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The Effectiveness of Manipulative Display Tool Assisted-Stay at Home Learning on the Students' Problem Solving

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Abstract

The use of manipulative display tool is able to draw the interest of the students and, at the same time, motivate them to pay attention to the learning process. The manipulative display tool itself may serve as an aid to deliver or to explain the mathematical concepts correctly. In addition to the problem, and specific to the context of the study, the problem-solving capacity of the students in SD Negeri Banjarsari the District of Ajibarang the Regecy of Banyumas is still low. The study aims to identify the effectiveness of the manipulative display tool assisted-stay at home learning against problem-solving skills of the students. In conducting the study, the method that has been implemented is the mixed method. The study used the sequential explanatory design using the sequential combination of the quantitative and the qualitative research method. The number of the subjects in the study consist of 88 respondents. The quantitative samples for the study are gathered through the cluster random sampling technique while the qualitative samples for the study are gathered through the purposive sampling technique. Furthermore, the data gathering method that has been used in the study consists of test, questionnaire, interview, and documentation. After the data have been gathered, the data are analysed by using the independent sample t-test and the N-gain test. Based on the results of the study, it is found that there have been differences on the mathematical problem-solving learning results between the students in the experimental group and the control group with the significance value .000 < 0.05. in addition, it is also found that the pre-test and the post-test results of the experimental group have increased namely 0.59 and 0.38 as these results belong to the moderate category. Hence, these findings show that the improvement on the learning results has been influenced by the effective of the manipulative display tool-assisted stay at home learning and the open-ended questions.

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INTRODUCTION

The world has ben shocked with a diseased caused by a virus known as Covid-19 (Coronavirus Diseases-19) (Hanifiyah & Hidayah, 2022). The virus has made its way to Indonesia on March 2nd, 2020. The entry of the virus was announced by the President of Indonesia Ir. Joko Widodo in his press release (Rahmatunnisa et al., 2020). Covid-19 has now been a very terrifying matter for the people throughout the globe. Corona has been the most lethal virus and the virus first appeared in Wuhan, China. Afterward, the World Health Organization (WHO) has announced Covid-19 as pandemic. Indeed, the Covid-19 pandemic has recently been considered as the global health emergency situation. The development of the virus has now reached not only China but also the other countries. The rate of casualty caused by the virus has been increasing including the one in Indonesia (Joharudin et al., 2020). This situation has encouraged the Indonesian government to pursue any kind of methods for suppressing the transmission rate of the virus.

The methods that have been afforded by the Indonesian government to overcame the situation are namely social distancing, staying at home, large-scale social distancing, facemask use, hand sanitizer use, and alike. All sectors in Indonesia have been impacted by the appearance of the virus and some of these sectors are economy, trading, and even education. A number of policies and updates have been made by the government in order that the educational process and the teaching-learning process can still be conducted online at home (Harahap & Harahap, 2020). The activities that involve groups of people such as working, going to schools, and praying have now been limited at home in order to suppress the number of Covid-19 patients. The Minister Nadiem Makarim has even issued the Circular Letter Number 03 of 2020 Regarding Educational Unit and Number 36962/MPK.A/HJ/2020 Regarding the Implementation of Educational Process during the Emergency Period of Covid-10 Disease. With the issuance of the two policies, the learning activities should be conducted online in order to prevent the Covid-19 transmission (Menteri Pendidikan, 2020).

The facts that have been previously outlines show the importance for a teacher to establish meaningful learning and a teacher should also be skilful in designing the interactive learning amidst the Covid-19 pandemic. Pertaining to the previous statement, Mathematics is one of the disciplines that have been contained in the elementary school curriculum as having been outlined by the Article 37. Mathematics is very important to equip the students for their personal life in the society. According to Kusmaya & Prabawati (2022), in order to understand Mathematics and use the lesson in solving the problems, there should be a good concept mastery. Hence, the students should be skilful in solving the given problems appropriately.

The facts that have been found also show that Mathematics education is one of the contributing factors to the advancement of information and technology in a nation. The mastery of mathematical knowledge is highly necessary in the daily life and the knowledge can be used in various disciplines, including the exact science and the social science. Therefore, the Mathematics education at school should be conducted as early as possible so that the students can start exercising their critical, creative, and reasoning skills and solve various problems that they encounter in the daily life (Pujiastuti et al., 2012).

The problem solving skills is the main objective of Mathematics education as these skills can help solving the problems in both the other subjects and the daily life (Iswara & Sundayana, 2021). The solution to mathematical problems demands systematics within the solution. Therefore, the understanding toward the mathematical problems becomes highly necessary since the understanding will help the students to solve the given mathematical problems (Vilianti et al., 2018).

Problem solving is the core and the main process in the Mathematics curriculum because

it promotes more the process and the strategy that the students perform in the solution rather than the results; consequently, the process and strategy-related skills in solving the problems become the fundamental capacity in learning Mathematics. According to Lerch (In'am, 2016), mathematical problem-solving is an abstract and complicated process that involves humane thought and reasoning.

The mathematical problem-solving skills of the Indonesian students is still low. The evidence of the statement can be traced back to the results of a test administered by the Programme for International Student Assessment (PISA) held by the Organization for Economic Cooperation and Development (OECD). The assessment by PISA is conducted by testing the 15 years old children. The test materials of PISA assessment consist of Mathematics, Science, and Reading Skills. The results of PISA 2018 show that Indonesia has had decreasing score in each domain. The test results in the 2018 test for Reading Skills, Mathematics, and Science are 397, 386, and 403 respectively. From all of these scores, the score of Reading Skills has been the lowest one and, in fact, the score has been under the one reached in 2012 namely 396 (Lestari, 2020).

The other matter that becomes the contributing factor to the low problem-solving skills of the students is that the teachers have not habituated the students to complete the open-ended question within the conduct of the learning process. The difficulty happens as the students try to complete the test items that are different from the ones that the teachers give despite that the different test items are taken from the same learning materials. Indeed, most of the students still have errors in solving these mathematical problems. In relation to the situation, there are several matters that make the students incorrectly complete the test items and one of these matters is related to the low understanding of the students toward the basic concept. Not a few students have been in despair because they are confused, and they do not have any other alternative solutions. Hence, the use of open-ended question in the mathematical learning can deliver certain benefits. According to Becker & Shimada (Gafur et al., 2015), there are several benefits that can be gained in administering the open-ended question to the students and these benefits are: (1) the students are able to participate more actively in learning and expressing their ideas; (2) the open-ended problem-solving can deliver the sense of freedom and the supporting learning atmosphere because the learning process is rich of enjoyment in the discovery process and the approval from the other students since every student has plenty of right solutions and, therefore, every student has the equal opportunity to arrive at one right answer or more; (3) the students have more opportunities in using their skills and knowledge comprehensively; (4) the students have more opportunities in developing their reasoning; and (5) the students have the experience of solution based on their unique reasoning and, therefore, the students will be interested to the solution from each other and this situation can expand the knowledge and enrich their solutions altogether at the same time.

Reflecting from the previous explanation, the problem-solving skills of the students in Banjarsari Public Elementary School are also low. Based on the results of the interview, when the students complete mathematical test items, they will only pay attention to the final result without noticing the basic concepts or procedures in completing the test items, especially the narrative ones. This finding fits into the average score of the students' Mathematics daily test, which has still been under the passing grade (70.00). This finding thus informs that the students' capacity in completing the problem-solving test items has been low.

The cause of the low score on the students' problem-solving skills is related to the learning process that has been conducted in Grade IV of Banjarsari Public Elementary School. Specific to the context of the study, for the learning process of Mathematics the teacher still implements the question-and-answer session and the assignment delivery as the learning method without reference to any learning model

despite that there are several learning models available based on the Minister of Education and Culture Regulation Number 103 of 2014 and the Minister of Education and Culture Regulation Number 22 of 2016. These learning models fit into the Curriculum 2013 and, thereby, the stay at home-learning process certainly needs the interactive learning models. Consequently, the teachers are demanded to plan the more effective learning process. With regards to the statement, one of the learning models that can be used is the discovery learning. Returning to the context of the study, in addition to not implementing the learning model that is relevant to the Curriculum 2013 the teachers have only been using the available textbooks as the learning media and the teachers only need to explain the materials in accordance with the given textbooks.

Sohilait (2021) explains that discovery learning is a problem-solving model that can be useful for the students in dealing with their life in the future. In addition, discovery learning provides opportunities for the students to be directly engaged in the learning activities as the learning activities will trigger the learning motivation. The statement is in line with the argument by Putri, Nasri and Renata, (2022) that discovery learning is a learning process that the teachers do not partially conduct but, instead, that develop the skills and the knowledge of the students in solving the problems. As a result, through the implementation of the discovery learning the students can improve their individual discovery skills; at the same time, the learning conditions can be shifted from being passive to being active. By doing so, the teachers are able to shift from the teacher-oriented learning to the student-oriented learning.

The selection of the appropriate learning model with the assistance of the display tool can be very helpful for the students in their learning process in progress. The teachers of Grade IV state that they still rarely se the display tool since the display tool has not been available for certain materials in the school, especially for the case of manipulative display tool. The use of the display tool can be very attractive for the students so that the students can be attracted and be motivated to attend to the learning process. In the meantime, the concepts in Mathematics are abstract and generally the students' reasoning departs from the concrete to the abstract. Hence, one of the bridges that will help the students to perform their abstract reasoning toward Mathematics can be found in the use of the manipulative display tool. In accordance with the level of the intellectual development, the elementary school students are able to retrieve the mathematical concepts through the concrete objects. In order to facilitate this, there should be manipulations toward the objects that will be used for the conduct of the mathematical learning process and these objects are popularly known as display tools (Hasriana et al., 2021).

The manipulative display tool assisted-mathematical learning does not only aim at identifying the concepts and the principles but also, referring to the implementation of Curriculum 2013, strengthens the competencies of the students on the aspects of attitude, knowledge, and skills and also encourages the students to be able to solve the problems in their daily life (Dewi & Agustika, 2020). Through such manipulative display tool, it is expected that the students are able to actively learn through fund and interesting activities. Therefore, the manipulative display tool and the open-ended question become the mediator of the discovery learning model that will help the students in their learning material mastery. In turn, both manipulative display tool and the open-ended question will impact the confidence and the mathematical problem-solving skills of the students.

Departing from the overall explanation, the present study aims at identifying the effectiveness of the manipulative display tool assisted-stay at home learning on the problem-solving skills of the students. According to Kania (2018), manipulative display tool refers to the display tool that helps informing or explaining the mathematical concept using certain concrete objects in order to represent a concept correctly. The benefit that can be gained

from the conduct of the study is that the present study may serve as the reference for improving the mathematical problem-solving skills from the perspective of the students' self-confidence and contributing to the schools in order to improve the mathematical learning process.Departing from the overall explanation, the present study aims at identifying the effectiveness of the manipulative display tool assisted-stay at home learning on the problem-solving skills of the students. According to Kania (2018), manipulative display tool refers to the display tool that helps informing or explaining the mathematical concept using certain concrete objects in order to represent a concept correctly. The benefit that can be gained from the conduct of the study is that the present study may serve as the reference for improving the mathematical problem-solving skills from the perspective of the students' self-confidence and contributing to the schools in order to improve the mathematical learning process.

METHODS

The method that has been adopted in conducting the study is the mixed method. Then, the design that has been used in the study is the sequential explanatory design with the sequential elaboration of quantitative and qualitative research method. The overall stages of the study thus can be broken down into several parts as follows: (1) quantitative data gathering; (2) data analysis; and (3) further investigation through the conduct of qualitative study. These stages are described further in Figure 1.

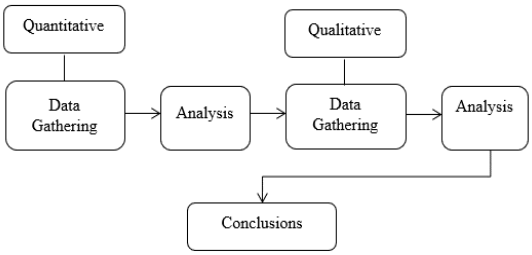


Figure 1. Sequential Explanatory Design

Within the conduct of the study, the researchers assign two groups that consist of an experimental group with the manipulative display tool assisted-stay at home learning and the open-ended questions and a control group with the stay-at-home learning with the manipulative display tool assistance and the open-ended questions. The research design can be seen in Table 1.

Table 1. Non-Equivalent Control Group Research Design

Group	Pre-Test	Treatment	Post-Test
Experimental	O_1	X	O_2
Control	O_3	-	O_4

Information:

O1 and O3 = The pre-test of the mathematical problem-solving skills

X = The implementation of the manipulative display tool assisted-stay at home learning and the open-ended question

O2 and O4 = The post-test of the mathematical problem-solving skills after the intervention of the treatment

The study has been conducted in Banjarsari Public Elementary School with the total number of subjects 88 Grade IV students from three parallel classrooms namely Grade IVA, Grade IVB, and Grade IVC. The quantitative sample gathering technique that has been adopted is the cluster random sampling and, therefore, Grade IVB becomes the experimental group while Grade IVC becomes the control group. Specifically, the experimental group consists of 30 students while the control group consists of 28 students. On the contrary, the qualitative sample gathering method that has been adopted is the purposive sampling. Through the purposive sampling, three students were selected as the representation of the high, the moderate, and the low self-confidence.

Then, the purposive sampling technique has been adopted because not all samples have the criteria that meet the phenomena under investigation. As a result, through the adoption of the purposive sampling technique, the

researchers should define certain criteria or considerations that should be met by the samples selected for the study.

Next, data gathering technique is defined as the technique that the researchers have used in order to gather the data for the current study. In the context of the study, the quantitative data are gathered from the problem-solving skills test and the students' self-confidence questionnaire. The indicators of the problem-solving skills that have been measured are problem understanding, solution planning, completing the calculation, rechecking the process, and results.

On the contrary, the qualitative data are gathered from the interview session with the students. Therefore, a good test item should undergo a test or an analysis first before being put into use. In relation to the statement, the test item analysis that has been selected is the validity test, the reliability test, the difficulty rate test, and the discriminant capacity test.

For the quantitative data analysis, the technique that has been adopted is the independent sample t-test and the N-gain test; meanwhile, for the qualitative data analysis, the validity of the data in the current study is tested by using triangulation. Specifically, the triangulation that has been adopted in the current study consists of the technique triangulation and the source triangulation. The technique triangulation is conducted by gathering the data through interview and documentation study. At the same time, the source triangulation is conducted by conducting interview sessions in order to attain the information necessary for the conduct of the current study. The qualitative data analysis will refer to the interaction model proposed by Miles & Huberman. According to this model, the activities that should be performed within the analysis consist of: (1) data reduction; (2) data display; and (3) conclusion drawing/verification. The complete process is depicted in Figure 2.

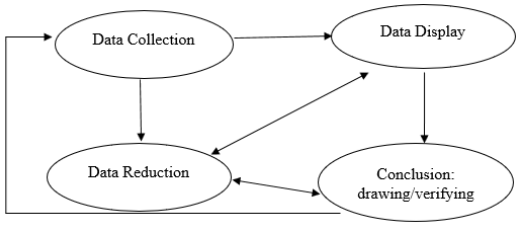


Figure 2. Data Analysis Model by Miles & Huberman

RESULTS AND DISCUSSION

The data that have been gathered are later analysed both quantitatively and qualitatively in order to answer the problem formulations with the total number of subjects 30 people in Grade IVB as the experimental group and 28 people in Grade IVC as the control group. The results of the normality test and the homogeneity test are provided in Table 2 below.

Table 2. Results of Normality Test

	Group	Sig.
Pre-Test Results	Experimental	0.135
	Control	0.200
Post-Test Results	Experimental	0.197
	Control	0.053

From the results in Table 2, the sig value for both the experimental group and the control group from both the pre-test results and the post-test results is higher than 0.05 ($\alpha > 0.05$). Hence, the H0 is accepted and it can be concluded that the data have been normally distributed. After the data have been normally distributed, the researchers proceed to the homogeneity test.

Based on the result of homogeneity test, it is found that the sig value is 0.054. Since $0.054 > 0.050$, the H0 is accepted and it can be concluded that the students in both the experimental group and the control group share similar or homogenous characteristics.

Then, departing from the independent sample t-test results, the researcher has found the sig. value 0.000. Since $0.000 < 0.050$, then H0 is rejected and this implies that the mean score of the problem-solving skills test results from the

students using the manipulative display tool and open-ended-assisted discovery learning are higher than that of the students using the activity sheet-assisted conventional learning. After the independent sample t-test has been completed, the researchers should proceed to the N-Gain test. The N-Gain test should be conducted in order to identify further the improvement of the students from their pre-test to their post-test. The data of the pre-test scores and the post-test scores from both the experimental group and the control group are provided in Table 4.

Table 4. Results of N-Gain Test from Both the Experimental Group and the Control Group

Group	Mean		N-Gain	Criteria
	Pre-Test	Post-Test		
Experimental	47.08	77.25	0.59	Moderate
Control	45.71	66.07	0.38	Moderate

Based on the results in Table 4, the improvement on the problem-solving skills of the students based on the pre-test score and the post-test score within the experimental group shows that the N-Gain mean score has been 0.59. This score implies that the problem-solving skills of the students belong to the "Moderate" category. In the meantime, the N-Gain within the control group has been 0.39 and this score implies that the problem-solving skills of the students belong to the "Moderate" category.

The manipulative display tool and open-ended question assisted-stay at home learning is conducted for the quantitative study; hence, the results of the study will be in the form of the scores for both the oral and the written test of problem-solving skills. The students in the experimental group have been treated with the manipulative display tool and open-ended question assisted-stay at home learning while those in the control group have been treated with the student's activity sheet assisted-conventional learning.

The results of significance from both groups show that the data have been normally distributed and thus there have been variance similarities between the experimental group and the control group. The learning process is conducted online by using the application WhatsApp Group due to the pandemic. Specifically, the learning process for the students in the experimental group has been conducted by using the manipulative display tool and open-ended question which has been previously delivered.

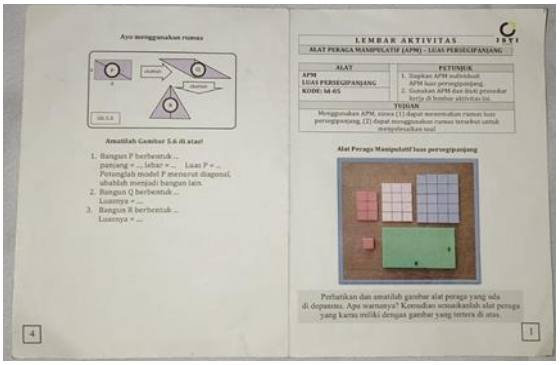
The use of the manipulative display tool and the open-ended question helps the students to understand the concept of the materials that the researchers have delivered so that the students can understand the concept easier. Afterward, the researchers deliver the teaching materials, the problem-solving test items, and the confidence questionnaire for students of both the experimental group and the control group. The problem-solving test items are completed by the students and sent to the application WhatsApp Group. Problem-solving itself is a process for dealing with the difficulties in order to achieve the expected objectives. In Mathematics, the problem-solving skills should be mastered by the students in order to solve the problem-based test items (Sumartini, 2016). After the test items have been sent by the students, the researchers interview the students in the experimental group one by one through the application WhatsApp. In the interview, the students view the problem-solving skills in oral manner while the researchers view the confidence with regards to the manipulative display tool and open-ended question-assisted stay at home learning. After the overall process has been done, the researchers proceed to the normality test and the homogeneity test for the final (post-test) data.

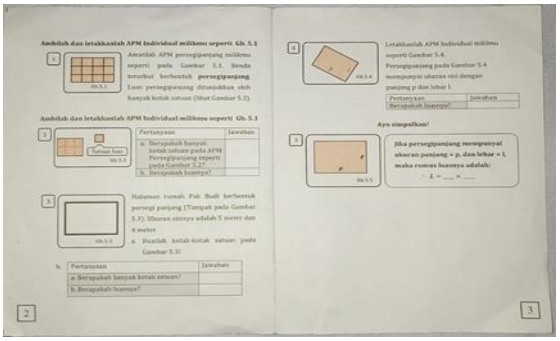
Reviewing the results that have been attained from the study on the use of the manipulative display tool and the open-ended question, it is found that both the manipulative display tool and the open-ended question has influenced the problem-solving skills of the students despite the learning process has been conducted online. The use of the manipulative display tool is deemed appropriate in the stay at

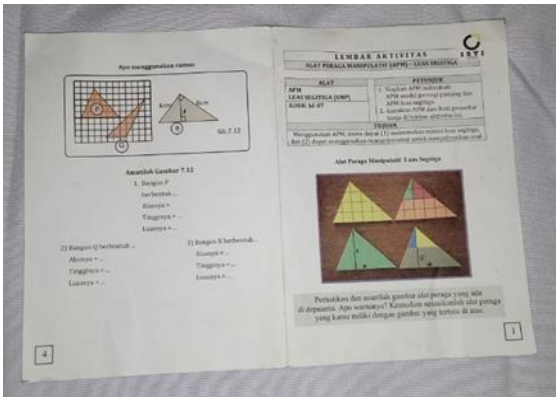
home learning because the tool delivers the concrete experience pertaining to the discussions of the existing materials despite the distance limitation. The statement is in line with the theory that has been proposed by Hidayah et al (2021) who state that the manipulative display tool can deal with the remote learning process.

The use of manipulative display tool has the relevance with the needs of learning media for the case of remote learning as it can help the teachers to simplify the abstract materials and helps the students to concretize the abstract learning materials. In addition, the use of manipulative learning tool can also improve the learning results of the students and later influence their classical completion based on their problem solving-skills in understanding the learning materials. The theory is supported by the study conducted by Harini & Juwana (2021), which show that the implementation of the manipulative display tool assisted-NHT type-cooperative learning model has been able to improve the learning results of Mathematics for the Grade VIII D students of Widya Sakti Junior High School Denpasar.

The manipulative display tools that have been used in the study are the ones designed for the fourth-grade students or equal by ISTI Corner for the learning materials of circumference and area of a square, a rectangle, and a triangle. These tools can be seen in Figure 3.







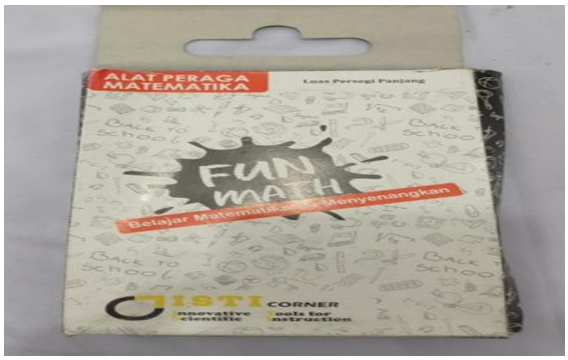


Figure 3. I-Corner Manipulative Display Tools

Aisyah (2022) in her journal article also supports the theory that has been previously explained, namely that the use of manipulative display tool is able to improve and accelerate the students' understanding toward the concept and improve their activeness, interaction, self-confidence, and enthusiasm within the learning process. The statement is in line with results of the study; therefore, especially for the elementary school students who are still in the concrete-thinking stage, these students should be provided with more opportunities to manipulate the items that can stimulate the activeness in the learning process so that they are able to understand the abstract mathematical concept and eventually solve the problems.

Lintang & Wardani (2017) mentions that the characteristics of the learning instruments that will be developed should encourage the students to be active in their efforts of solving the learning process both individually and collectively so that the learning instruments can lead the students to think about the solution to their problems. This explanation thus shows that the implementation of a display tool should trigger the improvement on the problem-solving skills of the students. Dewi, Ardana, & Saryasa (2019) in their journal article similarly state that the active engagement of the students during the learning process has been influenced by the use of manipulative media (GeoGebra) as the manipulative media helps the students to discovery again the concept of trigonometry that has been expected. It is the re-discovery of the concept of trigonometry that becomes the result of the influence by the manipulative display tool in the problem-solving skills.

The use of the manipulative display tool can be implemented hand-in-hand with the open-ended question for the case of problem-solving skills in order to gather the maximum results. Mariam et al. (2019) in their journal article state that the open-ended approach can deliver the opportunities for the students to gain knowledge or experience in finding the problem, the understanding, and the solution through the use of several techniques. With regards to the statement, open-ended problem is a kind of problem that bears the potentials in accommodating the solution to the problems of the students. The problem-solving skills of the students is highly supportive in delivering the solutions to the problems that they have been dealing with. In addition, the use of open-ended question also bears several characteristics that put forward the problem-solving skills of the students. The statement is in line with the theory proposed by Delyana (2015), which shows that the open-ended characteristics are involving the Mathematics significantly in order to view the understanding of the students toward a problem. Not only that, the use of the open-ended

question also leads to numerous responses as the given numerous responses demand the students to use their own reasoning in responding to a problem. On the top of it, the presence of the communication has led to the open-ended questions and such presence delivers the opportunities for the students to communicate their reasoning into a systematic and understandable writing.

Based on the test results of the students' problem-solving skills, it is found that the manipulative display tool and open-ended question-assisted online learning process is more effective than the student's activity sheet assisted-conventional learning. In addition, the results of the study have been supported by the theories proposed in the other studies. These results are similar to the results of the other studies that have been previously elaborated and also the theories that have been outlines. Therefore, the results of the present study can be developed into a learning innovation.

In the present study, the problem-solving skills of the students are analysed based on the confidence. From the analysis, one of three subjects from the "High" category is selected as the representative of the students who have gained quite high score from the test results of the students' problem-solving skills. The subjects with these results have already met with all indicators with good problem solution. The example of the students' work on this part is available in Figure 4.

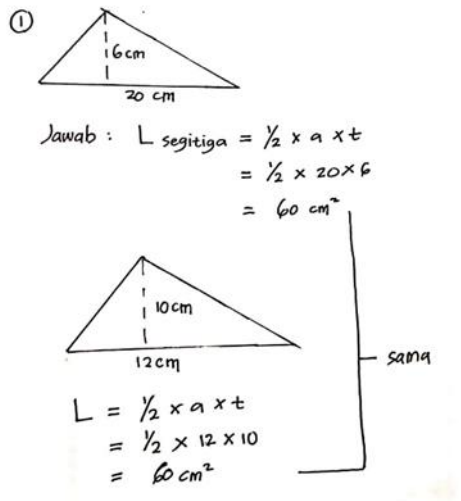


Figure 4. Research Subjects with "High" Category

Then, another subject from the "Moderate" category is selected as the representative of the students who have gained relatively moderate score from the test results of the students' problem-solving skills. These subjects have only achieved three indicators well namely: (1) understanding the problem; (2) planning the problem; and (3) reinvestigating. The example of the students' work on this part is available in Figure 5.

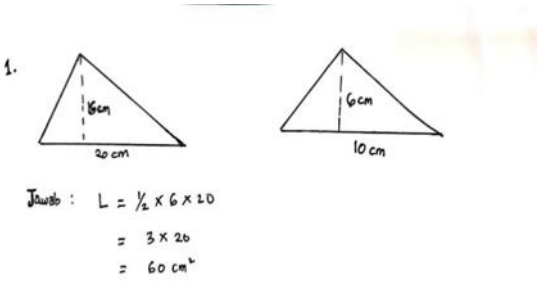


Figure 5. Research Subjects with "Moderate" Category

Last but not the least, another subject from the "Low" category is selected as the representative of the students who have gained low score from the test results of the students' problem-solving skills. These subjects have not been able to meet the problem-solving indicators. The example of the students' work on this part is available in Figure 6 below.

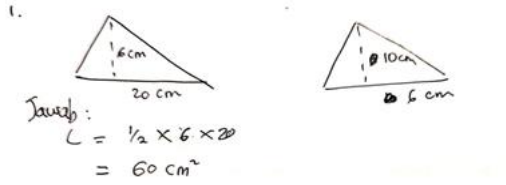


Figure 6. Researchers Subjects with "Low" Category

The results of the present study are in line with those of the study by Putra et al. (2018), which state that most of the students have good self-confidence in Mathematics but they are unable to make decisions on their own. As a

result, the students have to habituated to solve the mathematical issues without having to always be guided by the teachers. Despite that, the self-confidence of the students, which falls into the "Good" category, implies that the students are able to maintain self-confidence in finding the solution to their problems. Mualifah et al. (2020) also propose the same theory that self-confidence has significant influence on the mathematical problem-solving skills.

Annikmah et al. (2020) in her journal article similarly proposes that there is a positive and significant influence of the self-confidence on the mathematical problem-solving skills. Reski et al. (2019) also propose that in addition to the mathematical problem-solving skills alone learning independence will also influence the students in solving the given problems. Learning independence is described as part of individuals who are: (1) actively engaged in the learning environment; (2) arranging, exercising, and using their skills effectively; and (3) developing positive motivation in their learning skills. Pratiwi et al. (2019) in their journal article similarly explain that the learning independence of the students has direct and significant influence on the mathematical problem-solving skills of the students.

In the present study, 17% students have high self-confidence, 73% students have moderate self-confidence, and 10% students have low self-confidence. Since most of the students fall into the "Moderate" category, it can be implied that the subjects have been able to understand the problem, see and identify what is demanded by the problem, and also what is questioned by the problem although they have been less fluent in defining and selecting the problem-solving sequences and viewing how the test items can be put together so that they have the ideas to devise to the problem-solution plan. Furthermore, the students with the greatest portion of the category within the study are able to interpret the answers that have been found but their interpretation is still incomplete as they still make certain mistakes. From the interview session, the researchers find that the subjects have been able to contemplate on their mistakes.

Then, the students with the "Low" category (10%) have not been able to understand the problem and view what has been demanded from the problem as well as what has been identified from the problem but they still have to be guided in defining and selecting the problem-solving sequences and also viewing how the test items and the obscurities can be connected with the data in order to gain the ideas for devising a problem solution plan. From the interview session with the student, the researchers find that the student has not been able to elaborate the problem-solving sequence for the given test items clearly and to interpret the answers that have been found through the plan that has been made. In making sure that the response has been correct, the student still perform miscalculation despite the correct sequence.

Next, the students with the "High" category (17%) have been able to understand the problem and view what has been demanded from the problem as well as what has been identified from the problem very perfectly. These students have been able to define and select the problem-solving sequence and view how the test items and the obscurities can be connected to the data in order to gain the ideas for devising the problem solution plan. The statement is confirmed by the correct answers of the respondents in this group. From the interview session, the researchers find that the subjects can elaborate the problem-solving sequence for the given test items clearly. In addition, the subjects are able to interpret the answers that have been found through the plan that has been devised. At the same time, the students are also able to ensure whether the answers have been correct or incorrect.

The better the students are in solving the problems based on their problem-solving skills, the higher their self-confidence will be. The theory has been supported by the results of other studies. For instance, the results of the study by Rosmawati et al. (2021), Alawiyah et al. (2022), Fardani et al. (2021), and Khasmawati et al. (2022) have altogether stated that the higher the self-confidence is in each category then the higher the problem-solving skills among the

students will be. Hence, the level of the students' self-confidence will be equal to their problem-solving skills.

CONCLUSION

Based on the results of the study, it is found that there are differences on the mean score of the mathematical problem-solving skills between the students in experimental group and the students in the control group as the differences are shown with the significance value 0.000 < 0.050. The pre-test and the post-test results of the students in the experimental group have increased, namely 0.59 and 0.38, and these students belong to the "Moderate" category. These findings show that the learning results improvement has been influenced by the effectiveness of the manipulative display tool and open-ended question assisted-stay at home learning. The problem-solving skills of the students with high self-confidence show that these students have been able to meet all problem-solving indicators well. Then, the problem-solving skills of the students with moderate self-confidence show that these students have only been able to meet three problem-solving indicators namely: (1) understanding the problem; (2) planning the problem; and (3) reviewing the problem. Last but not the least, the problem-solving skills of the students with low self-confidence show that these students have not been able to meet the problem-solving indicators.

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