

The Learning Results of Seventh Grade Cendana School of Stella Duce 2 Junior High School, Yogyakarta Using Problem-Based Learning in Dividing The Line's Segments

Sepriani Liliana

Sanata Dharma University, Paingan Maguwoharjo Depok Sleman, Yogyakarta

Email: seprianililiana@gmail.com

Abstract. The purpose of this study was to determine the learning outcomes of students after participated in learning using problem-based learning in the line's segment dividing material. The research method that was being used in this research is descriptive qualitative research. The research was conducted in March 2018. This research includes giving tests and interviews. The research subjects consists of 4 seventh grader of Stella Duce 2 Junior High School of Yogyakarta that were selected based on the tendency of the answers to the written test. The Data are presented in the form of student works and interview results. The Data were analyzed using qualitative descriptive manner. The results showed that the ability of seventh grader of Cendana class of Stella Duce 2 Junior High School of Yogyakarta in dividing the line segments into several equal parts and dividing the lines into several parts with certain ratio was still not maximum. Therefore, although some students have been able to understand the given problem, most of them also been able to divide the line segments without taking measurements, but there are also students who do not understand the problem and also cannot divide the line without taking measurements. There is also a student who does not understand the problem, but he can divide the line segment without taking measurements. But the result is that the end result is not right, because understanding the problem is not right.

1. Introduction

Before conducting the research, the researcher made observations. Based on the results of observations conducted by researchers in the classroom, it appears that active teachers dominate the class while passive students (coming, sitting, watching, practicing and forgetting) only receive the finished material given by the teacher. Even researchers saw several students ignoring the information conveyed by the teacher. Several times the teacher must admonish noisy students and be busy doing other things outside of learning activities. As a result, learning is less smooth and less meaningful so the results are also unsatisfactory. Ivor K. Davis (in Rusman 2012: 229) argues that one tendency that is often overlooked is forgetting that the nature of learning is the learning of students rather than teaching them teachers. Thus a learning model is needed that integrates problem solving into mathematics teaching and learning activities. Problem solving skills must be owned by students. These skills will be possessed by students if the teacher applies a learning model that can encourage students to be actively involved in their learning experiences. NCTM (2000) states that solving problems is not only a goal of learning mathematics, but at the same time is the main tool for learning.

Problem-based learning model can be interpreted as a series of learning activities that emphasize the process of solving problems faced scientifically (Sanjaya, 2006: 214). writers such as (Barrows &

Kelson, 2003; Ibrahim & Nur in Ratnaningsih, 2003; Pierce & Jones in Dasari, 2003; Stephen & Gallagher, 2003; Sears & Hersh in Dasari, 2003) formulate problem-based learning as a learning model which allows students to be more active learning in gaining knowledge and developing thinking through presenting problems with relevant contexts. According to Tan (Rusman, 2013: 229) problem-based learning is an innovation in learning because in PBL, students' thinking skills are truly optimized through systematic group or team processes, so that students can empower, hone, test and develop their thinking skills on an ongoing basis. Then, PBL is a learning approach that is relevant to the demands of the 21st century and generally to education experts and practitioners who focus their attention on the development and innovation of learning systems.

Tabel 1. Ibrahim and Nur (in Rusman, 2012: 243) suggested that PBL's steps are:

Stage	Teacher's behavior
Student orientation on problems	Explain the purpose of learning, explain the logistics needed, and motivate students to engage in problem solving activities.
Organize students to learn	Helping students define and organize learning tasks related to the problem.
Guiding individual / group experience	Encourage students to gather appropriate information, carry out experiments to get explanations and problem solving.
Develop and present work	Helping students in planning and preparing appropriate works such as reports, and helping them to share assignments with their friends
Analyze and evaluate the problem solving process	Helping students to reflect or evaluate their investigations and the processes they use.

Based on the description above, the researcher formulated the problem in this study, namely: "How did the results of learning of students of class VII Cendana junior high school in the topic divide the line segment, after participating in learning using problem-based learning?" And the purpose of this study was to find out the learning outcomes of junior high school students Class VII Cendana in the topic divides line segments, after following the learning using problem-based learning.

2. Research Methods

The research method used is descriptive qualitative research. This research was conducted in March 2018. The research included giving tests and interviews. The research subjects consisted of 4 students in grade VII Stella Duce 2 Yogyakarta who were selected based on the tendency of the written test results. Data in the form of student work and interview results. Data were analyzed using qualitative descriptive.

3. Result & Discussion

3.1 Analysis of learning outcomes

The following is the process carried out in analyzing learning outcomes after applying problem-based learning:

- 3.1.1 giving a test to 34 students
- 3.1.2 Classification of students based on indicators that have been made
- 3.1.3 Choose several students with a particular answer tendency
- 3.1.4 Interview with students who have a tendency to answer
- 3.1.5 Analysis of test results and interviews
- 3.1.6 Conclusions

3.2 Test questions

The following is a question that is used to determine student learning outcomes in the material dividing line segments, after following the learning using a problem-based learning model.

1. *Mrs. Susi really likes roses. There are already two rose plants planted in the right and left edges of the yard. Mrs. Susi intends to add her rose flower plant with four more roses, and plant it between the two existing roses. The length of the mother susi's home page is 3m. Help Mrs. Susi to determine where to plant the four roses so that the distance between one rose and the other is the same length!*
2. *The length of the AB line segment is 12cm. divide the line segment AB into 2 parts with a ratio of 2: 4!*

3.3 Indicator

Indicators of achievement expected through the tests given are:

Tabel 2. Indicators

3.12 describes the angle, type of angle, relationship between angles, how to paint angles, divide angles, and divide lines	1. Learners	1	<ol style="list-style-type: none"> a. Students are able to identify the information provided in the question, including things that are known, namely page length 3m and 2 roses at the end of the page and 4 roses will be added, and asked to determine the location of the 4 roses to be planted. b. Students can find out that by adding 4 roses among the 2 roses that already exist, the student must divide the line segment into 5 equal lengths c. Students can divide the line segments into 5 equal parts by using a step dividing the line segments that have been studied d. Students can determine the location of 4 roses to be planted
		2	<ol style="list-style-type: none"> a. Students are able to identify the information provided in the problem, including things that are known, namely the length of the line segment AB is 12cm and is asked to divide the segment segment AB into 2 parts with a ratio of 2: 4 b. Students know how to divide the line into 2 parts with a ratio of 2: 4 by first dividing the AB line into 6 equal lengths c. Students can divide the AB line into 6 equal parts using the step dividing the line segments that have been studied. d. Students can determine where the division of the line segment is divided into two parts with a ratio of 2: 4

Based on the classification of the test results of 34 students, there were 4 trends in the answers, namely:

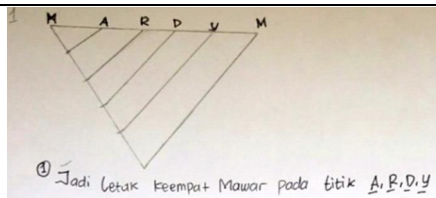
- 17 students fulfill all indicators 1 and all indicators 2.
- 9 students fulfill all indicators 2 but do not meet indicator 1.
- 3 students only fulfill indicators 1a, 1b, 2a and 2b only.
- 5 students only meet indicators 1a and 2a only.

From the results above, then the researcher takes each student as a representative of each tendency to answer the interview. There were 4 students interviewed as representatives for each of the answers. Then the results of the written test answers compared with the results of the interviews were then analyzed according to the indicators that had been compiled to draw conclusions.

3.4. The following is an analysis of student learning outcomes:

3.4.1. Student 1 (S1)

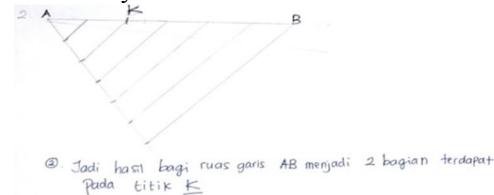
Tabel 3. Students fulfill all indicators 1 and all indicators 2.



P: do you understand the problem is no. 1?

S: yes, this wants to recognize the location of the rose that wants to be planted between these 2 roses (pointing the image at the problem) with the same distance

P: what do you do?



P: well we continue the second, what's the problem?

S: just like doing the task, measuring it from the ends of the rose that has been planted. the measurement uses the term, with the same length of measurement, the line is drawn equally. The line is also rather complicated, so that the lines are parallel.

P: ok keep on.

S: well then if it's parallel, this is the dots (pointing to the results of the work) and are given nma with letters

P: ok then next?

S: so I've found the location of the rose at point A, R, D, Y

P: then between MA, AR, RD, DY, and YM, what is the distance?

S: the distance is the same

P: so now the distance to this help line (explaining the chilli points to student work) between this and is this the same distance?

S: yes, it's the same, because it's parallel

S: the second is told, if the line is divided into 2 parts with a ratio of 2: 4. At first I saw that I had a friend, my friend, how come the line was only 4, then I thought about that one, the picture of the coconut compared to 2: 3, so I thought this line was definitely 6. Then I made the line 6 in the same way, making a line continue to make parallel lines with the triangle ruler, just like the first one

P: then?

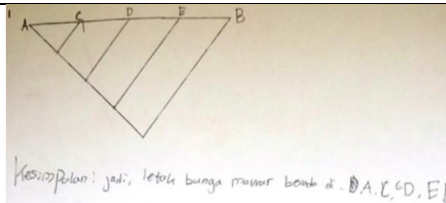
S: continue to be asked for two lines with a ratio of 2: 4, so I calculated this method with 6 lines. This means that these 2 are 4 (pointing at the answer sheet) so the division is K

Based on the analysis of the written test answers to problem no.1 shows that students are able to identify the information provided in the question, including things that are known that is the page length of 3m and the ends of the page have been planted 2 roses and 4 more roses will be added, and requested to determine the location of 4 roses to be planted. This was confirmed through interviews. Furthermore, students can find out that by adding 4 roses among the 2 roses that already exist, students must divide the line segment into 5 equal lengths. This was evident from the results of the students' written test answers and also supported by the results of the interviews. Furthermore, students can divide the line segments into 5 equal parts by using a step dividing the line segments that have been studied. This can be seen from the results of the written test answers and also based on the results of interviews where students can explain the steps to be taken. And students can determine the location of 4 roses to be planted. This can be seen from the results of written test answers and also supported by the results of interviews where students can show where the four roses will be planted.

Based on the analysis of written test answers to problem no.2 shows that students are able to identify the information provided in the problem, including things that are known, namely the length of the line segment AB is 12cm and is asked to divide the line segment AB into 2 parts with a ratio of 2: 4. It also appears from the results of the interview. Furthermore, students know how to divide the line into 2 parts with a ratio of 2: 4 by first dividing the AB line into 6 parts with the same length as seen from the results of the students' written test answers and confirmed by the interview results. Furthermore, students can divide the AB line into 6 equal parts by using a step dividing the line segments that have been studied. This can be seen from the results of students' written test answers and also from the results of interviews. And students can determine where the division of the line segment into two parts with a ratio of 2: 4. This can be seen from the results of written test answers and also the results of interviews.

3.4.2. Student 2 (S2)

Tabel 4. Students fulfill all indicators 2 but do not meet indicator 1



P: then how do you finish your work?
 S: this is 4, so it is divided into 4 lines and always make the same line help using the line and then make a line using a triangular ruler, then get C, D, E (point the answer sheet)
 P: continue?

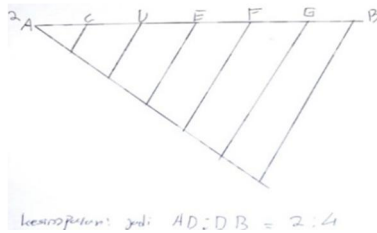
P: Do you understand what problem number 1 is?

S: It turns out that the flowers are on the AC, CD, DE, EB

S: find the location of the rose

P: ohh means the interest between these 2 points?

S: yes



P: well, if that is no.2 what do you understand?

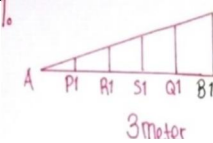
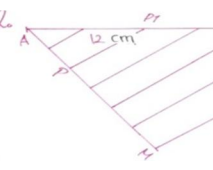
S: This is the same as the question before, it was compared to 2: 3 so divided by 5 lines means that this is divided 6. Then, for the line, please use the term, continue to make parallel lines. Now for the 2 lines with a ratio of 2: 4 means AD: DB (point to the answer sheet)

Based on the analysis of the written test answers to problem no.1 shows that students are able to identify the information provided in the question, including things that are known that is the page length of 3m and the ends of the page have been planted 2 roses and 4 more roses will be added, and requested to determine the location of 4 roses to be planted. This was confirmed through interviews. Furthermore, students do not know that by adding 4 roses among the 2 roses that already exist means students must divide the line segment into 5 equal lengths. This can be seen in the results of written test answers, where students only divide the line segments into 4 equal length sections. Furthermore, students can divide the line segments into several parts at the same length by using a step dividing the line segments that have been studied. it's just that on the given problem the student should divide the line segment into 5 equal parts, but what he does is he divides the line segments into 4 equal lengths. As a result, students cannot determine the location of 4 roses to be planted correctly. It was also seen from the results of interviews with students.

Based on the analysis of written test answers to problem no.2 shows that students are able to identify the information provided in the problem, including things that are known that the length of line AB is 12cm and is asked to divide the line segment AB into 2 parts with a ratio of 2: 4. It also appears from the results of the interview. Furthermore, students know how to divide the line into 2 parts with a ratio of 2: 4 by first dividing the AB line into 6 parts with the same length as seen from the results of the students' written test answers and confirmed by the interview results. Furthermore, students can divide the AB line into 6 equal parts by using a step dividing the line segments that have been studied. This can be seen from the results of students' written test answers and also from the results of interviews. And students can determine where the division of the line segment into two parts with a ratio of 2: 4. This can be seen from the results of written test answers and also the results of interviews.

3.4.3. Student 3 (S3)

Tabel 5. Students only fulfill indicators 1a, 1b, 2a and 2b only

	<p>Jadi, letak bunga mawar ada di P1, R1, S1, Q1, A, B $AP \cdot PR = RS \cdot SA \cdot AB$</p>	<p>S: this is from point A drag the line here (point the answer sheet) P: yes right? How can you determine the location of P1, R1, S1, Q1, B1 here (point to the student answer sheet) S: from here it is outlined here (point to the answer sheet)</p>
<p>P: do you understand what this problem is?</p> <p>S: understand, want to find 4 roses P: how do you do the finishing steps? S: Here (show the answer sheet) P: try to explain how can you write like that?</p>		<p>P: how come you can go straight, how do you make this line (point to the answer sheet), how do you measure it using a ruler? S: hehe yeah P: why not use the term? S: I'm still a little confused</p>
		<p>P: it's because you didn't take measurements properly, that's why. Then what is your answer like? S: it will be on P1. P: What is P1? S: aaaa</p>
<p>P: what about number 2? Do you understand?</p>		<p>P: are you doing this yourself or</p>

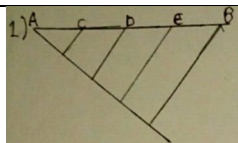
<p>S: told to line with a ratio of 2: 4 P: then how do you do the completion steps?</p> <p>S: like this, the 12cm line continues to be divided into 6 parts but I have less line yesterday P: how come?</p>	<p>have friends? S: see have friends. P: means you can't divide the line segment without calculating the ruler? S: not yet</p> <p>P: just when the group discussion did you do it?</p>
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Based on the analysis of the written test answers to problem no.1 shows that students are able to identify the information provided in the question, including things that are known that is the page length of 3m and the ends of the page have been planted 2 roses and 4 more roses will be added, and requested to determine the location of 4 roses to be planted. This was confirmed through interviews. Furthermore, students can find out that by adding 4 roses among the 2 roses that already exist, students must divide the line segment into 5 equal lengths. This was evident from the results of the students' written test answers and also supported by the results of the interviews. Furthermore, students can divide the line segments into 5 equal parts but not by using the step dividing the line segments that have been studied. This can be seen from the results of written test answers and also based on the results of interviews where students say that yes divides the lines by using measurements. And students can determine the location of 4 roses to be planted. This can be seen from the results of written test answers and also supported by the results of interviews where students can show where the four roses will be planted.

Based on the analysis of written test answers to problem no.2 shows that students are able to identify the information provided in the problem, including things that are known that the length of line AB is 12cm and is asked to divide the line segment AB into 2 parts with a ratio of 2: 4. It also appears from the results of the interview. Then the students did not know how to divide the line into 2 parts with a ratio of 2: 4 by first dividing the AB line into 6 parts at the same length as it appears from the results of the students' written test answers and confirmed by the interview results. Furthermore, students cannot divide the AB line into 6 equal parts by using the step dividing the line segments that have been studied. This can be seen from the results of students' written test answers and also from the results of interviews where students explain if they feel confused. But students can determine where the division of the line segment is divided into two parts with a ratio of 2: 4. This can be seen from the results of written test answers and also the results of interviews.

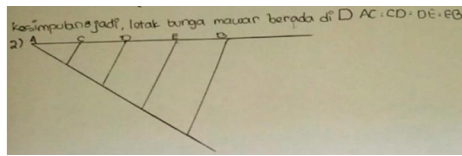
3.4.4. Student 4 (S4)

Tabel 6. Students only fulfill indicators 1a and 2a only



<p>P: do you understand the problem? S: yes</p> <p>P: what's the problem? S: determine the location of the flower P: how many flowers do you want to plant</p>	<p>S: Here, make this line (point to the answer sheet) P: continue this you get point C, D, E what? S: line up P: how do you do it?</p> <p>S: yes, line up P: does this mean you don't use the term huh? Directly measure to determine the distance? S: yes, the problem is difficult P: ok, where are the flowers planted? S: here are AC, CD, DE, EB</p>
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S: 4



P: do you understand the problem number 2?

S: a little confused

P: how confused are you? Did you discuss the group discussion?

P: ohh means between this huh?

S: yes

P: the problem is similar?

S: yes

P: so you are confused about it?

S: This was the same as No. 1

P: did you do it the same as No. 1? Then what do you conclude? What do you get?

Based on the analysis of the written test answers to problem no.1 shows that students are able to identify the information provided in the question, including things that are known that is the page length of 3m and the ends of the page have been planted 2 roses and 4 more roses will be added, and requested to determine the location of 4 roses to be planted. This was confirmed through interviews. Furthermore, students do not know that by adding 4 roses among the 2 roses that already exist means students must divide the line segment into 5 equal lengths. This can be seen in the results of written test answers, where students only divide the line segments into 4 equal length sections. Furthermore, students can divide the line segments into several parts at the same length by using a step dividing the line segments that have been studied. it's just that on the given problem the student should divide the line segment into 5 equal parts, but what he does is he divides the line segments into 4 equal lengths. As a result, students cannot determine the location of 4 roses to be planted correctly. It was also seen from the results of interviews with students.

Based on the analysis of written test answers to problem no.2 shows that students are able to identify the information provided in the problem, including things that are known that the length of line AB is 12cm and is asked to divide the line segment AB into 2 parts with a ratio of 2: 4. It also appears from the results of the interview. Then the students did not know how to divide the line into 2 parts with a ratio of 2: 4 by first dividing the AB line into 6 parts at the same length as it appears from the results of the students' written test answers and confirmed by the interview results. Furthermore, students cannot divide the AB line into 6 equal parts by using the step dividing the line segments that have been studied. This can be seen from the results of students' written test answers and also from the results of interviews. And students can not determine where the division of the line segment into two parts with a ratio of 2: 4. This can be seen from the results of written test answers and also the results of interviews.

Based on the results of the analysis of the learning outcomes above it can be concluded that the ability of students of class VII Cendana Stella Duce 2 Yogyakarta in dividing the line segments into several equal parts and dividing the lines into sections with a certain ratio is still not maximal. That is, even though some students have been able to understand the problem given, most of them have also been able to divide the line without taking measurements, it's just that there are still students who understand the problem and also cannot divide the line without taking measurements. There is also a student who does not understand the problem, but he can divide the line segment without taking measurements. But the result is that the end result is not right, because understanding the problem is not right.

4. Conclusion

Based on the analysis of learning outcomes it can be concluded that the ability of class VII students of Stella Duce 2 Yogyakarta Junior High School in dividing the line segments into several equal parts and dividing the lines into several parts with a certain ratio is still not maximal. That is, even though some students have been able to understand the problem given, most of them have also been able to divide the line without taking measurements, it's just that there are still students who understand the

problem and also cannot divide the line without taking measurements. There is also a student who does not understand the problem, but he can divide the line segment without taking measurements. But the result is that the end result is not right, because understanding the problem is not right.

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