THE USE OF GRASPABLE MATH APPLICATIONS ON STUDENTS' MATHEMATICAL UNDERSTANDING COMPETENCE IN THE TOPIC OF TWO-VARIABLE LINEAR EQUATION SYSTEM

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Abstract. This research study discusses the issue of applying digital technology in long-distance learning to improve the results of students' mathematical understanding competence in algebraic material, one of them is the Two-Variable Linear Equation System. The author has conducted a preliminary study in the form of interviews at a junior high school in Bogor Regency that creation and innovation with a digital technology approach are needed to increase the attractiveness of learning and reduce disruption due to the pandemic. After implementing the use of the Graspable Math application in learning, objective data was obtained through the results of working on questions, filling out questionnaires, and interviews. We conclude that this application can be used as a practical medium for learning mathematics for students and helps improve students' mathematical understanding, especially in algebraic material which includes operations and substitutions between algebraic terms.

Keywords: Graspable Math; Mathematical Understanding Competence.

INTRODUCTION

The pandemic that has hit the world including Indonesia has had a big influence on various human activities, one of which is education. The adaptation of this incident resulted in the implementation of learning from home (Kementerian Pendidikan dan Kebudayaan Republik Indonesia, 2020). The implementation of this emergency rule also provides various new things for planning, processes, and student learning outcomes. One of the visible effects is the obstacle to the learning process, especially in mathematics. This is because it was found that the students' opinion that math-based learning in distance learning is more challenging than theory-based learning, because: 1) Limited space for interaction with the teacher; 2) The number of formulas used in mathematics; 3) Objects studied in mathematics have abstract patterns (Fauzy et al., 2021:1; Syarifuddin et al., 2021:551). Therefore, cases of other learning barriers that often occur are found, namely the lack of adequate internet facilities and networks (Huzaimah et al., 2021:533).

On the other side of the impact that occurred, many things can be utilized to develop for the better. One of them is the use of technology. The development of increasingly sophisticated technology has a major influence on all aspects, one of them is education. Many conveniences are obtained through technology packaged in fun learning. This is following what was said by NCTM in Jupri that effective teachers are expected to be able to take advantage of the potential of technology to develop students' understanding, stimulate interest in learning, and improve students' mathematical skills (Jupri, 2018:306). If technology can be used strategically, it can provide access to mathematics for students. According to Scawab, the industrial era 4.0 is a term used to refer to the combination of technology that forms something physical, biological, and digital into something difficult to distinguish (Putrawangsa & Hasanah, 2018:43).

In learning mathematics, students often find it difficult to capture and express mathematical ideas (Nopiyani et al., 2016:45). Usually the subject considers mathematics a subject that is considered difficult, but important to learn (Siregar, 2017:224). Efforts are needed to minimize the difficulty of learning mathematics, including improving teacher performance even starting from

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the university education level, prospective teachers need to know their most dominant intelligence so that they can create better learning. (Ariany et al., 2018:95)

In addition to teacher performance, students must also have the ability to support a better learning process. One of the mathematical abilities that students must have is the ability to understand mathematical concepts (Hidayat et al., 2014:57). The lack of mathematical understanding skills greatly influences the development of other mathematical abilities, both communication, problem-solving, reasoning, understanding, representation, creative thinking, and mathematical critical thinking and much more (Hendriana et al., 2017). The ability to understand mathematics is a strength that must be possessed during mathematics learning to gain meaningful knowledge (Mulianty et al., 2018:1072) so that students can understand concepts well.

There are several references regarding student indicators in mathematical understanding competence. One of them is stated by NCTM (Putri et al., 2018:158) that there are seven indicators, namely: 1) Defining concepts verbally and in writing; 2) Identifying and creating examples and non-examples; 3) Using models, diagrams, and symbols to represent a concept; 4) Changing one form of representation to another; 5) Get to know the various meanings and interpretations of concepts; 6) Identify the characteristics of a concept and recognize the conditions that determine a concept; and 7) Comparing and contrasting concepts. Based on research needs regarding the material on the System of Linear Equations of Two Variables, this indicator of mathematical comprehension ability is condensed into five indicators with the statement that indicator number four is combined with indicator number five and indicator number six is combined with indicator number seven.

Through scientific learning, various theories underlie technology-assisted learning. Among them, according to Ausubel cited by Dahar (Ahdhianto & Darmono, 2018) suggests that , learning will be meaningful if what students learn is arranged according to students' cognitive structure there is learning according to Bruner cited by Hudojo (Ahdhianto & Darmono, 2018) suggesting that learning mathematics is learning about various mathematical concepts and structures contained in the material being studied and looking for relationships between various concepts and mathematical structures consisting of 3 types namely enactive, iconic and symbolic. Then according to Jean Piaget who was later quoted by MKBPM (Ahdhianto & Darmono, 2018) explained that there is a schemata structure in one's thinking which is a collection of various schemes (initial knowledge) so that it can develop continuously through environmental adaptation. There are two processes of adaptation, namely assimilation and accommodation.

So many math applications are available to facilitate the process of learning mathematics, for example online and offline applications such as GeoGebra, SPSS, Photo Math, QM for Windows, and others. One application that is expected to make it easier but can improve students' mathematical understanding in various operations of algebraic forms and geometric shapes is the Graspable Math used in this study.

Graspable Math is an application that can be accessed in a compatible browser on a PC or smartphone at the link http://www.graspablemath.com/. This application is one of the media that teachers can use to package learning in class in conveying abstract algebra into interesting learning. According to the founders, Graspable Math is an application designed as an exploratory medium for students to more easily understand algebra (Ottmar et al., 2015:263) by moving each term to perform substitutive, commutative, distributive and addition, subtraction, and multiplication operations. and division complete with geometry, text, and graphics features,

RESEARCH METHOD

This study was designed and implemented using a qualitative approach. This single case study is essentially researching cases needed to test a theory (Ulfiatin, 2022:64), in this case, it is an indicator of Mathematical Understanding Competence. This study was conducted through an in-depth description of the various cases that occurred with the research subject (Sanjaya, 2013:47-48). Besides that, this study also went through a phase of collecting calculated data which was

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presented and then analyzed to be able to describe, elaborate, or explain the findings objectively (Masrizal, 2012:53)

  The population or all research objects (Arikunto, 2013:174) in this study was students of class VIII SMP Negeri 1 Cigombong. Through a purposive sampling technique, a small representative portion of the population or the so-called research sample (Sugiyono, 2012:81) obtained as many as 6 students with different levels of initial math ability. From the results of grouping based on the final score of the supporting teacher, these students can be classified into three categories of high, medium, and low early math ability. After getting six students with two people in each category, continued with distance learning using Graspable Math. Application Grasof pable Math on the subject of Two-Variable Linear Equation Systems. After the students' Mathematical Understanding Competence tests were carried out, the data obtained from the description test was analyzed through a percentage score process with the following formula.

$$Score\ Percentage = \frac{total\ score\ obtained}{Maximum\ number\ of\ scores} \times 100\%$$

  Furthermore, the data were analyzed by grouping according to the level of ability of the initial understanding of mathematics obtained. Furthermore, the output of this result is the achievement category of mathematical understanding competence based on the modified Arikunto criteria as follows.

Table 1. Criteria for Students' Mathematical Understanding Competence

Percentage (%)	Category
0 – 20	Very Poor
21 – 40	Poor
41 – 60	Enough
61 – 80	Good
81 – 100	Very Good

(Tanzimah, 2021:82)

  This calculation is needed to find out the categories obtained by the six students so that they can be described based on reliable and objective data. After getting the category of each student, the data is described with the appropriate literature review. In addition to the posttest results, students also gave their respective responses to learning using the Graspable Math application by filling out the questions provided on the Google Form. All these results are then reviewed and conclusions can be drawn.

RESULT AND ANALYSIS

  The research was conducted in three online meetings with a focus on using Graspable Math outside of even semester learning hours. At the first meeting, the researcher motivated the students to remember or review the material on the Linear Equation System of Two Variables which they had obtained during the last odd semester,r and given some problems on the System of Two Variable Linear Equations contextually. In addition, students were also given a brief introduction to Graspable Math and given the motivation to explore the application and read the application guidebook that had been prepared by the researcher. From the first day, students were able to take part in the learning well, but some students were constrained by the network so they could not stay in virtual space from start to finish. The conclusion of the first meeting learning activities can be seen that students who have high motivation can participate and be active in learning, including R-4 and R-5 with medium dand high PAM categories.

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At the second meeting, students solved several problems regarding the Two-Variable Linear Equation System and practiced solving the Two-Variable Linear Equation System using the substitution method in Graspable Math. On the second day of learning, R-1 and R-6 did not attend class due to network constraints. This has the impact of the lack of exposure conveyed to R-1 and R-6.

At the second meeting, an introduction to the application was also carried out by the researcher with the aim that students could understand the guidebook that had been given before. The following is the initial appearance of version 2.33.3 which is opened in a browser on a Personal Computer and a display of the results of the substitution method of the Two-Variable Linear Equation System in the Graspable Math.
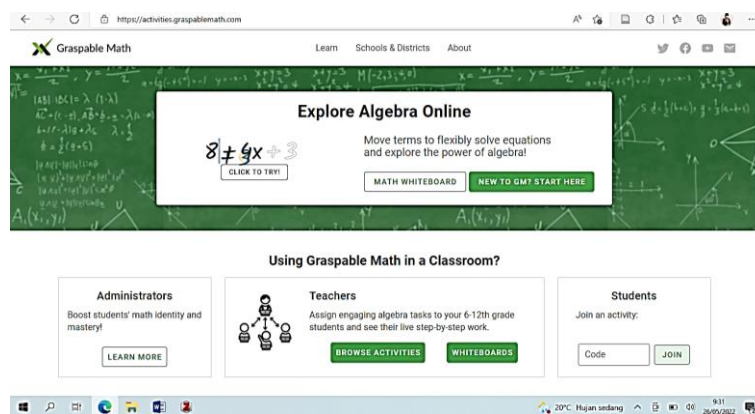

Fig. 1 Home of Graspable Math Application

Fig. 1 is given an explanation in advance regarding the initial appearance of the Graspable Math application by first opening the URL address at https://www/graspablemath.com via a search engine such as Google Chrome, Mozilla Firefox, Microsoft Edge, etc. This learning media is free to access for free and there is no need to download the application directly. This indirectly provides advantages, one of them is that it does not require a lot of space other than a search engine that users must have. However, this also has drawbacks, one of them is that you must always be connected to the internet network when you are using it. Furthermore, after explaining some of the tools in the initial display, the author provides examples of algebraic problems that can be solved through this application by clicking math on the whiteboard on the initial display so that it appears as shown below.
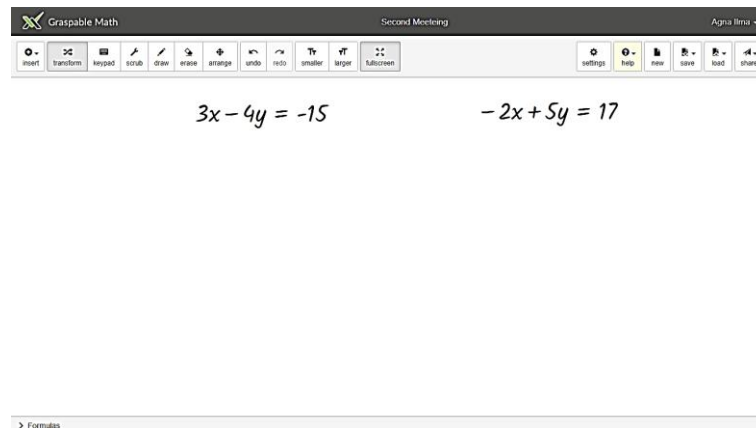
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Fig. 2 Input the Equation

The next Function, in Fig. 2 is the result after the user inputs the desired mathematical sentence. This process uses the insert tool then clicks math expression, then the result appears like that. The application can include an unlimited number of mathematical functions and up to three variables. In addition, the functions that have been entered can also be moved by dragging the function through the arranged tools in the display.
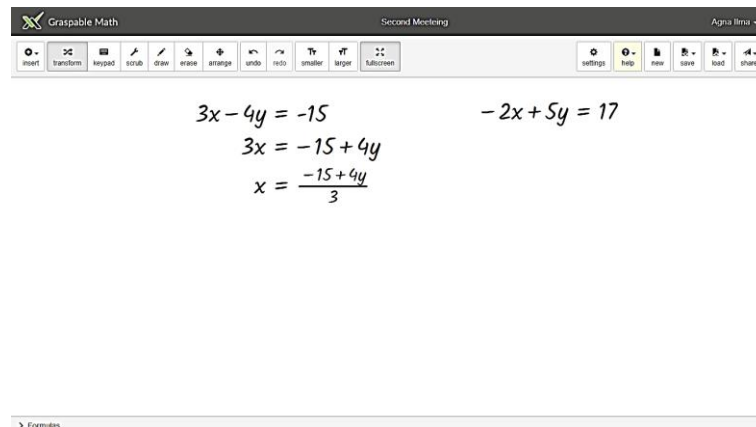

Fig. 3 Finding the Value of the First Equation

To find the value of x and y at two-variable linear equation system problem in the Graspable Math application, you can only use the substitution method. The way to operate it is to shift the number or variable you want to operate on. In Fig. 3, we can move $-4y$ and move sideways -15 then it will automatically be like above. The operation can be carried out further as was done before and can be seen in Fig. 4 following.

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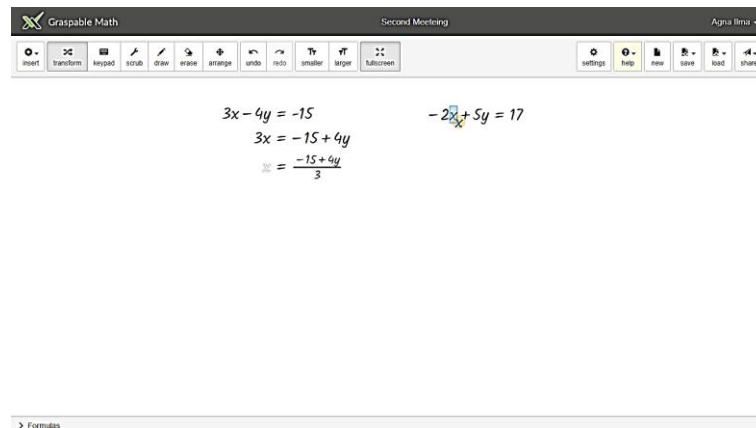Competence in The Topic of Two-Variable Linear Equation System

Fig. 4 Substitution of Values x in the Second Equation

Fig. 4 shows that variable x in the left equation (or the first equation) that has previously been operated into x can be shifted and stored just above the x variables in the right equation (or the second equation). This process is called the substitution process by substituting equation 1 into equation 2 (Humairah & Subaidi, 2022:59) to find the unknown values of the two variables.

The next process is carried out similarly, namely merging or grouping with similar tribes. This Graspable Math application has a sophisticated operation. When the two tribes are not of the same kind, it means that it cannot be operated. Then the application will not be able to operate with a variable response or the type that is being shifted will vibrate. This can indicate that students can learn more through this application regarding the same or different types of tribes.
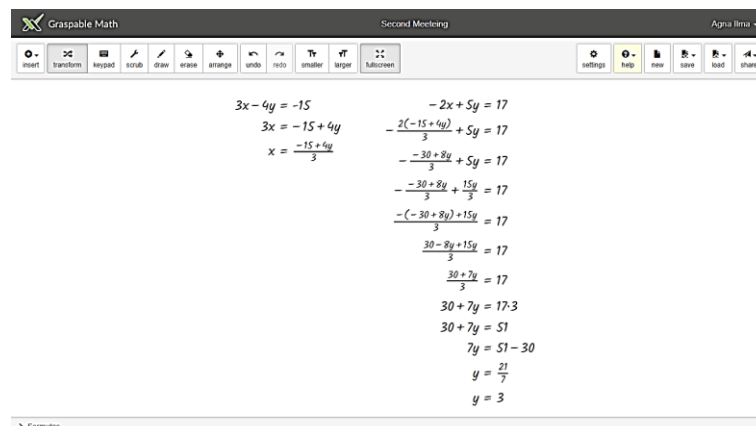

Fig. 5 Getting values of y

Can be seen in Fig. 4 illustrates that the variable y values in the two equations can be found through the process of transferring the x variables in the first equation to the second equation. Operational processes such as addition, subtraction, multiplication, and division can be done by double-clicking on the sign to be operated. Like the example in Fig. 4 we get the equation

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$7y = 51 - 30$. In this process the user can double-click on the subtraction operation sign (sign -) so that the application automatically responds to the calculation results below.
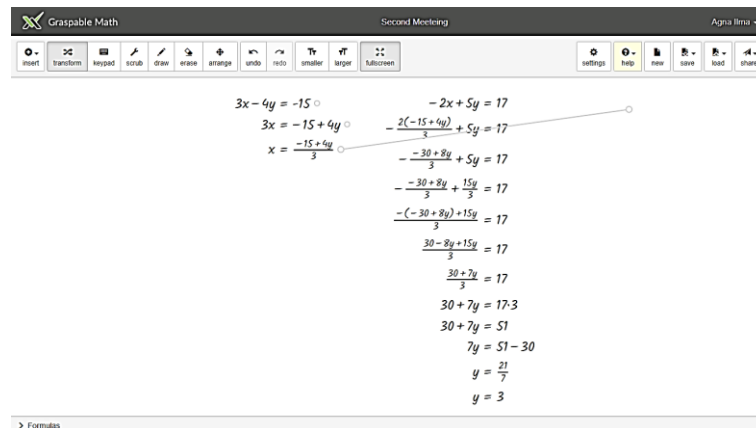

Fig. 6 *Drag the Result of the First Equation to Create a New One*

Next, in Fig. 6 it can be seen that the user shifts x the first operated equation to the right of the second equation. This can be done by clicking on the circle to the right of the equation and then dragging it until it is exactly where you want the canvas to be.

After that, the user can substitute back the x value that has been obtained, namely in Fig. The 3 results $y = 3$ are substituted into the first equation $x = -\dfrac{15 + 4y}{3}$ so that the desired result is obtained, namely the certain values of the two variables that were previously asked in the problem of the System of Linear Equations of Two Variables. The results of the two variables in this question are in Fig. 7 follows.
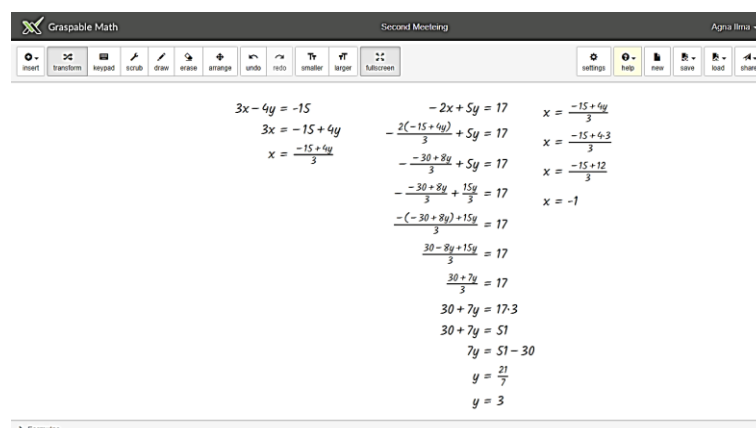

Fig. 7 Getting x and y Values

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In Fig. 7 the final result is obtained from the current problem of the Two Variable Linear Equation System. Fig. 1 to Fig. 7 shows some of the steps taken during the second meeting in solving the System of Two Variable Linear Equations problem with the help of the Graspable Math from the first equation $3x - 4y = -15$ and second equation $-2x + 5y = 17$ with the substitution method so that the values for $x = -1$ and $y = 3$. In accordance with the statement of the founder application Graspable Math work drop and drag , algebraic operations will be carried out (Ottmar et al., 2015).

The third meeting is the last meeting with the collection of various assignments and review . At the end of this meeting, it was continued by administering a description test with indicators of Mathematical Understanding Competence in the matter of the System of Two Variable Linear Equations. The following is a clear breakdown of the indicators of Mathematical Understanding Competence used in the five questions tested.

Table 2. Table of Indicators of Mathematical Understanding Competence

No	Indicators of Mathematical Understanding Competence	Question Indicator	Question
1	Restate the concept of a Linear Equation System of Two Variables that has been learned	Students are expected to be able to restate a concept, the concept in question is not just a formula but can also define a material.	What is a System of Two Variable Linear Equations?
2	Identify and make examples and non-examples of the Two-Variable Linear Equation System	Students are expected to be able to provide examples and non-examples of a concept and be able to provide correct answers and clear explanations of a mathematical problem.	Consider the following equations: a. $x^2 - 4y = 8$ b. $\begin{cases} x - 3y = -1 \\ x + y = 3 \end{cases}$ Which of the equations above is an example and not an example of a System of Two Variable Linear Equations? Explain that!
3	Using certain methods to solve models on a concept of a system of linear equations with two variables	Students are expected to be able to use and utilize certain procedures or operations. Students are said to be able to use the right procedure if students solve a mathematical problem with mathematical steps to obtain a solution or answer to the problem mathematically.	Determine the set of solutions for the following Two-Variable Linear Equation System! $\begin{cases} 3x + 2y = 19 \\ x - 4y = -17 \end{cases}$
4	Changing a story form into a Two-Variable Linear Equation System model and getting to know the various methods of the Two-Variable Linear Equation System	Students are expected to be able to change story problems about the problem of the Two-Variable Linear Equation System to the mathematical sentence form of the Two-Variable Linear Equation System The difference between the	ages of a father and daughter are 26 years old, whereas five years ago the sum of their ages was 34 years. How to write mathematical sentences in the form of a system of two-variable linear equations?
5	Identify the properties of a concept and recognize the requirements for a Two-Variable Linear Equation System to determine the method of the Two-Variable Linear Equation System concept to be used.	Students are expected to be able to apply concepts or algorithms to problem-solving. Students are said to be able to apply concepts if students can use concepts that are by the right procedures to obtain a mathematical solution.	Aminah bought 2 prayer mats and 3 Al-Qur'ans from Al-Kautsar Shop and paid Rp. 352,000, - while Abdul bought 1 prayer mat and 4 Al-Qur'ans to pay Rp. 381.000,- at the same store. If Nur wants to buy 4 prayer mats and 2 Al-Qur'ans at the shop, then how much change must Nur receive if he pays Rp. 400.000,-?

The problem indicators in Table 2 are the result of adjustments between the indicators of Mathematical Understanding Competence and the material used, namely the material for the System of Two Variable Linear Equations. These questions have been validated beforehand by expert validators so that five description questions are obtained which are given to students. The

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process of working on this problem is through a remote monitoring system by sending soft files via the WhatsApp application. The results of the posttest for the six students were obtained in the form of a percentage that can be adjusted to the categories that have been previously determined as follows.

Table 3. Student Posttest Results

Sample	Category of Early Knowledge of Mathematics	Score *Posttest* (%)	Category
R-1	Low	90	Very Good
R-2	Low	67	Good
R-3	Moderate	57	Enough
R-4	Moderate	88	Very Good
R-5	High	90	Very Good
R-6	High	59	Good

Table 3 shows the posttest and qualitative categories of mathematical understanding competence proposed by Arikunto have been adjusted according to needs. This table shows that the average of the six students got a score of 75.2 in the good category in understanding mathematical concepts in the material on the System of Two Variable Linear Equations. Meanwhile, if viewed individually, the highest score is 90 obtained by R-5 in the category of high prior knowledge of mathematics and R-1 in the category of low prior knowledge of mathematics, while the lowest score is 57 obtained by respondent R-3 in the category of moderate prior knowledge of mathematics. . Through this phenomenon it can be seen that there is a discrepancy between the categories of prior mathematical knowledge obtained. The following is the documentation of students working on post-test questions.
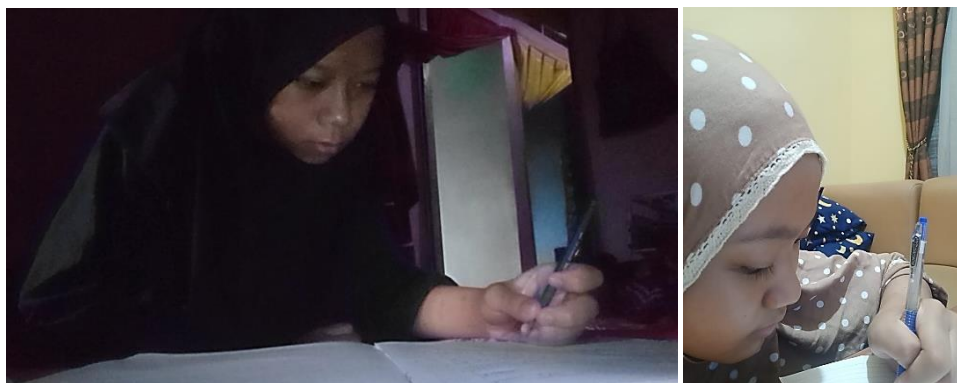

Fig. 8 Sample Documentation of Students When Doing Posttest

Fig. 8 are two out of six other students who have participated in distance learning via Zoom meeting. However, learning outside of class hours does not discourage students from getting additional knowledge. Furthermore, to see the achievement of students in this study is to analyze a sample of the results of students' answers from student answer sheets for each indicator that has been classified.

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1.1 Restating the concept of the Two-Variable Linear Equation System that has been studied

In this indicator of Mathematical Understanding Competence, it is described according to the material of the Two-Variable Linear Equation System, the problem indicator is that students are expected to be able to restate a concept, the concept in question is not just a formula but can also define a material. The following is one of the student's answers.
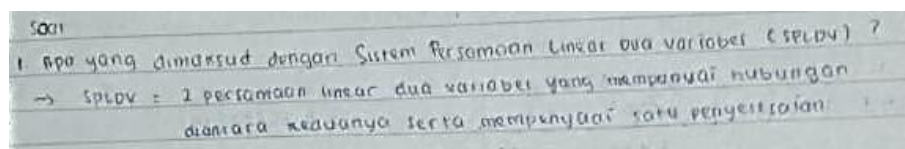

Fig. 9 One of the Student's Answers from Indicator Number One

From Fig. 9 answers to questions regarding the definition of a system of linear equations for two variables are obtained. This shows that students have been able to fulfill one of the indicators of mathematical comprehension ability by restating the concept of a system of two-variable linear equations by restating the definition completely and precisely.

1.2 Identify and make examples and non-examples of the Two-Variable Linear Equation System

In the second indicator, it is described by the material of the Two-Variable Linear Equation System so that the problem indicators are obtained, namely, students are expected to be able to provide examples and non-examples of a concept and be able to provide the right answers and a clear explanation of a mathematical problem. The following is one of the students' answers.
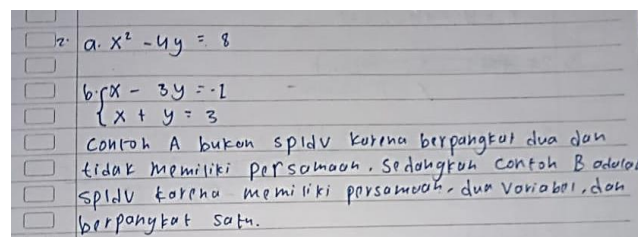

Fig. 10 One of the Student's Answers from Indicator Number Two

The results of examining student answers in number two on average are still not correct. Some of them as seen in Fig. 10. The answer has a slight error in the reason stated. First, by definition, an equation is an open sentence that contains an equal relationship and an open sentence is a sentence whose value is not yet known (Nafii, 2017:121). In this case, the student's reason for stating that example A is not an example of a system of two-variable linear equations is because it has powers of two and has no equations. So it is clear that $x^2 - 4y = 8$ that it is an equation and this matter is contradictory to the sentence "has no similarities". The second thing to observe in the student's answer is the reason why example B includes a system of two-variable linear equations. It is better if students can answer by explaining again its relation to the definition of a system of linear equations of two variables, namely because there are two systems and two variables in each system of linear equations and have one solution.

1.3 Using a certain method to solve a model on a concept of a system of two-variable linear equations.

Furthermore, this indicator describes readjusting it to the material of a system of two-variable linear equations. So that the indicator of the problem is that students are expected to be able to use and utilize certain procedures or operations. Students can use the right procedure if students solve

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a mathematical problem with mathematical steps to obtain a solution or answer to the problem mathematically. Here are the students' answers.

Fig. 11 One of the Student's Answers from Indicator Number Three

By the questions in the problem, students need to find the right solution to solve the problem through several steps that have been studied previously. As obtained in Fig. 11, students answered using the elimination method. Obtained almost all respondents' answers in this study used a mixed method that begins with the method of elimination. Even if it is related to learning using the Graspable Math application, students should also be able to try this method. However, after being asked questions through interviews, it was found that it was easier for students to understand using the elimination method. But this does not make the answer wrong. The student's answer is correct and can fulfill the third question indicator.

1.4 Changing a story form into a Two-Variable Linear Equation System model and getting to know the various methods of the Two-Variable Linear Equation System concept.

This indicator of Mathematical Understanding Competence, is described according to the material of the Two-Variable Linear Equation System. system of two-variable linear equations to form mathematical sentences. To answer this question, students only need to make the model and do not need to find a solution. However, there are several differences in student answers, including the following.

Fig. 12 Sample Student Answers from Indicator Number Four.

Sample student answers are shown in Fig. This means that students can describe what is the example for the variable. However, these students could not understand well the story sentences in the problem. This is shown by the students' answers to the second equation namely $x + y = 34$ namely when each variable in the equation should be subtracted by 5 first as an explanation of the sentence "five years ago the sum of the ages of the two was 34 years".

Fig. 13 Sample Student Answers from Indicator Number Four

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Different from Fig. 12, the students' answers in Fig. 13 show that besides students being able to make examples in the problem, students are also able to describe what is known in the problem so that two correct equations are formed as a representation of the story problem.

1.5 Identify the properties of a concept and recognize the requirements for a Two-Variable Linear Equation System to determine the concept method for a Two-Variable Linear Equation System to be used.

In the last indicator, this ability also adapts to the material for a Two-Variable Linear Equation System. So that the question indicators are set, namely, students are expected to be able to apply concepts or algorithms to solve problems. Students are said to be able to apply concepts if students can use concepts that are by the right procedures to obtain a mathematical solution. Through question number five which gives story questions, students must describe and understand what the problem wants. Obtained one of the students' answers as follows.
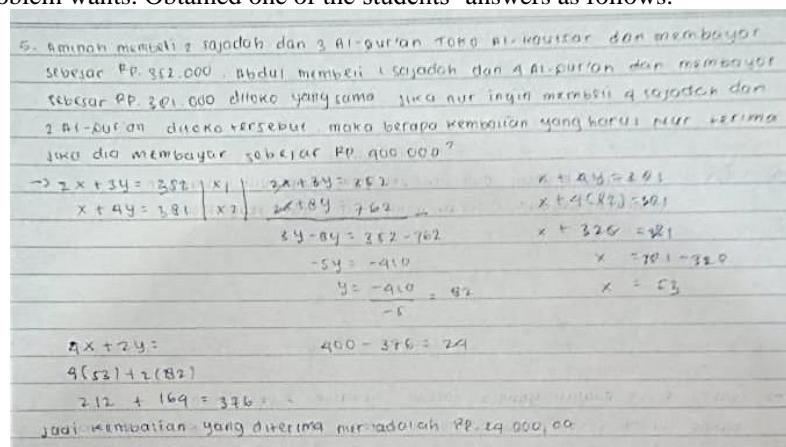

Fig. 14 One of the Student's Answers from Indicator Number Five

One of the students' answers in Fig. 14 shows that students can make mathematical models in advance from these contextual problems. Although it is better if the student's answer is given information about the example of each variable so that it is easy to understand. In addition, students can also carry out the procedure for solving both systems of two-variable linear equations through the mixed method, which begins with the elimination method and then the substitution method. Students can also understand that the main problem with the problem is the number of returns, not just the exact value of each variable.

Through the explanation of each of these indicators, it can be concluded that several things are already good, namely that on average students can already understand the keywords that are the problem in word problems. asked so that the answers from students appear well structured.

Apart from that, several things still need to be studied more deeply, namely: 1) The definition of a system of linear equations of two variables still seems to always be variables x and y; 2) Students still do not understand how to explain examples and non-examples, or only know the form that a system of two-variable linear equations has two variables without knowing further; 3) Some students still find it difficult to use the substitution method manually (when working without using the Graspable Math application), so students always responsively use mixed methods starting with the elimination method; 4) The results of verbal interviews show that students still feel that they do not easily understand when carrying out independent learning, and 5) Students still cannot easily understand the problem of a system of two-variable linear equations. So the student is still fooled and have not found the final answer that should be answered by the student.

Apart from some analysis of students' mistakes in answering the posttest questions, the most important thing is that students feel disturbed by spontaneous changes regarding distance learning. Apart from internal obstacles, students also experience external obstacles where sometimes there

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are problems with the internet network, electricity does not flow or there are blackouts, lack of electronic equipment for learning, economic difficulties, and others. Many things become obstacles for students in implementing distance learning.

1.6 Interview and Questionnaire Results

In addition to carrying out the posttest, in this study students also conducted the interview stage. A summary was obtained with the first question, namely: "In your opinion, how was the process of learning mathematics in the material for the Linear Equation System of Two Variables last odd semester?" the responses given by students varied. The positive thing is that students state that the material for the Linear Equation System of Two Variables in the previous odd semester can be easily understood because they have started learning with an off-network method, another thing is stated that the lack of study hours when face-to-face in class has an impact on students having to study independently without going through the introduced application. This can happen due to the different learning styles of students and learning that needs to be adapted to the conditions of students, especially in readjusting class hours in this transitional era. Like the statement that because differences in learning styles make important contributions and interrelationships, it is expected that the learning model used by educators is created in creative and innovative learning so that students' understanding abilities and learning styles are accommodated according to needs. (Khoirunnisa & Soro, 2021:2408)

Followed by the second question "What obstacles are often encountered when learning mathematics when the material for the Linear Equation System of Two Variables takes place?" when learning in the network is an inadequate network so it is often disconnected when learning takes place. Two other students said that they were able to understand and the others were still unable to understand both the several methods of solving the Two-Variable Linear Equation System and the basic material regarding the differences in the elements in the material of the Two-Variable Linear Equation System including constants, variables, and others. etc. What can be noticed in this distance learning phenomenon is the emergence of various responses and changes in the learning system that can affect the learning process and the development of students in responding to the material presented (Basar, 2021:216). In addition to devices or internet networks that must be adequate, teacher skills are also needed which must be optimal in utilizing information technology. (Ariany et al., 201:97)

The third, fourth, and fifth questions are regarding Graspable Math with the question "How is your understanding of the material for the Linear Equation System of Two Variables in the process of learning mathematics before getting to know the Graspable Math?", "How is learning mathematics Linear Equation System for Two Variables after using the Graspable Math?" and "How is the mathematical understanding of the material on the System of Linear Equations of Two Variables after getting to know Graspable Math ?" the responses of students from the last three questions were very enthusiastic about using the application by stating that learning using the Graspable Math was fun, more practical and easy to use. In addition, students realized that this application was very important to introduce because it adds exploration during distance learning, one of the students stated that "The Graspable Math helps understand the material of the Two-Variable Linear Equation System using the substitution method, helping make learning easier, especially at home at this time of the pandemic."

From the responses to the five student interview questions, it can be concluded that technology provides convenience as a means of student exploration. Not only does it help students to add insight into learning, but it is an innovation to continue to improve the creative forms of mathematics learning that are created so as not to give the perception that mathematics is only counting with pen and paper. In addition, learning mathematics through Graspable Math is also a factor so the competitiveness of technology among students in Indonesia is increasing.

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CONCLUSION

Based on the results of the research and discussion, it was concluded that students who were categorized through the Early Knowledge of Mathematics in the high, medium, and low categories were on average good at giving their interpretation of the mathematical understanding of the System of Linear Equations of Two Variables although in detail the categorization of Prior Knowledge of Mathematics turned out to not be the main factor that is directly proportional to the expectations of students' mathematical understanding competence.

The second conclusion is obtained from the description of the use of the application which is urgent in this study. application Graspable Math has a good influence on learning mathematics, especially in the material of the Two Variable Linear Equation System because this online application can be easily accessed anywhere and anytime for free. The tool in the form of this application is also one of the factors in creating independent learning so that students are motivated to explore mathematics which is not limited to hours of learning at school.

Besides that, there were several analyzes of students' abilities and errors in solving the System of Two Variable Linear Equations problems. In addition to the internal influences created by the students themselves, external factors such as the learning system can also make a huge influence on student learning outcomes.

Furthermore, researchers hope that technology that assists learning, especially Graspable Math, can continue to be introduced as a learning aid to students by not letting go of educator guidance as a guide and the foundation of learning. The author also hopes that this article will serve as material to continue to be explored in the field of learning using technology and error analysis and that other students' mathematical understanding competence can be described more clearly.

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