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The Application of Comic-Based Learning Assisted by Pixton to Improve Mathematical Creative Thinking Skill Of Class IX SMPN 8 Percut Sei Tuan

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A R T I C L E I N F O

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A B S T R A C T

This research aims to improve creative thinking skills of students of SMPN 8 Percut Sei Tuan grade IX with material Congruence by using the The Application of Comic-Based Learning Assisted by Pixton to Improve Mathematical Creative Thinking Skill . The subject of this research is the students of class IX.3 of SMPN 8 Percut Sei Tuan in the academic year 2022/2023. The object of this research is students' creative thinking skills by applying the Comic-Based Learning Assisted by Pixton and is assisted with to material Congruence in class IX.3 of SMPN 8 Percut Sei Tuan. This research used Classroom Action Research as the type of research, that consists two cycles, I and II. The instruments that used are observation, tests. The result analysis revealed that, the observation for mathematical creative thinking skill increased from 61% in cycle I to 83% in cycle II, there are 18 out of 30 students (60%) have attained the standard of mathematical creative thinking skills with mean score 68,06, improved after the execution in cycle II became 26 out of 30 students (87%) and mean 80, with gain index of 0,37 indicating a medium improvement. Therefore, the researcher concludes that applying of Comic-Based Learning Assisted by Pixton to Improve Mathematical Creative Thinking Skill Of Class IX SMPN 8 Percut Sei Tuan with material Congruence.

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INTRODUCTION

Mathematics is the queen as well as the servant of science which is the highest form of logic and provides a system of organizing science that is logical and statements in the form of mathematical. At all levels of education from elementary school to college, mathematics is one of the fields in the list of lessons, even mathematics is taught in kindergartens informally. Looking for the future, our students have to learning mathematics because the important usefulness in life of the Indonesian Nation. One of the benefits of mathematics to meet the practical needs and solve daily life problems. Creativity is something that is overlooked in the study of mathematics. Students had to think creatively so that students can solve problems in a variety of different ways Guilford (Park, 2004). Creative thinking is a mental activity that is associated with sensitivity to the problem, consider the new information and ideas that are not usually with an open mind and can create relationships in solving problems.(Mawarni,et al.2017).

One of the goals of education is to make children think creatively both to solve problem and to be able to communicate or convey their thoughts. Learning math need to be designed so that a potentially develop a creative skills thinking of students. Creative thinking is a mental activity that is associated with sensitivity to the problem, consider the new information and ideas that are not usually with an open mind and can create relationships in solving problems. Creative thinking includes right-brain thinking, with a focus on creating and communicating new, more meaningful relationships. Fasko Daniel (2001) that the mathematical creative thinking ability is the mathematics level thinking ability that include by originality, elaboration, flexibility and fluency components. Characteristics of creative thinking that is originality, elaboration, fluency and flexibility.In order for children's creativity can be realized needed a push in the individual (intrinsic motivation) and the encouragement of environmental (extrinsic motivation).

Students in Indonesia scored lower than the OECD average in reading, mathematics and science. The score of mathematics skill is 352 with the world average score of math ability is 567. Based on the results of the Program for International Student Assessment (PISA) survey initiated by the Organization for Economic Cooperation and Development (OECD) in 2018 it shows that, "Indonesia is ranked 74th out of 79th countries in the categories of reading, math and science abilities". Mathematical skills have something to do with students' mathematical creative thinking skills. Creativity or creative thinking is a person's ability to generate new ideas that effective and ethical (tatang, 2012). Creative thinking has the meaning that a person has a diversity in solving a problem. Guilford (1986) considered creative thinking as involving divergent thinking, which emphasizes fluency, flexibility, originality, and elaboration. (Pramudya:72). From the results of the analysis of student in SMPN 8 Percut Sei Tuan it can be concluded that the creative thinking ability of students is still low because students have relatively difficulty working on questions that require creative thinking skills in mathematics. And mathematics learning that is carried out is more centered on conventional learning. , while students tend to be passive. Most of the students admitted that they still often had difficulty understanding the mathematical subjects explained by the teacher.

To improve mathematic creative thinking skill, it is important to revising textbooks used. There are so many media available on the internet that can be used to support students' learning process during online learning. So that, the model of learning, instructional media and learning resources are approaches to use of computer. One of instructional media that used in learning is comic digital. Comic is media visual to express ideas via images and is combined with text for information. Usually comics are made serial image. Comic as learning media are one of the media that are considered effective for teaching and developing students' creativity. According to Heru, comics have many meanings and debutants, which are adapted to the place where each comic is located. In general, comics are often defined as illustrated stories. Comic can have the meaning of juxtaposed images and other symbols (nearby, next to each other) in a certain order, to convey information and/or achieve an aesthetic response from the reader. Comics are actually more than just light and entertaining picture stories.

The comics that are applied this time are in the form of digital online by paying attention to efficiency and practicality using a web program called Pixton. Pixton-assisted comics-based learning, Pixton is a website that creates comic books online without installing anything on your computer. The platform allows you to choose characters and scenarios and add speech bubbles to create stories easily. Every user who wants to make comics doesn't need to draw smartly. They need to develop creativity by pouring all the contents into an image because comics are available in it. In addition to being able to create silent comics, Pixton can also create animations and include sound into them to make them more attractive. This practicality can be used by teachers who want to add variety to learning media or bring a fun 21st-century learning atmosphere to the classroom.

LITERATURE REVIEW

The use of comics as a medium will be very good because it will provoke students to read. In addition to having interesting pictures, comics also have a storyline that will arouse the curiosity of students, thus making students to continue reading without having to be ordered by the teacher. Comic is a form of visual communication media that has the power to convey information in a popular and easy to understand manner.

Comics will be created with pixton, Pixton has excellent potential to enhance the teaching-learning process due to enabling students to create comics easily on a digital platform and have control over the content they create. the ability to think creatively is a person's ability to think something to understand the information and make it a new idea or innovation that involves the ratio and emotional component. Creative thinking can also be developed as a mental activity that a person uses to build new ideas or ideas. Creative thinking that a person has is the ability to express new relationships, see a problem from a new perspective and come up with unusual but useful solutions. Willliam (in Al-Khalili, 2005) shows the characteristics of creative thinking skills, namely fluency, flexibility, originality, and elaboration.

Wiht problem Based Learning is a learning method that uses problems as the first step in collecting and integrating new knowledge. So it can be concluded that Problem-Based Learning is a learning process where the starting point of learning is based on problems in real life then from this problem students are stimulated to study problems based on the knowledge and experience they have previously (prior knowledge) so that from this prior knowledge and skills will be formed and new experience. Problem-Based Learning engages students in an active, collaborative, learner-centered, learning process, which develops the problem-solving and independent learning skills needed to face challenges in life and careers, in today's increasingly complex environment.

METHODOLOGY

This type of research is Classroom Action Research (CAR). According to Kemmis (1988), classroom action research (CAR) is a form of self-reflection research carried out by participation in social situations (including education) to improve practices and situations in which these practices are carried out.. The CAR was planned into two (2) cycles. The stages of each cycle in this research include (1) planning; (2) action; (3) observation and (4) reflection.

The subject in this classroom action research were students of grade IX-3 A and B from SMPN 8 Percut Sei Tuan, taken one class ftom an exisiting class as many as 30 students, which is class IX-3 A, class had chosen based on the background of study, the mean is 35,56 , the creative thinking skill of students when giving diagnostic test is low. The object of this research is The Application of Comic-Based Learning Assisted by Pixton to Improve Mathematical Creative Thinking Skill.

RESULT RESEARCH

Research' Result of Cycle I of Critical Thinking Skill Test

After the application of Comic based learning in the learning process cycle I to 30 students IX of SMPN 8 Percut Sei Tuan, the researchers conducted a mathematical creative thinking skill test. Based on these results, the level of students' creative thinking skill based on indicators is explained as follows:

Tabel 1. Level of Students' Abilities based on Indicator Fluency

No	Score Interval	Criteria	Number of Students	Perc.	Perct.
1.	$86 \leq score \leq 100$	Very Good	8	27%	**53% Not Good**
2.	$71 \leq score < 85$	Good	8	27%	
3.	$55 \leq score < 70$	Quite Good	0	0%	
4.	$41 \leq score < 54$	Not Good	13	43%	
5.	$0 \leq score < 40$	Very Not Good	1	3%	
Means			**69,17**		

From fluency indicators, students can convey many arguments and can quickly see the mistakes and weaknesses of an object or situation. In terms of means, the researcher determined 69,17, and for percentages are 53% implying that students are still not good in many arguments and can quickly see the mistakes and weaknesses of an object or situation in contextual problems.

Tabel 2. Level of Students' Abilities based on Indicator Flexibility

No	Score Interval	Criteria	Number of Students	Perc.	Perc.
1.	$86 \leq score \leq 100$	Very Good	10	33%	
2.	$71 \leq score < 85$	Good	11	37%	**60% Quite Good**
3.	$55 \leq score < 70$	Quite Good	4	13%	
4.	$41 \leq score < 54$	Not Good	3	10%	
5.	$0 \leq score < 40$	Very Not Good	2	7%	
Means			**74,166**		

Flexibility is seeing a problem from a different perspective by finding many alternatives, being able to change approaches or thoughts while creating varied ideas, answers or questions. In terms of means, the researcher determined 74,166, and for percentages are 60% implying that students are still quite good in students are able to provide a range of answers correct with a clear solution to the problem.

Tabel 3. Level of Students' Abilities based on Indicator Originality

No	Score Interval	Criteria	Number of Students	Perc.	Perct.
1.	$86 \leq score \leq 100$	Very Good	5	17%	
2.	$71 \leq score < 85$	Good	12	40%	**70% Quite Good**
3.	$55 \leq score < 70$	Quite Good	8	27%	
4.	$41 \leq score < 54$	Not Good	3	3%	
5.	$0 \leq score < 40$	Very Not Good	2	2%	
Means			**68,33**		

Originality indicators can create new expressions and uniqueness and have an unusual way of thinking to express themselves and can make combinations of uncertain elements from a given problem. Students have not been able to provide answers in a unique way or a way that is different from those given by other students, the calculation process and the results are correct. In terms of means, the researcher determined 68,33, and for percentages are 70% implying that students are still quite good in students are not used to solving open-ended math problems causing students to be confused and find it difficult when working on the questions given because they do not know the method or alternative to be used to solve the problem.

Tabel 4. Level of Students' Abilities based on Indicator Elaboration

No	Score Interval	Criteria	Number of Students	Perc.	Perct.
1.	$86 \leq score \leq 100$	Very Good	5	17%	
2.	$71 \leq score < 85$	Good	13	43%	**43% Not Good**
3.	$55 \leq score < 70$	Quite Good	4	13%	
4.	$41 \leq score < 54$	Not Good	3	10%	
5.	$0 \leq score < 40$	Very Not Good	5	17%	
Means			**63,33**		

Indicators of Elaboration can add ideas and can demonstrate the material provided. students are able to give the correct answer to one or more ways of solving the problem, accompanied by detailed steps. In terms of means, the researcher determined 63,33, and for percentages are 63,33%, lack of understanding of students in learning mathematics, and there is no willingness to ask questions to the teacher so that students will experience difficulties when working on questions given by the teacher.

Tabel 5. Result of Mathematical Creative Thinking Skill on Cycle I

No	Score Interval	Criteria	Number of Students	Perc.
1.	$86 \leq score \leq 100$	Very Creative	0	0,00%
2.	$71 \leq score < 85$	Creative	11	36,67%
3.	$55 \leq score < 70$	Quite Creative	7	23,33%
4.	$41 \leq score < 54$	Not Creative	9	30,00%
5.	$0 \leq score < 40$	Very Not Creative	3	10,33%
Total			30	100%

From the results of students' mathematical creative thinking ability tests in cycle I, it was found that there was an increase in learning completeness from the pre-test. From the results of the first mathematical creative thinking skill test for class IX Percut Sei Tuan, the percentage of class classical completeness was 60%. The 30 students who took the first mathematical creative thinking skill test, it was found that 11 students could think creatively mathematically in the creative category, 7 students could think creatively mathematically in the quite creative category, 9 students could think creatively mathematically in the not creative category, and 3 students who have mathematical creative thinking abilities are in the very uncreative category. The means of mathematical creative thinking skill is 60,09.

Research' Result of Cycle II of Critical Thinking Skill Test

After the application of Comic based learning in the learning process cycle II to 30 students IX of SMPN 8 Percut Sei Tuan, the researchers conducted a mathematical creative thinking skill test. Based on these results, the level of students' creative thinking skill based on indicators is explained as follows:

Tabel 6. Level of Students' Abilities based on Indicator Fluency

No	Score Interval	Criteria	Number of Students	Perc.	Perct.
1.	$86 \leq score \leq 100$	Very Good	18	60%	**73% Good**
2.	$71 \leq score < 85$	Good	4	13%	
3.	$55 \leq score < 70$	Quite Good	1	3%	
4.	$41 \leq score < 54$	Not Good	2	7%	
5.	$0 \leq score < 40$	Very Not Good	5	17%	
Means			**76**		

The result shows us that there are 18 students (60 %) categorized as very good, 4 students (13%) as good, 1 students (3%) as quite good, 2 students (7%) as not good, and five (5) students (17%) are not very good. In terms of means, the researcher determined 76, and for percentages are 73% implying that students are good.

Tabel 7. Level of Students' Abilities based on Indicator Flexibility

No	Score Interval	Criteria	Number of Students	Perc.	Perc.
1.	$86 \leq score \leq 100$	Very Good	17	60%	**63% Quite Good**
2.	$71 \leq score < 85$	Good	2	7%	
3.	$55 \leq score < 70$	Quite Good	1	3%	
4.	$41 \leq score < 54$	Not Good	7	23%	
5.	$0 \leq score < 40$	Very Not Good	3	10%	
Means			**77,91**		

The result shows us that there are 17 students (60%) categorized as very good, 3 students (7%) as good, 1 students (30%) as as quite good, 7 students (23%) as as not good, and 3 students (10%) as as veryn not good. In terms of means, the researcher determined 82,5, and for percentages are 70% implying that students are good.

Tabel 8. Level of Students' Abilities based on Indicator Originality

No	Score Interval	Criteria	Number of Students	Perc.	Perct.
1.	$86 \leq score \leq 100$	Very Good	21	70%	**83% 1Good**
2.	$71 \leq score < 85$	Good	4	13%	
3.	$55 \leq score < 70$	Quite Good	1	3%	
4.	$41 \leq score < 54$	Not Good	2	7%	
5.	$0 \leq score < 40$	Very Not Good	2	7%	
Means			**85,42**		

The result shows us that there are 21 students (70%) categorized as very good, 4 students (13%) as good, 1 students (3%) as quite good, 2 students (7%) as not good, and 2 students (7%) as veryn not good. In terms of means, the researcher determined 85,42, and for percentages are 83% implying that students are Very Good.

Tabel 9. Level of Students' Abilities based on Indicator Elaboration

No	Score Interval	Criteria	Number of Students	Perc.	Perct.
1.	$86 \leq score \leq 100$	Very Good	14	47%	**83% Very Good**
2.	$71 \leq score < 85$	Good	11	37%	
3.	$55 \leq score < 70$	Quite Good	1	3%	
4.	$41 \leq score < 54$	Not Good	2	7%	
5.	$0 \leq score < 40$	Very Not Good	2	7%	
Means			**80**		

The result shows us that there are 14 students (47%) categorized as very good, 11 students (37%) as good, 1 students (3%) as quite good. In terms of means, the researcher determined 80, and for percentages are 83% implying that students are Very Good.

Tabel 10. Result of Mathematical Creative Thinking Skill on Cycle II

No	Score Interval	Criteria	Number of Students	Perc.
1.	$86 \leq score \leq 100$	Very Creative	10	33,33%
2.	$71 \leq score < 85$	Creative	16	53,33%
3.	$55 \leq score < 70$	Quite Creative	2	6,67%
4.	$41 \leq score < 54$	Not Creative	1	3,33%
5.	$0 \leq score < 40$	Very Not Creative	1	3,33%
Total			30	100%

The results of students' mathematical creative thinking skill tests in cycle II showed an increase in learning completeness from students' mathematical creative thinking ability tests in cycle I. From the results of tests of students' mathematical creative thinking ability II class IX SMPN 8 Percut Sei Tuan, the percentage of classical class completeness was obtained at 87%, that is, of the 30 students who took the mathematical creative thinking ability test II, 10 students (33,33%) were in the Very Creative category, 16 students (53,33%) were in the

Creative category, 2 students (6,67%) were in the Creative category quite creative and 1 student (3.33%) in the not creative category and in the veryn not creative. In this study, researchers used the gain index to interpret the score development of mathematical creative thinking skills. Based on the calculations, a gain index of 0.41 is obtained which indicates progress, but is medium. Despite the progress, it is still a failure. This is because the classical value which is still 60% has not reached the standard classical value (≥85%).

$$(g) = \frac{CTSS\ II - CTSS\ I}{100 - CTSS\ I}$$

$$(g) = \frac{80 - 68{,}06}{100 - 68{,}06}$$

$$(g) = 0{,}37$$

DISCUSSION

The learning was carried out with 30 students in class VII SMPN 8 Percut Sei Tuan using comic-based learning with the help of pixon on congruent material. The first activity carried out by the researcher was to look for a problem that occurred in the classroom by conducting an initial ability test first to find out the cause of the low ability of students' mathematical creative thinking. By implementing comic-based learning assisted by Pixton, the mathematical creative thinking skill can be improved. There is an increase in each indicator of creative thinking skills as seen from the means score. Skill Fluency, granted increased from 69.17 to 80. Skill Flexibility, increased from 74.1667 to 82.5. Skill Originality increased from 68.33 to 82.50. And finally, the Eloboration skill increased from 63.33 to 81.

The efforts made by the teacher to improve students' mathematical creative thinking skills in class IX of SMPN 8 Percut Sei Tuan are in cycle I forming small groups by selecting one student to be the leader of each group, presenting the material being discussed. , each group solves the problems given through discussions arranged by the chairman, asking each group to express every idea they can from their own perspectives and in their own language through presentations and asking students to review each answer they discussed in groups by checking their calculations. Whereas in cycle-II the effort that the teacher gave was for each group to solve the given problem through discussions arranged by the group leader, asking each group to express every idea they could from their own point of view and in their own language through presentations, asking representatives the group voluntarily advanced to answer the questions the teacher gave in front of the class, appreciating each group representative who advanced with applause. appoint the best group as well as the highest scoring group and active students and then give them prizes, and designate groups to conclude the content of the material.

The result of the pre-test mathematical creative thinking skills shows that three (3) out of 30 students (10%) exceed the minimum score (very not creative), with means is 28,89. After the execution in cycle I, the score increased to 18 out of 30 students (60%), with means is 68,06. After the execution in cycle II, the score increased to 26 out of 30 students (87%) exceed the minimum score (very creative), with means is 80. For the clearer, table 4.18. shows the level of students' thinking skills below,

Tabel 11. The Level of Mathematical Creative Thinking Skills in Every Cycle

Score Interval	Categories	Pre-tes	Cycle I	Cycle II
$86 \leq score \leq 100$	Very Creative	1	0	10
$71 \leq score < 85$	Creative	2	18	16
$55 \leq score < 70$	Quite Creative	4	4	2
$41 \leq score < 54$	Not Creative	1	8	1
$0 \leq score < 40$	Very Not Creative	22	0	1
Total		30	30	30
Means Score		28,89	68,06	80
Classical Score		10%	60%	87%

Mathematical creative thinking skill increases as a consequence of the teacher's ability to apply comic-based learning assisted by Pixton. Students are more active and involved in the learning process when researchers use comics. This is because the learning process is more interactive, with more opportunities for students to share thoughts and less lectures. In the learning process, there are group discussions that are able to share, compare, decide, and evaluate their ideas. They also learn teamwork in analyzing and solving contextual problems. This can be seen from the increase in the percentage of observations from cycle I to II, from 61% to 83%.

Thus, based on the presentation of the discussion of the results of the research above, comic-based learning assisted by pixton has succeeded in improving learning by increasing students' mathematical thinking skills, especially on congruent subjects in class IX SMPN 8 Percut Sei Tuan.

CONCLUSION AND SUGGESTION

Based on the result and discussion in this research, the researcher concluded that the implementation of comic based-learning assisted by Pixton in the material Congruence can improve mathematical creative thinking skill is explained below,

a. The result of the pre-test mathematical creative thinking skills shows that three (3) out of 30 students (10%) exceed the minimum score (very not creative), with means is 28,89. After the execution in cycle I, the score increased to 18 out of 30 students (60%), with means is 68,06. After the execution in cycle II, the score increased to 26 out of 30 students (87%) exceed the minimum score (very creative), with means is 81,3889.
b. Based on the tests, there is improvement in each indicator, namely, Fluency (69,17 to 76), for indicator Flexibility (74,16 to 77,91), for indicator Originality (68,33 to 85,42), and for indicator Elaboration (63,33 to 80). The mean score also improved from 68,06 (quite creative) to 81,2889% (creative), with classical score improved from 60 % to 87 %.
c. Based on the observation result, students' mathematical creative thinking skill activities increased from 61% to 83%. Students were more engaged in cycle II in terms of asking questions, giving answers, sharing ideas, comparing, and making decisions. Their collaboration also got better.
d. The researcher earned a gain index of 0,37 indicating a medium improvement.

The suggestions in this research are as follow:

a. For Mathematics teachers should start implementing comic-based learning in teaching mathematics learning materials with student-centered learning as an alternative to improve students' mathematical creative thinking skills. It is expected that evaluation and reflection will always be held at the end of the learning that has been carried out, so that deficiencies found by teachers and students can be corrected immediately and can increase success in subsequent learning.
b. For future researchers who wish to further research the same topics and problems, they should pay more attention to the application of appropriate learning and learning strategies in order to achieve learning success. It is recommended to focus more on improving indicators of mathematical creative thinking in order to achieve learning success.
c. For Students of SMPN 8 Percut Sei Tuan are advised to continue to develop their mathematical creative thinking skills and to be more active and courageous in learning activities both in providing new ideas and ideas that they have or find in solving mathematical problems as well as asking the teacher things that they do not understand.

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