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STUDENTS' CREATIVE THINKING ANALYSIS OF SPLTV MATERIALS THROUGH VIRTUAL LEARNING REVIEWED FROM BEGINNING MATHEMATICS ABILITY

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Abstract

Mathematical creative thinking ability is certainly different for each student based on their initial mathematical abilities. Virtual learning has become the main learning process during a pandemic. The purpose of this study was to analyze how students' creative thinking skills on SPLTV material through virtual learning were based on students' initial mathematical abilities. The subjects in this study were students of class X SMA Malahayati Islamic School totaling 149 students, which were then taken 3 students based on their initial mathematical abilities. This study used the descriptive qualitative method. Data analysis in this study is to describe the results of student interviews and answers. Checking the validity of the data using data triangulation techniques. The results showed that students with high and moderate initial abilities had mathematical creative thinking skills from the ground up and needed to be honed again. Meanwhile, students with low initial ability cannot think creatively at all. Learning in virtual classes greatly affects the learning process, especially student learning outcomes. So mathematical creative thinking skills are strongly influenced by students' initial mathematical abilities and student learning processes.

Keywords: Creative Thinking; Initial Ability; SPLTV; Virtual.

Abstrak

Kemampuan berpikir kreatif matematis tentunya berbeda-beda tiap siswa berdasarkan kemampuan awal matematikanya. Pembelajaran virtual menjadi proses pembelajaran utama selama masa pandemic. Tujuan penelitian ini adalah untuk menganalisis bagaimana kemampuan berpikir kreatif siswa pada materi SPLTV melalui pembelajaran virtual berdasarkan kemampuan awal matematika siswa. Subjek dalam penelitian ini merupakan siswa kelas X SMA Malahayati Islamic School yang berjumlah 149 siswa, yang kemudian diambil 3 siswa berdasarkan kemampuan awal matematika. Penelitian ini menggunakan metode deskriptif-kualitatif. Analisis data dalam penelitian ini yaitu dengan mendeskripsikan hasil dari jawaban dan wawancara siswa. Memeriksa keabsahan data menggunakan Teknik triangulasi data. Hasil penelitian menunjukkan bahwa siswa dengan kemampuan awal tinggi dan sedang memiliki kemampuan berpikir kreatif matematis dari dasar dan perlu diasah lagi. Sedangkan siswa berkemampuan awal rendah sama sekali tidak memiliki kemampuan berpikir kreatif. Pembelajaran dalam kelas virtual sangat mempengaruhi proses belajar terutama hasil belajar siswa. Sehingga kemampuan berpikir kreatif matematis sangat dipengaruhi oleh kemampuan awal matematika siswa dan proses pembelajaran siswa.

Kata kunci: Berpikir Kreatif; Kemampuan Awal; SPLTV; Virtual.



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INTRODUCTION

Epidemic covid-19 which spread all over the world has built the digital era simultaneously in every corner of the world. In the world of education, online learning is one of the best solutions in the pandemic period (Herliandry et al., 2020). In addition, Herliandry said that the teacher and educator had to accept the progressive development era and developed fast in the technology area. Virtual class or E-learning is learning that use web device and the internet (Dhawan, 2020). In virtual learning, the students should study independently to enrich their knowledge from the internet. It requires the students to be active and creative in doing the learning process in virtual learning.

Based on (Siswanto & Ratiningsih, 2020) the ability that has character of sensitivity on problems, find out new information and develop it, it is students' creative thinking ability be the focus of mathematic learning. But learning implementation like this has not been optimal. Then, it is still far between students' creative thinking ability and the target (Fatah et al., 2016). students' creative thinking ability can be developed based on their math ability at the beginning.

Based on (Purnamasari & Setiawan, 2019) the basics of students' math ability is the ability owned before they learn new material, students' math ability at the beginning is really important known by the teachers and also the students in order to get a good learning result (Suryani et al., 2020). It can be concluded that to develop creative thinking ability, one needed to know their math ability at the beginning.

Previous research which is done by (Abidin et al., 2018) explained that

students' creative thinking ability was still low. The result was relevant with (Triyani & Azhar, 2021) that students' thinking ability in solving problems was still low. Next, the research (Kristiana et al., 2016) had resulted that students' creative thinking ability depended on their beginning ability.

Students' creative thinking ability was affected to students' math learning, one of them was problem-solving of SPLTV (Puspitasari et al., 2018) SPLTV is the material that has problems with using story questions and their long solutions (Sari et al., 2019) based on (Dewi & Kartini, 2021) SPLTV material was given as story questions to make the students get stimulus and understand the concept of problem in daily life. SPLTV was judged difficult because of the concept and long process to solve the problem this is in line with (Benyamin et al., 2021) who said that SPLTV material is difficult because it needed a long process to solve and also take extra time to finish. it made the students had to have creative thinking ability. Students' creative thinking ability is affected by their math ability in the beginning. This is matches with a study designed by Rina Novita and Ramlah which said that students' creative ability was affected by their math ability at the beginning (Novita & Ramlah, 2021).

Analysis of students' creative thinking was really important to be done to know whether the indicators of students' creative thinking ability can be reached or not (Hanipah et al., 2018). So, the analysis of students creative thinking ability is needed to be done on SPLTV material through virtual learning focus on students' ability in the beginning. Based on explanation above, this research is to analyze students' creative thinking ability based on

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students' ability in the beginning in solving problem SPLTV on virtual learning in Malahayati Senior High Islamic School.

METHOD

This research used qualitative descriptive. This method is used to describe the result of research analysis that has been done. This research is conducted at Malahayati Senior High Islamic School for X grade in year 2021/2022.

The subjects of this research is X grade of Malahayati Senior High Islamic School which consisted of 149 students in the academic year 2021/2022. then, those subjects were divided based on their basic math ability that could be seen from a previous mid-test score. The students were divided into three groups based on their basic math ability there are low, middle and high. One of the students in each group was tested to know her or his creative thinking ability when she or he did SPLTV questions. Therefore, three students followed the test of creative thinking ability. To determine the category, used a formula with students' average score and standard deviation (Purnamasari & Setiawan, 2019). The following was the formula used:

Table 1. The formula of KAM.

No	Formula	Category
1	$KAM \geq \bar{X} + SB$	High
2	$\bar{X} - SB \leq KAM < \bar{X} + SB$	Middle
3	$KAM < \bar{X} - SB$	Low

After grouping the students, then one student was taken randomly from each group then he or she was given essay test questions to measure students' creative thinking. Indicators of this research referred to indicators of creative thinking which was put forward by Guilford. There are three of creative

thinking: (a) fluency, (b) flexibility and (c) originality (Mardhiyana & Sejati, 2016).

The test instrument of creative thinking which consisted of HOTS questions about the problems in daily life which consist of three essay questions and has been validated and approved by the lecture and also declared that it was worthy to be a research instrument. Besides essay tests, collecting data has been done by interviewing unstructured. The interview was done to know how the learning process in virtual class and what was the obstacle faced by the students in finishing SPLTV problems.

The data that has been collected was analyzed with using data technique analysis such as data reduction, data presentation, and getting conclusions.

1. Data reduction

the data which was collected then would be sorted to find out the most relevant problem statement.

2. Data presentation

The data which was reduced, then it would be presented in narrative text (written disclosure). that was done to make it easier in describing findings so that the conclusion could get easily.

3. Getting a conclusion

The data that has been presented, then systematically arranged in the narrative. After the data has been analyzed, validated, data triangulation. Data triangulation is a technique that was used to validate the data with using data comparison (Hadi, 2017) so it was appropriate method to check validity in this qualitative research.

RESULT AND DISCUSSION

This research used 149 students grade X which were categorized based on their basic math ability, determination of students' category

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based on their mid-test score. The students were divided into three categories based on their basic math ability, one of them in each group was chosen randomly. The following was table grouping results based on KAM. Table 2. The results of grouping students based on KAM.

Students' basic math ability			Total of students
High	Middle	Low	
8 Students	102 Students	39 Students	149 Students

Based on table 2, there were 8 students who had high score basic math ability, 102 students who had middle

score and 39 students who had low score basic math ability one of them in each category was chosen to do essay question about students' creative ability to finish SPLTV.

After the students did the essay questions test, the answers were analyzed based on their basic math ability. Then the students were interviewed about the answer that they had given and how the learning process on virtual class. The following were the questions given to the students based on the indicator of students' creative thinking ability. It could be seen in the table 3

Tabel 3. the essay question test SPLTV

SOAL		
No. 1	No. 2	No. 3
It is known that the total of number triple from the first number and the second number also two times The third number was 5. If triple times from the second number then minus from the amount of first number dan triple times from the third number the total is 2. If the third number is minus from the amount of two times the first number and three times the second number the total is 1. Make its equality!	It is known that Aryo is 6 years older than Tati and Tati's age 4 years older than Fina. The amount of their age was 80 years. Find out their age, then from your answer make the question and give the solution!	On Sunday, Mr. Dodo, Mr. Diki, and Mr. Tono went to a plant shop that sold seeds. Mr. Dodo bought 2 packs of kale seed, 1 pack of corn seed, and 4 packs apple seed that cost Rp. 84.000,00 while Mr. Diki bought 2 packs of corn seed and 1 pack of an apple seed that cost Rp. 37.000,00 while Mr. Tono bought 3 packs of kale seed and 2 packs of an apple seed that cost Rp. 56.000,00. which one is the most expensive seed?

The following was the result of analysis from the answer of students' creative thinking in finishing SPLTV in the virtual class. Based on students' basic math ability. IT was analyzed one by one for each question and answer.

1. Students' answers for number 1

The following is the students' answer to essay test in category basic math ability high, middle and low for

question number 1 could be seen in Figure 1.

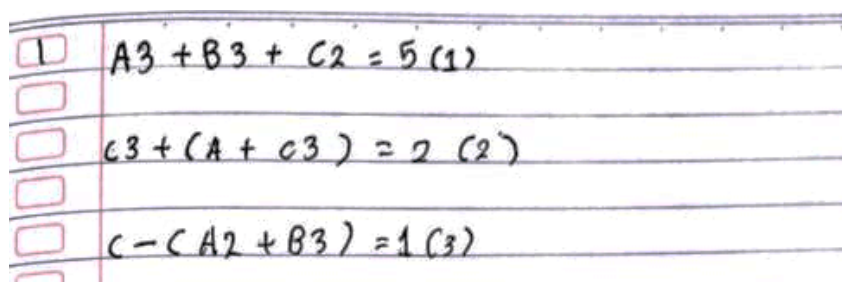
Figure 1, showed the answer of the student who had low basic math ability in finishing the essay question test of SPLTV. Question number 1 was not done by the students who had high and middle basic math ability, and from the Figure number 1 showed that the student who had low basic math ability only could write the variable and did

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not finish question number 1. it should be answered as detail and finished it according to what the students understood. Question number 1 had indicator creative thinking Fluency. Fluency meant supposing the term which should be found as variable and fluency in changing story questions into

math form. This indicator is used for students to make the students release their ideas and answer with fluency. But, it could be seen that the student could not answer it properly. This showed that the fluency indicator did not fulfill.

Student's Answer number 1



1 $A3 + B3 + C2 = 5 (1)$

$C3 + (A + C3) = 2 (2)$

$C - (A2 + B3) = 1 (3)$

Figure 1. Student's answer sheet for category low

2. Students' answers for number 2

Next, moved to question number 2. question number 2 had the indicator flexibility. Flexibility was one of the creative thinking ability indicators that had to be owned by the students, to make them easy to finish math problems in various ways (Al Adawiah et al., 2019). the answer of the students could be seen in Figure 2 and 3.

Based on the answer above, the student who had high basic math ability could finish the question in various ways according to their understanding. Based on that answer, the students wrote the answer in detail and suitable with the answer that they understood. This was shown that the students who had high ability could finish the question according to that indicator. Next, the answer of the students who had middle basic math ability only

could write new questions from questions given. The answer from that student did not full, the student did not give detail about the calculation given. This showed that the student could not finish the answer based on indicator flexibility, and the student had to finish the question in various ways. Although the student had a low ability, that student did not answer at all. This showed that the student did not have an indicator to solve the problem.

3. Students' answers for number 3

According to table 3, question number 3 had the indicator originality. This indicator made the student have to answer the question or finish the question with something new or used an unusual way the following was the answer for question number 3.

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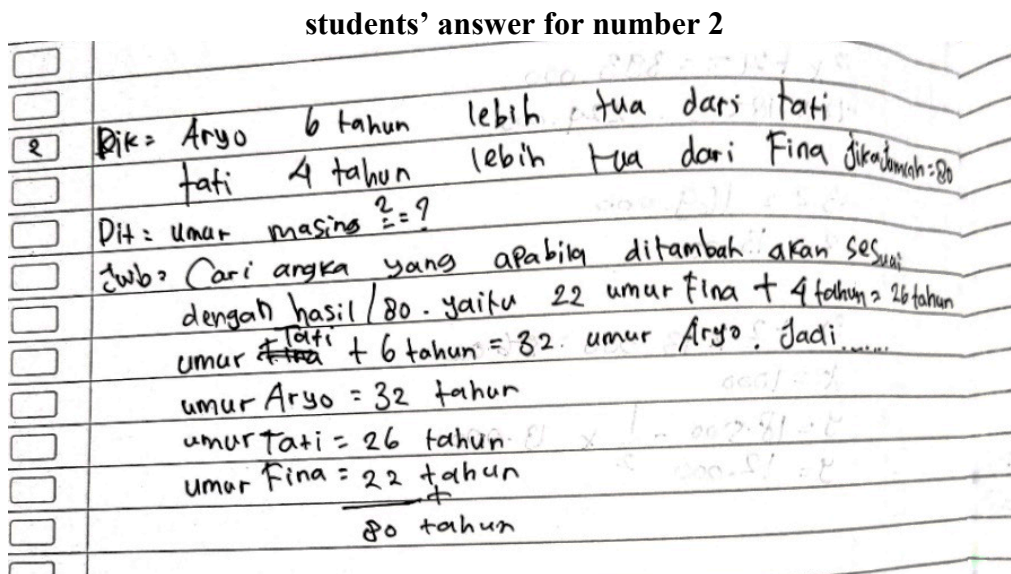


Figure 2. Student's answer sheet for category high

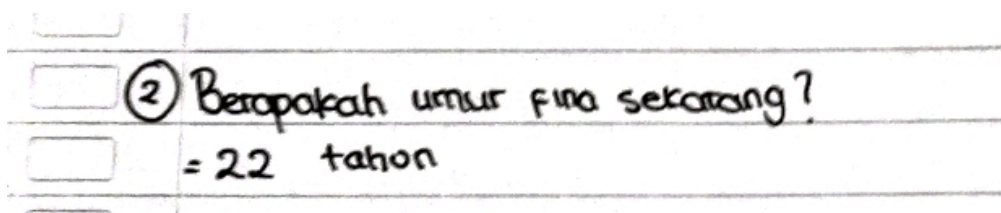


Figure 3. Student's answer sheet for category middle

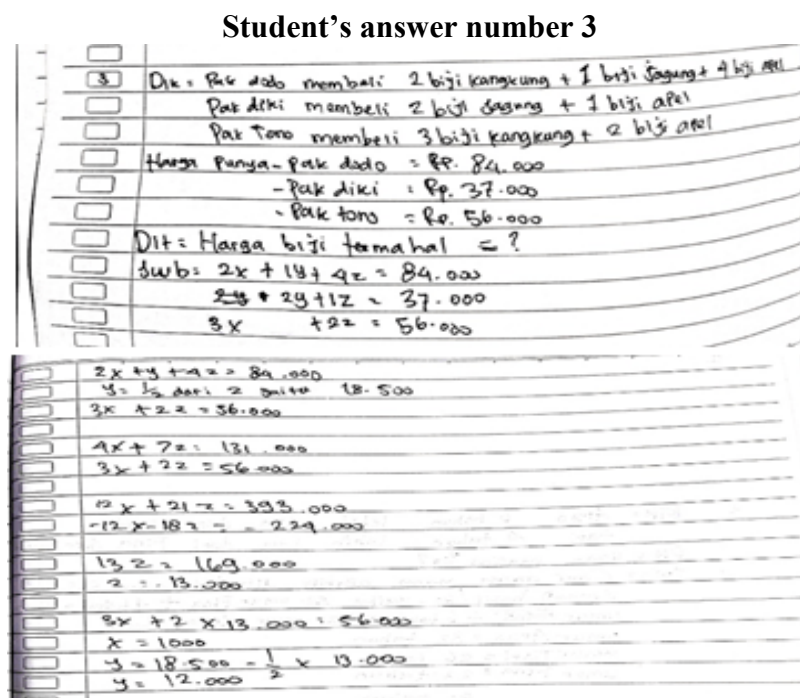


Figure 4. Student's answer sheet for category high

$$\begin{cases} 2x + 4y + 4z = 84.000 \\ 2y + 1z = 37.000 \\ 3x + 2z = 56.000 \end{cases} \quad \begin{cases} 2x + 4y + 4z = 84.000 \\ 2y + z = 37.000 \\ 3x + 2z = 56.000 \end{cases}$$

$$\begin{cases} 2x + 10500 - \frac{1}{2}z + 4z = 84000 \\ y + 18500 - \frac{1}{2}z \\ 3x + 2z = 56000 \end{cases} \quad \begin{cases} 2x + 10500 - \frac{1}{2}z + 4z = 84000 \\ 3x + 2z = 56000 \end{cases}$$

$$\begin{array}{r} 4x + 7z = 131.000 \\ 3x + 2z = 56.000 \\ \hline 13z = 1169.000 \\ z = 130.000 \end{array} \quad \begin{array}{r} 12x + 21z = 303.000 \\ -12x + 18z = -224.000 \\ \hline 39z = 79.000 \\ z = 2025,64 \end{array}$$

$$\begin{aligned} 2x + 2 \times 13.000 &= 56.000 \\ 2x &= 10.000 \\ x &= 5.000 \\ y + 18.500 - \frac{1}{2} \times 13.000 &= 37.000 \\ y &= 12.000 \end{aligned}$$

$$\Rightarrow (x, y, z) = (10.000, 12.000, 13.000)$$

$$\begin{aligned} 2 \times 10000 + 1 \times 12000 + 4 \times 13000 &= 84.000 \\ 2 \times 12000 + 1 \times 13000 &= 37000 \\ 3 \times 10000 + 2 \times 13000 &= 56.000 \end{aligned}$$

$$\begin{aligned} 84.000 &= \text{Rp. } 84.000 && \text{(Jagung)} \\ 37.000 &= \text{Rp. } 37.000 && \text{(Apel)} \\ 56.000 &= \text{Rp. } 56.000 && \text{(Kangkung)} \end{aligned}$$

Paling murah \rightarrow Apel.

Figure 5. Student's answer sheet for category middle

According to the answer of the student on Figure 4 and 5, the student who had high basic ability could solve the problem of SPLTV on the question which had indicator originality. The student could do with using many ways that he/she thinks she/he could find out the answer which was asked. The way how to answer was unusual in solving the problem. This showed that the student who had high basic ability could finish the problem with that indicator. Next, the student who had middle basic ability had the answer which was appropriate with that indicator of question. The student who had middle basic ability solved the problem well. The student made it in detailed every answer in an unusual way. This showed that the student who had middle basic ability could finish the question with indicator originality. Next was the

student who had low basic ability liked the previous question, the student who had low basic ability could not do the question at all. It showed that the student who had low basic ability could not finish the question dan that indicator.

According to the analysis of the essay answer test, it is seen that the student who had high basic ability had ability in math creative thinking which was seen from the answer that was suitable from the indicator. Meanwhile, the student who had middle basic ability had potential in creative thinking that could be sharpened to make it better. The student who had the low basic ability did not have math creative thinking which was seen from there was no indicator that could be fulfilled from the answer.

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It was strengthened by the data of interviewing with the three students about the answer and also the process. Based on the interview with the student who had the higher ability, the student felt that virtual learning was an obstacle in the learning process and getting the material. So, the student had to enrich their knowledge from google and youtube, because delivering the material in the class was not optimal, this impacted solving the problem SPLTV which was not optimal. Besides that, according to the interview, the student did not make the question because felt confusing about the question and question that have been made.

Based on the interview with the student who had the middle ability, it was seen that the creative thinking indicator flexibility was not really could be replicated by the student. The student could not write what was understood, so did not answer which was suitable with the question and the answer that the student knew.

Based on the interview, the student who had low basic ability did not know what SPLTV and also the material was. It was supported by the student's answer which was not completed. It was proven that the student who had low basic ability could not take math lessons and did have math creative thinking.

Based on previous research (Kristiana et al., 2016), if the basic ability was high so creative thinking ability was high too. On other hand, if the basic ability was low so creative thinking ability was low too. In this research, the student who had high basic ability could fulfill 2 categories of indicators of student's creative thinking in solving problem SPLTV. The student who had middle basic ability had 1 indicator of creative thinking which was

fulfilled in solving problem SPLTV. While the student who had the low basic ability, could not able to fulfill three indicators of creative thinking ability in solving problem SPLTV. So, there was a similarity between the result of this research and previous research, there was the student who had high basic ability would also have creative thinking ability. If the basic ability was high so creative thinking ability was high too.

There was a new finding in this research, the student who had the high basic ability, middle and low felt hard to explore and upgrade their ability in virtual learning. The indicators of creative thinking that could not be fulfilled by the students were affected by the learning process which was done as virtual. The learning process which was done as virtual made the student limited in understanding material deeply. The method chosen for virtual learning which was suitable could help the students to understand the material well.

Theoretical implications from this research were using the learning method virtual correctly. The students, in this case, had limited in the learning process so their ability that student had, it was hard to be explored and developed.

CONCLUSION AND SUGGESTION

The result of this research showed that students' creative thinking ability was affected by math basic ability and the process of math learning. It was supported by the data from 3 indicators of creative thinking ability, there were only two indicators which were fulfilled the categories of creative thinking ability of the students who had high basic ability and middle, that was flexibility and originality, while the

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students who had low basic ability did not fulfill it.

The next research could investigate how the process of virtual learning was effective to increase students' creative thinking ability in SPLTV problems according to their basic math ability. Knowing how the learning process in virtual class was effective could help the teacher and the students to resolve the difficulty in the virtual learning process and make the mathematics learning process easier based on an era like this virtual learning process.

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