THE STUDENTS' REFLECTIVE THINKING PROCESSES ANALYSIS IN SOLVING PISA MATH PROBLEMS ON QUANTITY CONTENT

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Abstrak: Keterampilan yang wajib dimiliki dan dilatih siswa salah satunya adalah kemampuan mengevaluasi hasil dan berpikir reflektif berdasarkan pengalaman belajarnya. Oleh karenanya berpikir reflektif sangat penting, supaya siswa dapat mengetahui apa yang dibutuhkan dalam proses pembelajarannya. Adapun tujuan dari penelitian ini adalah untuk menganalisis proses berpikir reflektif siswa dalam menyelesaikan soal matematika PISA pada konten quantity. Terdapat tiga tahap dalam berpikir reflektif yaitu: *1)Reacting 2)Elaborating* dan *3)Contemplating*. Pendekatan dalam penelitian ini adalah pendekatan kualitatif dengan desain studi kasus. Penelitian ini dilakukan di SMP N 1 Tanon, Kab.Sragen, dengan subjek penelitian siswa kelas VII-A berjumlah 6 orang. Teknik pengumpulan data dilakukan dengan *Think Aloud* dan wawancara. Dalam penelitian ini, think aloud dipilih karena membantu siswa untuk mengamati, mengidentifikasi dan mengukur isi pemikiran siswa dalam proses pemecahan masalah. Soal PISA yang digunakan meliputi tiga tipe proses matematisasi yaitu: *1) formulating 2) employing* dan *3) interpreting*. Berdasarkan hasil analisis diperoleh bahwa: 1) Tipe soal Formulating, terdapat 5 subjek yang mampu memenuhi semua tahapan berpikir reflektif; 2) Tipe soal Employing, terdapat 2 subjek yang mampu memenuhi semua tahapan berpikir reflektif; 3) Tipe soal Interpreting, terdapat 3 subjek yang mampu memenuhi semua tahapan berpikir reflektif.
Kata kunci : *Berpikir reflektif, PISA, Quantity*

Abstract: The skills that students should have and develop are the ability to evaluate results and reflective thinking based on their learning experiences. The reflective thinking is crucial for students to recognize what is expected during the learning process. Therefore, this research aims to analyze students' reflective thinking processes in solving PISA math problems on quantity content and the reflective thinking involves three stages, namely: 1) Reacting 2) Elaborating, and 3) Contemplating. This study employed a qualitative approach with a case study design. This research was conducted at SMP N 1 Tanon, Sragen, with the research subjects, six students from VII-A Class. Think Aloud and interviews were applied as data collection techniques. Think-aloud was selected because it aids students in observing, identifying, and measuring the content of students' thoughts during the problem-solving process. The PISA questions used included three types of mathematical processes, namely: 1) formulating 2) employing, and 3) interpreting. The results of the analysis obtained: 1) Formulating question types, 5 subjects can meet all the stages of reflective thinking; 2) Employing question type, 2 subjects can meet all the stages of reflective thinking; 3) Type of Interpreting questions, 3 subjects can reach all the stages of reflective thinking.
Keywords: *Reflective Thinking, PISA, Quantity*

INTRODUCTION

The advantages and practical applications of mathematics in daily life illustrate the importance of mathematics. According to Kusumaningrum (2012) mathematics trains students to think critically and to investigate in order to draw conclusions. For example,through inquiry activities, the students are trying to show similarities and differences, consistency, and inconsistency (Saputra and Zulmaulida 2021). Therefore, thinking sensitivity is a crucial ability for learning mathematics, especially for higher-order thinking abilities such as critical thinking ability, creativity, logic, analysis, and reflective thinking (Nasrah, Kasmarani, and Rahayu 2021). This is in line with the Regulation of the Minister of Education and Culture Number 21 in 2016 which regulates that the skills that students should have and develop are the ability to evaluate results and reflective thinking based on their learning experiences. Reflective thinking involves well-thought-out communication of solutions, identifying alternative solutions to problem-solving, and creating extensions for further study (Program and Pendidikan 2022). Reflective thinking includes the ability to examine and monitor the solution process in solving problems (Sabandar & Jozua,2013). This demonstrates that the ability to think reflectively is essential for students to be able to think reflectively, and be able to recognize what is expected in the learning process (Apriliana, Handayani, and Awalludin 2019)

The reality found in schools indicates that the learning process still puts less emphasis on students to think more critically and creatively in the learning process(Widyaningrum, Usodo, and Pratiwi 2021). One of the pieces of evidence can be seen in mathematics learning at SMP N 1 Tanon, Sragen Regency. Based on observations made by researchers, the students were not given enough time to reflect on the learning process in order to recognize and relate to a concept or theory that has already been learned since the material is supplied too quickly. Basically, students just concentrate on memorizing formulas and following the steps of solving the problems in the book (Meryansumayeka et al. 2021). Additionally, part of the assessment process is merely assessing how the work steps and final results are written down without considering the rationale of how students solve problems with those steps.

Furthermore, a person who thinks reflectively will be able to identify problems, choose alternatives or solution strategies to formulate problems, analyze problems and evaluate solutions, as well as draw conclusions and choose the best solution to solve the given problem, Nuriadin (2015). Therefore, an evaluation is needed, especially related to solving mathematical problems so that students are more accustomed to practicing questions related to problem-solving. This evaluation is necessary to do both nationally and internationally. One of the international tests taken by Indonesia is the Program for International Student Assessment (PISA). The objectives of PISA is to monitor and find out the level

of student ability between countries in Southeast Asian countries. Indonesia itself has participated in PISA starting in 2000 and the most recent was in 2018. Based on the results of international reports in six periods, Indonesian students' test scores are always lower than the global average (OECD,2019). The following figure showed the results of the PISA assessment in Indonesia compared to other participating countries over periods.
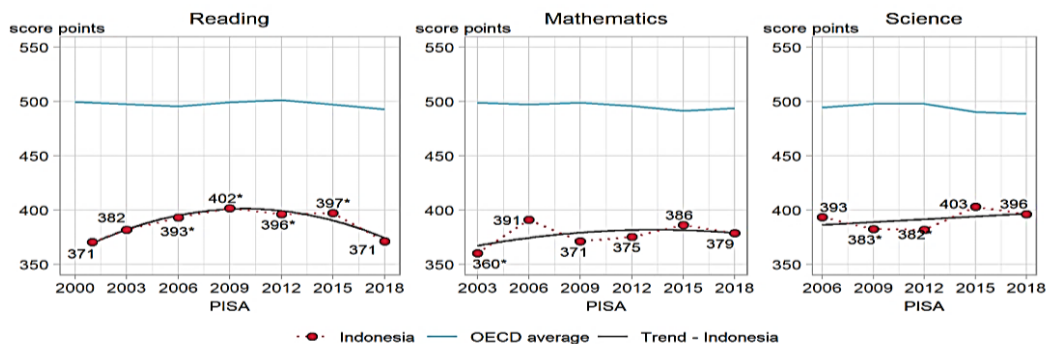

Figure 1. Indonesia's PISA level in 2000-2018

Based on the report of the Organization for Economic Cooperation and Development (OECD:2019), the results of international reporting data over the six time periods show that Indonesian students' test scores are consistently below the International average. The 2012 PISA results report shows that Indonesian students' scores are low on change and relationship content and quantity. Indonesian students only scored 368 in formulating problems, 369 in applying concepts, and 379 in the process of interpreting solution results. These results indicate that Indonesian students perform much worse in terms of problem formulation.

According to the OECD (2019), PISA was established based on four contents, which include the follows: 1) Shape and space, also known as form and space, refers to a variety of phenomena that are present in both our visual and physical worlds and are based on elements of mathematical areas such as spatial visualization, measurement, and algebra. 2) Change and Relationship, mathematically, means modeling changes and relationships with corresponding functions and equations, creating, interpreting, and translating between symbolic and graphic representations of relationships. 3) Quantity, applying knowledge of numbers and number operations in various settings and 4) Uncertainty, which is the understanding of numerical data and algebraic concepts like graphs and symbolic representations.To complete all four contents, the types of completion processes include; 1) the ability to recognize and formulate mathematical situations (formulate); 2) using concepts, facts, and mathematical steps to perform analysis (employ); 3) interpreting, applying and evaluate and relate to a principle or theory (interpret). Therefore, students should use higher-level thinking strategies when addressing mathematics

problems, one of which is reflective thinking.

Rahmy (2012:33) states that reflective thinking is a thinking activity that can encourage students to continually attempt to tie the knowledge they have acquired in solving new problems related to their old knowledge. Reflective thinking consists of three stages namely: 1) Reacting (reflection for action): responding to a personal understanding of an event, situation, or mathematical problem by focusing on the original state of the situation 2) Elaborating (reflection to evaluate): analyzing and clarifying personal experiences, as well as meanings and information, to evaluate what is believed by comparing responses with other experiences, such as referring to a principle or theory, and 3) Contemplating (reflection for inquiry): prioritizing deep personal understanding. In this case, the focus is on describing, communicating, reviewing, considering, and reconstructing the situation or problem (Rosmaya and Noer 2020).

Based on the importance of reflective thinking in mathematics learning and the fact that not all mathematics lessons emphasize reflective thinking processes are the main reasons for conducting this research. This research uses PISA questions and focuses on quantity content. The issue of Indonesia's consistently low PISA results and education that still primarily prioritizes student learning outcomes has inspired researchers to use PISA mathematics problems. This study is distinct from previous research since it focused on students' thought processes as they employed PISA math problems to solve problems rather than merely focusing on their ability for solving mathematical problems. Student's reflective thinking is seen from three stages which include (Reacting, Elaborating, and Contemplating). This study is expected to broaden knowledge of the reflective thinking process used by junior high school students to solve PISA mathematics problems and serve as a platform for instructors to reflect on how to improve the quality of mathematics learning.

RESEARCH METHOD

This research employed a qualitative approach with a case study design; because this study produced data in the form of written words as data on solving PISA questions and oral data (interviews) to describe the ability to think reflectively on the basis of data obtained from the field. The subject of this study was the VII grade students of SMP Negeri 1 Tanon who had studied number material. This study refers to the results of students' test scores on number material by categorizing students into two groups. The first group is students who have passed with a standard KKM (Minimum Completeness Criteria) score and the second group is students who score below the KKM score or can be said to have not passed the minimum score.

The snowball sampling method was employed to select respondents for this research. According to Budiyono (2017: 152), snowball sampling is a sample method in which the number of sources for

research data increases over time. When there is already duplication of information or when it may be considered that the information acquired has reached capacity, sampling is said to be complete. The research data obtained contains data on the reflective thinking process as well as information on its difficulties. The data obtained from interview results based on PISA questions in the quantity of mathematics content that has been done by students. The supporting instrument used by the researcher is a mathematical PISA problem.

PISA question is a type of question that relates to personal contexts, the presence of stimuli, and images that are presented to attract students' curiosity. This study used data collection techniques with "Think aloud" and interviews. Think Aloud is a research method in which the subject expresses his thoughts while working on the questions so that the data collected is simple and without delay (Abadi, at. al., 2012). The think-aloud approach was chosen because this method can observe, identify and measure what is on the student's mind when solving PISA questions. Therefore, it is expected that the currently available data would be adequate and significant to meet the goals of this study. The interview format employed is an open interview where the student is free to express their opinions. Depending on the respondent's conditions and situation, an in-depth interview is undertaken.

The validity of the data used in this study was then tested using triangulation methods. In this triangulation, researchers employ a variety of data collection techniques, including valuable observations and interviews that allow for the valid observation of the data. Additionally, researchers consult a variety of sources or informants to increase the credibility of the data. It can make the data or information acquired more accurate to have a variety of points of view. The data analysis technique used in this research employs a number of techniques, including: 1) Data reduction, 2) Data presentation, data presented on each problem based on the results of the analysis of reflective thinking processes in solving PISA mathematical problems on quantity content, and 3) Drawing of imports, reasoning or testing, drawing conclusions after the results of the analysis are known to be available data.

RESULTS AND DISCUSSION

The analysis of reflective thinking processes on six research subjects was carried out based on the results of students' mathematical tasks in solving PISA math problem problems in quantity content and was explored by interviews. The following result is described based on the predetermined question types.

- ***Analysis of Students' Reflective Thinking Process with Formulate Process in Solving Math Problems PISA Content Quantity.***

PENGUIN

Animal photographer Jean Baptiste went on an annual expedition and took some pictures of baby penguins. Jean was very interested in developing groups of penguins of different sizes. Jean wondered how the size of the penguin group changed from year to year. To determine the size, Jean made several assumptions:

- At the beginning of the year, the penguin group consisted of 10,000 penguins (5,000 pairs).
- Each pair of penguins lays eggs and has 1 baby penguin every year.
- By the end of the year 20% of all penguins (adults and children) die.

How many penguins (adults and children) are left in the group at the end of each year?

Figure 2. The original PISA problem in 2012 with formulate process

– **Reacting Stages**

At this stage, all subjects can understand the problem well and can formulate it into a definite statement.

Q : Try to explain the meaning of this matter?
S3: It is explained that at the beginning of the year there were 10,000 penguins (5000 pairs), each pair of penguins had 1 child born each year, and by the end of the year 20% of all penguins died. So it was asked how many remaining penguins
are still alive at the end of each year.
Q: Is what is known to be enough to answer the question or is it still lacking?
S3: That's enough,
Q: How are you sure you know enough to answer this question?
S3: hmm.. because, the important points for looking for the rest of the penguins that live are already in the question, so I can

(a)

Q : Try to explain what do you think is the problem in question No. 1?
S2: There are 5000 pairs of penguins, 1 pair = 2 penguins that produce 1 child annually. By the end of the year 20% of all penguins died, then there were 80% still alive. So it was asked how many penguins were still alive at the end of the year.
Q: 80% from where?
S2:100% (total penguins) – 20% (dead)
Q: Is the known information enough to answer the question?
S2:Already,
Q: How are you sure that what is known is enough to answer the question?
S2: Because it can be searched for the number of dead penguins based on anything that is already known

(b)

Figure 3. Interviews transcripts with students at the reacting stage (a) meaning of the questions, (b) using language of the questions

Figure 3a, is interviews transcripts with students using meaning language of the questions, while Figure 3b is the interviews transcripts with students using language of the questions. Based on the interviews conducted by researchers on the six subjects at the reacting stage, it is clear that all subjects can understand the meaning of the question. Subjects 1,3,4,5 and 6 explain the question using the

language of the question itself, explaining the meaning of the question by reading the important points of the question, while Subject 2 seems different where subject 2 formulates the problem in the question using his own language without compromising the meaning conveyed in the question. Therefore, it may be concluded that all research subjects can properly answer the question at the reacting stage.

− **Stages of Elaborating**

At this stage, all subjects try to analyze every piece of information in the problem and relate the problem in the problem to a principle or theory.
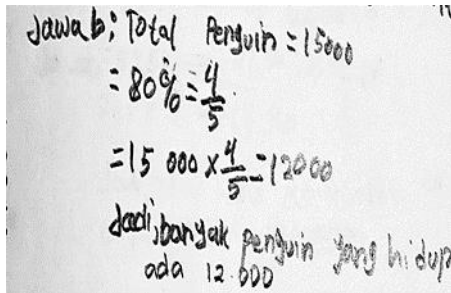
Q : When you read the question, Does it have anything to do with the previous material that has been studied? S1: There is a Q : What are the materials? S1: Material Multiplication, Addition and subtraction on fractional numbers. Q : How many ways do you think there are that can be used to solve the problem? S1:It seems to be only 2 ways, Q: What are the ways? S1: Using multiplication methods on fractions and using comparison methods. Q: Is there no other way? S1: It seems that there are still people, who use the concept of buying and selling on social arithmetic material if I remember correctly, but the work is long, so it's a bit complicated.

(a)

Q : When you read the questions, does it have anything to do with the previous material that has been studied? S5: There's a Q : Remember what material? S5: Material Multiplication, addition and subtraction on fractional numbers Q : Is it just matter? S5: As far as I recall it was just Q : how many ways do you think there are ways that can be used to solve the problem? S5: I think it can be solved in 2 ways but still use the concept of multiplication on the fractional number Q: Is there no other way but fractional multiplication? S5: if I remember correctly, use the concept of percent, but don't remember what material it is

(b)

Figure 4. Interviews transcripts with students at the elaborating stage (a) relates to social arithmetic material, (b) relates to the percentage material and the use of the concept of arithmetic operations

Figure 4a is a transcript of interviews with students that relates to social arithmetic material. while Figure 4b is a transcript of interviews with students that relates it to the percentage material and the use of the concept of arithmetic operations. Based on interviews with the six subjects that the researchers performed during the elaborating stage, there were 4 subjects, namely subjects 3,4,5 and 6 who stated that the problem in the problem could be solved by multiplying to calculate the total penguins, the percentage to calculate the number of dead penguins, and reducing to counting the number of penguins that were still alive. While subjects 1 and 2 have thoughts in addition to using the concept of multiplication calculation operations, addition and subtraction can also be solved using the concept of comparison. At this stage, it may be concluded that question No. 1 at the elaborating stage can be completed by all research subjects because they can all analyze every piece of information in the question and relate it to a principle or theory that they have learned
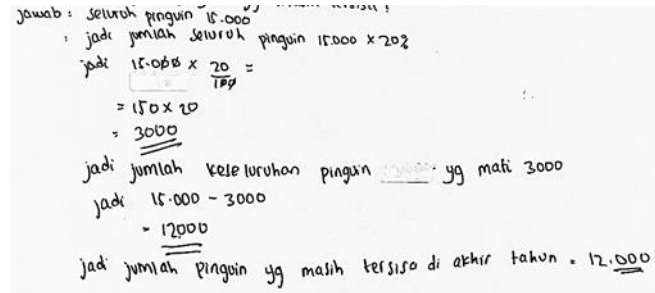
– **Stages of contemplating**

At this stage the subject begins to formulate the procedure for solving the problem, explain and be able to correct if something goes wrong, and draw in-depth conclusions about the existing problem.

(a)   (b)

Figure 5. Result of solving with students at the contemplating stage by means (a) comparison, and (b) multiplication, addition, and subtraction

Figure 5a is a result of solving subject 2 by means of comparison and Figure 5b is a result of solving subject 4 by means of multiplication, addition, and subtraction. At this stage, there are only a few subjects who use some of the proposed solutions to solve the problem. Subjects 1 and 2, who propose two types of solving that is by means of comparison and using the operations of calculating multiplication, addition, and subtraction. The two subjects simply choose and use the method of comparison to do the problem. Subjects 3,4,5 and 6 chose to solve the problem using the concept of multiplication and subtraction calculation operations.

Q : Can the problem be solved in all the ways you have found before?
S2: Yes,
P : Why did you finally choose to solve the problem by comparison?
S2: Because I think this method is easier and shorter to work on than others.
Q : How are you sure that the final answer you got is correct?
S2:I'm sure it's correct, because I've checked repeatedly, and found no errors in the process.

Figure 6. Interviews transcripts with students at the contemplating stage

Based on the analysis of the results of the work and interviews conducted by the researcher on all research subjects, subjects 1 and 2 solved the problem using the concept of comparison, arguing that the completion was easier and shorter. Subjects 3,4 and 5 solved the problem using the concepts of multiplication, addition, and subtraction calculation operations. These five subjects also re-examined the results of their work. Meanwhile, subject 6 neglects to recheck his work's outcomes when there are errors in the problem-solving process, resulting in incorrect results when answering the questions. Therefore, it may be concluded that for question number 1, subjects 1, 2, 3, 4, and 5 can successfully complete the

considering stage but subjects 6 does not meet the contemplating stage.

- ***Analysis of Students' Reflective Thinking Processes with Employ Processes in Solving PISA Math Problems on Quantity Content.***

DVD RENTAL

Jenn works in a DVD rental and computer game store. In the store, customers have to pay a fee of 10 zed. DVD rentals for customers are usually lower than non-customers, as shown in the following table:

Non-subscriber fee for one DVD rental	Subscriber fee for one DVD rental
3.20 zed	2.50 zed

Troy was a customer of a DVD rental store last year. Last year, Troy spent 52.50 zeds on DVD rental and subscriber fees. How many zeds should Troy spend if he doesn't want to be a subscriber but rents out DVDs for the same amount as last year?

Figure 7. The original PISA problem in 2012 with employ process

- **Reacting Stages**

At this stage, all subjects can understand the problem well and can formulate it into a definite statement.

Q : What do you understand about the question?
S2: It is known that in a DVD rental store there is a charge for customers and non-customers. The customer's cost is 2.50 zed while for non-customer costs it is higher at 3.20 zed. For newly joined customers will have to pay 10 zed first.
In
    the last year, for the first time Troy rented a number of DVDs on the store and paid 52.50 zed. The problem is, how much does Troy have to pay if he wants to rent the same amount of DVDs this year?
Q : Is the information known in the question enough to answer the problem in the question?
S2: Already
P : How are you sure that the information known is enough to answer the question?
S2: Because with the points I've been able to solve this problem.

Figure 8. Interviews transcripts with students who uses language in the question

In accordance with the analysis of interviews conducted by researchers on the six subjects, each subject is able to formulate and identify problems with the questions. By highlighting many crucial areas in the question in order, subjects 4,5,6 provide an explanation of the material in the question. Subjects 1, 2, and 3 can explain the question's meaning and say it in their own words without reducing its key aspects, as can be seen in the interview's previous transcript. Therefore, it may be concluded that all subjects can reach the reacting stage for question number two.

- **Stages of Elaborating**

Q : When you read the questions, does it have anything to do with the previous material that has been studied?
S2:There is a
Q: Remember what material?
S2:SPLDV miss
Q :Why with that material?
S2: By using foraging, Troy last year has become a customer, so this year if Troy wants to borrow again, it means using a price that is not a customer, then you must first find out how many DVDs were borrowed last year (x). if the amount of x is already known then it is only multiplied by the rental price of the non-customer.

(a)

Q : when you read the question remember what material?
S3: Remember the material of division, addition,subtraction and multiplication of
Q : when is multiplication, division and subtraction used, try to explain?
S3: the deduction is used to find the costs that troy paid last year, troy issued 52.50 and that's at the same time the customer's cost because still the first time renting means $52.50 - 10 = 42.50$. The division is used to find the number of DVDs borrowed last year $42.50/2.50 = 17$. Meanwhile, multiplication is used to find the amount of costs incurred by troy when it becomes a non-customer, which is $3.20 \times 17 = 54.40$.

(b)

Q : When you read the questions, you remember what material?
S6 : Reduction of
Q : In addition to that material, remember what other material?
S6 : hmm.. I don't know miss, I forgot
Q : What was the deduction used for?
S6 : to reduce last year's costs by customer costs $(52.50 - 10) = 42.50$
Q : 42.50 what is the cost?
S6 : The fee that troy paid last year if not included with the customer's fee for the first time renting the DVD.
Q : okeh, then what to do again?
S6 : I don't know anymore

(c)

Q : When you read the question remember what material?
S4: Social arithmetic is
Q : What does it have to do with that material? Try explaining
S4: Because there is some kind of transaction, then first look for the fee paid by the troy minus the customer's fee (first time renting). Now after that, you find the number of DVDs rented and then multiplied by the cost of not the subscriber.
Q: Besides, is there no other way to solve the problem?
S4:It could also be with the concept of calculating multiplication, division and such operations.
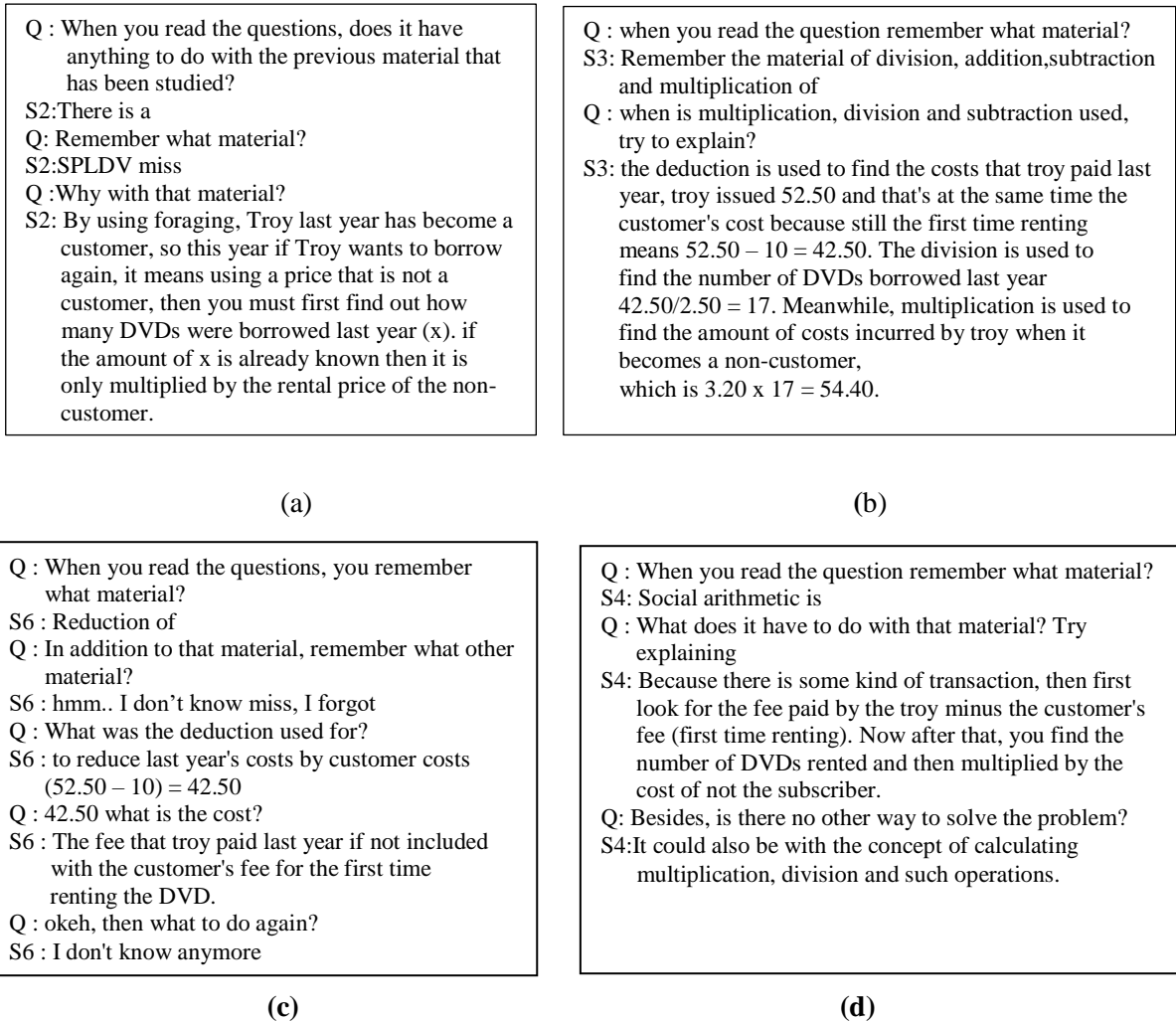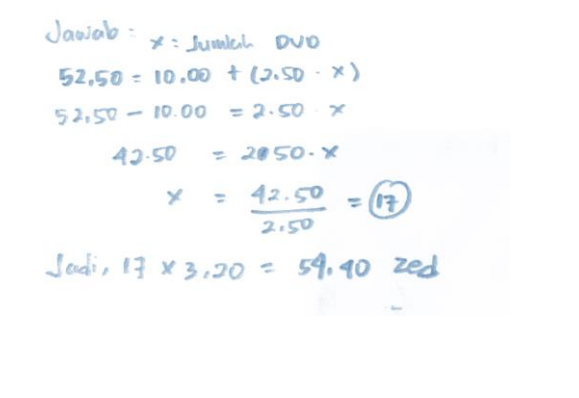
(d)

Figure 9. Interviews transcripts with students at the elaborating stage
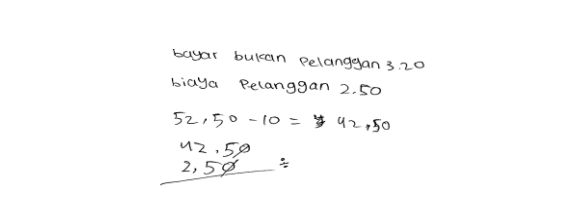
According to the analysis of interviews conducted by the researchers with the six study subjects, it can be concluded that each subject has a variety of opinions regarding how to relate the questions to previously studied content. Subject 3 connects the notion of multiplication, division, and subtraction with the material in exactly the same way as Subject 2 connects the problem in the problem to the material of the linear equation of one variable. The interview transcript indicates how well the subject is able to explain and relate it to the problem at hand. Subject 1,4,5 employs the ideas of multiplication and division as well as connecting it to the social arithmetic material they studied in elementary school. However, subject 6 is the only one who is still confused and is unable to connect the problem to a principle or theory that can be applied to solve it, claiming that he has forgotten the necessary information. In light of this, it can be said that, for question No. 2, one subject, namely Subject 6, has not been able to analyze and relate the material in the problem to a theory or principle, whereas the other five subjects are able to accomplish this task.

- **Stages of contemplating**

At this stage, the subject starts to formulate a procedure for resolving the issue, explain what happened and how to solve it, and draw detailed conclusions about the existing problem.

Jawab : x = Jumlah DVD $52,50 = 10.00 + (2.50 \cdot x)$ $52,50 - 10.00 = 2.50 \cdot x$ $42.50 = 2050 \cdot x$ $x = \dfrac{42.50}{2.50} = \boxed{17}$ Jadi, $17 \times 3,20 = 59,40$ zed	Q : Why did you choose to solve the problem in this way? S2: Because I understand more about using this method, it's not long-winded. Q : why did the shape of the equation become such? S2: yes, because 52.50 is the amount paid by Troy as a whole last year including customer fees, well when he wants to borrow this year again it means that there are no more customer fees, that's why it is deducted 10 zed, while x that I suppose with the number of DVDs borrowed by troy. Q : Are you analyzing the application of the solution? Like the calculation check? S2: double-check it out

(a)

bayar bukan Pelanggan 3.20 biaya Pelanggan 2.50 $52,50 - 10 = \$ 42,50$ $\dfrac{42,50}{2,50} \div$	Q : What way do you choose to solve the problem? S4: Social arithmetic and the concept of division of Q : Why is it not resolved? S4:I forgot how to divide the decimal numbers, so Istopped

(b)

Figure 10. Result of solving with students at the contemplating stage

Figure 10a is a results of the work and Interview transcript subject who completed by means of SPLDV and Figure 10b is a results of the work and Interview transcript subject who completed by means of Division. In light of the analysis of the work's results and the results of the interviews with subject 2, it is clear that the subject is able to solve problems by starting with the best way to proceed, correctly reconstructing the course of action, and conducting a pulling evaluation of the results of his work.

Based on the findings of the analysis performed by researchers on the six subjects, it can be said that only two of them, subjects 2 and 3, are able to reach this stage. This is because some of the subjects committed divinity while reconstructing the settlement procedure, and no effort has been made to re-examine the findings of their work. The remaining four subjects have not been able to reach this stage.

- *Analysis of Students' Reflective Thinking Processes with Interpretive Processes in Solving PISA Problems on Quantity Content*

MP3 PLAYER

Music City MP3 Specialists

MP3 player	Headphones	Speakers
155 zeds	86 zeds	79 zeds

Music City sells several mp3 special products at prices as shown above. When you buy two or more discounted items, Music City will give you a 20% discount from the normal selling price of each item. Jason has 200 zed money for shopping at the Music City store.

Item	Can jason buy an item with 200 zed?
MP3 Player & headphones.	Yes or No
MP3 player & speaker.	Yes or No
MP3 Player, headphones & speaker.	Yes or No

Figure 11. The original PISA problem in 2012 with interpret process

− **Reacting Stages**

At this stage, all subjects can understand the problem well and can formulate it into a definite statement.

Q   :What do you understand about this? try to explain!
S4   : City music stores sell several MP3 products, priced at 155 zed MP3 Player, 86 zed Headphones, and 79 zed Speakers.   All of these embers again have a discount of 20% per item. Jason only has 200 zed money, which is the problem is that Jason can buy any item, by identifying the items according to those in the table.

Figure 12. Interview transcript with subjects that describe based on the wording of the question.

Based on the results of the analysis of the results of the work and the results of interviews that have been conducted by researchers on the six research subjects, all subjects have been able to identify the information in the questions. The students also are able to clearly explain and be able to state it in a

definite statement. Therefore, it may be stated that for question number 3, all subjects are able to understand the problem clearly, thus the reacting stage is met.

− **Stages of Elaborating**

At this stage, all subjects try to analyze every piece of information in the problem and relate the problem in the problem to a principle or theory.

Q : When you read the question, does it have anything to
    do with the previous material that has been studied?
S3: There's something to do with the concept of
    discounts, which is social arithmetic material
Q : What does that have to do with that material try to
    explain!
S3: yes, there is a 20% discount from each item. So later,
    we will find the amount of the 20% discount price
    first by multiplying to each item then deducting
    from the initial price of the goods.
Q : When did you get this material?
S3:When I was in grade VI of elementary school, I liked
    the material, so I remembered it all the time.
Q: Is there no other way to solve this problem?
S3: There's still something, if you don't want to bother
    using the comparison method, that's a 20% discount,
    which means that the price we pay is 80% again, just
    multiply it to each item.
Q: Why don't you just use this method, it's shorter.
S3:The multiplication number is too big, I'm afraid of
    Miscalculating

(a)

Q : What material do you remember when you did
    This problem?
S1: that's why I forgot the material, but that uses
    associative properties, continues the concept of
    percent, the concept of multiplication and
    subtraction.
Q: Other than that there are no more?
S1: I'm just that.

(b)

Q : Remember what material when doing the
    questions?
S2: SPLDV miss,
Q : Why with SPLDV, try to explain
S2: Because every item that is discounted can be
    provided with a variable. For example: x=MP3,
    y=headphones and z=speakers. So x,y,z it shows
    the price of the item after it is discounted.
Q: Why did you choose this method?
S2:Just be more focused in the process,
Q: Is there no other way?
S2: Most use the concept of discounts again.

(c)

Figure 13. Interviews transcripts with students at the elaborating stage

Following the findings of the analysis of the interviews with the six study subjects, it can be determined that subjects 3, 4, and 5 tried to change the known information in the problem and relate it to social arithmetic material by using concepts in their work. The relationship between the material and the problem in the problem is effectively explained by the subject. Subject 1 applies associative qualities and the idea of multiplication to solve a problem which appears to be related to the current difficulty. In addition, subject 2 chose to relate to the SPLDV material, where the reasoning was carried out so that the settlement process was more directed and systematic. In addition to the five subjects who are able to relate the problems in the problem to a principle or theory, there are 6 subjects who have difficulty in relating the problem with the material that has been previously obtained. Therefore, it may be concluded that one subject has not been able to reach the elaborating stage for question number 3.

− **Stages of Contemplating**

At this stage the subject begins to determine the procedure for solving the problem, explain and be able to correct if something goes wrong, and make in-depth conclusions about the existing problem.

Misalkan : MP3 player = x = $\frac{4}{5}$ × 155 = 124

Headpones = y = 4/5 × 86 = 68,8

Speaker = z = 4/5 × 79 = 63,2

Jadi, ① x + y = 192,8 zed

② x + z = 187,2 zed

③ x + y + z = 256 zed

Q : Do you think this is an easier way to do this?
S2: yes, because I think it's more directed
Q : are you analyzing the application of the solution? like checking back on the completion procedure?
S2: yes, I re-checked
Q : What can you conclude from the results of solving this problem?
S2: Means it can be concluded that Jason can buy criterion 1 (MP3 Player and Headphones) and criterion 2 (MP3) Player and Speaker) because the number is still below 200 zed. As for criterion 3 (MP3 Player, Headphones and Speakers) it cannot be purchased anymore because it is more than 200 zed.

(a)

Q : Do you think this is an easier way?
S1: I think yes,
Q : are you analyzing the application of the solution? like checking back on the completion procedure?
S1: yes, I re-checked
Q : What can you conclude from the results of solving this problem?
S1: It can be concluded that Jason can only buy things with an amount of not more than 200 zed. Therefore, the criteria for goods that can be purchased in the table are criteria 1 and 2 while for criterion 3 they are not.

(b)

Figure 14. Result of solving with students at the contemplating stage

Based on the analysis of the subject work performed by the researcher on the six subjects, it is clear that subject 2, who selected the SPLDV solution to the problem, can successfully carry out the entire procedure. The process used to solve the problem was successfully accomplished by the subject. Subject 1 can successfully solve the problem without making any mistakes during the problem-solving process if they choose to use associative qualities as a solution. In addition, the other three subjects who proposed the solution used the concept of percent on the social arithmetic material, namely subject 3,4,5 only subject 3 was able to solve the problem using the solution offered well, while subjects 4 and 5 made mistakes in the problem-solving procedure, namely the lack of accuracy in performing the counting operation. Meanwhile, due to issues with the previous stage's completion, subject 6 was unable to complete this level. So it can be concluded that for question no. 3 there are only 3 subjects that are able to meet the contemplating stage well.

CONCLUSION AND SUGGESTION

The following are the conclusions for each type of question based on the analysis of students' thinking process in solving PISA questions in quantity content:

- Analysis of reflective thinking processes on type questions with the formulating mathematical process there are five subjects (subjects 1,2,3,4 and 5) that can meet all stages in the reflective thinking process and there is one subject (subject 6) that is only able to only meet up to the elaboration stage;

- Analysis of reflective thinking processes on type questions with employing mathematical processes,

there are two subjects (subjects 2 and 3) that can meet all stages in the reflective thinking process, and three subjects (subjects 1,4 and 5) who are only able to meet up to the elaborating stage and one subject (subject 6) who is only able to meet up to the reacting stage,

- Analysis of reflective thought processes of the type problem with the interpreting mathematical process, there are three subjects (subjects 1,2 and 3) who are able to meet all the stages in the reflective thinking process, two subjects (subjects 4 and 5) who are only able to meet up to the elaborating stage and there is one subject (subject 6) who is only able to meet up to the reacting stage.

The results of the analysis as previously described are the results of an analysis of the reflective thinking process of students who are classified into two groups, namely groups whose scores are above KKM (subjects 1,2 and 3) and students whose scores are still below KKM (subjects 4,5, and 6) it revealed that not all students from groups with grades above KKM are able to complete every step of reflective thinking the result is far from expectation. These findings suggest that educators should teach and train students to address problem-solving questions in the form of contextual inquiries in order to develop their reflective thinking processes.

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