The Experiment of 3CM Learning Model on The Creative Thinking Ability of Junior High School Students in Salatiga Indonesia

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ABSTRACT

Creative thinking skill needs to be trained, even though the learning is conducted online these days. One of the attempts in developing students' creative thinking skill is through the implementation of 3CM (Cool-Critical-Creative-Meaningful) learning model. This study aimed at analyzing the students' creative thinking skill through the implementation of the model with two different creative products (problem construction and non-problem construction) in flat-surfaced three-dimensional object. The population of this research was the whole Junior High School students in Salatiga City with the 80 samples of students from SMP Negeri 1 Salatiga and SMP Negeri 6 Salatiga. This study applied quasi experiment research with pretest-posttest control group design. The data were collected through written test and the result of observation on the students. The data analysis used involves initial balance test and hypothesis test using parametric test called Independent Sample T-Test with the significance rate of α=5%. Before being administered with different treatments, the two samples class were in a balanced condition. The findings presented that the implementation of 3CM (Cool-Critical-Creative-Meaningful) with creative activity of project and problem posing (constructing problem and solving constructed problem) for the material of flat-surfaced three-dimensional object proved to be significantly affect, equally, the creative thinking skill.

Keywords: *3CM Learning, Creative Thinking Ability, Online Learning*

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INTRODUCTION

Ever since the occurrence of Covid-19 (Corona Virus Disease) Pandemic that originated from Wuhan City, China, in the end of 2019 and spread around the world, many changes had happened that eventually affected the human life in general (Kurniyati and Siswati, 2020; Nurdin and Anhusadar, 2021). One of the life aspects which experienced quite a change was education. The learning process which was commonly conducted in schools was shifted into long distance learning, that was done from home without a direct face-to-face meeting, due to the school shut-down in order to decrease the spreading of the Covid-19 (Bao, 2020; Satrianingrum and Prasetyo, 2021; Setyorini, 2020). The Circular Letter No. 4 Year 2020 issued by the Ministry of Education and Culture of the Republic of Indonesia (Kemdikbud), that discusses about the implementation of education policy during the emergency situation due to the spreading of Coronavirus Disease (COVID-19), mentions about the learning activity throughout Indonesia should be conducted from home throughout the pandemic through long-distance/online learning in order to create a meaningful learning for the students (Kemdikbud, 2020).

During the implementation of long-distance learning, the students' thinking skill in arranging or independently finding solution to a problem should still be developed (Baharuddin, 2020; Supardi, 2012). Maya, Sari, & Zanthy (2018) states that creative thinking skill is the ability that must be acquired and required by someone as the asset to face the globalization that keeps flourishing by time.

According to the Constitution No. 20 of 2003 about Sisdiknas (National Education System) article 3, creative thinking skill is one of the attempts to develop students' potential in order to achieve the national education goal. The development of creative thinking skill is included as one of the character values in the 21st century through the attempt in strengthening students' character education (Dit. PSMA Ditjen Pendidikan Dasar dan Menengah, 2017). The Government of Indonesia also

includes creative thinking skill in the Curriculum 2013 objective of as mentioned in Permendikbud No. 36 year 2018 that said to equip the students with the life skill as a creative individual and as the citizen of Indonesia. In Permendikbud, it is also mentioned in one of the philosophies in developing Curriculum 2013, especially in concerns to the determination of students' quality to be achieved, that the goal is to prepare the students of Indonesia to become the heir of the national culture who are creative individuals.

Creative thinking will support problem solving skill (Mahmudi, 2008; Oncu, 2016). Creative thinking is someone's thinking skill in creating a wide and varied method, coming up with ideas or new concept to solve a problem (Hudanagara and Anita, 2018; Nuraeni and Kusuma, 2020). Creative thinking is an important thing to have to achieve. The highest level of Bloom Taxonomy is 'creating' (Wahyudi et al., 2018).

A creative person, according to William (Munandar, 1990), possesses 4 criteria, such as fluency (eloquent thinking) which means the creation of ideas and offering more than one answers to a problem; flexibility (adaptive thinking) refers to the ability in assessing a problem from different point of views; originality (novel thinking) means the creation of unique ideas; while elaboration (detailed thinking) signifies the ability to enrich, develop, and convey the details of an ideas or product. Azhari & Somakim (2013) also amplified the same idea related to these criteria.

The problems raised from the learning process in Indonesia is the tendency to emphasize on memorizing materials and the lack of assistance for students to develop their creative thinking skill (Munandar, 1990; Utami et al., 2018; Larasanti, & Prihatnani, 2021). According to Azhari & Somakim (2013), in everyday practices, teachers have not been optimal in training students' creative thinking skill. The learning model being applied for the process is inadequate to develop students' creative thinking skill. There are studies that attempted to analyze the students' creative thinking skills in mathematics, such as the study of Apriansyah & Ramdani (2018), which was conducted in the material of flat-surfaced three-dimensional object, and the research by Andiyana, Maya, & Hidayat (2018) in the same material. Both studies concluded that students' creative thinking skill in mathematics were still classified as low/ not creative.

A series of studies in a specific area proposes a development of a model for mathematics learning that can be implemented to train students' creative thinking skill, namely the 3CM (cool-critical-creative-meaningful) learning model, to increase the creative thinking skill by Wahyudi et al (2019a) and Wahyudi et al. (2019b). This model was proved to be able to improve the creative thinking skills of students of 2017 elementary pre-service teacher (Wahyudi et al., 2020c), the freshmen of future elementary school for basic mathematic concept (Wahyudi et al., 2020a, 2020b), and also the elementary students (Wahyudi et al., 2019a). The four researches required the students to implement the concept they had learnt into a creative product as a result of concept implementation, new product, and ideas in problem solving which was considerable different from others.

On the other hand, creative thinking is also required to create other kinds of product such as constructing problems and solving the constructed problems. This is because a good material comprehension, skill and creativity in selecting interesting and contextual problem stimuli are needed in constructing a problem (Widana et al., 2019). A learning which specifically requires students in constructing a problem is called problem posing. Problem posing is an activity which leads to critical and creative thinking (Thobroni, 2015). In problem posing method, students are asked to come up with a question to the information given, and they have the opportunity to investigate and provide answer to it. Someone with the ability to create is called creative. This is according to Asfar & Nur (2018) who argued that problem posing in learning instructed students to formulate a problem and solved it independently. The implementation of problem posing approach in learning cantrigger students to be challenged in creating their own problem and solve i (Amelia, Aripin, & Kirana, 2020).

Some of the researches that have implemented problem posing in mathematic subject were Taufik (2015) for trigonometry material, Permatasari, Veronica, & Susilo (2013) in rectangular material for grade VII, Hartini et al. (2018) for grade VIII, and Kelen (2016). The four studies concluded that the implementation of problem posing would positively influenced the students' creative thinking skill. Additionally, the students' creative thinking skill would improve after implementing problem posing during the teaching learning process.

Based on the result of the researches, this research compares the implementation of 3CM teaching model, which is implemented in the form of different creative products. The creative products used are in the form of non-problem construction and the problem construction like the one in problem

posing. This research analyzes the presence of difference in the implementation of 3CM teaching model with the different types of creative products upon the creative thinking skill of the students in the teaching of mathematics.

The implementation of 3CM teaching model (Cool-Critical-Creative-Meaningful) with the different creative product in this research is expected to habituate the students to sharpen one of the skill of the 21st century, which is creative thinking. This research was done in the teaching of mathematics in middle school on the topic of flat-surfaced three dimensional objects. It is expected to picturize the model, as well as to inspire the teachers to implement the 3CM teaching model with different types of creative products in the teaching of mathematics in other topics and even for the teachings of other subjects. Besides, the result of this research is expected to become the base of other studies in education.

LITERATURE

3CM Learning Model

The idea behind this learning approach was influenced by Yohanes Surya's GASING (translates as easy and enjoyable) learning patterns. According to this theory of learning, learning mathematics will be most effective and successful if it is made entertaining (cool), engaging, and enjoyable. The GASING method's secret is a step-by-step procedure that is set up so that mastery of the material is built on comprehension of the prior information. When students study a subject and there is a test-taking threshold, it illustrates the significance of this step-by-step GASING process. In this turning point, working on the topic's questions won't be too challenging. Students are encouraged to experiment and interact with teaching tools as part of the GASING learning approach so that they may truly feel and visualize the subject they want to convey. So that pupils may understand and implement the concepts taught much more easily, the abstract always begins with something concrete.

Students who are required to think critically to solve problems, think of producing creative products or applied products as new solutions generated from learned concepts, and take meaning from these things are different from the GASING learning process with 3CM. By doing so, people would study mathematics in a meaningful way and comprehend its advantages in their daily lives. The idea of meaningful learning is derived from Ausubel's (1960) assertion, that learning will be more meaningful if it is connected to the real-world issues that students are facing in their everyday lives, as well as from Brownell (1982) and Mayer (2002)'s meaningful theory.

There are seven syntaxes in 3CM learning model, those are motivation, presenting contextual problem, criticizing the contextual problem, problem solving, concept implementation in a creative product, confirmation, and reflection (Wahyudi et al., 2019b). The seven syntaxes of 3CM learning is presented in Table 1. In 3 CM learning model, there is a stage of implementing a concept in a creative product. At this stage, the students are trained to use their creative thinking skill by asking them to create a creative product.

Table 1. Syntax of 3CM (Cool-Critical-Creative-Meaningful) Learning Model

3CM Learning Aspects	Learning Syntax	Details
Cool	1. Motivating 2. Formulating a contextual problem	Manage the students and maintain them in a happy yet challenged condition by presenting a phenomena and contextual problem that allows them to be ready and happy to learn. This condition is the initial starting point for the students to criticize the problems given to them.
Critical	3. Criticizing contextual problem 4. Problem Solving	After ensuring that the students are comfortable and happy to learn, they are invited to criticize the problem given to determine the solution to the problem
Creative	5. Implementing concept in a creative product	After the students manage to determine the solution to the problem, they are invited to think of a creative product that can be created as the implementation of the creative thinking from the result of problem solving along with the concept they have just learnt

Meaningful	6. Confirming creative product 7. Meaningful reflection	Along with the teacher, the students discuss about their learning experience and the creative product to obtain the meaning and a good habit/character building

Creative Thinking Ability (CTA)

Creative thinking is a mental activity that improves the originality and clarity of ideas when generating a product (Coleman and Hammen, 2011). It also includes elements of cognitive and metacognitive skills (Pucio and dan Murdock, 2001). These abilities include problem-solving abilities, question-building abilities, the ability to distinguish between relevant and irrelevant facts, productivity, the ability to generate many new ideas, and dispositional abilities, such as the ability to be open, take initiative, act swiftly, and behave (Pucio and danMurdock, 2001). The highest level of cognition is the capacity for creative thought (Mohanty, 2015).

According to Haylock (1997) and Reid and Petocz (2004), creativity can happen throughout the creating process or be seen in the finished output. As a result, the capacity for creative thought can be defined as the mental process that results in the acquisition of novel insights, ideas, approaches, perspectives, or methods of understanding a problem, leading to the discovery of solutions that take the form of outstanding creative outputs that are the outcome of the method or strategy employed and involve numerous concepts that are organized systematically and clearly. The ideas of Kim et al. (2011) and Torrance (2000) are used to develop the features of creative thinking and description.

Table 2. Description Of Aspects of CTA

Aspect	Description	Explanation
Fluency	The ability of students to generate many ideas of true value in a short time	Judging from the idea/idea of the answer and the number of ideas/ideas of the right answers are generated
Flexibility	The ability of students to produce many categories of answers that are true value	Viewed from the student's correct answers and explored in-depth in interviews and discussions so as to elicit another idea/another way to check again the correct answer given
Novelty	Students' ability to use new/unique, or unusual strategies/answers (different from other students) to solve problems and be true	Viewed from student answers and compared with other student's answers to see new things different from other friends as well as deeply dug in the interview
Elaboration	The ability of students to explain in detail and coherent to certain mathematical procedures, answers or mathematical situations as a solution to the correct problem that he/she gave	Judging from the explanation of the correct answers given and explored in-depth through interviews and discussions

METHOD

This research is a quasi-experiment that implementated the 3CM learning model with a different type of creative product, conducted from October to November in the first semester of 2020/2021. The population of this research was the whole students of state junior high school in Salatiga City which consisted of 10 groups of school. The sampling technique used was cluster random sampling, where the population of the research was divided into 1 cluster according to the school. Among 10 clusters, two samples were selected randomly and two schools were selected, whish were the SMP Negeri 1 Salatiga and SMP Negeri 6 Salatiga. After that, the students of the two schools were grouped based on their own class and two classes were selected randomly.

In this research, the determination of learning models to be implemented in the two experiment groups in each school was made based on the inputs given by teachers in the class. Based on all the considerations made, it was decided the class experiment 1 was conducted in class IXF in SMP Negeri 1 Salatiga and class IXA in SMP Negeri 6 Salatiga, who received the application of 3CM learning model that uses creative activity of project. The experiment class 2 was conducted in class IXA in SMP Negeri 1 Salatiga and class IXH in SMP Negeri 6 Salatiga by implementing 3CM learning model with the creative product of problem posing (constructing problem and solving the constructed-problem).

This research did not merely comparing the final ability of both sample groups after the treatment was given, but also to examine the balance of initial ability from the two classes before different treatment was given. Therefore, the research design applied in this study was pretest-posttest control group design.

This research was conducted online, the data collection was done through test and observation methodology. The test methodology was used to obtain the score of students' initial ability, students' creative thinking ability assignment, and students' final ability after the implementation of the model was administered. In addition, this research also used the observation methodology to assess the implementation of 3CM learning model with two different creative products, assess students' active involvement, and discipline throughout the teaching and learning process. The instrument used in this study was the test instrument which consisted of 2 essay questions in Figure 2 to measure the students' final ability after being validated by the lecturer of mathematics education and mathematics teacher, observation and lesson plan implementation instrument, also students' observation instrument.

The data was analyzed twice, through the skill balance and the hypothesis test. Both tests were equal and used the average difference test. There are two tests to determine the difference average tests, the parametric and the non-parametric test. Therefore, it needs the conduct of the normality test. If the normality test fulfills the criteria, then the test used is the parametric test, that is the Independent Samples T-Test. Meanwhile, if the normality test does not fulfill the criteria, the next test used is the non-parametric ones. The Independent Samples T-Test has two types of tests. In order to determine the Independent Samples T-Test, homogenity test is needed. If the homogeneity test fulfills the criteria, then the Independent Samples T-Test used is the Equal Variances Assumed for the initial skill balance testing, and for the hypothesis test, it uses the Equal Variances not Assumed if the homogeneity does not fulfill the criteria.

FINDINGS AND DISCUSSION

Result

The data of the initial skill from both classes gained from the result of the initial skill test of 2 essay problems. The recapitulation of the result of initial skill data that are given the different treatment for the two classes are presented in the Table 3.

Table 3. Data Of Initial Skill

	N	Min	Max	Mean	Std. Deviation
Exp. 1	43	7.50	82.50	37.21	15.912
Exp. 2	37	12.50	65.00	36.55	13.351

*Exp= Experiment

Table 3 shows that the accomplishment of highest score, average, and the standard deviation of 43 students in Experiment Class 1 is better. However, if it is seen from the lowest score accomplished, the accomplishment of the students of Experiment Class 2 is better. Although the descriptive analysis of the initial skill has been done, it still needs to have inferential test in determining the balance of initial skill from both experiment class. The inferential test that was done was the average difference test. There are two types of average test, the parametric for the sample class from the normally distributed population, and the non-parametric test for the sample class from the non-normally distributed population. Before determining the test, normality test is needed. Both sample class consist of 30 students each, so that the normality test used was the Kolmogorov-Smirnov test. The result of the normality test is presented in the Table 4.

Table 4. Normality Test On The Initial Skill

		Kolmogorov-Smirnova		
	Class	Statistic	df	Sig.
Initial Skill	Exp. 1	.055	43	.200*
	Exp. 2	.123	37	.173

*Exp= Experiment

*. This is a lowest bound of the true significance.

a. Lilliefors Significance Correction

Table 4 indicates that the homogeneity with the Levene's Test that resulted the significance of 0.231, which means that the significance score is more than 0.05 so that it can be concluded that both of the experimental classes are from the population with similar variance. Therefore, the Independent Samples T-Test that is used is the Equal Variances Assumed. The result of the Independent Samples T-Test creates the significant score of 0.844, showing that the significance score is higher than 0.05, so that it can be concluded that both experimental groups significantly have the same creative thinking ability (balanced).

The teaching process was done in the State Middle School 1 of Salatiga and State Middle School 6 of Salatiga by giving different treatments, applying the 3CM teaching model with the creative product type that was not the result of the problem construction for the Experimental Class 1, and the other with 3CM with the creative product type from the construction of problems and the solution for the Experimental Class 2. The teachings on both sample classes were done online using the media of laptop and smartphone, through WhatsApp Group (WAG) to conduct the online communication and teaching with no offline meeting. Zoom was used for the virtual teaching, Google Classroom for the location of the assignment files, and Google Form for the attendance checking. The teaching process was done 8 times with each meeting was done in 2 periods, so that it reached a total of 16 periods. The materials taught are flat-surfaced three dimensional shapes on 8th grade of Middle School with the sub-materials of Surface Area of the Flat-Surfaced Three Dimensional Shapes.

In the teaching, the students worked in their worksheet to ease the learning process. The teaching process of both classes are divided into three phases that followed the standardized process, those were the opening, main, and closing. The opening activity began with the delivery of the contextual problem that are the same for both sample classes on the LKPD, which can be observed on Figure 1.



Figure 1. The Delivery Of The Contextual Problem

On the 'Cool' phase, the students get the chance to criticize the contextual problem that are given by the researchers. In this contextual problem, the students go the chance given by the researchers to mention the ideas to make the new and unique packaging design. Then, for the implementation of the phase 'Critical' by looking for a solution from every problems that was presented on the worksheet. Figure 2 is one of the problems that are the same for both sample classes that are given by the researchers to sharpen the students' critical thinking skill.

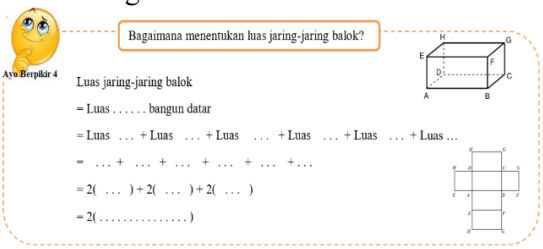


Figure 2. Presentation of problem

In every activity in the Experimental Class 1 and 2 generally got the same steps of activity, the one thing that distinguished in every class was the 'Creative' step, which was the implementation of the concept in the form of creative product in order to explore the creative thinking of the students. The implementation of the concept for the two classes were different. The delivery of the different creative product in the form of non-problem construction that was applied on the Experimental Class 11, that

was the 9th grade Class F of the State Middle School 1 of Salatiga and the 9th grade Class A in the State Middle School 6 of Salatiga by the delivery of the project assignment to design a product packaging. Meanwhile, the Experiment Class 2, the 9th Grade of Class A in State Middle School 1 of Salatiga and the Class H of State Middle School 6 of Salatiga, that were given the assignment to construct a problem according to the indicators and to solve the problem with their own method like the one n problem posing. The picture showed below are the implementation of the concept in the form of the creative product from both Experiment classes.

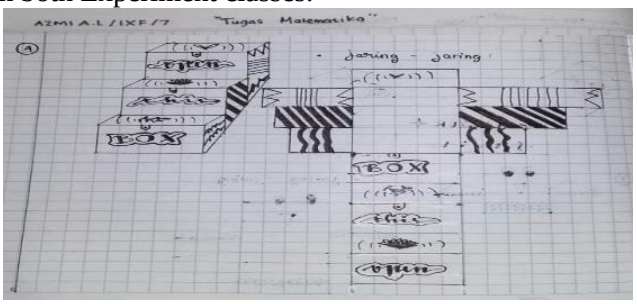


Figure 3. Creative Product Of The Experiment Class 1

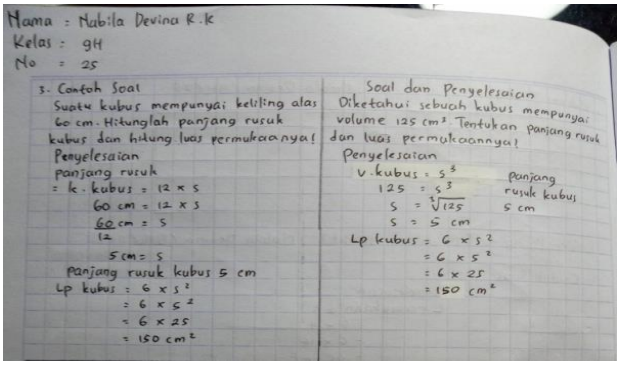


Figure 4. Creative Product Of The Experiment Class 2

Figure 3 is a result of the students' work with the product type in a form of project assignment to design the creative thinking skill by designing a shape for the biscuit packaging, this student also added the design for the packaging so that it looks interesting. On Figure 4, this is a result of the students' work that get the creative product type in the form of problems and the solution. It is seen that this student can solve the problem given by the researcher on the example problem and one can also develop the problem given by the researchers with the indicators of problem that are different from the one given by the researchers.

On the 'Meaningful' phase, the students got the opportunity to write the conclusion from the lesson gained in every study. This phase applied the same treatment for the two Experiment classes, after the students wrote the conclusion, the researchers would appoint several students to present their conclusion. After that, the researcher confirmed the conclusion presented by the students. Then, the researcher also gave the final conclusion in a more depth so that other students could write the conclusion from each lesson.

In the teaching and learning process, there were students who complained the lesson given by the researcher. There were also students who participated in the initial skill test and the final test, but did not submit the result of the test. This happened when the researcher taught the Experiment Class 2 on the application of the 3CM learning model with the type of creative product in the form of problem construction. In this class, there were also some assignments given by the researcher that were not finished optimally, the researcher had given the instruction for working and the indicators of the problem to finish the assignment. However, there were still a number of students works that did not fulfilled the instruction and the indicators of the problem. Not only in term of work completion, yet on the working of the test for the final skill had also the same result. In the initial research, there were many enthusiastic students with the lesson given. Along the process, there were several students who stopped working on the assignments as well as the final test given by the researcher. The researcher considered

that the responsibility of the students in working on the assignment and the test given by the researcher are still lacking, because several students do not work and submit the assignments and the test given.

The teaching and learning process had been done optimally according to the lesson plan that had been constructed before. During the data collecting process, the researcher acted as the teacher and the teacher acted as the observer to judge the completion of the learning model. The observation result from the teaching from each school sample are presented on the Table 5. Table 5 shows that the completion of both models on every aspect had been done well.

Table 5. The Recapitulation Result of The Observation on The Completion of Teaching Model

Aspect of Observation	Scoring Result Percentage	
	3CM	3CM and Problem Posing
Planning	86,79%	86,25%
Practice	89,59%	90,11%
Material Mastery	90,76%	92,19%
Classroom Management	86,16%	87,50%
Online Teaching Media	95,84%	95,84%
Category	Very Good	Very Good

This research also measures the development of the skill of creative thinking of the students from the implementation of the two teaching models. The data used is the final skill data (the result of posttest) that is gained from both Experiment classes that is presented on Table 6.

Table 6. Data Of Creative Thinking Ability Skill On Mathematics In The Final Condition

	N	Min	Max	Mean	Std. Deviation
Exp. 1	43	3.33	55.00	27,79	12.503
Exp. 2	37	1.67	71.67	28,02	18.076

*Exp= Experiment

Table 6 shows that the accomplishment of the maximum score, average, and the standard deviation on the Experiment Class 2 that implements the 3CM teaching model with the creative product type of the construction of problem, is better. Although the score accomplished on the Experiment Class 2 is better, if it is seen from the score accomplishment of the Experiment Class 1 for the minimum score accomplishment.

To determine the difference on the creative thinking ability on both classes, then it needed the differential test that is the difference on the average. Just like the ones that was done on the initial skill balance testing, before determining the average difference test, the normality test was needed. The normality test used on the final skill testing was the same with the one used on the initial skill testing, that was the Kolmogorov-Smirnov. The result of the normality test of the final skill is presented on Table 7. The normality test on the final skill from both Experiment classes are from the population with normal distribution because the significance score for Experiment Class 1 (0.200*) and Experiment Class 2 (0.164), which means that the significance of both Experiment classes is higher than 0.05.

Table 7. Normality Test On The Final Skill

		Kolmogorov-Smirnova		
	Class	Statistic	df	Sig.
Final Skill	Exp. 1	.087	43	.200*
	Exp. 2	.124	37	.164

*Exp= Experiment

*. This is a lowest bound of the true significance.

a. Lilliefors Significance Correction

With the fulfillment of the normality test on the final skill, then the difference of the average done is the parametric test that is the Independent Samples T-Test. Before conducting the Independent

Samples T-Test, then it needs the homogeneity test. The homogeneity test and also the Independent Samples T-Test can be observed on Table 8.

Table 8. The homogeneity test and the independent samples t-test of the final skill

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Final Skill	Equal variances assumed	5.618	.020	-.066	78	.947	-.22818
	Equal variances not assumed			-.065	62.645	.949	-.22818

The result of the testing on Table 8 shows that the result of the homogeneity test with Levene's Test resulted to the significance score of .02, which means that the significance score is less than 0.05, so that it can be concluded that both Experiment groups are not from the population with the same variance. Therefore, the test on the Independent Samples T-Test used is the Equal Variances not Assumed. The result of the Independent T-Test shows the significance score of 0.949 so that it can concluded that both Experiment groups significantly have the equal creative thinking.

Discussion

The result of the hypothesis test in this research shows that the creative thinking skill of the students are significantly equal (not different) on the classroom which both treatments are given. The result of this research does not meet the expectation hypothesis that has been determined by the researcher, which is that there is a difference on the creative thinking skill from the implementation of the 3CM teaching model (Cool-Critical-Creative-Meaningful) in the form of different creative product. The designing and the practice of both models optimally that was done according to the context of daily life through the fun teaching is possible to be the accomplishment factor of both creative thinking skill. This is also supported by the observation result by the observer, that is the teacher of State Middle School 1 of Salatiga and State Middle School 6 of Salatiga who observes the researcher when the teaching process is done on both classes. It shows that both observation result on the designing and the practice of the teaching model is in the scoring criteria of 'Very Good'. Besides, Wahyudi et al. (2019b) shows that the 3CM teaching model (Cool-Critical-Creative-Meaningful) with the Blended Learning can improve the creative thinking skill of the students in finishing the mathematics problems with the teachings that are constructed and is done according to the context of daily life of the students by doing fun activities.

Besides, there are other factors that can also influence the creative thinking result of both classes that is the enthusiasm of the students in following the teaching. The students on the Experiment Class 2 that uses the implementation of the 3CM teaching model with the creative product type of the construction of problems, just like the class that uses the problem posing, are less enthusiastic in following the lesson given. This is because there are several students of the Experiment Class 2 hat did not follow the lesson and did not work on the assignments, so that the result of the posttest on the creative thinking skill of the students in the Experiment Class 2 is not optimal. This is different from the students on the Experiment Class 1, the students on this class are very enthusiastic and responsible on the assignments as well as the test given by the researcher. The result of the assignment and test on the Experiment Class 1 is also better than the result of the assignments and tests from the students of the Experiment Class 2.

The students of Experiment Class 1 are also active in asking and answering question from the researcher. The implementation of the creative product in the form of project here is very supportive upon the development of the creative thinking skill of the students in the class. This is according to the characteristics of the 3CM teaching model that the students will become creative because there is the opportunity to do something creative (Wahyudi, Nuryani, & Setiawan, 2022); Wahyudi et al., 2019b). This result is also according to the research of Rati, Kusmaryatni, & Rediani (2017) also Insyasiska, Zubaidah, & Susilo (2015) where the project-based teaching can improve the creative thinking skill of the students. Besides, this research also explains that to create a meaningful project and according to

the expected result, one does not only need a mere knowledge, but one also needs a high creative thinking process. Both results of the research show that the creative product of the students can be developed by giving the project assignment in the lesson.

However, different thing happens to the Experiment Class 2. The observation result shows that when teaching in Experiment Class 2, which implement the 3CM teaching model with the creative product type of the construction of the problem (problem solving), there are students who show less curiosity in solving the problem. This is also because the students are not active in asking questions to solve the problem as well as answering the questions from the researcher. Indriani, Widyasari, & Amril (2019) mentions that the implementation of the problem-based learning model is begun with the presentation of the problem that can give the opportunity to the students to improve their thinking capacity. Besides, that can also show the curiosity in solving the problem. From the observation result of the researcher when teaching, on the Experiment Class 2 that applied the 3CM teaching model with the creative type of the construction of problem (problem solving), there are students who are less enthusiastic and show less curiosity in solving the problem. This is also because on this class the students are not active in asking question to be able to solve the problem and to also answer the question from the researcher.

Amelia, Aripin, & Hidayani (2018) mention that the lack in knowledge upon the material taught can happen because the students has not understood the material and the students have not practiced sufficiently on the problems so that their creative thinking skill is not developed optimally. This is shown with the presence of several students of the Experiment Class 2 whose result of the test are still low. It is due to the declining of number of submitted work on the problems that are aimed to develop the creative thinking of the students. The students on the Experiment Class 2 are lacking at the responsibility in finishing the assignment given. The researcher suspects that the implementation of the creative product in the type of the construction of problem here is not very suitable with the characteristics of the students of Experiment Class 2 because there are many issues experienced by the students in this experiment class.

Based on the discussion and the final result gained, this research still has some down points because the researcher cannot be sure of what are the factor that cause the creative thinking skill of the students in Experiment Class 1 to be lacking compared to the students of Experiment Class 2. This is interesting to be observed further by the future researchers so that one can find out the causing factor from the issue. For other researchers who will continue this research by comparing the 3CM teaching model (Cool-Critical-Creative-Meaningful) with the implementation of the concept in the form of different creative product, it is expected that it does not only see the presence of difference in the creative thinking skill, but also to see observe other variables. Besides, for other researchers who will compare the creative thinking skill of the students, then it is suggested to conduct the research by choosing other teaching model in order to gain a different result.

CONCLUSION AND RECOMMENDATION

Based on the results of this research, the 3CM teaching model with project creative activities and problem posing (constructing problems and solution of the problem made) on the topic of flat-surfaced three-dimensional objects, has the same impact on the creative thinking ability of SMP Salatiga students (creative thinking ability is significantly the same). The opportunity to do creative activities can improve the ability to think creatively in solving mathematical problems.

Based on the results of the research obtained, the advice that can be given in the next research is that if you are going to apply the 3CM learning model, you must prepare activities that provide opportunities for creativity and creative thinking skills so that students will increase their problem-solving skills in the field of mathematics.

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REFERENCES

Amelia, R., U. Aripin, and N. Hidayani. 2018. "Analisis Kemampuan Berpikir Kreatif Matematik Siswa Smp Pada Materi Segitiga Dan Segiempat." *JPMI: Jurnal Pembelajaran Matematika Inovatif* 1(6):1143–54. doi: https://doi.org/http://dx.doi.org/10.22460/jpmi.v1i6.p1143-1154.

Amelia, R., U. Aripin, and Y. C. Kirana. 2020. "Implementasi Pendekatan Problem Possing Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa SMP." *JPMI: Jurnal Pembelajaran Matematika Inovatif* 3(1):27–34. doi: https://doi.org/10.22460/jpmi.v3i1.p27-34.

Andiyana, M. A., R. Maya, and W. Hidayat. 2018. "Analisis Kemampuan Berpikir Kreatif Matematis Siswa SMP Pada Materi Bangun Ruang." *JPMI: Jurnal Pembelajaran Matematika Inovatif* 1(3):239–48. doi: https://doi.org/10.22460/jpmi.v1i3.239-248.

Apriansyah, D., and M. Ramdani. 2018. "Analisis Kemampuan Pemahaman Dan Berpikir Kreatif Matematika Siswa MTs Pada Materi Bangun Ruang Sisi Datar." *Jurnal Cendekia: Jurnal Pendidikan Matematika* 2(2):1–7. doi: https://doi.org/10.31004/cendekia.v2i2.46.

Asfar, A. M. I. T., and S. Nur. 2018. *Model Pembelajaran PPS (Problem Posing & Solving) (Cetakan Pe)*. Sukabumi: Hani Wijayanti.

Ausubel, D.P. (1960), "The use of advance organizers in the learning and retention of meaningful verbal material", Journal of Educational Psychology, Vol. 51 No. 5, p. 267.

Azhari, and Somakim. 2013. "Peningkatan Kemampuan Berpikir Kreatif Matematik Siswa Melalui Pendekatan Konstruktivisme Di Kelas VII Sekolah Menengah Pertama (SMP) Negeri 2 Banyuasin III." *JPM: Jurnal Pendidikan Matematika* 7(2):1–12. doi: https://doi.org/10.22342/jpm.8.1.992.1-12.

Baharuddin, I. 2020. "Pembelajaran Bermakna Berbasis Daring Di Tengah Pandemi Covid-19." *Kelola: Journal of Islamic Education Management* 5(2):79–88. doi: https://doi.org/https://doi.org/10.24256/kelola.v5i2.1377.

Bao, W. 2020. "Covid-19 and Online Teaching in Higher Education: A Case Study of Peking University." *Hum Behav & Emerg Tech* 2:113–15. doi: https://doi.org/10.1002/hbe2.191.

Brownell, P. (1982), "A field study examination of budgetary participation and locus of control", Accounting Review, pp. 766-777.

Coleman, J.C. and Hammen, C.L. (2011), Contemporary Psychology and Effective Behavior, Foresman, and Co., Glenview, Scot.

Dit. PSMA Ditjen Pendidikan Dasar dan Menengah. 2017. *Panduan Implementasi Kecakapan Abad 21 Kurikulum 2013 Di Sekolah Menengah Atas*.

Hartini, R., P. Gunowibowo, and S. H. Noer. 2018. "Pengaruh Model Pembelajaran Problem Posing Terhadap Kemampuan Berpikir Kreatif Matematis Siswa." *Jurnal Pendidikan Matematika Unila* 6(6):508–19.

Haylock, D. (1997), "Recognizing mathematical creativity in schoolchildren", Zentralblatt Für Didaktik Der Mathematik, Vol. 29 No. 3, pp. 68-74, doi: 10.1007/s11858-997-0002-y.

Hudanagara, M. A., and I. W. Anita. 2018. "Analisis Kesulitan Yang Dialami Siswa SMP Pada Kemampuan Berpikir Kreatif Matematis Pokok Bahasan Segitiga Dan Segiempat." *Jurnal Silogisme: Kajian Ilmu Matematika Dan Pembelajarannya* 3(1):14–20. doi: https://doi.org/http://dx.doi.org/10.24269/js.v3i1.940.

Indriani, D. S., W. Widyasari, and L. Amril. 2019. "Pengaruh Model Pembelajaran Berbasis Masalah Terhadap Kemampuan Berpikir Kreatif Matematis Siswa Pada Materi Bilangan Pecahan Kelas IV SDIT ATTHORIQ." *E-Journal Skripsi: Fakultas Keguruan Dan Ilmu Pendidikan* 2(3).

Insyasiska, D., S. Zubaidah, and H. Susilo. 2015. "Pengaruh Project Based Learning Terhadap Motivasi Belajar, Kreativitas, Kemampuan Berpikir Kritis, Dan Kemampuan Kognitif Siswa Pada

Pembelajaran Biologi." *Jurnal Pendidikan Biologi* 7(1):9–21. doi: https://doi.org/http://journal2.um.ac.id/index.php/jpb/article/view/713/446.

Kelen, Y. P. K. 2016. "Pembelajaran Matematika Dengan Pendekatan Problem Posing Untuk Meningkatkan Kemampuan Berpikir Kreatif Siswa." *Jurnal Matematika Dan Pendidikan Matematika* I(1):55–64. doi: https://doi.org/https://doi.org/10.26594/jmpm.v1i1.513.

Kemdikbud. 2020. "Surat Edaran Mendikbud Nomor 4 Tahun 2020."

Kim, K.H., Lee, H., Chae, K., Andersen, L. and Lawrence, C. (2011), "Creativity and confucianism among American and Korean educators", Creativity Research Journal, Vol. 23 No. 4, pp. 357-371.

Kurniyati, E., and Siswati. 2020. "Kurikulm 2013 Dalam Proses Pembelajaran Online Pada Masa Pandemi Covid-19." *Tadarus Tarbawy* 2(2):257–64. doi: https://doi.org/http://dx.doi.org/10.31000/jkip.v2i2.3186.

Larasanti, R., & Prihatnani, E. (2021). Pembelajaran Daring dengan Model Kolaboratif 3CM dan Tutor Sebaya untuk Meningkatkan Hasil Belajar dan Kreativitas. Scholaria: Jurnal Pendidikan Dan Kebudayaan, 11(3), 271–282. Retrieved from https://ejournal.uksw.edu/scholaria/article/view/4421

Mahmudi, A. 2008. "Tinjauan Kreativitas Dalam Pembelajaran Matematika." *Pythagoras* 4(2):37–49. doi: https://doi.org/https://doi.org/10.21831/pg.v4i2.559.

Maya, F. A., I. K. Sari, and L. S. Zanthy. 2018. "Analisis Kemampuan Berpikir Kreatif, Berpikir Kritis Matematik Siswa SMK Pada Materi SPLDV." *JPMI: Jurnal Pembelajaran Matematika Inovatif* 2(4):167–76. doi: https://doi.org//dx.doi.org/10.22460/jpmi.v2i4.p167-176.

Mayer, R.E. (2002), "Rote versus meaningful learning", Theory into Practice, Vol. 41 No. 4, pp. 226-232.

Mohanty, A. (2015), "Information processing and creative thinking abilities of residential and non-residential school children: a pilot study", SAGE Open, Vol. 5 No. 4, doi: 10.1177/2158244015611452.

Munandar, S. C. U. 1990. *Mengembangkan Bakat Dan Kreativitas Anak Sekolah Penuntun Bagi Guru Dan Orang Tua*. Jakarta: PT. Gramedia.

Nuraeni, S., and A. B. Kusuma. 2020. "Peningkatan Kemampuan Berpikir Kreatif Dan Disposisi Matematis Siswa Melalui CTL Dengan Teknik Probing-Prompting SMP Negeri 1 Kembaran." *Jurnal Silogisme: Kajian Ilmu Matematika Dan Pembelajarannya* 5(1):44–53. doi: https://doi.org/http://dx.doi.org/10.24269/silogisme.v5i1.1920.

Nurdin, and L. O. Anhusadar. 2021. "Efektivitas Pembelajaran Online Pendidik PAUD Di Tengah Pandemi Covid 19." *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini* 5(1):686–97. doi: https://doi.org/10.31004/obsesi.v5i1.699.

Oncu, E. C. 2016. "Improved Creative Thinkers in a Class : A Model of Activity Based Tasks for Improving University Students' Creative Thinking Abilities." *Academic Journals* 11(8):517–22. doi: https://doi.org/10.5897/ERR2015.2262.

Permatasari, G. A., R. B. Veronica, and B. E. Susilo. 2013. "Keefektifan Pembelajaran Problem Posing Dengan Pendekatan PMRI Terhadap Kemampuan Berpikir Kreatif Siswa." *Unnes Journal of Mathematics Education* 2(2). doi: https://doi.org/https://doi.org/10.15294/ujme.v2i2.3343.

Pucio, G.J. and Dan Murdock, M.C. (2001), "Creative thinking, an essential life skill", in Costa, A.L. (Ed.), Developing Mind for Teaching Thinking, 3rd Ed., Assosiation for Supervision and CurriculumDevelopment, VT.

Rati, N. W., N. Kusmaryatni, and N. Rediani. 2017. "Model Pembelajaran Berbasis Proyek, Kreativitas Dan Hasil Belajar Mahasiswa." *JPI: Jurnal Pendidikan Indonesia* 6(1):60–71. doi: https://doi.org/http://dx.doi.org/10.23887/jpi-undiksha.v6i1.9059.

Reid, A. and Petocz, P. (2004), "Learning domains and the process of creativity", The Australian Educational Researcher, Vol. 31 No. 2, pp. 45-62.

Satrianingrum, A. P., and I. Prasetyo. 2021. "Persepsi Guru Dampak Pandemi Covid-19 Terhadap Pelaksanaan Pembelajaran Daring Di PAUD." *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 5(1):633–40. doi: https://doi.org/10.31004/obsesi.v5i1.574.

Setyorini, I. 2020. "Pandemi Covid-19 Dan Online Learning: Apakah Berpengaruh Terhadap Proses Pembelajaran Pada Kurikulum 13?" *Journal of Industrial Engineering & Management Research (JIEMAR)* 1(1):95–102. doi: https://doi.org/https://doi.org/10.7777/jiemar.v1i1.

Supardi. 2012. "Peran Berpikir Kreatif Dalam Proses Pembelajaran Matematika." *Jurnal Formatif* 2(3):248–62. doi: https://doi.org/10.30998/formatif.v2i3.107.

Taufik, A. 2015. "Penerapan Pendekatan Pembelajaran Open Ended Dan Problem Posing Dengan Media Pohon Matematika Untuk Meningkatkan Kemampuan Berpikir Kreatif Dan Hasil Belajar." *JPM: Jurnal Pendidikan Matematika* I(2):154–67.

Thobroni, M. 2015. *Belajar & Pembelajaran Teori Dan Praktik*. Yogyakarta: Ar-Ruzz Media.

Torrance, E.P. (2000), Research Review for the Torrance Tests of Creative Thinking Figural and Verbal Forms a and B, Scholastic Testing Services, Bensenville, IL.

Utami, W. S., M. Ramli, J. Ariyanto, and B. Riyanto. 2018. "Memperbaiki Kemampuan Berpikir Kreatif Siswa Melalui Problem Based Learning Dan Creative Problem-Solving Process Di Pelajaran Biologi." *Proceeding Biology Education Conference* 15(1):82–89.

Wahyudi, S. B. Waluya, H. ,. Suyitno, and Isnarto. 2019. "The Use of 3CM (Cool-Critical-Creative-Meaningful) Model in Blended Learning to Improve Creative Thinking Ability in Solving Mathematics Problem." *EST: Journal of Educational Science and Technology* 5(1):26–38. doi: https://doi.org/https://doi.org/10.26858/est.v5i1.7852.

Wahyudi, S. B. Waluya, H. Suyitno, and Isnarto. 2018. "Effectiveness of 3CM Learning Model with Blended Learning on Improving Creative Thinking Ability in Mathematical Problem Solving." *Atlantis Press* 247:577–82.

Wahyudi, S. B. Waluya, H. Suyitno, and Isnarto. 2019. "Development of 3CM (Cool-Critical-Creative-Meaningful) Learning Model to Increase Creative Thinking Skill." *Journal of Physics: Conference Series* 1321. doi: https://doi.org/10.1088/1742-6596/1321/2/022063.

Wahyudi, S. B. Waluya, H. Suyitno, and Isnarto. 2020a. "Schemata and Creative Thinking Ability in Cool-Critical-Creative- Meaningful (3CM) Learning." *International Journal of Sustainability in Higher Education*. doi: https://doi.org/10.1108/IJSHE-06-2019-0198.

Wahyudi, S. B. Waluya, H. Suyitno, and Isnarto. 2020b. "Students' Creative Thinking Ability and Thinking Schemata in Cool-Critical-Creative-Meaningful (3CM) Learning." *International Journal of Innovation, Creativity and Change* 11(10):482–98.

Wahyudi, S. B. Waluya, H. Suyitno, and Isnarto. 2020c. "The Impact of 3CM Model within Blended Learning to Enhance Students' Creative Thinking Ability." *OmniaScience: Journal of Technology and Science Education* 10(1):32–46. doi: https://doi.org/https://doi.org/10.3926/jotse.588.

Widana, I. W., S. Adi, Herdiyanto, J. Abdi, Marsito, and Istiqomah. 2019. "Modul Penyusun Soal Keterampilan Berpikir Tingkat Tinggi (Higher Order Thinking Skills) Matematika."

Wahyudi, W., Nuryani, D., & Setiawan, Y. (2022). Pengembangan Media Smart Land Untuk Meningkatkan Kemampuan Berpikir Kreatif Dalam Penerapan 3CM Learning Untuk Peserta didik Sekolah Dasar. Scholaria: Jurnal Pendidikan Dan Kebudayaan, 12(1), 20–30. https://doi.org/10.24246/j.js.2022.v12.i1.p20-30