

The Fluency of Students' Mathematical Procedures Through Flipped Classroom on the Linear Equation System with Two Variables

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ABSTRACT

This research is descriptive research with a qualitative approach. This study aims to describe the students' mathematical procedural fluency through flipped classroom learning in the Class VIII the linear equation system with two variables which was analyzed using indicators of procedural fluency ability. The research subjects that will be used in this study are from SMP Negeri 45 Palembang, precisely in class VIII.6 which is a recommended class from the mathematics teacher at the school concerned. In the implementation of this research, the data collection technique that will be used is the provision of written tests with assessments in the form of scores of work results and interviews as additional references to the understanding obtained by students through the flipped classroom learning model. The data analysis technique given in this study is a descriptive study with a qualitative approach consisting of data reduction, data presentation, and conclusion drawing. The results of research that the procedures fluency through the flipped classroom on the linear equation system with two variables the linear equation system with two variables is good, although there are students who do not meet the criteria for procedures fluency.

Keywords: Procedural fluency, Flipped classroom, Linear equation system with two variables.

1. INTRODUCTION

Mathematics is one of the compulsory subjects that has been studied by every student at all school levels which is then very useful for its use in everyday life. This mathematics material can provide a briefing on the ability to think logically, critically, creatively, and systematically in a knowledge competence to achieve the objectives of learning mathematics by the demands of the given curriculum [1]. The objectives of the curriculum by covering four competencies, one of which is the competence of student knowledge about the ability to understand and apply factually, conceptually, and procedurally in completing a learning process [2]. One of the cognitive aspects that are very important in its application and must be mastered by students is the fluency of mathematical procedures [3]. The ability to complete, understand, and also use a concept smoothly can be said to be a completion procedure which are important components of the five components of students' mathematical skills [4,5].

The purpose of learning mathematics begins with the development of five components between mathematics skills themselves which are often called mathematical proficiency. One of which is procedural fluency, which is a very important ability and becomes the main point in helping students solve math problems in each lesson [6,7,8]. That way, to increase the expected abilities, students can carry out a process in the form of effective learning and solve problems that are given well, if factual knowledge, procedural fluency ability, and conceptual understanding knowledge can be applied. The ability to choose the right procedure in every application of mathematics learning is one of the skills possessed by students [9]. With the ability to fluency, the procedure itself refers to the points of solving mathematical problems in the form of the stages of when and how to use the sequence of procedures and discusses the skills possessed by students then the ability to procedural fluency is one of the basic abilities that require understanding [10,11].

However, there is a tendency that students do more towards the application of a procedure compared to the concepts they already have [12]. Regarding the procedural fluency ability of the five students' mathematical skills, they have not yet given satisfactory results. Lack of ability that students have in solving a problem which includes identifying completion procedures and understanding basic mathematical concepts which in this case are often encountered in everyday life [13]. It is the same with the results of research which say that there will be many students who have difficulty applying the procedure of one concept to another because they do not understand the adjusted settlement procedure, only with memorizing formulas [15]. The procedural fluency possessed by each student still needs to be improved to achieve the goal of forming the completion procedure.

The linear equation system with two variables (SPLDV) is one type of mathematical material that is often used in everyday life with examples of its application to money problems, business age, and other types of problems [15]. There are difficulties faced by students when given practice questions that are different from the examples given by the teacher in the linear equation system with two variables material, because most students who can only memorize concepts from the formulas given without understanding the process, it is difficult to make plans by completing the information from the information. The difficulties experienced by students when solving SPLDV questions are that students do not understand what is known or asked from the questions given; have not been able to change the questions given into the form of a mathematical symbol model; have not applied the concept of completion with the right method and have not been able to connect the various concepts used in solving the mathematical problem. [16]. In this case, the ability to procedural fluency is needed in its application to this SPLDV material to be able to solve the problems.

The implementation of PJJ during the Covid-19 pandemic has caused various impacts related to the world of education, one example of the negative impact is that students cannot carry out the learning process as usual again effectively [16]. One of the learning models that can be used to assist teachers in forming an adaptive learning process is the application of the flipped classroom model. The flipped classroom learning model is a learning model that is rarely used and can still be regarded as a new learning model [17]. The procedures fluency owned by students who use the flipped classroom model and use videos results in a better understanding than the lecture method [18]. The composition of learning using videos is more effective when compared to learning that does not use videos [19]. To overcome problems in a learning process so that it can be effective and efficient

is to use strategies and learning models that are following the abilities and needs of students to create a more pleasant and customized learning atmosphere, which when using the flipped classroom there is an increase in differences. The students' mathematical procedural fluency becomes better than when using conventional learning [20]. In this case, it is necessary to use the flipped classroom learning model to improve the mathematical concept's ability in the linear equation system with two variables in class VIII.

2. METHOD

2.1. Research Design

This research is a type of descriptive research using a qualitative approach. Qualitative research is a proposal that sometimes the results will not go according to plan, depending on the temporary situation, which will also develop while in the field, in which case there may often be differences in focus, theory, data collection techniques, data analysis and even can be considered as part-time work for work [21]. In this study, the results obtained were based on the information obtained following the conditions during the research process that occurred. The research subjects were students in class VIII of SMP Negeri 45 Palembang who were selected using the purposive sampling technique. This study uses data collection techniques in the form of written tests and interviews. There is the use of the flipped classroom learning model in its application by using videos. The researcher started by giving Student Worksheets in which Work Example Worksheets were also applied before the written test was given to find out the students' ability to run procedures. Interviews were conducted for each student to be able to dig up information and an overview of the knowledge that students have on the fluency of students' mathematical procedures.

2.2. Procedure

The data analysis technique used in this study is the analysis technique of the Miles and Huberman model. The research data in this study were obtained based on written tests and semi-instructor interviews conducted by the research subjects. Interviews with the semi-instructor method are a type of interview method that starts from one question that can develop into several new questions according to the answers given by students [14]. Data from the written test was taken based on the results of the achievement scores obtained by students after working on the problems given. In the interview, the data obtained is based on the results of the interview test which has been converted into a text form of a conversation transcription test in the form of a narrative that already contains words according to the voice recording.

Researchers analyze the procedural fluency starting from the data reduction stage by taking the results of student achievement tests based on written tests and interviews.

3. RESULT AND DISCUSSION

The online learning process has been going well, in which the researchers continue to use the flipped classroom learning model, to be precise in class VIII.6 SMP Negeri 45 Palembang with the academic year 2021/2022. The learning carried out by this researcher was in three meetings, two offline meetings, and one remaining online meeting. Learning through flipped classroom has been divided into three stages, namely (1) asynchronous activities by providing content in the form of videos; (2) the existence of a process of extracting information related to the material carried out by students from the subject matter provided; and (3) synchronous activities which are carried out through google meetings or face-to-face in class [21].

The use of videos in asynchronous activities require students to be more independent in studying the material provided and be able to explore more detailed information before synchronous activities. Students are ready when face-to-face takes place in starting the learning process when students have studied material before activities. When face-to-face activities, the learning process occur more effectively because it contains discussion and explores more information related to material that has not been understood.

3.1. Analysis Test and Interview

The following are indicators of procedural fluency:

Table 1. Code of indicators

Number of Question	Code of Indicators	Indicators
1 (Subjects with High Ability)	A1	Choose the appropriate steps of the procedure.
	A2	Use procedures properly.
	A3	Utilize this type of procedure for the right solution.
	A4	Modify the resolution procedure according to the problem.
2 (Subjects with Medium Ability)	A1	Choose the appropriate steps of the procedure.
	A2	Use procedures properly.
	A3	Utilize this type of procedure for the right solution.
	A4	Modify the resolution procedure according to the problem.
3	A1	Choose the appropriate steps of the procedure.
	A2	Use procedures properly.

(Subjects with Low Ability)	A3	Utilize this type of procedure for the right solution.
	A4	Modify the procedure according to the problem.

This ability of the procedure fluency which includes four indicators, namely (1) selecting the appropriate procedure stages; (2) using procedures appropriately; (3) utilizing the type of procedure for the right solution; and (4) modifying the settlement procedure according to the problem. These indicators have been included in each question on the test given to students. Based on the indicators of procedural fluency, the researcher constructs three questions:

Ary pergi ke Toko Diamond Distro untuk membeli baju kemeja dan kaos untuk saudaranya. Jika Ary ingin membeli dua kemeja dan dua kaos, dia perlu membayar uang senilai Rp190.000,- Lalu, terdapat pula tulisan lain yang menuliskan harga untuk satu kemeja dan dua kaos hanya senilai Rp130.000,- Tentukan harga dua kemeja dan satu kaos di toko Diamond Distro tersebut !

Figure 1 Question number one

Berikut merupakan tampilan bungkus kado dan bangun jajar genjang.



Indra ingin membungkus sebuah kado dengan bungkus kado dengan bentuk jajar genjang. Keliling dari jajar genjang diatas sama dengan 44 cm. Jika diketahui panjang sisi a adalah 6 cm yang lebih pendek dari panjangnya sisi b, carilah panjang sisi a dan b masing-masing pada bungkus kado yang berbentuk bangun jajargenjang tersebut !

Figure 2 Question number two

Berikut merupakan tampilan gambar Nenek Ranti dan kedua cucunya.



Nenek Ranti memiliki dua cucu kesayangan, yang bernama Lita dan Dony. Jika diketahui jumlah dari dua kali umur Lita dan tiga kali umur Dony adalah 12 tahun. Lalu selisih dari dua kali umur Lita dan Dony adalah 4 tahun. Maka, berapakah umur dari Lita dan Dony masing-masing sekarang ?

Figure 3 Question number three

Based on the achievement indicators on the procedural fluency, the results of the discussion regarding the procedural fluency are obtained for each student through the flipped classroom in the learning process. The researcher discussed the results of the written test worksheets from 6 subjects which were

divided into three criteria, namely 2 subjects for the high ability criteria, 2 subjects for the medium ability criteria, and 2 subjects for the low ability criteria.

3.1.1. Analysis High Ability Subject Work

3.1.1.1. Subject PNRH

In the results of this Subject PNRH worksheet, she is one of the subjects with high criteria who has been able to solve the problems given in this SPLDV material with the correct and precise elimination method. This Subject PNRH uses steps that are already accurate and, in their completion, have contained the four indicators that are following the desired procedure fluency. Subject PNRH has good results in the form of the emergence of four indicators.

1. Penyelesaian:	
Diket:	
<input checked="" type="checkbox"/> 2 kemeja + 2 kaos = 190.000	
<input checked="" type="checkbox"/> 1 kemeja + 2 kaos : 130.000	
Ditanya:	
Tentukan harga 2 kemeja dan 1 kaos?	
Dijawab:	
<input checked="" type="checkbox"/> 1 kemeja = x	Choose the appropriate steps of the procedure
<input checked="" type="checkbox"/> kaos = y	
$2x + 2y = 190.000$ Persamaan Using procedures	
$x + 2y = 130.000$ " properly	
$\begin{array}{l} 2x + 2y = 190.000 \\ x + 2y = 130.000 \end{array}$	$\begin{array}{l} 2x + 2y = 190.000 \\ x + 2y = 130.000 \end{array}$
$\begin{array}{r} - \\ \hline -x & = 60.000 \end{array}$	$\begin{array}{r} - \\ \hline -x & = 60.000 \end{array}$
$x = 60.000$ (1 kemeja)	$y = -70.000$
$= 2 \text{ kemeja} = 120.000$	-2
$y = 35.000$ (1 kaos)	$y = 35.000$
Jadi harga 2 kemeja adalah 120.000 dan	
1 kaos adalah 35.000.	

Figure 4 Answer from subject PNRH

The interview with Subject PNRH following here:

Teacher: If you modify the method of solving the problem, it means that PNRH has chosen what modification method to use?

PNRH: I guess I just want to use the elimination and substitution method, ma'am. But ma'am, I haven't tried using it yet, I'm afraid that if I say I can when I do it, I can't even finish it, ma'am.

Teacher: Why the two methods? What is the reason?

PNRH: In my opinion, the method of elimination and substitution is almost the same, ma'am, for elimination you only need to multiply the value of the variable and then subtract it, so

for substitution, just enter the values of the known variable number, and there will be switching sides as well.

Figure 5 Results of interview with subject PNRH

From the sentences delivered that have been adapted to the interview test of Subject PNRH, it provides additional information on matters relating to the modification of the two completion methods in the 4th indicator in the ability to do procedural fluency, namely the indicator of modifying the settlement procedure according to the problem when working on the problems given. Subject PNRH said about the differences in the way of solving the three methods of completion given in this SPLDV. Based on the results of the written test and interview, the elimination method was easier to do than other methods.

3.1.1.2. Subject SAP

Subject SAP is one of the research subjects which is also included in the high category of the choice of subjects. Subject SAP was carried out using this graphical method, it produced the appropriate answer. The application in the form of searching for the coordinate points needed in the completion process has been carried out very well by subject SAP.

Penyelesaian	Choose the appropriate steps of the procedure
Diketahui:	
$x = 11\text{ta}$	
$y = 10\text{ny}$	
$2x + 3y = 12$	
$2x - y = 4$	
$2x + 3y = 12$	Using procedures properly
$2x - y = 4$	
$\begin{array}{l} 2x + 3y = 12 \\ 2x - y = 4 \end{array}$	
$\begin{array}{r} - \\ \hline 4y = 8 \end{array}$	
$y = 2$	
Ditanya:	
$x = 11\text{ta}$ dan $y = 10\text{ny}$	
Jawab:	
$2x + 3y = 12$	
$4y = 8$	
$y = 2$	
$2x = 4 + 2$	
$2x = 6$	Modify the resolution procedure
$x = 3$	
$2x = 4 + 2$	
$2x = 6$	
$x = 3$	
$2x + 3y = 12$	
Titiknya A = (6, 0)	
B = (0, 4)	
$2x - y = 4$	
Titiknya C = (2, 0)	
D = (0, -4)	
Titik Pertemuan : (3, 2)	Utilize the type of procedure for the right solution
Jadi, umur lita 3 tahun dan umur dony 2 tahun.	

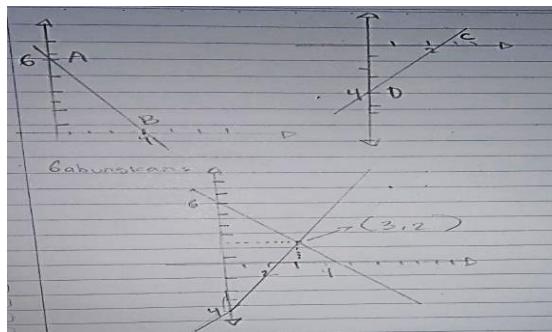


Figure 6 Answer from subject SAP

In addition, according to the results of the interviews below, the procedural fluency that SAP has been seen from the two tests. The interview was asked of Subject SAP:

Teacher: How do you work with this solution?

SAP: Just like the others, ma'am, prioritize finding the mathematical model first and then do it according to the substitution solution, which finds the value of one variable by entering the other values in the equation.

Teacher: Is there a difference between the three methods?

SAP: Yes ma'am, not all of them are the same. Initially, the path was the same, after the mathematical model was obtained, the solution method was different. Elimination by multiplying the two equations to the value of the variable factor, then just continue the substitution while looking for other values by substituting the value for which the variable is already known, and the graph uses coordinate points.

Figure 7 The results of the interview subject SAP

The results of the interview that subject SAP following the second indicator on the indicator of the procedural fluency which contain about using the procedures correctly according to the indicator. Subject SAP can provide answers that match the description of the adjusted indicators. Subject SAP has been able to convey how the steps of the procedure can be used in a problem and can apply to a settlement procedure.

3.1.2. Analysis Medium Ability Subject Work

3.1.2.1. Subject MFFM

Subject MFFM is in the medium category, subject give the correct answer following the implementation of

procedures. When students have understood how the completion process is used which is then adjusted to the application of an appropriate procedure, it can provide accurate answers at the final settlement. Subject MFFM uses the substitution method in solving problem number 2 and it can be seen from the results of the answers given by MFFM in this method that the substitution method procedure has been implemented well.

Subject MFFM gave an answer that was following the first indicator on the ability to procedural fluency which discussed choosing the appropriate procedure stages, besides that subject MFFM also provided information on the difficulties faced by subject MFFM when solving problems using the MFFM elimination method because subject MFFM was unsure of the multiplication calculations. The constraints it has to made it difficult to complete the appropriate procedure and considers the elimination method more complicated.

Subject MFFM uses the substitution method in solving problem number 2 following here:

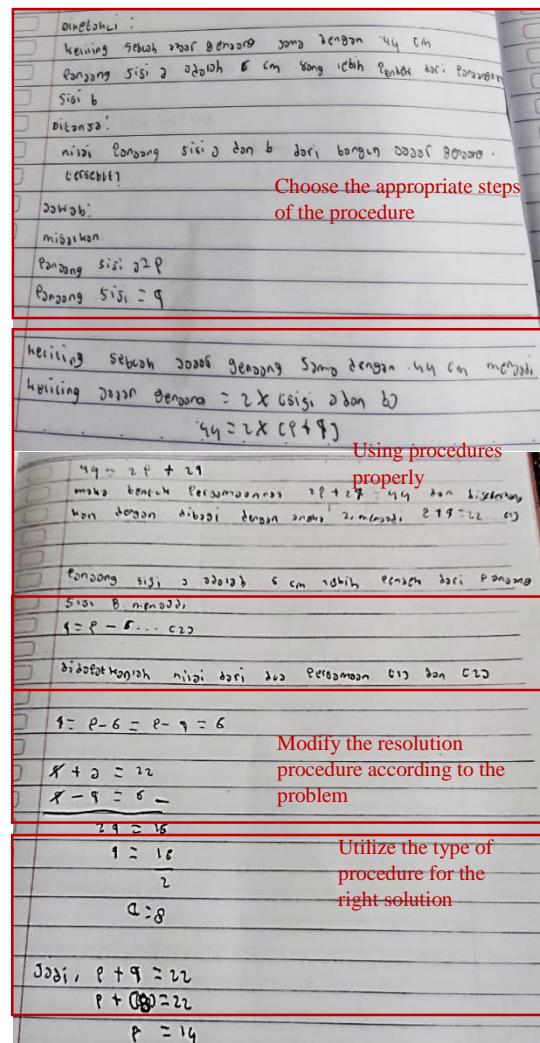


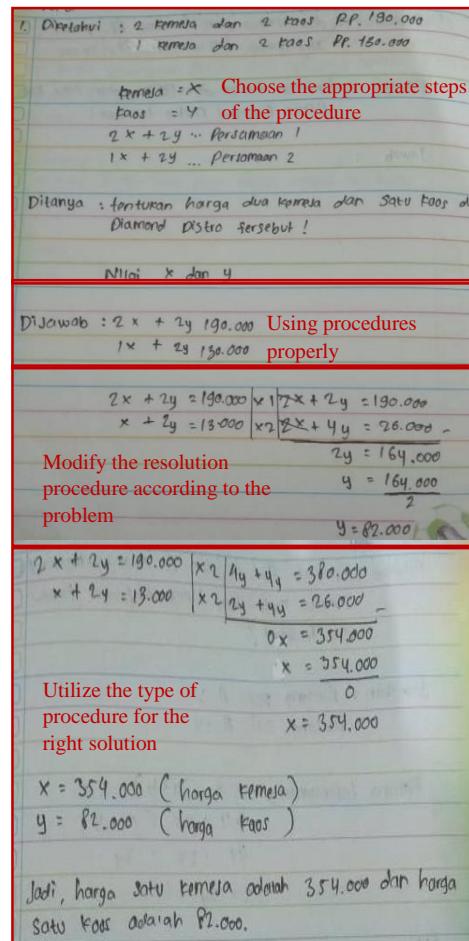
Figure 8 Answer from subject MFFM

The existence of obstacles that arise starting from the lack of understanding that students have in the previous material can make obstacles for students to be able to continue the subject matter which will then be studied further. A doubt experienced by subject MFFM regarding the multiplication calculation made one of the important points that must also be prioritized so that the next learning process can be carried out properly without any obstacles. After the researcher did an interview with subject MFFM, subject opened up about the struggles that subject know the multiplication concept, but the subject was afraid that can't apply it correctly. Subjects find a difficulty in elimination method by the repetitive algebra process especially multiplication so choose to solve the problem with substitution in order to apply the procedure correctly and solve the problem. The interview result with Subject MFFM following here:

- Teacher:** Is there any other method in solving the problem?
- MFFM:** Maybe elimination, ma'am. It's possible, ma'am, but it's quite complicated if you try it many times.
- Teacher:** Please explain how complicated the steps are?
- MFFM:** It's quite complicated, isn't it, because after it is converted into a variable, it needs to be multiplied by the value of another variable to get the value of another variable. Well, that's a long way to go, I'm afraid I'll make a mistake if you multiply like that.
- Teacher:** MFFM do you know multiplication?
- MFFM:** I memorized it ma'am, but I'm afraid of multiplying it wrongly.

Figure 9 Results of interview with subject MFFM

3.1.2.2. Subject KKP



Diketahui : 2 kemeja dan 2 kaos Rp. 190.000
 1 kemeja dan 2 kaos Rp. 180.000

Choose the appropriate steps of the procedure

2x + 2y ... Persamaan 1
 1x + 2y ... Persamaan 2

Ditanya : tentukan harga dua kemeja dan satu kaos di Diamond Distro tersebut !

Nilai x dan y

Dijawab : 2x + 2y = 190.000 Using procedures
 1x + 2y = 180.000 properly

2x + 2y = 190.000 | -2x + 2y = 190.000
 x + 2y = 180.000 | x2 | 2x + 4y = 360.000

2x + 2y = 190.000 | x2 | 2x + 4y = 380.000
 x + 2y = 180.000 | x2 | 2x + 4y = 360.000

Modify the resolution procedure according to the problem

2y = 164.000
 y = $\frac{164.000}{2}$
 y = 82.000

Utilize the type of procedure for the right solution

x = 354.000
 x = $\frac{354.000}{2}$
 x = 177.000

x = 354.000 (harga kemeja)
 y = 82.000 (harga kaos)

Jadi, harga satu kemeja adalah 354.000 dan harga satu kaos adalah 82.000.

Figure 10 Answer from subject KKP

Based on the work carried out by subject KKP, which are included in the medium indicators, it is found that the four indicators of the procedural fluency provided, from selecting a procedure stage to modifying a procedure, clearly show the ability of the subject to have and apply the procedure fluency. There are differences in the results of the answers obtained by Subject KKP who experienced errors in the complete procedure. Subject KKP experienced errors in the complete procedure in the third indicator at the multiplication stage which ended up forming a result that was different from the proper answer.

The interview conducted by the researcher with subject KKP gave information that the solution using the elimination method was included in the method which according to subject KKP could be completed by him well and the error he had was only because he was not careful. This can be seen following in the text of the conversation with the researcher, namely:

Teacher: How do you solve it using the graph method?

KKP: If I use the graphical method, I ask to check the results of doing the questions with my sister, ma'am. Because I don't understand graphics.

Teacher: So, what is complicated by KKP, is it only in the graphical method or in other methods?

KKP: Only graphics, ma'am. My sister participated in teaching me while studying the graphic material.

Figure 11 Results of interview with subject KKP

That way, of the three methods taught in this linear equation system with two variables material, according to subject KKP, the graphical method is categorized as a complicated solution method to work with because it uses coordinate points in the formation of a complete graph.

From the results of the work of subjects KKP and subject MFFM, they got good results by bringing up the four indicators correctly, for choose the step of procedures, using procedures properly, modify the procedure according to the problems and utilize the type of procedure to get the final solution. But, in some step both subjects made some mistake in the procedures that they failed to get the final correct solution. Even two subjects show four indicator of the procedure but the it is not all apply correctly.

3.1.3. Analysis Low Ability Subject Work

3.1.3.1 Subject CM

Subject CM is one of the subjects with low criteria who have participated in solving the given problem. In the results of the work used, the number of indicators that were met in the completion process given by the CM only contained two indicators, even though two other indicators should have been raised by subject CM. The worksheet of subject CM following here:

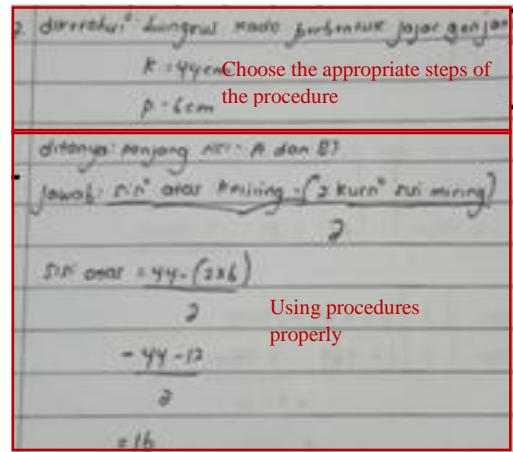


Figure 12 Answer from subject CM

The settlement process carried out by the CM which is not following the indicators has also made the answers not correct. We can see that according to procedural fluency that occur when they are related to each other, this can give less than optimal results when the application is carried out in a non-sequential manner and the procedure is not following how the completion process should be.

During the interview test process, the researcher found additional information subject CM when working on the given problem, including:

Teacher: What are the steps that you will explain regarding how to solve using the method you have chosen earlier?

CM: Following the method of solving the substitution, after obtaining the mathematical model, it means that the variable values can be added to the equation.

Figure 13 Results of subject interviews CM

If it is also adjusted to the results of the answers from subject CM when conducting interviews with researchers, it is found that the questions related to the second procedure fluency indicator which contains using the procedure correctly cannot provide the information that CM should convey. Subject CM indicates that he does not understand the settlement procedure that has been conveyed by the researcher and cannot apply the steps required in a settlement procedure in each problem.

It can be seen in the following results given by subject CM who provided information that he had not carried out the learning process properly. The interview with subject CM including:

Teacher: Did CM understand the material that you conveyed yesterday? Then, has the learning video been studied?

CM: Sorry, ma'am, I don't understand, I also haven't had time to watch the video that you gave.

Figure 14 Results of interview with subject CM

The learning video that has been given by the researcher to provide prior understanding to the students has not been seen by subject CM. Even the subject cannot understand the concept teaches by the teacher, subject didn't follow synchronous activities to help to understand the concept.

3.1.3.2 Subject LTN

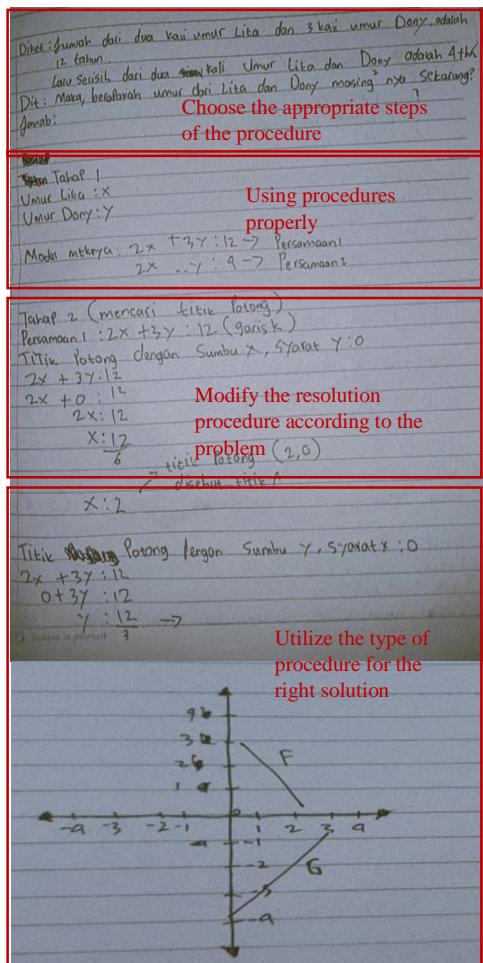


Figure 15 The work of subject LTN

The results of the work owned by subject LTN in completing the completion procedure have gone through the stages as they should, but in the results, the work obtained by subject LTN is not correct. In the completion, the result has not been obtained due to the stages in combining two lines to find a point of intersection on the

coordinate line worked on by subject LTN, which has not yet reached the result. Then when asked to subject LTN regarding this, it can be informed according to the following text, namely:

Teacher: How about solving the problem by solving two methods in one problem?

LTN: May be used after one of the uses of the solution method results in the value of one of the variables bu.

Teacher: In the solution, you are working on, how do you draw a line when using the graph method?

LTN: I don't understand ma'am with such a coordinate line, I need to study it again.

Figure 16 Interview results of subject LTN

Then, if it is seen following the results of the work and the interviews given by subject LTN, it informed that there will be two discussions. The first discussion said that in the fourth procedure fluency indicator related to modifying the settlement procedure according to this problem, the results were not getting the appropriate answer, it was seen that subject LTN answered the questions given by the teacher with hesitation regarding it. Then, besides that, a second discussion was also obtained that subject LTN did not understand how to apply the SPLDV material to the given coordinates.

From the results of the six research subjects based on the written test and the interview, it appears that the appearance of the complete procedure during the written test almost entirely appears in its application and is enforced in a process, the procedure is applied by the six research subjects even though each subject is some do not understand in detail the completion procedures taught. The interview test which is used as an additional reference also shows that there will be results in understanding a settlement procedure applied to the SPLDV material with the three methods. The results of the interviews given informed how the application of the flipped classroom learning model played a role in providing an understanding of the discussion in SPLDV with asynchronous and synchronous activities.

The flipped classroom learning model is used as a learning model in the ongoing learning process that can be used in any situation in asynchronous and synchronous ways. The convenience provided by this learning model can greatly help teachers to be able to simultaneously take advantage of technology that also provides additional knowledge to students that is not only based on books.

The procedural fluency which has been included in these five mathematical skills makes it an important subject to be able to improve its abilities for each student. This is because, these five mathematical skills are very important and will continue to be applied during the learning process, especially in the mathematics material. The ability of the procedural fluency is not only based on being skilled in writing the steps in the form of a sequence but also includes an understanding to be achieved in a matter on a problem that needs to be solved [16].

In the first indicator, which is choosing the appropriate procedure, the six research subjects have experienced the emergence of an appropriate completion procedure. The six research subjects were able to understand the given problem into a settlement procedure into a statement adapted to the indicator. The six research subjects were able to apply the application of the problem into the form of "known" and "asked" to make the implementation process easier.

In the second indicator, which is using the procedure correctly, out of the six research subjects, only one of them has not met these indicators, namely subject CM because of the steps that directly lead to completion. This second indicator means understanding the use of procedures that are adapted to the understanding possessed by students. The use of this procedure must also be adapted to the problems encountered. That way, the five research subjects have understood how the procedures should be used following the problems given and what settlement methods are used. Then, the implementation of the process of solving a problem can have a different way in each method.

The third indicator, namely utilizing the type of procedure for the right solution, was successful in four research subjects and experienced a few errors, subject MFFM was less thorough in performing the multiplication calculations that took place in the completion process. However, even so, in its application, a complete procedure of the five research subjects has obtained good and appropriate results following the procedure for the complete method that has been chosen to get the right solution. Students who in their procedural ability still have deficiencies can provide difficulties they will face when they want to better understand the material related to learning or want to solve the problem as well [16].

The fourth indicator, namely modifying the solution according to the problem, gives precise and accurate results in the completion process. The process of modifying the pre-selected completion procedure becomes a continuation of the completion process that utilizes the understanding of a procedure that is owned by each student. The six students who have understood

research procedures who are also able to apply them can lead to procedural fluency for solving a problem. The process of a complete procedure to the final stage of completion when carrying out a settlement using the right procedure, it will produce the correct final answer, and vice versa if applying the settlement procedure is still not appropriate. the results obtained will also give unsatisfactory results.

4. CONCLUSION

Based on the analysis of the discussion on the research that has been carried out, it concluded that students' procedural fluency through the flipped classroom learning model on the linear equation system with two variables class VIII material bring up the application of the procedural steps used in solving types of problems correctly.

Student's understanding of the procedural process at each stage of the steps to solve the problems increasingly improve. With the implementation of the flipped classroom learning model in a learning process, help teachers pay attention to the procedural fluency abilities possessed by students both before and after the application of the model.

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