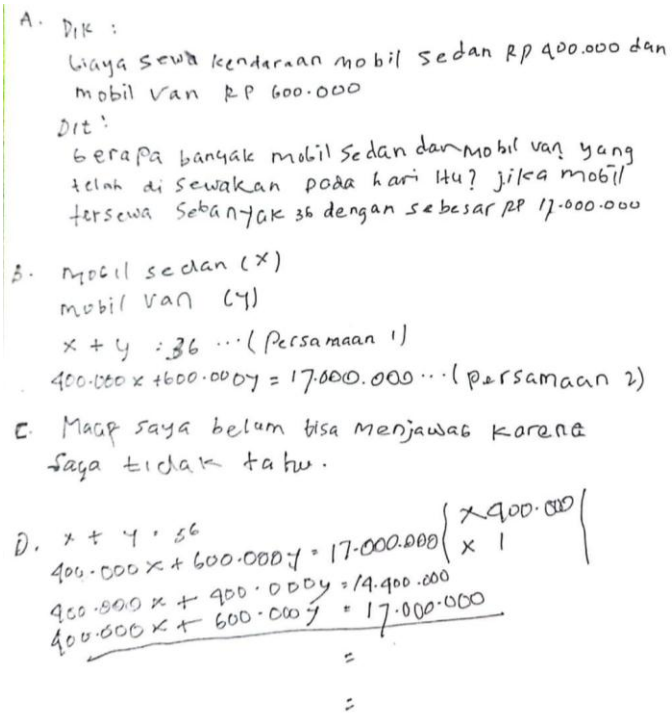
P : "Excellent explanation. Please try to write down what you explained earlier, brother wants to see!".
S2 : "This is my answer sis".
P : "Okay, let's continue, shall we?"
S2 : "Okay sis".
P : "Then explain why you chose that to solve the problem?"
S2 : "Because what I understand is using the method of elimination and substitution (combined) to solve the problem above".
P : "Okay then the reason. Then apart from the method you used in point D, are there other alternatives to solve the problem?"
S2 : "Maybe there is sis. But I don't know."
P : "Okay, is there anything you want to ask about the problem?".
S2 : "No sis".
P : "Okay, that's enough for the interview, thank you for your time."
S2 : "You're welcome sis".

The results of interviews with subject S2 for question point D show that subject S2 can solve the problem by writing and explaining the purpose of the problem in a way that is done to find the results of the sedan (x) that is rented and the van (y) that is rented in accordance with the answers from the question referred to in the problem. As well as the S2 subject can explain the selection of the method used in the settlement. Thus, the master's degree subject can be declared

to fulfill the indicators of reflective thinking ability in the Critical Reflection aspect according to the results of the tests carried out by the master's subject.

**3. Reflective Thinking Ability with Low Level Critical Thinking Ability**

From the results of the analysis that has been done, S3 subjects (IA) with low-level critical thinking skills, when working on a PISA-based reflective thinking test on SPLDV material, it is known that S2 subjects (IA) are still not able to solve problems well. The following results of the




reflective thinking ability test are shown in Figure 3.

Figure 3. S3 (IA) Answer Sheet

Subjects in the category of low-level critical thinking skills were only able to fulfill 2 of the 4 indicators of reflective thinking. This is evidenced by the results of the researcher's data analysis which explains that subjects with low-level critical thinking skills are able to fulfill 2 indicators of reflective thinking, namely Habitual Action, and Understanding. But for 2 other indicators such as Reflection and Critical Reflection the subject still needs improvement. Subjects with low critical thinking skills have the lowest reflective thinking abilities among subjects with high and medium critical thinking abilities. Judging from the subject, they are able to think about and describe the problems that have been given, such as by writing down what is being asked clearly and precisely and being able to describe the meaning or meaning in the problem. The subject is able to understand and capture the given stimulus and can have a sketch of the given problem. However, the subject has not been able to develop high-order thinking skills to relate new knowledge to problems that have been encountered. And the subject has not been able to resolve and decide or conclude from the problem.

There is no significant difference between students' reflective thinking skills with moderate and low levels of critical thinking skills. Because seen from the results of the analysis, students' reflective thinking abilities are limited to the Critical Reflection aspect and have similarities that do not meet the Reflection aspect. In the sense that the subject has not been able to develop high-level thinking skills to relate new knowledge to problems that have been encountered and the subject has not been able to solve and decide or conclude from the problem. However, the reflective thinking ability of students with high and low levels of critical thinking ability has a significant difference. Because it is limited to 2 indicators of reflective thinking. In connection with the data analysis of the results of the reflective thinking test by the S3 subject on point A of the Habitual Action aspect, the researcher conducted interviews with the selected subjects. Following are the results of interviews with S3 subjects on aspects of Habitual Action listed in the following transcript.

P : "Have you ever worked on a question that is similar or similar to this question before?"

S3 : "Never sis."
P : "Okay, continue, what information do you have in mind after knowing this question?".
S3 : "Confused, then I understand and I know in the question explained that the cost of renting a sedan car is Rp. 400,000 and a van is Rp. 600,000 and the total rental income from Doni's vehicle rental business is Rp. 17,000,000 by renting out 36 vehicles".
P : "Excellent, do you understand what is being asked from the question?"
S3 : "Already sis".
P : "Then what is asked from the question?".
S3 : "Determine the number of sedans and vans that have been rented out".

The results of the interview with the S3 subject for point A showed that the subject was able to explain the known information and the purpose asked in the problem. In the interview session, the doctoral subject can answer the researcher's questions by understanding the questions presented. Thus, the S3 subject can be declared to fulfill the indicators of reflective thinking ability in the aspect of Habitual Action in accordance with the results of the written test that has been carried out by the S3 subject. Meanwhile, in data analysis on the results of reflective thinking tests by S3 subjects on point B questions on the Understanding aspect, the researchers conducted interviews with the selected subjects. The following are the results of interviews with S3 subjects on the Understanding aspects listed in the following transcript.

P : "Okay good. Then proceed to question point B, okay?".
S3 : "Ready sis".
P : "Ok, next from what is already known and asked, may I ask for help to sketch it?".
S3 : "Written on paper sis?".
P : "Yes on paper".
S3 : "Like this sis". (while showing the sketch that has been written on paper)
P : "Okay, can you explain in words?"
S3 : "From the sketch explained first, let's assume first that for sedans use the variable (x) and for vans use the variable (y). Then, make it in the form of an equation that is x+y=36 is equation (1) and 400,000x+600,000y=17,000,000 is equation (2)"
P : "Exactly, that means you really understand the problem, right?
S3 : "God willing, if you understand the problem, but don't understand the next solution."

The results of the interview with the S3 subject for point B questions show that the S3 subject can explain and sketch the meaning of the information that is already known in the problem. Thus, S3 subjects can be declared to fulfill the indicators of reflective thinking ability in the Understanding aspect according to the results of the written test that has been carried out by the S3 subjects. Furthermore, in connection with the data analysis of the results of the reflective thinking test by the S3 subject on the question of point C on the Reflection aspect, the researcher conducted interviews with the selected subjects. Following are the results of interviews with S3 subjects on the Reflection aspect listed in the following transcript.

P : "Okay, let's go to point C, OK? Try what is the relationship between these questions and the problems you have faced.
S3 : "I don't know sis because I never knew about it."
P : "Oiya, then how does the above question relate to the SPLDV problem that you have faced?"
S3 : "Hehe, I don't know sis".

The results of the interview with the S3 subject for point C indicated that the S3 subject was unable to explain the purpose of the relationship between the problems in the questions and the problems that had been faced precisely. Thus, it can be stated that the S3 subject does not meet the indicators of reflective thinking ability in the Reflection aspect according to the results of tests that have been carried out by the S3 subject. Then, analyzing data from the results of the reflective thinking test by the S3 subject on point D questions on the Critical Reflection aspect, the researcher conducted interviews with the selected subjects. Following are the results of interviews with S3 subjects on the Critical Reflection aspect listed in the following transcript.

P : "Yes, let's just move on to the last question on point D, shall we?"
S3 : "Ready sis".
P : "Okay. What are your steps in solving the problem?"
S3 : "I plan to use the elimination method and maybe substitution, I'm not sure either."

P : "Okay, then can you explain the steps for the process at a glance?"
S3 : "Initially I wrote down what was known and asked in the questions to make my work easier. Next, suppose a sedan (x) and a van (y) then make them into the equation. Then I immediately started calculating, but after I wanted to calculate which would eliminate one x or y variable, I was confused, sis, that's why I didn't find an answer until it was finished."
P : "Good explanation. Please try to write down what you have explained, brother wants to see!".
S3 : "This is my answer sis".
P : "Okay, did your answer answer the question?"
S3 : "Not yet sis".
P : "Then, why did you think of using this method?"
S3 : "It's not a thought. It's just that when I'm going to work on a problem, I look for examples of questions that are the same type as the problem to understand. And I'm trying to understand it while it's hard for me to understand without someone to explain, so I can do it like that sis."
P : "Extraordinary enthusiasm. Next, explain why you chose to solve the problem?
S3 : "Yes, because I only found that way to solve the problem above."
P : "Okay then the reason. Then apart from the method you used in point D, are there other alternatives to solve the problem?"
S3 : "There is a possibility sis. But I don't know and haven't found any other alternatives because I haven't gotten the right answer either and don't understand."

The results of the interview with the S3 subject for point D showed that the S3 subject could not solve the problem and could not explain the meaning of the problem. As well as the S3 subject also cannot explain the selection of the method used in completing. Thus, the S3 subject can be declared as not fulfilling the indicators of reflective thinking skills in the Critical Reflection aspect in accordance with the results of tests that have been carried out by the S3 subject

## CONCLUSION

Based on the results of research and discussion, students in class VIII G SMP Negeri 10 Semarang students with high-level critical thinking skills are able to fulfill all indicators of reflective thinking, namely Habitual Action, Understanding, Reflection and Critical Reflection. Students with moderate critical thinking skills are able to fulfill 3 of the 4 indicators, namely Habitual Action, Understanding, Critical Reflection and have not fulfilled the Reflection reflective thinking ability indicator. And students with low critical thinking skills are able to fulfill 2 of the 4 indicators, namely Habitual Action and Understanding. And do not meet the indicators of the ability to think reflective aspects of Reflection and Critical Reflection.

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