Al Khawarizmi: Jurnal Pendidikan dan Pembelajaran Matematika

ISSN 2549-3906
E-ISSN 2549-3914

Students Ability to Solve Mathematical Problem Through Online Learning During Covid-19 Pandemic

Budi Azhari[1*], Nurhalimah[1] Anwar[2], Zainal Abidin[1]
[1]Universitas Islam Negeri Ar-Raniry Banda Aceh, Aceh, Indonesia
[2]Universitas Syiah Kuala, Banda Aceh, Indonesia
*Correspondece Author: budiazhari@ar-raniry.ac.id

Abstrak

Penelitian ini bertujuan untuk mengetahui kemampuan pemecahan masalah matematis siswa melalui pembelajaran daring selama kondisi COVID-19 dalam menyelesaikan masalah pada materi luas dan keliling trapezium. Pengumpulan data dilakukan melalui soal tes kemampuan pemecahan masalah dan wawancara. Selanjutnya analisis data dengan mereduksi data, menyajikan data, dan menarik kesimpulan. Penelitian ini menghasilkan kesimpulan bahwa kemampuan pemecahan masalah siswa yang diterapkan melalui pembelajaran daring dengan menggunakan *whatsapp group* dan *g-meet* adalah sangat baik dengan rincian setiap tahapan pemecahan masalah sebagai berikut: 1) memahami masalah; siswa yang menjadi subjek penelitian dapat menjelaskan soal menggunakan bahasa sendiri, menganalisa soal dengan menuliskan apa yang diketahui dan ditanyakan, dan memberikan ilustrasi dari gambar. 2) merencanakan pemecahan masalah; subjek dapat menentukan syarat lain dari soal, memilih rumus dan menyusun langkah-langkah untuk menyelesaikan masalah. 3) melaksanakan pemecahan masala; subjek menyelesaikan masalah menggunakan rumus yang dipilih dan sesuai dengan langkah-langkahnya. 4) memeriksa kembali; subjek melakukan pengecekan jawaban dengan metode lain dan membandingkan hasilnya dengan yang ada pada soal dan jawaban.

Kata kunci: COVID-19; kemampuan pemecahan masalah matematika; pembelajaran daring

Abstract

The purpose of this study is to examine the solving skill of students on mathematical problem through online learning during COVID-19 pandemic, particularly in solving the problem related area and perimeter of trapezium. Data collection is conducted by performing problem solving skill test and interview. Furthermore, the data analyses are conducted by data reduction, data presentation and conclusion formulation. This study concludes that students have very good ability to solve the problem during the online learning through *whatsapp group* and *g-meet*. Detail of the steps used in examining the problem solving abilty as follow: 1) problem comprehension; students as research subject able to explain the problem by using their own terms, analyse the problem by stating the known and unsolved variables and illustrating the provided pictures 2) planning the problem solving; subject can determine other condition from the problem, selecting and structuring the steps to solve the problems 3) implementing the problem solving; subject solved the problem by using the selected formula accordingly 4) cross-checking; subject cross-checked the solutions by using other method and compared the results.

Keywords: COVID-19; Mathematical problem solving ability; online learning

INTRODUCTION

Mathematical problem-solving skills are very useful for students, not only in solving mathematical problems but also in solving daily problems. Mathematical problem-solving ability is an activity to understand the problems and identify strategies that will be used correctly and appropriately as well as the ability to interpret the solutions (Nursyahidah et al, 2018; Putri, 2017; Siagan et al, 2019; Suraji et al, 2018). Problem solving ability is not something that is easily obtained by students so students must be trained to develop these abilities (Fajri et al., 2021; Jua, 2018; Wulandari et al, 2020).

To develop these abilities, the learning processes and strategies that will be applied must help students understand problems, plan problem solving, find solutions and be able to draw conclusions from solving these problems (Ali, 2019; Fajri, 2021; Hmelo-Silver, 2004; Seibert, 2021). However, the general perception at the schools is that students' abilities to solve mathematical problem are still limited. This is because teachers still rarely pay attention to students' students' abilities to solve mathematical problem and familiarize students with problem solving (Doorman et al, 2007; Santi et al, 2021; Suastika, 2017).

In this study, we reviewed students' problem-solving skills on the quadrilateral material performed in class VII SMP in the second semester. This rectangular material includes material that is often an obstacle for students in learning it, particularly when solving problems related to rectangles. Based on research conducted by Rika Kartika on rectangular material, it is suggested that students' mathematical problem-solving abilities are still low on each indicator. This can be seen from the students' answers to the given questions. Students have difficulty comprehensing the questions because students are still confused and have not been able to interpret the sentences presented. Students are also confused in selecting the formula that must be used in solving problems (Kartika, 2018).While the research conducted by Tita Mulyati showed that the low mathematical problem solving ability of students was caused by the teacher's teaching method. These including the teacher's lack of attention to the development of problem-solving skills in the mathematics learning process, the learning process focused on teacher where the teacher actively provided material with students just happy when teacher also provide the answers resulting on students become

passive and teachers are accustomed in adopting the questions provided in the handbook (Mulyati, 2016).

Based on the results of the initial research by conducting semi-structured interviews with two students, it was obtained that the mathematical problem solving ability of students was still low. This can be shown from the stages of problem solving by students. First, students have not been able to understand the problem correctly and are still wrong in interpreting the sentences in the problem. Second, students have not been able to formulate the right plan by choosing the right formulas that can solve the problem in this case the students have not been able to determine other circumtances for the problem. Third, students have not been able to solve problems by using the selected formula and have not been able to provide the correct and appropriate solution. Fourth, students have not been able to re-check the correctness of the answers that have been given. So it is necessary to conduct in-depth research to determine the mathematical problem solving ability of students at school. Moreover, when this research was conducted, COVID-19 outbreaks globally.

As in other parts of the world, Indonesia is also experiencing a serious COVID-19 pandemic, this has prevented people from gathering in crowds. COVID-19 is a collection of viruses that attack the respiratory system (Fong et al., 2020; Hariman, 2020; Prem et al., 2020; Tian et al., 2020). This virus was first discovered in the city of Wuhan, China at the end of December 2019 (WHO, 2020). This has made several countries implement lockdowns in order to prevent the spread of the Corona virus. In Indonesia, it is known as PSBB or large-scale social restrictions. Thus, being in crowded situations is prohibited to prevent the spread of COVID-19 (Cauchemez et al., 2009; Cowling et al., 2010; Hn et al., 2010). School is a place where students and teachers carry out the learning process in one class and are in a crowded environment (Azhari & Fajri, 2021). Due to the COVID-19 virus, the government circulated a circular that schools must be vacated and continues learning by implementing online learning (Prem et al., 2020). This policy is followed up by schools by implementing online learning.

Online or online learning is one of the technological learning models to complement face-to-face learning (Mdigely, 2018; Suryana, 2020). One of the online learning aproaches that is widely applied by teachers in schools is to use the assignment method without further developing students' problem solving abilities. Therefore, to examine the students abilty in problem solving during online learning, the researchers not only using the assignment

method but also conducted face-to-face remotely so that students can get deeper understanding on the material provided which can help increase students' ability to solve the goven problems.

Based on the background decribed above, the focus of this research is to determine students' mathematical problem solving abilities through online learning during COVID-19 pandemic, particularly in solving problems on the area and perimeter of the trapezium.

RESEARCH METHOD

Type of Reseach

This type of research is descriptive qualitative research. The research aims to examine directly the mathematical problem solving ability of students in solving problems on the area and perimeter of a trapezoid through online learning during the COVID-19 pandemic.

Research Location

This research was carried out at MTsS Darul Aitami, South Aceh Regency, the selection of this school is by considering the willingness of the school and teachers to be involved in the research and the school has implemented the online learning approach as instructed by the government. To conduct this research, the researchers have had proper permission and access from the school in conducting this research.

Research Subject

Research subjects are cases or people who participate in the research where researchers measure the research variables. The subjects in this study were 2 students of class VII-1, one female student with the initials MW as the subject of S1 and another one is a male student with the initials MR as the subject of S2. The selection of this subject was taken based on the willingness of students to take part in online learning using whatsApp groups and G-meet. Initially there were 17 students who joined the WhatsApp group, but out of the 17 students only a few students were actively discussing in the group. Then the 17 students were given a test to assess initial students' problem solving abilities. After completing the test, the researcher invited 17 students to learn remote face-to-face via G-meet. Out of 17 students, only two students provided a good response to remote face-to-face learning and were willing

to participate from the beginning to the end via G-meet. Based on this, the researchers selected these two students as subjects in this study.

Procedures

The procedure in this study is that the two selected subjects were given a problem-solving ability test question, namely TKPM 1 to see the subject's problem solving ability prior online learning process, and then the subject was interviewed about the answers relating the results of TKPM 1 based on the indicators of problem solving ability. After the interview, the subject was given online learning about the area and perimeter of the trapezoid through the WhatsApp group and face-to-face online through the G-meet application. After completing direct learning, the subject was given TKPM 2 to assess the subject's problem-solving ability after online learning then the subject will be interviewed.

Data Analysis Technique

Data analysis was carried out qualitatively through data reduction, data presentation and finally drawing the conclusions. The validity or correctness of the data is important in research. The validity of the data was assessed by detail observation and triangulation. The type of triangulation used is time triangulation.

RESEARCH RESULTS AND DISCUSSIONS

Research Results

This research was conducted online on 29 students of grade VII-1 during Covid-19 pandemic at MTsS Darul Aitami, South Aceh. Out of the 29 students, there are 17 students who join the WhatsApp group, meanwhile the rest of students do not have mobile phones. Furthermore, out of 17 students only 2 students were selected to participate in the learning from the beginning to the end of the process and have given their consent on as research subject.

This research was conducted online, using the G-meet and WhatsApp applications to meet face-to-face. This research is carried out remotely with the presence of researchers and students located at their respective homes. The test was carried out outside math class hours on with permission from the mathematics teacher and the willingness of students by considering the time in which the schedule of the two students did not coincide with the

schedule of mathematical class and they were also in different locations therefore the researcher keep communicating regaridng the schedule to conduct the research. After completing the test, interviews were conducted with students to obtain a concrete picture of the students' mathematical problem solving abilities on the rectangular shape material.

Furthermore, the subject was interviewed about the tests that had been given by discussing with the students concerned to ask students' time availability. This is so that the interviewed students do not feel forced or disturbed and have a lot of time so that the data or information that the researcher wants to explore is obtained optimally.

The code used in the interview transcript begins by using letters to state the research subject category. Research questions and answers in interview activities at TKPM 1 on the subject of S1 on the first number question, respectively, are coded with P1-WT1S11 and J1-WT2S11. The number after the letter P or J indicates the sequence of questions or answers to the subject's interview, while the number at the end of the word indicates the sequence number of the questions. For example P6-WT1S11 and J6-WT1S11, P6 states the interview questions given by the researcher in the 6th sequence, while J6 indicates the interview answers given by the subjects in the 6th order, W states the interview, T1 indicates the problem-solving ability test 1, S11 indicates the first subject in question number 1. As for the next questions and answers follow the pattern described above. In addition, for supporting interviews, the researcher provided a code with the symbol P representing the researcher and S representing the student.

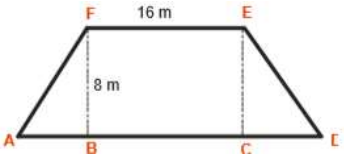
Data Presentation and Analiysis on Mathematical Problem Solving Ability of S1 and S2 Subjects

Based on the indicators of mathematical problem solving ability, in TKPM 1 the problem solving ability of the S1 subject is in the sufficient category and the S2 subject is in the good category. While in TKPM 2, the problem-solving abilities of the subjects of S1 and S2 are in the very good category. The indicators that guide researchers in analyzing students' mathematical problem solving abilities are based on Polya's mathematical problem solving indicators.

In this section, data on the mathematical problem solving ability of S1 and S2 subjects is presented in solving questions number 1 and 2. This test is given before online learning. The test results given by S1 and S2 have not been able to provide a good answer. The

problem-solving ability of the S1 subject is in the sufficient category while the S2 subject is in the good category. The questions and results of the written test along with excerpts from the interview with the subject of S1 and S2 are as follows:

"Nanda ran around the park with a garden as sketched below.



The area of the park is 176 m2. If Nanda run around the park twice, how many meters has Nanda traveled?

Response from S1 Subject

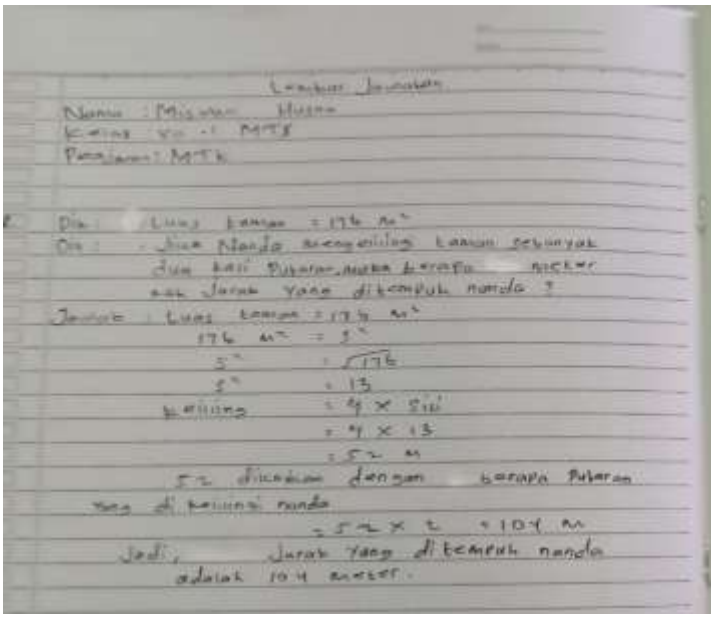


Figure 1. Worksheet of S1 Subject

1) Indicator on Problem Understanding

Based on the students' answers in Figure 1, the subject of S1 did not understand the problem in the given questions. The subject of S1 only mentions part of known variables on the answer sheet. In addition, the subject is also not able to explain clearly the meaning of the question by using his own language as the S1 subjects still using similar wording as in the question. However, S1 subjects can fully express what is known variable and what is variable to be asked at the time of the interviews. To support the results of the tests, the researchers conducted interviews with these students. Here are

the results of the interview:

Table 1. Interview on Problem Understanding

P_3-WT1S1$_1$	:	Can you read the question?
J_3-WT1S1$_1$	:	Ok madam (starting reading)
P_4-WT1S1$_1$	:	Can you explain the question in your own languange (*question no 1*)?
J_4-WT1S1$_1$	:	Nanda ran around the park which has an area of 176 m2. If Nanda circled the park twice, how many meters did Nanda cover?
P_5-WT1S1$_1$	:	What do you know about it?
J_5-WT1S1$_1$	:	A garden has area of 176 m2, its height is 8 m and EF = 16 m
P_6-WT1S1$_1$	:	Are there any other known variables of the question?
J_6-WT1S1$_1$	:	That's all madam
P_9-WT1S1$_1$	:	Okay, now what is asked of the question?
J_9-WT1S1$_1$	:	It asks if Nanda circled the park twice, how far the distance did Nanda cover?
P_{10}-WT1S1$_1$	:	Why does your answer sheet not mention the known variables in the picture?
J_{910}-WT1S1$_1$	:	Forgot ma'am, because I thought it was already in the picture so we could see it directly.

Based on the results of the interview above, the S1 subject meets the indicators of understanding the problem, because the S1 subject is able to write down what is known and asked. The ability of these subjects can be seen in the interviews P5-WT1S11 to J9-WT1S11. The answers to the interview results of the S1 subject are consistent with what has been written.

2) Indicator on Problem Solving Planning

Based on the students' answers in Figure 1, the subject of S1 has made a solution plan. However, the plan is not appropriate to solve the given problem. When looking for the sides of a trapezoid, subject S1 uses the formula for the area of a square because they are not familiar with the formula for the area of a trapezoid. Likewise, the perimeter formula used is the formula for the perimeter of a square. To support the results of the test, the researchers conducted interviews with these students. Here are the results of the interview:

Table 2. Interviews on Indicator for Problem Solving Planning

P_{11}-WT1S1$_1$	:	After reading the questions, do you have any plans to answer the questions?
J_{11}-WT1S1$_1$	:	I do madam
P_{12}-WT1S1$_1$	:	What's your plan?

J_{12}-WT1S1$_1$	:	Here we know the area of the garden is 176 m2, so to find the length of sides we use the area formula.
P_{13}-WT1S1$_1$	:	After you get length of sides, what are your plans to solve the problem?
J_{13}-WT1S1$_1$	:	To identify the formula for the perimeter of madam
P_{14}-WT1S1$_1$	:	That means to answer the question using the perimeter formula, right?
J_{14}-WT1S1$_1$	:	Yes madam
P_{15}-WT1S1$_1$	:	So, what is the first step you take to answer this question?
J_{15}-WT1S1$_1$	:	Before looking for the perimeter formula, firstly I should find the length of the sides
P_{16}-WT1S1$_1$	:	So, after getting the sides and perimeter, what else do you do?
J_{16}-WT1S1$_1$	:	After knowing the sides and perimeter, then the result of the circumference is multiplied by the two rounds earlier
P_{17}-WT1S1$_1$	:	Ok, do you think the formula for finding the area of a trapezoid is correct?
J_{17}-WT1S1$_1$	:	I don't know, madam. I only use that formula because I don't know what the formula is.

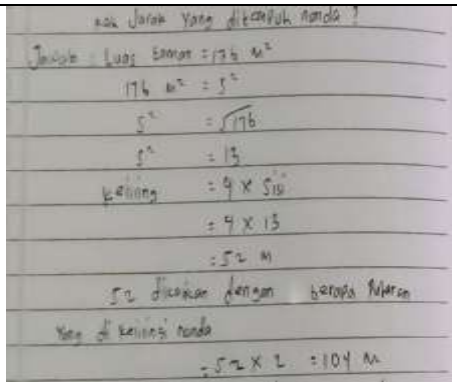
Based on the results of the interview above, the S1 subject can mention a plan to solve the problem, but the plan used is not the correct formula to solve the problem. S1 subjects are able to develop strategies and know the sequence as shown in Figure 4.1. However, due to misconception of the formula used, the strategy used by the S1 subject was not appropriate so that it did not meet the indicators for planning problem solving as expected from the problem.

3) Indicators on Problem Solving Implementation

Based on students' answers in Figure 1, the subject of S1 also has not met the indicators of implementing problem solving. It can be seen in which the subject of S1 has not been able to solve the problem correctly because the plan used is not proper. As data to support the results of the tests that have been carried out, the researchers conducted interviews with these students. Here are the results of the interview:

Table 3. Interviews on Indicators of Problem Solving Implemention

P_{19}-WT1S1$_1$	:	Can you try again by using the formula that you got earlier?
J_{19}-WT1S1$_1$	:	Ok madam (grabbing a book and a pen)



P_{20}-WT1S1$_1$	:	Why did you take 13 as the length of sides? Even though the value is 176?
J_{20}-WT1S1$_1$	:	Because if it is 14 x14, there will be too large, so 13 is choosed
P_{21}-WT1S1$_1$	:	What is the reason you don't take that lenght, will it be a problem?
J_{21}-WT1S1$_1$	:	Because the area is only 176, it's impossible to have an excess value, so as explained in the class, we take the slightly closer one
P_{22}-WT1S1$_1$	:	Ok, if we take 14, then what is the radicand of that?
J_{22}-WT1S1$_1$	:	196 madam
P_{23}-WT1S1$_1$	:	After getting the length of sides, what is the perimeter and distance you have travelled Nanda?
J_{23}-WT1S1$_1$	:	Its perimeter is 52 m and the distance traveled by Nanda is 104 m madam.

Based on the results of the interview above, the subject of S1 has not met the indicators of planning problem solving, the subject of S1 has not been able to solve the problem in correctly, even though the subject of S1 has a strategy to solve the problem.

4) Indicator on Problem Solving Cross-checking

Based on the student's answers in Figure 1, the subject of S1 has not met the indicators for conducting a cross-checking on the correctness of the answer, the subject of S1 has not been able to re-examine the answer correctly and the conclusions given are less precise. To support the results of the tests that have been carried out, the researchers conducted interviews with these students. Here are the results of the interview:

Table 4. Interviews on the Indicators of Problem Solving Cross-checking

P_{24}-WT1S1$_1$	:	From the solutions that you have done, are you sure your answer is correct?
J_{24}-WT1S1$_1$	:	Yes I am madam
P_{25}-WT1S1$_1$	:	How do you prove that your answer is correct?
J_{25}-WT1S1$_1$	:	by determining the perimeter first
P_{26}-WT1S1$_1$	:	Does that mean by knowing the perimeter formula?

J_{26}-WT1S1$_1$	:	Yes madam
P_{27}-WT1S1$_1$	:	Can you try to prove it now?
J_{27}-WT1S1$_1$	:	Ok madam (opening a book)
P_{28}-WT1S1$_1$	:	Can you get what you got earlier?
J_{28}-WT1S1$_1$	:	Yes madam, by dividing 52 by four equals 13. So, the sides are the same, madam.
P_{29}-WT1S1$_1$	:	From that question, what conclusion do you draw?
J_{29}-WT1S1$_1$	:	So, the distance traveled by Nanda to circle the park twice is 104 m.

Based on the results of the interview, the subject of S1 conducted an examination of the answers he had received. However, the examination carried out was inaccurate because the concept used when carrying out the problem solving was also wrong. It can be seen from Figure 4.1, the subject of S1 makes a conclusion but it is still not quite right with the problem given.

Answer from Subject - S2

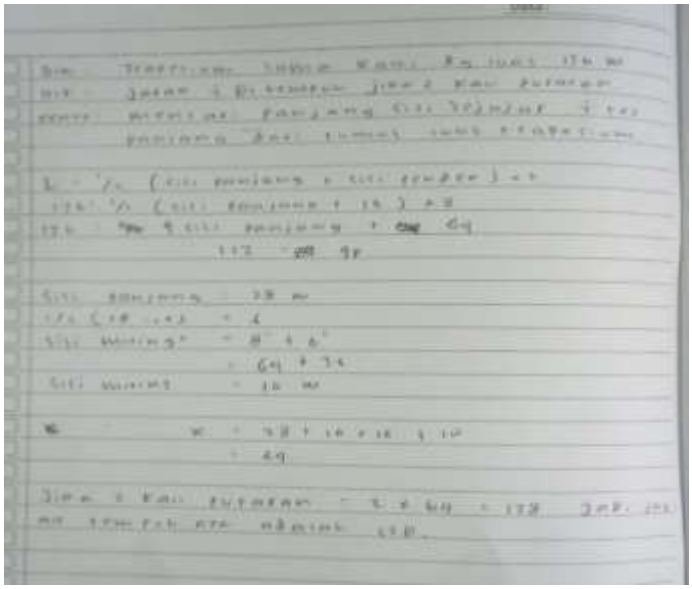


Figure 2. Worksheet Subject-S2

1) Indicator on Problem Understanding

Based on the students' answers in Figure 2, subject S2 fulfills the indicator of understanding the problem by mentioning the variables that are known and asked. However, the subject of S2 was only able to mention a few known variables correctly. The variable that were not written on the answer sheet were mentioned at the time of the interview. To support the results of the tests that have been carried out, the researchers conducted interviews with these students. Here are the results of the interview:

Table 5. Interviews on Indicators of Problems Understanding

P_5-WT1S2$_1$	:	Can you explain in your own language what the question (question no. 1) is?
J_5-WT1S2$_1$	:	Nanda running around a garden in the shape of an isosceles trapezoid with an area of 176 m2. Asked: what is the distance covered in 2 rounds.
P_6-WT1S2$_1$	:	What is known variable of the question?
J_6-WT1S2$_1$	:	Isosceles trapezoid with an area of 176 m2
P_7-WT1S2$_1$	:	What was asked varibles of the question?
J_7-WT1S2$_1$	:	Asked the distance traveled if I run two rounds.
P_8-WT1S2$_1$	:	Are there any other known variables of the problem?
J_8-WT1S2$_1$	:	There is madam, the side is 16 m and the height.
P_9-WT1S2$_1$	:	16 m which you mentioned is the length of which side?
J_9-WT1S2$_1$	:	The shortest side madam from the parallel side
P_{10}-WT1S2$_1$	:	So, why don't you write down the side length on the answer sheet?
J_{10}-WT1S2$_1$	:	Because I think it's already represented from the picture, madam, so there's no need to rewrite it.

Based on the results of the interview above, the subject fulfills the indicator of understanding the problem, because the S2 subject is able to write down what is known and asked variables even though the subject's answer sheet only mentions some of the known elements. This is because the subject of S2 assumes that there is no need to write down what is known in the picture again. In this case, actually the students are asked to write down everything they know about the questions to achieve the indicators on understanding the problem. The ability of these subjects can be seen in the interviews P6-WT1S11 to J9-WT1S11. The answers to the interview results of the S1 subject are consistent with what has been written.

2) Indicator for Problem Solving Planning

Based on the student's answers in Figure 2, S2 subject also fulfills the indicators of planning problem solving, because the S2 subject is able to develop plans to solve problems in the questions and lead to the correct answer. It can be seen that the S2 subject can write down the step by step plan used to solve the problem. This is because the S2 subject understands the concept of the area of a trapezoid. As supporting data, the researchers conducted interviews with the results of the tests that had been carried out. Here are the results of the interview:

Table 6. Interviews on Indicators of Planning Problem Solving

P_{11}-WT1S2$_1$	:	Having read the question, do you have any plans to answer the question?
J_{11}-WT1S2$_1$	:	Yes I do madam
P_{12}-WT1S2$_1$	:	What's your plan?
J_{12}-WT1S2$_1$	:	First find the longest side by using the area formula madam
P_{13}-WT1S2$_1$	:	After you get his side length, what are your plans for solving the problem?
J_{13}-WT1S2$_1$	:	Find the hypotenuse using the Pythagorean formula bu.
P_{14}-WT1S2$_1$	:	After that, what's your strategy?
J_{14}-WT1S2$_1$	:	Finding the perimeter Mrs
P_{15}-WT1S2$_1$	:	Then, what else do you do?
J_{15}-WT1S2$_1$	:	Because the question is the distance covered in two rounds, the perimeter is multiplied by 2.

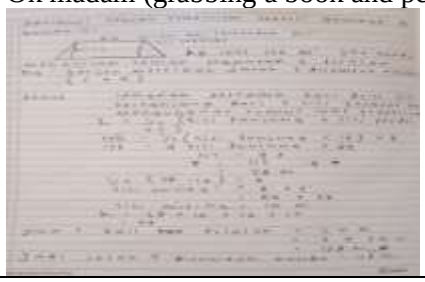
Based on the results of the interview above, the S2 subject can mention a plan to solve the problem. The plan mentioned is in relevant to the problems that appear in the question as in the interviews J11-WT1S21 to J14-WT1S21. S1 subjects are able to formulate strategies and know the sequence such as the steps taken in solving problems. Based on the results of the tests and interviews above, the master's subject meets the indicators of planning problem solving as expected from the questions.

3) Indicator on Problem Solving Implementation

Based on the students' answers in Figure 2, the subject of S2 has also met the indicators on problem solving implementation. The subject of S2 is able to solve the problem correctly and precisely so as to provide the right solution to the problems that exist in the problem. S2 subjects are able to solve problems as planned. To support the results of the tests that have been carried out, the researchers conducted interviews with these students. Here are the results of the interview:

Tabel 7. Interviews on Indicators of Problem Solving Implemention

P_{16}-WT1S2$_1$	:	In your opinion, with the formula above, can you solve the problem?
J_{16}-WT1S2$_1$	:	Yes, I can madam
P_{17}-WT1S2$_1$	:	Can you try to do it again using the formula you got earlier?
J_{17}-WT1S2$_1$	:	Ok madam (grabbing a book and pen)



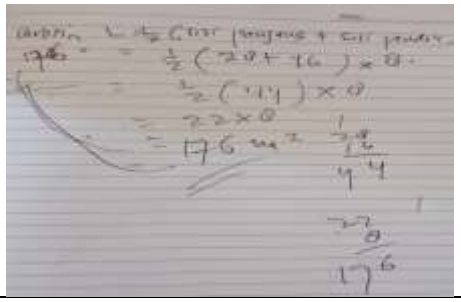
P_8-WT1S2$_1$	:	Are the results you get exactly the same as before?
J_{18}-WT1S2$_1$	:	Yes it is madam

Based on the results of the interview, it was found that the subject of S2 could answer the questions correctly. In the interview, the subject carried out the problem solving process according to the plan so as to produce the right answer as outlined in the J16-WT1S21 to J17-WT1S21 interviews. The answer given by the S2 subject is in accordance with the solution to the problem given, it can be concluded that the S2 subject also meets the indicators of carrying out problem solving

4) Indicators on Problem Solving Cross-checking

Based on the students' answers in Figure 2, the S2 subject also met the re-examination indicator, the S2 subject was able to re-examine the answer correctly by proving that the area of the trapezoid obtained was the same as known in the question. It convinced the S2 subject that the answer was correct. S2 subjects can also draw conclusions from the problem solving that has been done. To support the results of the tests that have been carried out, the researchers conducted interviews with these students. Here are the results of the interview:

Table 8. Interview on Indicators on Problem Solving Cross-checking

P_{19}-WT1S2$_1$	:	From the solutions that you have done, are you sure your answer is correct?
J_{19}-WT1S2$_1$	:	I am sure madam
P_{20}-WT1S2$_1$	:	How do you prove that your answer is correct?
J_{20}-WT1S2$_1$	:	By crosschecking the area madam?
P_{21}-WT1S2$_1$	:	Can you prove it?
J_{21}-WT1S2$_1$	:	Ok madam 
P_{22}-WT1S2$_1$	:	Is the area you get the same as the area you know?
J_{22}-WT1S2$_1$	:	Yes it is madam
P_{23}-WT1S2$_1$	:	It means your answer is correct?
J_{23}-WT1S2$_1$	:	Yes madam
P_{24}-WT1S2$_1$	:	From the question, what can you concluce?

J_{24}-WT1S2$_1$	:	The conclusion is the distance traveled by Nanda to round the park is 128 m.

Based on the results of the interview, the S2 subject examined the answers that had been obtained with the correct and appropriate examination procedures so that the results obtained were the same as those known in the questions. This can be seen in the interviews P19-WT1S21 to J23-WT1S21. It can be seen from the results of the interview, the subject of S2 draws conclusions from the problem solving carried out.

The results of data analysis on the ability of S1 and S2 subjects at TKPM 1 and TKPM 2 are summarize below:

Table 9. Triangulation of Problem Solving Ability Data

No Soal	Data TKPM 1	Data TKPM 2
1.	Subjects S1 and S2 did not understand the problem properly, subjects S1 and S2 both were only able to name some of known and asked variables. S1 subjects have not been able to explain questions in their own language, while S2 subjects can explain in their own language	S1 and S2 subjects can understand the problem by explaining using their own language, able to mention the known and asked variables of the question, and able to provide illustration pictures of the problem
	The subject of S1 plans to solve the problem by using the formula for the area of a square but the prepared plan does not lead to the correct answer. S2 subjects are able to plan problem solving by finding the length of unknown sides using the formula for the area of the trapezoid, then using the formula for the perimeter of the trapezoid and leading to the correct answer.	S1 and S2 subjects are able to plan problem solving and lead to the correct answer. Subjects S1 and S2 both were able to determine the steps to solve the problem by finding the length of unknown side with the trapezoidal formula, finding the height of the trapezoid, and finding the area of the trapezoid.

No Soal	Data TKPM 1	Data TKPM 2
	Subject S1 did problem solving using the formula for the area of a square and could not provide the correct and correct solution. The subject of S2 solves problems with the formula for the area and perimeter of a trapezoid and gives the correct and correct answer	Subjects S1 and S2 solve problems using the formula for the perimeter and area of a trapezoid and provide the correct and correct solution to the given problem.
	The subject of S1 re-checked the answer but the checking was done by using the wrong method. The subject of S2 re-checked the answer by using the formula for the perimeter of the trapezoid and drew conclusions.	Subject of S1 re-checked by proving height through the Pythagorean formulam whilst subject of S2 re-checked with the trapezoid perimeter formula. S1 and S2 subjects were able to draw conclusions.

DISCUSSION

Based on the results of data analysis through test questions and interviews at TKPM 1, the problem-solving ability of the S1 subject is in the sufficient category while the S2 subject is in the good category. S1 subjects have not been able to explain the questions in their own language, while S2 subjects can explain in their own language. S1 and S2 subjects understand the problem by analyzing the problem by writing down what is known and asked from the question, but the subject only mentions a few of known and asked variables in the question number 1. S1 and S2 subjects show ability to make plans to solve the problem, but the S1 subject chooses a less precise formula in solving the problem and does not use known variables to determine other conditions of the problem, while the subject of Masters prepares the right plan on question number 1, while question number 2 the subject chooses the correct formula but the subject does not use other conditions that has been determined to search for the unknown. S1 and S2 subjects were incomplete in writing down the steps to solve the problem. This is in line with research conducted by Nurul Tridayanti which suggested that

in the stage of implementing the chosen strategy/method to solve the problem students are unable to assume known data, unable to make equations from known data and unable to draw conclusions (Tridayanti, 2019) .

At the stage of implementing the problem solving, subjects S1 and S2 did problem solving, in question 1, subject S1 solved the problem with inappropriate steps, while the subject S2 solved the problem with the correct steps. For question number 2, subject S1 and S2, used less steps so that it does not provide a correct and appropriate solution. In the re-examination stage, subjects S1 and S2 re-checked, in question number 1, subject S1 used the wrong method and subject S2 used the correct method in re-examining, while question number 2 subjects S1 and S2 did not use the correct and appropriate method in conducting checking.

Based on the results of data analysis through test questions and TKPM 2 interviews given after online learning, the problem-solving abilities of S1 and S2 subjects are excellent. At the stage of understanding the problem, the subjects of S1 and S2 are able to rephrase the problem using their own language, analyze the problem by writing down what is known and asked variables of the problem and able to provide an illustrated picture of the problem. This is due to online learning where the students used to be asked to write down everything what is known and asked in the questions and make illustrations of the questions. In the planning stage of problem solving, S1 and S2 subjects are able to choose the right formula when making plans, are able to determine other unknown requirements and develop step by step in solving problems. This is due to face-to-face online learning through video calls, S1 and S2 subjects are guided to plan and choose the right formula for the given problem, besides that the subject is also asked to think about what elements to look for first before using the selected formula. .

In the stage of implementing of problem solving, the subject is able to solve the problem with the steps that have been prepared and provide the correct and correct answer. This is due to online learning, subjects are guided to solve problems with the chosen method until they provide the right solution. In the re-examination stage, the subject re-checks by reviewing the answer using another method and comparing it with the answers obtained by the subject and drawing conclusions. This is due to online learning, the subject is guided to re-check so that the subject is sure the answer is correct by comparing the results with what is known in the subject's questions and answers before the subject is asked to make

conclusions. The problem-solving ability of S1 and S2 subjects is very good at TKPM 2 because online learning is carried out using the assignment method and face-to-face through video calls, the subject understands and the teaching material better. In line with the research, several studies were conducted in learning mathematics during the COVID-19 pandemic. In improving the quality of online mathematics learning during the Covid-19 pandemic, one of them is learning through video calls (Bringula et al., 2021; Mustakim, 2020; Wardani & Saputro, 2021; Winhandl et al., 2021).

CONCLUSION

This study concluded that the students problem-solving skills during online learning via Whatsapp Group and G-meet on the contect of identifying the area and perimeter of the trapezoid by using the assignment method in face-to-face online were excellent. The details of each stage of problem solving can summarize as follows: 1) problem understanding, the subject can explain the problem using their own language, analyze the problem by writing down known and asked variables, and provide illustrations of the picture 2) plan problem solving, the subject can determine other requirements of the problem, select a formula and arrange steps to solve the problem 3) problem solving implemenation, the subject solves the problem by using the selected formula and the relevant steps, and 4) cross-checking the answers, the subject re-checks the answers by using other methods and compares the results with their answers.

REFERENSI

Ali, S. S. (2019). Problem based learning: A student-centered approach. *English language teaching*, *12*(5), 73-78.

Ariani, S. Hartono, Y. Hiltrimartin, C. 2017. Kemampuan Pemecahan Masalah Matematika Siswa Pada Pembelajaran Matematika Menggunakan Strategi Abduktif-Deduktif Di SMA Negeri 1 Indralaya Utara. *Jurnal Elemen 3(1), 25-34*

Azhari, B., & Fajri, I. (2021). Distance learning during the COVID-19 pandemic: School closure in Indonesia. *International Journal of Mathematical Education in Science and Technology*, 1-21.

Bringula, R., Reguyal, J. J., Tan, D. D., & Ulfa, S. (2021). Mathematics self-concept and challenges of learners in an online learning environment during COVID-19 pandemic. *Smart Learning Environments, 8*(1), 1-23.

Cauchemez, S., Ferguson, N. M., Wachtel, C., Tegnell, A., Saour, G., Duncan, B., & Nicoll, A. (2009). Closure of schools during an infl uenza pandemic. *The Lancet infectious diseases*, *9*(8), 473–481. Diambil dari https://doi.org/10.1016/S1473-3099(09)70176-8

Cowling, B. J., Lau, M. S. Y., Ho, L. M., Chuang, S. K., Tsang, T., Liu, S. H., … Lau, E. H. Y. (2010). The effective reproduction number of pandemic influenza: Prospective estimation. *Epidemiology*, *21*(6), 842–846.

Doorman, M., Drijvers, P., Dekker, T., van den Heuvel-Panhuizen, M., de Lange, J., & Wijers, M. (2007). Problem solving as a challenge for mathematics education in The Netherlands. *ZDM*, *39*(5), 405-418.

Fajri, I. (2021). Implementation of The Project Citizen Model In 21st Century Learning: The Project Citizen. *PENCERAHAN*, *15*(2), 169-187.

Fajri, I., Yusuf, R., & Yusoff, M. Z. M. (2021). Model Pembelajaran Project Citizen Sebagai Inovasi Pembelajaran Dalam Meningkatkan Keterampilan Abad 21. *JURNAL HURRIAH: Jurnal Evaluasi Pendidikan Dan Penelitian*, *2*(3), 105-118.

Fong, M. W., Gao, H., Wong, J. Y., Xiao, J., Shiu, E. Y. C., Ryu, S., & Cowling, B. J. (2020). Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings — Social Distancing Measures. *Emerging Infectious Diseases*, *26*(5).

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn?. *Educational psychology review*, *16*(3), 235-266.

Hn, P., Kong, H., Wu, J. T., Cowling, B. J., Lau, E. H. Y., Ip, D. K. M., … Riley, S. (2010). School Closure and Mitigation of Pandemic (H1N1) 2009, Hong Kong. *merging infectious diseases*, *16*(3), 10–13. https://doi.org/10.3201/eid1603.091216

Jua, S. K. (2018, May). The profile of students' problem-solving skill in physics across interest program in the secondary school. In *Journal of Physics: Conference Series* (Vol. 1022, No. 1, p. 012027). IOP Publishing.

Kartika, R. 2018. Analisis Kemampuan Pemecahan Masalah Matematik Siswa SMP Kelas VII Pada Materi Persegi Panjang. *Jurnal Pembelajaran Matematika Inovatif 1*(4), *773-778*

Mulianda, D., & Fajri, I. (2021). Pembelajaran jarak jauh selama pandemi COVID-19: Pemahaman, penggunaan dan kriteria pemilihan ICT oleh guru IPA di Aceh. *PENCERAHAN*, *15*(2), 111-126.

Mulyati, T. Rohaeti, E. E. Afrillianto, M. (2016). Kemampuan Pemecahan Masalah Matematis Siswa **Sekolah** Dasar. *Jurnal Pendidikaan Dasar 3*(2), *1-15*

Mustakim. 2020. Efektivitas Pembelajaran Daring Menggunakan Media Online Selama Pandemi COVID-19 Pada Mata Pelajaran Matematika. *Journal of Islamic Education 2(1), 1-12*

Nursyahidah, F., Saputro, B. A., & Rubowo, M. R. (2018). Students Problem Solving Ability Based on Realistic Mathematics with Ethnomathematics. *Journal of Research and Advances in Mathematics Education, 3*(1), 13-24.

Prasetyo, B. dkk. 2005. *Metode Penelitian Kuantitatif,* Jakarta: Raja Grafindo Persada

Prem, K., Liu, Y., Russell, T. W., Kucharski, A. J., Eggo, R. M., & Davies, N. (2020). The effect of control strategies to reduce social mixing on outcomes of the COVID-19 epidemic in Wuhan , China : a modelling study. *The Lancet Public Health, 5*(5), 261–270. https://doi.org/10.1016/S2468-2667(20)30073-6

Purwaningsih, D. Ardani, A. 2019. Analisis Kemampuan Pemecahan Masalah Matematika Menurut Polya Pada Materi Transformasi Linier. *Jurnal Pendidikan Surya Edukasi (JPSE) 5(1), 69-76*

Putri, H. E. 2017. *Pendekatan Concrete-Pictorial-Abstract (CPA), Kemapuan-Kemampuan Matematis dan Rancangan Pembelajarannya.* Sumedang: UPI Sumedang Press

Santi, C., Helmon, A., & Sennen, E. (2021). Pembelajaran Pemecahan Masalah Matematika Di Sekolah Dasar: Masalah Dan Upaya Yang Dapat Dilakukan. *Jurnal Literasi Pendidikan Dasar (JLPD), 2*(2), 31-40.

Seibert, S. A. (2021). Problem-based learning: A strategy to foster generation Z's critical thinking and perseverance. *Teaching and Learning in Nursing*, *16*(1), 85-88.

Siagan, M. V., Saragih, S., & Sinaga, B. (2019). Development of Learning Materials Oriented on Problem-Based Learning Model to Improve Students' Mathematical Problem Solving Ability and Metacognition Ability. *International electronic journal of mathematics education, 14*(2), 331-340.

Siregar, H. S. et all. 2020. Merekonstruksi Alam Dalam Kajian Sains dan Agama: Studi Kasus Pada Masa Pembatasan Sosial Berskala Besar (PSBB) dampak Covid-19. Bandung*: Digital Library UIN Sunan Gunung Djati,* H. 1-12

Suastika, K. (2017). Mathematics learning model of open problem solving to develop students' creativity. *International Electronic Journal of Mathematics Education, 12*(3), 569-577.

Suraji, S., Maimunah, M., & Saragih, S. (2018). Analisis kemampuan pemahaman konsep matematis dan kemampuan pemecahan masalah matematis siswa smp pada materi sistem persamaan linear dua variabel (SPLDV). *Suska Journal of Mathematics Education, 4*(1), 9-16.

Suryana, Y. et all. 2020. Manajemen Pembelajaran Daring Berbasis Empati Untuk Pemeliharaan Motivasi Belajar Daring Mahasiswa Dalam Situasi Wabah Covid-19. Bandung: *Karya Tulis Ilmiah UIN Sunan Gunung Djati,* H. 1-14

Tian, H., Liu, Y., Li, Y., Wu, C., Chen, B., Kraemer, M. U. G., … Dye, C. (2020). An investigation of transmission control measures during the first 50 days of the

COVID-19 epidemic in China. *Science*, *368*(6491), 638–642. https://doi.org/10.1126/science.abb6105

Tridayanti, N. Darmawan, P. Prayekti, N. 2019. Analisis Kemampuan Pemecahan Masalah Siswa SMP Dalam Memecahkan Masalah Aritmatika Sosial Ditinjau Dari Langkah-langkah Pemecahan Masalah Polya". *Prosiding: Konferensi Nasional Matematika dan IPA Universitas PGRI Banyuwangi 1 (10), 107-114*

Wardani, E. R., & Saputro, D. R. S. (2021, March). Online Mathematics Learning during the Covid-19 Pandemic. In *Journal of Physics: Conference Series* (Vol. 1808, No. 1, p. 012044). IOP Publishing.

Weinhandl, R., Lavicza, Z., Houghton, T., & Hohenwarter, M. (2021). A look over students' shoulders when learning mathematics in home-schooling. *International Journal of Mathematical Education in Science and Technology*, 1-21.

WHO. (2020). Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020.

Wulandari, N. P. R., Dantes, N., & Antara, P. A. (2020). Pendekatan Pendidikan Matematika Realistik Berbasis Open Ended Terhadap Kemampuan Pemecahan Masalah Matematika Siswa. *Jurnal Ilmiah Sekolah Dasar*, *4*(2), 131-142.

Yensi, A.N. (2020). Efektifitas Pembelajaran Statistika Matematika Melalui Media *WhatsApp Group* Ditinjau Dari Hasil Belajar Mahasiswa (Masa Pandemik Covid-19). *Jurnal Pendidikan Matematika Raflesia 5(2), 65-74*