

Problem-solving ability of primary school teachers based on Polya's method in Mataram City

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ABSTRACT

Problem-solving is an important competency that must be owned by students. Problem-solving skills can facilitate students in understanding, connecting, and using mathematical concepts. Even so, mistakes in solving mathematical problems are still made by students. One reason is the lack of habituation of problem-solving in learning mathematics. Teachers who have good problem-solving skills will find it easier to teach and do an activity about problem-solving in learning mathematics. The purpose of this study is to describe the problem-solving ability of primary school teachers based on Polya's method. This research method is descriptive-qualitative. The research subjects were primary mathematics teachers who taught in Mataram City, Indonesia. Each research subject solved three mathematical problems correctly and the problem-solving process will be analyzed based on Polya's method. The results obtained are teachers from city and suburb schools doing three indicators, namely identifying information on the problem, carrying out the procedure according to plan, and doing calculations correctly. Indicators of problem-solving that are not done are writing problem questions, making mathematical models, and writing final conclusions.

Pemecahan masalah adalah salah satu kompetensi yang cukup penting. Kemampuan pemecahan masalah dapat memudahkan siswa dalam memahami, menghubungkan, dan menggunakan konsep-konsep matematika. Meskipun begitu, kesalahan dalam pemecahan masalah matematika masih dilakukan oleh siswa. Salah satu sebabnya adalah kurangnya pembiasaan pemecahan masalah pada pembelajaran matematika di sekolah. Guru yang memiliki kemampuan pemecahan masalah yang baik, akan lebih mudah mengajarkan dan membiasakan pemecahan masalah pada pembelajaran matematika di sekolah. Tujuan dari penelitian ini adalah untuk mendeskripsikan kemampuan pemecahan masalah pada guru SD di Kota Mataram. Metode penelitian ini adalah deskriptif-kualitatif. Subjek penelitian adalah guru matematika SD yang mengajar di pusat dan pinggiran Kota Mataram. Masing-masing subjek penelitian menyelesaikan tiga masalah matematika dengan benar dan akan dianalisis proses penyelesaian masalahnya berdasarkan metode Polya. Hasil yang didapatkan adalah guru dari sekolah kota dan pinggiran melakukan tiga indikator, yakni mengidentifikasi informasi pada masalah, melakukan prosedur penyelesaian sesuai rencana, dan melakukan perhitungan dengan benar. Indikator penyelesaian masalah yang tidak dilakukan adalah menuliskan pertanyaan masalah, membuat model matematika, dan menuliskan kesimpulan akhir.



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INTRODUCTION

Mathematics is a branch of basic science that contributes to other disciplines. Educational Assessment Center (Puspendik) (2012) states that mathematics is the science of logic regarding the form, composition, quantity, and concepts related to one another which is divided into three fields, namely algebra, analysis, and geometry. Veldhuis (2019) claims that mathematics consists of components: language, statements, questions, reasons, and ideas mathematics itself. Mathematics plays an important role in a learning process because a person will be trained to think critically, creatively, logically, analytically, and systematically (National Council of Teachers of Mathematics, NCTM, 2000).

As with mathematics, problem-solving is also important. Problem-solving is needed by students in discussing concepts, relationships between concepts, and relationships between concepts with other fields (van Galen & van Eerde, 2013). According to Hendriana, Johanto, and Sumarmo (2018), this is confirmed by the approval of Calor, Dekker, van Drie, Zijlstra, and Volman (2019) that problem-solving is needed by students today and problem-solving is the main focus of the mathematics curriculum. In line with that, NCTM (2000) states that problem-solving is the "heart" of mathematics. NCTM (2000) also puts problem-solving as one of the basic abilities required to get students to math skills. According to Polya (1957), the steps of problem-solving can be done by understanding problems or solving problems, arranging plans, carry out the plan, and looking back.

Although problem-solving is the "heart" of mathematics, there are still many students who have difficulty in solving mathematical problems. Novita, Zulkardi, and Hartono (2012) in her research explained that most students do not have an understanding of the problem-solving process correctly. This fact certainly causes concerns since the questions given to students are in the form of problems (non-routine questions). Based on data from the Program for International Student Assessment or known as PISA, Indonesia is ranked 58th or second-lowest (OECD, 2012). This is because the questions given by PISA are questions that are in the form of problems (Edo, Putri, & Hartono, 2013). PISA problems require cognitive abilities to the stage C4 (analytical) to be solved (Prediger, 2019). If students are not accustomed to solving problems, then they don't have good problem-solving skills.

The teacher is key in the effort to make problem-solving activity become habitual. In order to do problem-solving activity in mathematics class, teachers must also have good problem-solving skills. Based on research by, van Galen and van Eerde (2013), students do not understand the problem-solving process and do not know how to solve problems because they have never been given non-routine questions (problems) by their teacher. This fact is the initial basis of researchers to explore information related to the problem-solving abilities owned by the teacher. Edo et al. (2013) that the teacher is a reflection of their students, when the teacher has good problem-solving skills, then the students will also have it and certainly vice versa. Thus it is very important for teachers to have the ability to solve problems in order to provide an element of problem-solving to their students.

The problem-solving ability should be taught from the most basic level because students tend to form their thinking patterns when they are at the primary school level (Kamaliyah, Zulkardi, & Damawijoyo, 2013). This is because we can make students accustomed to problem-solving activity in primary school. For this reason, teachers who teach at the primary school level are required to have good problem-solving skills. There are several non-routine questions in the latest elementary school textbooks. Primary school teachers have to be good at teaching their students how to solve those problems. It will be better if the teacher can make students enjoying the problem-solving activity.

Current students must also be prepared to get used to solving problems. Demands for world development have resulted in the emergence of several problems that are not insignificant (Chotima, Hartono, & Kesumawati, 2019). Therefore in the realm of education, students as "objects" of education must be prepared to solve problems ranging from simple problems. Teachers as education personnel must also be aware that their assignment has now shifted from a knowledge provider to become a facilitator of the discovery of knowledge by students (Napitupulu, 2008). Problem-solving skills will also train students' observation and exploration skills. Because to be able to determine the solution of a problem, students must be able to analyze a topic in depth. The manifestation of this shift is a form of learning questions or instruments that are turned into non-routine questions.

In mathematics itself, textbooks at the elementary level have started to contain non-routine questions. Even though it is packaged simply, the problem still contains elements of problem-solving that require students' ability to analyze each sentence in the problem (Afandi, 2013). This will impact on the demands of the teacher as a facilitator of the learning process to be able to solve these non-routine problems. There are other aspects that can

be taken into consideration about teachers' problem-solving skills. It turns out that school location can affect the quality of learning at the school. According to Veldhuis (2019), there are several factors that can cause disparities between schools in urban and rural areas, such as learning facilities and infrastructure in schools, teacher education qualifications in schools, and supporting infrastructure around the school. This is because it is important to take research subjects both from schools in urban and rural areas. Based on the facts that have been described, researchers feel it is important to explore how the problem-solving abilities of teachers in primary schools, especially in mathematics.

METHOD

The research approach used is descriptive-qualitative which is still under the qualitative research. In accordance with the opinion of Creswell (2012) states that qualitative approaches are research procedures that produce qualitative data, words or notes of the people themselves or their observed behavior. This type of research was chosen because the purpose of this study is to see how the ability to solve mathematics problems in primary school teachers. The location of the research was SD Negeri (State Primary School) 34 Cakranegara which is located on Jl. Brawijaya No. 18X, Cakranegara Sub-District, Mataram City, West Nusa Tenggara; SD Negeri 41 Mataram having its address at Jl. Garut No. 10, Pagesangan Team, Mataram Sub-District, Mataram City, West Nusa Tenggara; SD 26 Ampenan (Public Elementary School) which is located at Jl. Bung Karno No. 112, Pagutan Bar, Mataram Sub-District, Mataram City, West Nusa Tenggara; and SD 44 Ampenan having its address at Jl. D. Paniai No. 1, Pagutan Bar, Mataram Sub-District, Mataram City, West Nusa Tenggara.

The selected primary school consists of two schools in the central city (urban) and two schools in the suburb (rural) area. The subject selection technique in this study is purposive sampling using several criteria in the selection, namely (1) teachers who teach mathematics subjects for at least four semesters (2 years); (2) the teacher can solve the pretest questions; (3) teachers who are able to communicate well, especially in explaining the results of their work. Teachers who are selected as subjects can represent two categories namely schools located in the center of the city (urban) and schools located in suburban areas (rural).

The research procedure is the researcher will give a question about the pretest and a short interview in each school, then according to the criteria for selecting subjects, the researcher will choose three teachers from each school to be given a matter of pretest and a short interview as confirmation of the results of the work done by the subject. Furthermore, researchers will provide posttest questions for subjects who successfully answer the pretest questions correctly. Table 1 is the problem-solving indicators used to analyze the problem-solving abilities of research subjects.

Table 1. Problem-Solving Indicators

Problem-solving Indicators	Operational Form	Indicators Code
1. Understanding the problem	- Writing the information in the problem.	Y1
	- Writing the question statement based on the problem.	Y2
2. Devising a plan	- Devising and writing the mathematical models (or equations) for solving the problem.	Y3
3. Carry out the plan	- Carrying out the procedure for solving the problems.	Y4
	- Doing the calculation correctly.	Y5
4. Looking back	- Writing the conclusion correctly.	Y6

The data obtained in the form of teacher work and interviews. The results of the teacher's interview and work will be analyzed the steps to solve the problem based on the indicators in Table 1. Teacher's problem-solving will be analyzed whether to fulfill the indicators above or not.

RESULTS AND DISCUSSION

Based on the results of the research, in general, the subjects could not do the problem-solving based on Polya (based on the indicators in Table 1). Some subjects even failed to solve the problem correctly. In rural school, there were two from six teachers were able to complete the pretest questions correctly so that it would be continued with the provision of test questions. The researcher has chosen one from two teachers for deeper analysis. As for

subjects from urban schools, from six subjects given pretest questions, only four subjects completed the pretest questions correctly. The researcher chose one subject for a deeper analysis of their work results. So, there were two subjects in this research. The comparison of pretest results between urban and rural schools presented in Figure 1.

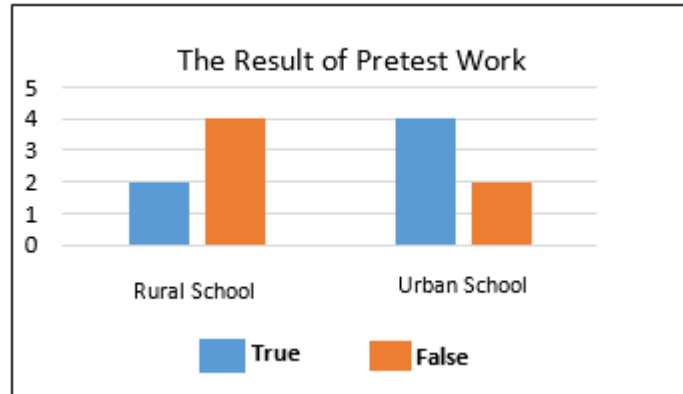


Figure 1. Pretest Result of Subjects

The researcher analyzed more deeply the results of the subjects' work given the posttest questions. To simplify the process of discussing, subjects in rural schools referred to as SP and subjects in urban school referred to as SK.

Problem 1:
 The picture below represents the soccer field at SDN Unram 1. The shaded image shows a hollow section of the field. You are assigned by the Principal to cover the hole with grass. Every 1 square meter of grass can be purchased at a price of Rp50,000. How much rupiah do you need to cover all parts of the field?

$9 \times 50.000 = 450.000$
 $L_1 = 3 \times 2 = 6 \text{ m}^2$
 $L_2 = 2 \times 1 = 2 \text{ m}^2$
 $L_3 = 1 \times 1 = 1 \text{ m}^2$
 $L_{\text{Bangun Berlubang}} = 9 \times 50.000 = 450.000$
 Translation:
 The area of perforated Plane = $9 \times 50.000 = 450.000$

Figure 2. SK's Answer for Problem 1

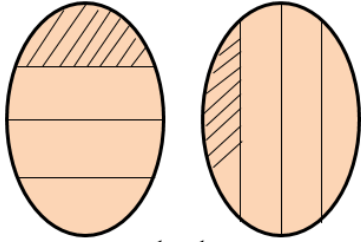
Based on the results of SK's work on problem number 1 (see Figure 2), it could be seen that SK did not write the known information and the question asked based on the problem. SK was able to find important information from questions and wrote them down so that it can be said that SK could understand the information contained in the problem. The planning stage for problem-solving was done well by SK. This could be seen from the work of SK who wrote the mathematical model. The next step to solve the problem was to carry out the procedure that had been planned to find the right answer. Based on the procedures and calculations performed, the answers obtained by SK were correct.

The results of the SK's work in Figure 3 show that the SK did not write down what was known and the questions, but in part (a) the explanation given by SK was quite detailed. Based on the written answer, there was a slight contradiction in SK's answer. SK analyzes the given image then finds errors from the image. For answers (b) it could be seen that SK did not understand the purpose of the problem so the answer is given as not right.

Problem 2:

a. Give an analysis of the misunderstanding of the fraction concept based on the figure below.

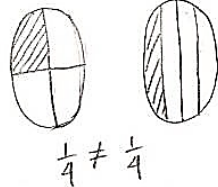
b. In your opinion, how to express or represent the value of fraction $\frac{1}{4}$?



a. Perhatikan adalah satu bagian dari bagian yang sama besar. Jika kita lihat pada gambar tersebut tampak satu bagian dengan bagian lainnya tidak sama besar. Selain itu dalam satu bagian dalam gambar tidak diarsir dengan penuh. Seharusnya gambar $\frac{1}{4}$ sebuah pecahan melambangkan satu bagian yang diarsir penuh dari empat bagian yang sama besar, tidak lebih atau kurang.

Translation:
The fraction is a part of the parts that have a common size. If we look at that figure, it shows that a particular part is not as big as another part. Besides, one particular section is not fully shaded. The fraction $\frac{1}{4}$ should be symbolized by one of four parts that are shaded fully, no more, no less.

b.

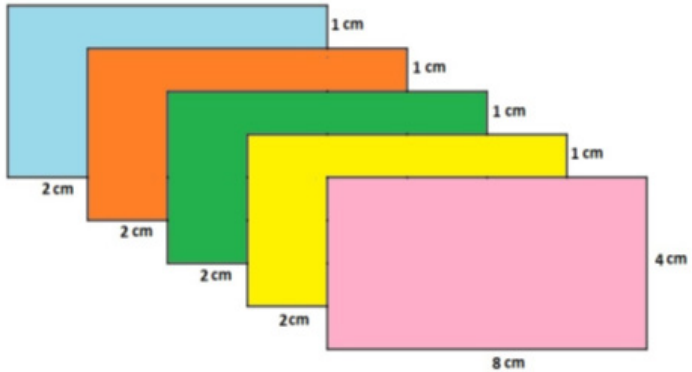


$\frac{1}{4} \neq \frac{1}{4}$

Figure 3. SK's Answer for Problem 2

Problem 3:

There are five rectangular cards. The length and width are 8 cm and 4 cm. The cards are then arranged stacked as shown in the figure below. What is the area of the card stock that can be seen?



① $L_{\square} = P \times l$

Luas pink = $8 \times 4 = 32 \text{ cm}^2$ (penuh) (Nampak)

Luas Kuning = $6 \times 3 = 18$, $32 - 18 = 14 \text{ cm}^2$ (tidak Nampak) (Nampak)

Luas Hijau = $6 \times 3 = 18$, $32 - 18 = 14 \text{ cm}^2$

Luas Orange = $6 \times 3 = 18$, $32 - 18 = 14 \text{ cm}^2$

Luas Biru = $6 \times 3 = 18$, $32 - 18 = 14 \text{ cm}^2$

Lumpukannya Kartu = $32 \text{ cm}^2 + 14 \text{ cm}^2 + 14 \text{ cm}^2 + 14 \text{ cm}^2 + 14 \text{ cm}^2 = 88 \text{ cm}^2$

Answer:

Translation:

Area of Pink = $8 \times 4 = 32 \text{ cm}^2$ (full)

Invisible part ---- visible part

Area of Yellow = $6 \times 3 = 18$, $32 - 18 = 14 \text{ cm}^2$

Area of Green = $6 \times 3 = 18$, $32 - 18 = 14 \text{ cm}^2$

Area of Orange = $6 \times 3 = 18$, $32 - 18 = 14 \text{ cm}^2$

Area of Blue = $6 \times 3 = 18$, $32 - 18 = 14 \text{ cm}^2$

The pile of cards = $32 \text{ cm}^2 + 14 \text{ cm}^2 + 14 \text{ cm}^2 + 14 \text{ cm}^2 + 14 \text{ cm}^2 = 88 \text{ cm}^2$

Figure 4. SK's Answer for Problem 3

Based on Figure 4, SK did not write down the information from the problem. SK also did not write questions about problems. SK also did not write problem modeling. SK did not indicate the procedure strategy that will be carried out. This shows that the basic mathematical concepts possessed by SK are still weak. If the decree understands the basic concepts used to solve the problem, then it will be reflected in the resolution strategy carried out by the SK. Even so, the problem-solving process was correct. To determine the covered area, the SK conducted operations to reduce the total full area by the covered area. The following was the inaccuracy of deciding the SK problem-solving procedure in problem 3. SK did not write which part of the colored area needed to be determined. SK did not explain the entire area of yellow, green, orange and blue paper. SK only wrote the area that is visible and not visible for each paper. Even so, the calculation to obtain the final results made by SK was correct. SK got the right result. Based on Figure 4, there was an SK's mistake in writing the addition operation. SK wrote down the units when doing addition. Addition rules could only be applied to numbers, not units. The unit will be written when writing the conclusion. SK did not write down conclusions in solving problems.

biaya $1 \text{ m}^2 = \text{Rp } 50.000,$
 Ditanyakan: $9 \text{ m}^2 = \dots ?$
 2). Jawaban
 $9 \text{ m}^2 \times \text{Rp } 50.000,- = \text{Rp } 450.000,-$

Translation:
 Cost $1 \text{ m}^2 = \text{Rp } 50.000$
 Question: $9 \text{ m}^2 = \dots ?$
 Answer:
 $9 \text{ m}^2 \times \text{Rp } 50.000, = \text{Rp } 450.000,$

Figure 5. SP's Answer for Problem 1

SP's result for problem number 1 (see Figure 5) showed that SP explained what information is known and what is asked on the answer sheet, namely "cost for" and "asked". Although SP wrote the problem-solving stage, the writing of the sentences was not correct. The question of the problem was how to determine the cost of covering the entire field. This was not following the purpose of the problem written by SP on the answer sheet. In the next stage, it was seen that SP does the calculation without a strategy used to solve the problem. This could be seen in Figure 5. Based on Figure 5, it could be seen that the SP skipped the stage of planning the problem and goes straight to the stage of solving the problem. The stage of completing the questions carried out by the SP, it appeared that the SP could do the calculations well. After conducting a brief interview, SP did not write a concluding sentence because it assumed that it was not very important to write. When explored deeper, it turned out that SP also did not re-check the results of the work done.

The result of SP's work on problem number 2 showed that SP understands the problem being given. This could be seen from the explanation given by SP on the answer sheet. This could be seen in Figure 6.

Konsep pecahan kurang tepat jika seperti gambar disamping karena bagian $\frac{1}{4}$ yang ditunjuk bagian yang diarsir terlihat tidak sama besarnya dengan bagian yang lain

Translation:
 The concept about fraction is still not right. As figure below, the shaded part that symbolized by $\frac{1}{4}$ is not as big as the other parts.

Figure 6. SP's Explanation about Problem 2 Part 1

Figure 6 showed that SP understood the concept of fraction well. Besides, the understanding of the SP's fraction concept was also seen in Figure 7, when SP provided an example of a true fraction representation. Even though the illustration of the picture given by SP did not match the right size, after checking through an interview SP could explain well the purpose of the illustration made.

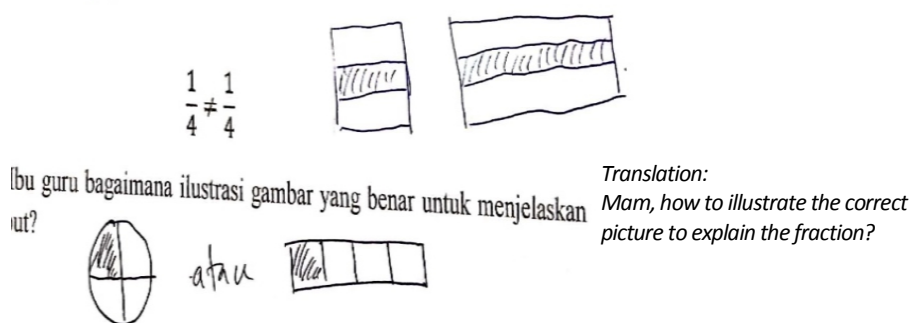


Figure 7. SP's Work about Problem 2 Part 2

The result of SP's work on questions number 3 showed that SP could solve the questions correctly. However, SP did not use the appropriate problem-solving steps. This could be seen from the following Figure 8.

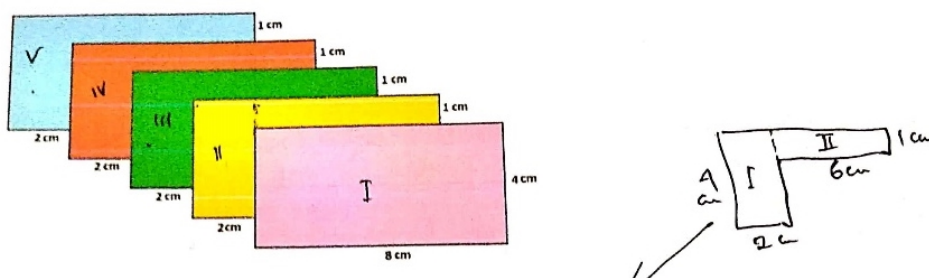


Figure 8. SP's Information Writing Based on Problem 3

Figure 8 showed that SP used the help picture to write information from the problem. The purpose of the picture was the sides that can be used as information assistance to solve the problem given. Figure 8 also showed the strategy used by SP when solving the problem, so SP is said to meet the indicator Y3. In the next step, the SP would carry out the procedure to solve the problem as shown in Figure 9.

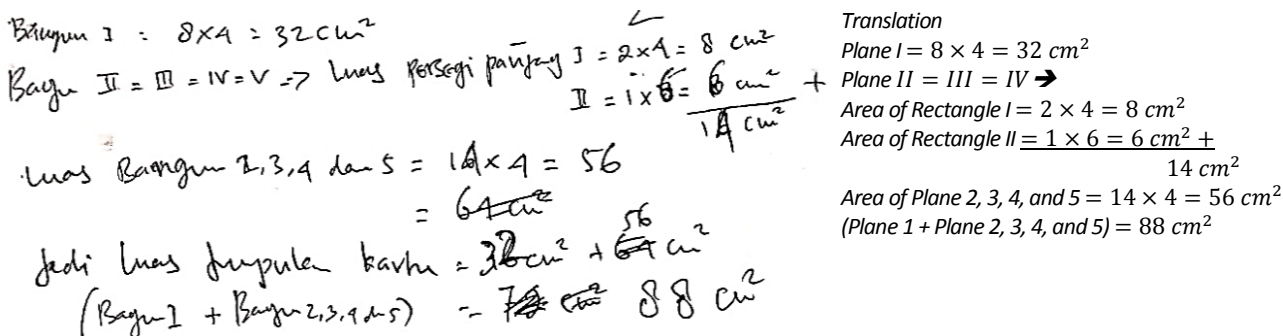


Figure 9. SP's Work When Solving the Problem

Figure 9 showed that the SP problem-solving procedure is good. This could be seen from Figure 9 which showed that SP solved the problem coherently. The final answer was true but SP did not write the conclusion.

Discussion

The urban teacher could find important information in the problem. This is in accordance with research from Vendiarys, Junaedi, and Masrukan (2015) which explains that analytically the subject can find important information from the problem and tends to write down the important parts to solve the problem. If based on indicators of the ability to understand the problem, it can be said that Y1 has been fulfilled. The urban teacher did not write what is asked of the problem. This means that urban teacher does not meet indicator Y2. The result shows that the urban teacher plan problem-solving and do the modeling well. Based on these indicators Y3, Y4, and Y5 can be met by the urban teacher well. The urban teacher does not meet indicator Y6. This was because the urban teacher does not write the conclusion of the answer to the problem. Based on the results of the interview, the urban teacher

explained that he was very sure that the answer was correct. Self-confidence influences the ability to solve the problem (Aisyah, Nurani, Akbar, & Yuliani, 2018). Based on this belief, the urban teacher does not need to check the steps that have been taken and the final answer.

In general, the concept conveyed by the urban teacher is right. The urban teacher also analyzed the shape of the drawing. There is an inaccurate picture of the analysis. The picture representation is not right. Picture representation is related to how to interpret fractions. Fractional interpretation in the form of picture is determined by how to understand the meaning of the narration relationship with the image in the problem (Pratama, 2017). The urban teacher does not know what the problem asked in the problem. This is why the urban teacher's answer is not clear. This is consistent with the explanation from Vendiagrys et al. (2015) that the ability to understand the problem well can determine success at a later stage. The urban teacher should draw four parts of the same size. But in the picture made by the urban teacher, it is seen that each part does not have the same area. This shows that the urban teacher lacks a deep concept towards flat and fractional shapes. This error can also occur due to the lack of an urban teacher's ability to represent the ideas they have, especially visual representation. According to Mauliyda and Hidayati (2019), the ability of visual representation possessed by a person can influence both whether or not the results of the pictorial representation are made. In accordance with this matter, the urban teacher chooses to use a circle shape (oval) to represent fractions. This building has a curved side so it tends not to be divided into 4 large parts. The urban teacher should have buildings that have flat or straight sides to make it easier to divide into 4 parts. Considering that the material is flat and broken shapes is a very basic material, it is most likely that this error occurred due to the lack of visual representation capabilities possessed by the urban teacher.

The urban teacher does not meet the indicators Y1 and Y2. This is because the urban teacher did not write the information and what was asked from the problem. The urban teacher did not do the problem solving completely. The problem-solving process on indicator Y3 is not fulfilled by the urban teacher. Because the urban teacher does the problem-solving stage coherently, the indicator Y4 can be met by the urban teacher. Even so, the urban teacher was still not quite right in writing the settlement procedure. The urban teacher showed the calculation correctly. This shows that indicator Y5 has been fulfilled. Because of not completing the conclusion correctly, indicator Y6 is still not fulfilled by an urban teacher. The urban teacher succeeded in arranging a settlement and getting the desired results but still did not do the final stage which is checking the results. Plan-execute-check activities are the most basic things that must be done when performing problems (Voskoglou, 2011). The urban teacher did not carry out the process of checking and writing concluding sentences when resolving problems.

The rural teacher write the information in the problem, then rural teacher fulfilled the indicator Y1. The rural teacher does not write the question correctly, thus the rural teacher does not meet indicator Y2. This fact is consistent with the statement Jalan, Nusantara, Subanji, and Chandra (2016), that difficulties in representing problems can be seen from the way to understand what is asked about the problem. The rural teacher does not meet indicator Y3 when solving problem number 1. This is in line with the results of research Mauliyda, Hidayanto, and Rahardjo, (2019), that the subject often do not write down the strategies or formulas they use to solve the problem. The rural teacher tend to directly work on the problems given. Miscalculation done by the rural teacher caused rural teacher did not meet indicator Y5. In the last stage, it is seen that the rural teacher does not write the concluding sentence. So that the rural teacher does not meet the indicator Y6. In fact, according to Pratikno and Retnowati (2018) writing a conclusion sentence is one of the benchmarks to see whether a person checks the results of his work. Besides the concluding sentence also shows a person's understanding of a problem (Saygili, 2017).

The rural teacher's explanation about fraction $\frac{1}{4}$ is detailed enough so that it appears that rural teachers can distinguish true and false fraction representation. Although the picture depicting fraction $\frac{1}{4}$ is still unclear, in interview the rural teacher could explain the purpose of the picture correctly. This is in line with the research of Mahyudin, Wahyu, and Sugilar (2018), that giving the test to the teacher about fractions showed positive results.

The rural teacher does not meet indicator Y1 because the rural teacher does not understand what is known in problem number 3. According to Mustamin (2018), the procedure of working on questions coherently is one of the important aspects of problem-solving. This is supported by the statement of Brozo and Crain (2018) which says that good written and coherent communication skills are a reflection of one's ideas and thought processes. The rural teacher is said to meet the indicator Y4. The calculations made by the rural teacher are also correct, so the rural teacher is said to meet indicator Y5. Unfortunately, the rural teacher does not write a concluding sentence so

the rural teacher does not meet the indicator Y6. Even though after being confirmed through interview, the rural teacher has actually checked its calculations and the rural teacher actually understood the purpose of the questions given.

CONCLUSION

The teacher from the urban school does problem-solving quite well. Even so, there are some indicators of problem-solving that are not met. Based on Polya's problem-solving indicators, the teacher from the urban school identified problem information well. Even so, writing problem questions was not done. Indicators regarding problem-solving planning are not carried out clearly. Even so, the problem-solving procedure and the calculation process are carried out correctly. The writing of the final conclusions and the re-checking were not done by the teacher from the urban school. Thus, three of the six indicators defined in this research were not fulfilled properly.

The teacher from rural school writes and can identify information on problems. Even so, the question sentences for the problem are not written clearly. Planning or modeling is not clearly written. The process of executing the problem-solving procedure has been done well. The calculation process to get the results done is also done well. However, the teacher from rural school does not write the final conclusions clearly.

Based on the explanation above, it is concluded that the teacher from urban and rural schools had similarities in solving problems. Teachers tend not to do indicators 2, 3, and 6. These indicators are writing problem questions, writing modeling or mathematical equations in solving problems, writing final conclusions from the calculation results. These three indicators are often skipped or not included in problem-solving.

Researchers formulated suggestions to both researchers and teachers as educators in the school. For further research, it can be done on a broader scope by adding research subjects so that research results can be generalized. Also, further research can explore the process of learning mathematics in the classroom to increase the repertoire and insight of studies related to elementary school teacher problem-solving skills. For teachers in schools, it is hoped that the results of this study can be used as reflection material to be able to improve the ability in the process of solving problems using the rules that have been formulated so that students who are taught are also trained to solve mathematical problems properly.

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