UJME 10 (1) 2021: 52-61
UNNES JOURNAL OF MATHEMATICS EDUCATION
https://journal.unnes.ac.id/sju/index.php/ujme/
ISSN: 2252-6927 (print); 2460-5840 (online)

Creative thinking mathematical ability of students in Treffinger learning based on cognitive style

Siti Nurzulifa*, Dwijanto

Department of Mathematics, Universitas Negeri Semarang, Sekaran, Gunungpati, Kota Semarang, 50229, Indonesia

** E-mail address: zulifa@students.unnes.ac.id*

ARTICLE INFO

Article history:
Received 6 August 2019
Received in revised form 30 March 2021
Accepted 30 March 2021

Keywords:
Creative Thinking Ability;
Treffinger Learning;
Cognitive Style

Abstract

This study aimed to test the thoroughness of learning Treffinger for mathematical creative thinking abilities of students, tes the mathematical creative thinking abilities of students in the learning Treffinger compared conventional, and analyze the mathematical creative thinking abilities of students in Treffinger based cognitive style. This study uses a mixed methods design sequential explanatory. The subjects of this study were six students of class VII J SMP Negeri 1 Godong in the even semester of the academic year 2018/2019. Data collection techniques used include: observation, documentation, test, and interviews. The result showed that (1) learning Treffinger due to the ability of creative thinking mathematically, (2) ability to think creatively mathematical students in learning Treffinger higher than the ability to think creatively mathematical students in learning conventional, (3) the ability to think creatively mathematically students on cognitive style is (a) field independent students less able to work on question smoothly and flexibly; can work on new problem correctly ; can write in detail and correctly what is known in the problem, can develop ideas that are owned by being able to draw geometric flat shapes well; (b) intermediet field students less able to work on question smoothly and flexibly; less able to work on new problem correctly; can develop ideas that are owned by being able draw geometry well; (c) field dependent student less able to work on question smoothly and flexibly; less able to work on new problems correctly; less able to develop ideas that have to work on a problem.

1. Introduction

Creative thinking ability is the abilty to reflect aspects of fluency (*fluency*), flexibility (*flexibility*), and originality in thinking (*originality*), as well as the ability to elaborate (develop, enrich, or itemize) an idea (*elaboration*) Munandar (2014). This is in line with Permendikbud No. 21 of 2016 which revealed that the purpose of learning mathematics, one of which was to show a creative attitude. This shows that ability to think creatively is one of the important things in mathematics learning. Mathematics learning at every level aims to help students understand the concepts learned and applied in vorious situations. According to Dwijanto as quoted by Pratiwi, Dwijanto, & Wijayanti (2018) creativity means creativity. Creativity as the ability to create totally new things is almost impossible, therefore creativity is a combination (combination) of things that already exist. Siswono & Novitasari (2007) says that creativity is a way or something new in looking at a problem or situation. Creativity (cretaive thinking or divergent thinking) is the ability to find many possible correct answer to a problem, where the emphasis is the quantity, usefulness, and diversity of answers Siswono (2010). According to Sternberg, as quoted by Munandar (2014), creativity is unique meeting point between three psychological attributes: intellegence, cognitive style, and personality motivation together with these three fecets of the picran nature to help understand what lies behind creative individuals. Mursidik et al. (2015) the ability to think creatively can be interpreted as the ability to create something new, an ability that can combine a number of objects different from human thought that is understandable, useful, innovative with a variety of influencing

To cite this article:
Nurzulifa, S. & Dwijanto. (2021). Creative thinking mathematical ability of students in Treffinger learning based on cognitive style. *Unnes Journal of Mathematics Education*, *10*(1), 52-61. doi: 10.15294/ujme.v10i1.32402

factors. Creative thinking consist of fluency (*fluency*), flexibility (*flexibility*), authenticity (*originality*), and elaboration (*elaboration*).

Munandar (2014) states several indicators of the ability to think creatively. Each of these aspects contains different aspects can be shown in Table 1 as follow.

Table 1. Indicatos of Characteristics of Creative Thinking Abilities

Aspect	Indicators
Fluncy (*fluency*)	a. The ability to produce many ideas and answers to solutions and a relevant problem.
	b. Ability to have a smooth flow of throught.
Flexibility (*flexibility*)	a. The ability to provide uniform answers/ideas but different dirrectos of thinking
	b. Ability to change ways or approaches.
	c. The ability to see problems from various points of view in thinking.
Authenticity (*originality*)	a. Ability to give birth to a new expression.
	b. The ability to think of unusual ways from the others that most people give.
Elaboration (*elaboration*)	a. The ability to enrich, develop, expand, and add ideas.
	b. Ability to details.

Based on the result of interviews with Grade VII mathematics teachers in SMP Negeri 1 Godong, information was obtained that students mathematical creative thinking skilss in solving mathematical problems were still low. Students are not used to exploring and developing creativity thinking about the material being studied. If students are given a question that demands high creativity students have difficulty in solving the problem, beside that the teacher in learning has not fully paid attention to the cognitive style of the students. When learning students are not to active in trying to solve problems and these problems is still low.

Based on the obsorptive capacity of the 2017/2018 national exam, SMP Negeri 1 Godong on Geometry material, data were obtained that in the Geometry and Measurement material at the level of the education unit rechead 42,01%. Distrinct/city level recheas 36,88%, provincial level recheas 43,07%, and the national level recheas 41,40%. This shows that absorption in the geometry material at SMP Negeri 1 Godong Grobogan has not fulfilled the classical learning completeness, which is 70. Therefore, this study is focussed on building rectangular and square flat material.

On reason for the low creativity for students is that students are still weak in cognitive aspects in processing information and solving problems or situations. Solso et al. (2008) explains creativity is defined as cognitive activity that produces a way or something new in looking a problem or situation.

Rahmatina, Sumarmo, & Johar (2014) says that cognitive style is a characteristic of a person in receiving, analyzing and responding to a given cogitive action. While Susanti (2015), defining what is meant by cognitive style is an individual characteristic i the use of cognitive functions, including thinking, remembering, solving problems, making decisions, organizing and processing information, and so on consistently and long lasting. Whereas according to Agoestanto & Sukestiyarno (2017), cognitive style is consistent way by which someone captures stimuli or information how to remember, think, and solve problems responding to tasks or various types of environmental situations. Cognitive style is an important variable that influences students' choices in the academic field, ongoing academic development, how students learn, and how students and teachers interact in tehe classroom.

Witkin et al. (1997) states that two types of cognitive styles, namely the field type cognitive style are independent and filed dependent. Individuals who have cognitive style field independent has characteristics such as: 1) tent to analytically; 2) has the ability to analyze to separate objects from their environment; 3) has the ability to organize objects; 4) have an impersonal orietation; 5) prioritizing internal motivation and strengthening; and 6) prefer independent tasks. While individuals who have a cognitive field dependent style aleady have characteristics including: 1) tend to be global thinkers; 2) it tends to be difficult to organize and separate objects from their environment; 3) have a social orientation; 4) need help to compile information; 5) inclined work with external reinforcement; and 6) have difficulty in carrying out complex tasks.

The teachers's role is very influential in learning, so the teacher must be innovative and creative to develop student's reasoning and creativity. One of the learning model innovations that can be used is

using the Treffinger learning model. Treffinger's model is one of the few models that deal with the problem of creativity directly and give practical suggestions on how to achieve integration Munandar (2014).

According to Sarson, as quoted by Huda (2013), the most dominant characteristic of the Treffinger's learning model is its efforts in integrating cognitive and affective dimensions of students to find direction of completion to be taken to communicate solutions to problem solving. This means that students are given the freedom to solve their own problems in the ways he wants. Furthermore Triwibowo, Dwidayati, & Sugiman (2017) states that Treffinger's learning model an improve student's creative mathematical thinking skills. Then Lestari, Waluya, & Suyitno (2015) states that Treffinger model learning can improve student's spatial abilities for geometry material.

The Treffinger learning model according to Munandar (2014), consist of the following steps. (1) Phase I (*Basic Tools*), students are directed to express different ideas to others to practice divergent thinking and the creation of students activeness in the learning by giving open problems; (2) Phase II (*Practice with Process*), students are invited to further broaden their thoughts and participate in activies that are more diverse and challenging; (3) Phase III (*Working with real problems*), students use their ability to solve problems in ways that are meaningful to their lives and use information obtained in their lives.

Based on description above, the problems faced by this study are: (1) whether the ability of mathematically creative students of class VII to use the Treffinger learning model can achieved learning completeness, (2) whether the mathematical creative thinking ability of class VII student's mathematical creative thinking abilities in conventional learning, (3) how mathematical creative thinking skilss of class VII students based on cognitive style through Treffinger learning.

2. Methods

The research method used in this study is a combination method (*mixed methods*) sequential explanatory design. Quantitative research design uses True Experimental Design the form Posttest-Only Control Group Design. There is a description of quantitative research design can be seen in Table 2.

Table 2. Research Design

Class	Treatment	Posttest
Experiment Class	X	O
Control Class	C	O

Information:
X : Treffinger Learning Model, C : Conventional, O : Posttest mathematical creative thinking skilss

The population in this study is VII grade students of semester 2 of SMP Negeri 1 Godong, Grobogan Regency, academic year 2018./2019. The sample of this research was students of class VII J as an experimental group given treatment in the form of conventional learning models. The sampling is based on random sampling technique. The selection of research subjects was based on the purposive sampling technique.

In the case, students are given a cognitive test GEFT (*Group Embedded Figure Test*) which adopts from Ngilawajan (2013) which has been tested for validity and reliability. Then it is classified into students with an independent cognitive field style, itermediet field, and field dependent which include three parts. The first part consist of 7 easy questions with 5 minutes. The second and the third section consist of 9 questions with 10 minutes each (Ulya, 2015). The subject chosen for analysis of mathematical creative thinking skills were 6 students, namely 2 students in independent field cognitive style, 2 students in intermediet field cognitive style and 2 students in dependent field cognitive style.

The method of data collection in this study is the method of documentation, test, observation, and interviews. The purpose of the interview is find out the students' creative mathematical thinking skills those are cognitive in style FI, FDI, and FD.

Analyse of the data in this study is the analysis of prerequisite tests, analysis of data from the results of tests of mathematical creative thinking skills, and analysis of qualitative data. The prerequisite the includes the homogenity test to find out whether the sample group is homogenous and the average difference test to determine whether the sample group has the same initial ability. The normality prerequisite test uses the *Kolmogorov Smirnov Test*, homogenity using the *Levene Test*, and the similarity of two on average using *Independent-Sample T-Test* with the help of SPSS 18.0 and it was found that the sample group came from a population that was normally distributed homogenous and the initial ability of both students.

Analysis of data from the test's ability to think creatively mathematically used to Awab formulation of the problem of mastery learning in the learning model Treffinger's ability to think creatively mathe atical and creative thinking abilities mathematical students in the learning model Treffinger when compared with conventional learning by using a test for normality the Kolmogorov-Smirnov assisted SPSS 18.0, test of the similarity of variance using the Levene test assisted by SPSS 18.0 as a prerequisite test. Then the data were tested using proportion test and average difference test. Then mathematical creative thinking skills of students in terms of cognitive style. Analysis of mathematical smoothness (*fluency*), flexibility (*flexibility*), authenticity (*originality*), and elaboration (*elaboration*).

Qualitative data analysis techniques in this study are analyzes during the Miles and Huberman Model fields, namely data reduction, data display, and conclusion: drawing/verifivcation. Test the validity of the data in this study was technical triangulation. Triangulation of the technique is done by comparing the test results and interviews with the research subjects.

3. Results & Discussions

3.1. Classification of Cognitive Style

Cognitive style classification was carried out on 32 students of the experimental class (VII J) using the GEFT test who adopted from Ngilawajan (2013) which has tested its validity and reliability. The test consist of 18 items with the type of questions looking for a simple pisture of the image forms a complex (complex) is provided.

The GEFT test consist of 3 parts, the first part consist of 7 easy questions for learning with 5 minutes. The second and third parts consist of 9 questions, with the students answering each part with10 minutes (Ulya, 2015). Each correct answer is given a score of 1. The maximum score is 18 points and a minimum of 0 points. The actual score 0-9 is said to have a dependent cognitive field style, score 10-13 is said to have an intermediet cognitive field style, and score 14-18 is said to have a field independent cognitive style. The following are the results of grouping students based on their cognitive styles presented in Table 3.

Furthermore, each of the 2 subjects of cognitive style was chosen with the following provisions: (1) students who had the independent field cognitive style were taken from groups of students who completed the test mathematical creative thinking ability and were cognitive style children FI, (2) students who had cognitive styles field intermediates are taken from a group of students who complete the test of mathematical creative thinking ability and are children of cognitive FDI style, (3) students who have a field dependent cognitive style taken from a group of students who complete the creative thinking ability test mathematical and is a child cognitive style FD. Selected research subjects for cognitive style are presented in Table 4.

Table 3. Classification of Student Cognitive Styles

Student Cognitive Style					
FI		**FDI**		**FD**	
Code	**Score**	**Code**	**Score**	**Code**	**Score**
E-05	14	E-07	10	E-01	6
E-12	17	E-18	12	E-02	9
		E-25	10	E-03	7
		E-29	11	E-04	6
		E-32	10	E-06	9
				E-08	5
				E-09	7
				E-10	8
				E-11	6
				E-13	5
				E-14	6
				E-15	7
				E-16	7
				E-17	5
				E-19	9
				E-20	5
				E-21	3
				E-22	6
				E-23	6
				E-24	8
				E-26	7
				E-27	8
				E-28	6
				E-30	5
				E-31	7
2 students (6.25%)		5 students (15.625%)		25 students (78.125)	

Table 4. Cognitive Style Research Subjects

Cognitive Group	Students Code	GEFT Value
FI Group	1. E-05	14
	2. E-12	17
FDI Group	1. E-18	12
	2. E-25	10
FD Group	1. E-02	9
	2. E-21	3

3.2. Completeness of Treffinger's Learning Model for Mathematical Creative Thinking Ability

Based on the recapitulation of the result of the mathematical creative thinking ability test, it was found that the result of the mathematical thinking ability test of the experimental class VII J, including the highest score obtained was 95, the lowest value obtained was 63 and the proportion of the completeness was 93.75%. While the results of the test of mathematical creative thinking ability VII H control class, including the lowest value obtained is 67 and the proportion of completeness is 75%.

Furthermore, the data were analyzed through several tests, including the prerequisite test in the form of a normality test with the *Kolmogorov Smirnov Test* assisted by SPSS 18.0 and test for the similarity of variance with the SPSS 18.0 assisted *Levene Test*. In the normality test result show that for the experimental class $sig = 0.955 > 0.05 = \alpha$ and for the control class $sig = 0.275 > 0.05 = \alpha$, then H_0 is accepted. So the data from the experiment and control classes come from populations that are normally distributed. Then in the test of equality of variance, the result is that the sig value on the line equal variance $assumed = 0.261 > 0.05 = \alpha$, then H_0 is a accepted. So the data of the two sample groups have the same variance.

Then the learning completeness test is the carried out by proportion test (one party, right party). This test was conducted to find out that Treffinger's Learning Model was completed in a classical manner for students' mathematical creative thinking abilities. Classical completeness in this study if more than 75% of students obtain a minimum grade of 70. The hypothesis in this study is the completeness percentage of

learning in a classical test of mathematical creative thinking ability test in a class that uses Treffinger's learning model of more than 75%. The result of the calculation of the learning completeness test are presented in Table 5.

Table 5. Classical completeness test result

z_{count}	z_{table}	Value	Conclusion
2.44949	1.645	$z_{count} > z_{table}$	The mastery learning percentage is classically a test of mathematical creative thinking ability in a class that uses Treffinger's learning model with minimum completeness criteria of ≥ 75 achieving classical completeness.

Based on Table 5, price of $z_{count} = 2.44949$ and $z_{table} = 1.645$. Because $z_{count} > z_{table}$, it can be concluded that the percentage of learning completeness classically tests the mathematical creative thinking ability in the class using Treffinger's learning model with minimum completeness criteria of ≥ 75 achieving classical completeness. This is because 93.75% of students complete the test of mathematical creative thinking skills.

3.3. Students' Mathematical Creative Thinking Abilities in Treffinger's Learning Model compared to conventional

In this study the average difference test was used. The average difference test (one party, right party) was conducted to test students' creative mathematical thinking skills that followed the Treffinger Learning Model higher than the mathematical creative thinking ability of students who take a conventional learning, or not.

The hypothesis in this study is the average score of the ability to test the mathematical creative thinking of students who follow the Treffinger learning model is more than the average test score of students' mathematical creative thinking abilities that follow conventional. The result of the calculation of the average difference test presented in Table 6.

Based on Table 6, the price of $t_{count} = 1.980618$ and $t_{table} = 1.669$, because $t_{count} > t_{table}$, then H_0 rejected, so it can be concluded that the average test scores of students' mathematical creative thinking abilities that the follow Treffinger's learning model are more than the average mathematical creative thinking abilities of students who follow conventional learning. The average value of the test of mathematical creative thinking ability of students who follow the Treffinger learning model is 81.5625 and the average value of the test of mathematical creative thinking ability of students who follow conventional is 78.0625.

Table 6. Average difference the result

t_{count}	t_{table}	Value	Conclusion
1.980618	1.6698	$t_{count} > t_{table}$	The mathematical creative thinking ability of students who follow the Treffinger learning model is better than the mathematical creative thinking abilities of students who follow conventional learning.

This is in line with what was stated by Pomalato (2005) in his research which concluded that the class taught with the Treffinger learning model achieved individual and classical completeness. The application of the Treffinger learning model in mathematics learning contributes possitevely to the development or improvement of mathematical creative thinking skills and problem solving. Then in Rohaeti's study (2013) showed that the increase in students' mathematical creative thinking abilities with Treffinger's learning model was higher than students with conventional learning (DL).

In implementing the learning model in the experimental class, students follow learning actively in learning. Students are easier to follow the learning material taught with the learning instruments used (such as LKS, LTS). Students can also easily expand their own experience and knowledge. In addition, with the Treffinger learning model given, students will be involved in activities to train how to express ideas and skills for new tasks. Treffinger learning model in this study can develop mathematical creative thinking skills of students, because the problems proporsed in this study familiarize students to increase the ability to express ideas that are different from others.

3.4. Mathematical Creative Thinking Skills Viewed from Cognitive Style

The result of mathematical creative thinking ability tests and interview analyzed with regard to creative thinking abilities mathematical indicators which include: (1) fluency (*fluency*), namely spark lots of ideas, answers, ways, or suggestions for solving problems or questions; (2) flexibility (*flexibility*), that generates ideas, alternative answers, or questions vary, look at things from the perspective of different, changing the approach or way of thinking; (3) authenticity (*originality*), which gave birth to a new and unique expression, composing unusual way, making the combinations unusual of its parts; (4) elaboration (*elaboration*), which is developing an idea or product, detailing the details of an object, idea, and situation so that it becomes more interesting. The following is an example of the results of students' work on cognitive style FI, FDI, and FD on item 4.

(1) Students style cognitive Field Independent

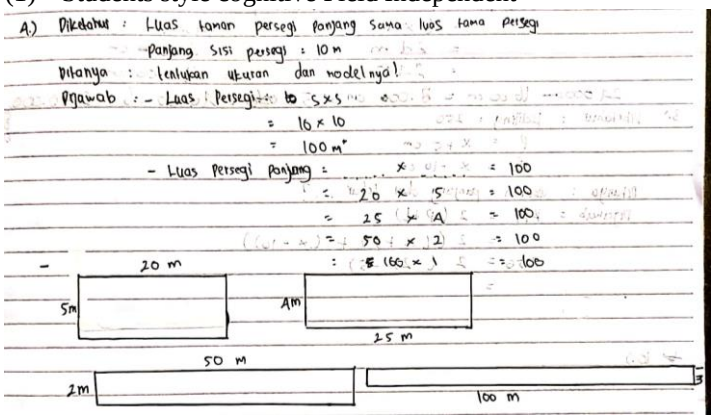

Figure 1. Example of Work for FI Students

Based on the result of student work and analysis of interview result, it was obtained that on the *elaboration* indicator, that subject made a complete problem situation, wrote the steps correctly and made conclusions completely and clearly. On the fluency indicator the subject can work clearly and smoothly. In the flexibility indicator, the subject is able to make equestions appropriately, perform complete calculations by involving mathematical expressions of information from the equestions made, and find the right final solution and the different answers. In the originality indicator, the subject is able to draw clearly and precisely.

(2) Students style cognitive FDI

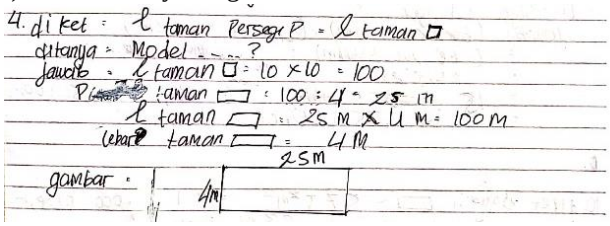

Figure 2. Example of FDI Student work

Based on the result of the work nd the analysis of the result of the interview, it was obtained that the *elaboration* indicator create the problem situation in full, writes steps with word, but make conclusions incomplete. On *fluency* indicators the subject can work on the questions clearly and smoothly. On the indicator *flexibility*, the subject is able to make equestions correctly, perform complete calculations by involving mathematical expressions of information on the equation made, but the final solution found is only one answer. In the *originlity* indicator, the subject is able to draw clearly and precisely.

(3) Students have cognitive style in the Dependent Field

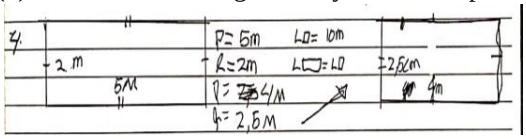

Figure 3. Example of the work of FD Students

Based on the result of the work and analysis of inteview results, it was found that on the elaboration indicator, the subject did not make a complete problem situation, did not write the steps appropriately,

and did not make conclusions completely and cleraly. In the fluency indicator, the subject cannot work clearly and smoothly. On the flexibility indicator, the subject is not able to make equations correctly, cannot do the complete calculation, and the final solution is not right. In the originalityindicator, the subject is not able to draw clearly and precisely.

Students with the Field Independent cognitive style are able to meet the Fluency indicator, which is working on the equestions smoothly and precisely. On the flexibility indicator, which is to provide uniform answers but different directions of thinking. On the originality indicator, which is answering questions that are different from the others. Then on the elaboration indicator, which is working on the problem with details according to the information thta is owned.

Students with the Field Intermediet cognitive style are able to fulfill the fluency indicator, which is to work questions smoothly and precisely. On the flexibility indicator, that is giving uniform answers but different directons of thinking but the final solution is only one answer. On the originality indicator, which is answering question that are different from the others. Then on the elaboration indicator, which is working on the problem with details according to the information that is owned.

Students with the Field Dependent cognitive style have not been able to meet the fluency indicator, which is to work the questions smoothly and precisely. On the flexibility indicator, which is to provide uniform answersbut different directions of thinking. On the originality indicator, which is answering questions that are different from the others. Then on the elaboration indicator, which is working on the problem with details according to the information that is owned.

This is in accordance with the Ningrum study (2016). The ability of mathematical creative thinking students with field independent cognitive style is more active in participating in learning compared to students in field dependent cognitive styles. Therefore in learning, the teacher must pay attention to the cognitive style of students. Especilally for mathematical creative thinking skills, learning must be able to improve students' mathematical creative thinking skills even with different cognitive styles.

As stated by Sarson, as quoted by Huda (2013) the most dominant characteristic of Treffinger's learning model is its effort to integrate the cognitive and affective dimensions of students to find the dirrections of completion that will be taken to communicate problem solving problems. This means that students are given thee freedom to solve their own problems with the ways he wants. In addition, Pomalato (2005) said that the results of his research showed that the class taught with the Treffinger learning model achieved individual completeness and classical completeness. The application of the Treffinger learning model in mathematics learning contributes positively to he development or improvement of mathematical creative thinking skills and problem solving abilities.

Therefore, one of the lessons that can be applied to improve studnets' creative mathematical thinking skills with different student cognitive style is the Treffinger learning model. This is because Treffinger's learning model has been proven to be completely for students' mathematical creative thinking abilities and better than conventional learning.

4. Conclusion

Based on the results of research and discussion, conclusions can be drawn: (1) students' mathematical creative thinking ability in Treffinger's learning research learning completeness; (2) the ability of students' creative mathematical thinking in Treffinger's learning is better than students' cretaive mathematical thinking skills in conventional learning; (3) students' mathematical creative thinking ability in Treffinger learning is based on cognitive style as follows. First, students with the Independent field cognitive style on the fluency indicator, studentsare less able to work on the problem smoothly, because of a lack of understanding of the previous material. On the flexibility indicator, students are able to work on the problem correctly but have not been able to mention or work with other ways to solve a problem. In the originality indicator, students are able to work on new problem and lack of practice working on the questions, but can write in detail and correctly what is known and what is asked about the questions. In the elaboration indicator, students are able to work on new problems correctly in accordance with the development of the ideas they have, but not carrefullyin the calculation.

Second, students with cognitive style field intermediate on fluency indicators, students are less able to work on the problem smoothly, because of a lack of understanding of the previous material. On the flexibility indicator, students are less able to work on the questions correctly, although they can use

flexible work methods but have not been able to mention or work with other ways to solve a problem. In the originality indicator, students have not been able to work on a new problem, because of lack of understanding and lack of practice working on the problem, but can write in detail and correctly what is known and what is asked about the equestion. On the elaboration indicator, it is able to work on new problems correctly in accordance with the development of the ideas they have.

Third, students with the Field Dependent cognitive style on the fluency indicator, students are less able to work on the problem smoothly, because of a lack understanding of the previous material. On the flexibility indicator, students are less able to do the questions correctly, although they can use flexible methods but have not been able to mention or work with other ways to solve a problem. In the originality indicator, students have not been able to work a new problem, because of lack of understanding and lack of practice working on the problem, but can write in detail and correctly what is known and what is asked about the question. In the elaboration indicator, students are less able to work on new problems correctly according to the development of ideas that are owned and less rigorous in calculations.

References

Agoestanto, A., & Sukestiyarno, Y. L. (2017). Analysis of Mathematics Critical Thinking Students in Junior High School Based on Cognitive Style. In *Journal of Physics: Conference Series* (Vol. 824, No. 1, p. 012052). IOP Publishing.

Ministry of National Education. (2016). *Republic of Indonesia Ministry of Education and Culture No. 21 of 2016 concerning Standard Content of Primary and Secondary Education*. Jakarta: Ministry of Natioal Education.

Huda, M. (2013). *Teaching and Learning Models*. Yogyakarta: Student Library.

Lestari, S., Waluya B., & Suyitno, H. (2015). Analisis Kemampuan Keruangan dan Self Efficacy Peserta Didik dalam Model Pembelajaran Treffinger Berbasis Budaya Demak. *Unnes Journal of Mathematics Education Research*, 4(2), 108-114.

Munandar, U. (2014). *Development of Gifted Children's Creativity*. Jakarta: Rineka Cipta.

Mursidik, E. M., Samsiyah, N., & Rudyanto, H. E. (2015). Kemampuan Berpikir Kreatif Dalam Memecahkan Masalah Matetatika Open-Ended Ditinjau Dari Tingkat Kemampuan Matematika Siswa Sekolah Dasar. *PEDAGOGIA: Jurnal Pendidikan*, 4(1), 23-33.

Nasution, S. (2010). Various Approaches in the Learning and Teaching Process. Jakarta: Bumi Aksara.

Ningrum, P. (2016). Analisis kemampuan berpikir kreatif matematis berdasarkan gaya kognitif siswa dalam menyelesaikan soal open-ended bertipe problems with multiple solution methods (Doctoral dissertation, Universitas Negeri semarang).

Pomalato, S. W. (2005). The Influence of the Implementation of the Treffinger Model on Mathematics Learning in Developing Creative Capabilities and Solving Mathematical Problem Students. Print_fieldopt_type_phd thesis, Indonesian Education University. http://repository.upi.iedu/1065/ Accessed 18-02-2019.

Pratiwi, L. A., Dwijanto, D., & Wijayanti, K. (2019). Analisis Kemampuan Berpikir Kreatif Matematis pada Pembelajaran Read, Think, Talk, Write Ditinjau dari Kecemasan Matematika. *PRISMA, Prosiding Seminar Nasional Matematika*, 2, 576-582.

Rahmatina, S., Sumarmo. U., & Johar, R. (2014). Tingkat berpikir kreatif siswa dalam menyelesaikan masalah matematika berdasarkan gaya kognitif reflektif dan impulsif. *Jurnal Didaktik Matematika*, 1(1), 62-70.

Rohaeti, I. T. (2013). Application of the Treffinger Model on Mathematics Learning to Improve the Middle School Students' Creative Thinking Ability. S1 thesis, Indonesian Education University. http://repository.upi.edu/2951/ Accessed 19-02-2019.

Siswono, T. Y. E. (2010). Levelling Students' Creative Thinking in Solving and Possing Mathematical Problem. *Journal on Mathematics Education*, 1(1), 17-40.

Siswono, T. Y. E., & Novitasari, W. (2007). Meningkatkan Kemampuan Berpikir Kreatif Siswa Melalui Pemecahan Masalah Tipe" What's Another Way". *Jurnal Trasformasi*, 1(1), 1-13.

Solso, R. L., Maclin, O. H., & Maclin, M. K. (2008). *Psikologi kognitif*. Jakarta: Erlangga..

Sugiyono. (2016). *Educational Research Methods.* Bandung: Alfabeta.

Susanti, I. T. (2015). Analysis of Student Creativity in Resolving Mathematical Problems Viewed from Reflective and Impulsive Cognitive Style. *Thesis*. Muhammadiyah University Purwokerto. http://repository.ump.ac.id/14/ Accessed 14-01-2019.

Triwibowo, Z., Dwidayati, N. K.., & Sugiman. (2017). Analysis of Mathematical Creative Thinking Ability Viewed from Students Learning Styles in Seventh Grader Through Treffinger Learning Model with Open-Ended Approach. *Unnes Journal of Mathematics Education*, 6(3), 391-399.

Ulya, H. (2015). Hubungan gaya kognitif dengan kemampuan pemecahan masalah matematika siswa. *Jurnal konseling GUSJIGANG*, 1(2).

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. (1975). Field-dependent and field-independent cognitive styles and their educational implications. *ETS Research Bulletin Series*, *1975*(2), 1-64.