ISSN 2964-4291
https://proceeding.unnes.ac.id/index.php/iset

Implementation of the CORE Model with the Interventionist Assessment to Improve Students' Mathematics Creative Thinking Ability

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Abstract. Low students' mathematical creative thinking ability. so that an innovative learning model is needed related to assessment before, during and after learning. This study aims to determine the effectiveness of the CORE Model with Interventionists *Dynamic Assessment* to Improve Students' Mathematical Creative Thinking Ability. This type of research is quantitative research. The population in this study were students of class XI in one of the high schools in the Ciamis district, teaching 2021/2022. The research sample with random sampling. The learning using the CORE model with interventionist dynamic assessment is very effective The results showed that (1) the average mathematical creative thinking ability of students who taught using the CORE model with Interventionist *Dynamic Assessment* more than the average mathematical creative thinking ability of students who taught using ordinary learning models, (2) mathematical creative thinking skills using the CORE model with Interventionist *Dynamic Assessment* achieve completeness of at least 65, (3) students' self-confidence affects the ability to think creatively by 35% .

Key words: CORE Model; Interventionist; Dynamic Assessment; creative thinking skills

How to Cite: Solihah, S., Kartono., Mariani, S., Dwijanto, D. (2022). Implementation of the CORE Model with the Interventionist Assessment to Improve Students' Mathematics Creative Thinking Ability. *ISET: International Conference on Science, Education and Technology* (2022), 365-370.

INTRODUCTION

Introduction Include: Mathematics is a subject that exists at the level of education (Rahmah, 2018) and must be one by every level of education (Purwaningrum, 2016). Mathematics is a science that can be applied to everyday life (Kenedi et al., 2019), and schools are places to instill the habit of thinking (Johnsen, 2011). Education in the 21st-century education pattern focuses on developing human resources (Tendrita et al., 2016). (Sari et al., 2017) shows that creative mathematical thinking is very relevant in today's educational developments. Thinking involves the brain manipulating information to reasoning, solving problems (Letseka & Zireva, 2013). So that at school, students can develop their creative thinking attitude. Creative thinking ability is one of the mathematical abilities students need in learning mathematics because it can train them to issue ideas(Wahyuni & Kurniawan, 2018) and create or provide new concepts in solving problems (Murdiana et al., 2020). and creative is publishing original ideas based on their knowledge (Runco & Jaeger, 2012), and high creativity can provide new concepts in solving problems (Argarini et al., 2014). Characteristics of students have various backgrounds and different abilities; they have different potentials in patterns of thinking, imagination, fantasy, and performance (Siswono, 2010). So the ability to think creatively is needed by students to solve math problems at school and solve everyday math problems in the community.

In fact, in the field, students' creative thinking skills are low (Abidin et al., 2018; Handoko, 2017). Students are not allowed to build interpretations related to the learning objectives to be achieved (Murdiana et al., 2020). Indicators of creative thinking ability Fluency, Flexibility, Novelty, and Elaboration (Abidin et al., 2018; Handayani et al., 2021). Fluency students can solve problems with various alternative answers; Flexibility can solve in different ways, Originality solves with novelty and other methods (Handayani et al., 2021). Based on this, the ability to think creatively in mathematics is an ability that can develop and create novelty with various alternative answers in different ways.

The results of the study (Khabibah; 2009) , that after being given LAS 1 26.3% showed that students had low creativity, LAS 2 students 100% began to increase, and in LAS 3, 89.5% of students had shown an increase in creativity, this student was able to show solve open questions, but the data above is still lacking when students are faced with higher questions students are reluctant to do it. Give up first without trying and exercising his creativity. This is because students lack confidence in their abilities. Give up first without trying and exercising his creativity. This

is because students lack confidence in their abilities.

Self-confidence is an attitude that arises from the desire to manifest oneself, act, and succeed. This expression can be interpreted that if students have high self-confidence, they can confirm curiosity is high. It will maximize student involvement in the teaching and learning process. Confidence that arises can increase motivation (Roland Bénabou, Jean Tirole, 2012). there is in line with what Bandura (Hendriana and Sumarmo, 2015) stated that self-confidence is an individual's view of himself in mobilizing the motivation and resources needed and raised in actions following the demands of the task. Self-confidence is a mental and emotional state that changes to specific tasks or situations (Axelrod R.H, 2017).

Improvement of creative thinking skills using innovative learning, which involves cognitive, affective, and psychomotor aspects. To optimize students' mathematical creative thinking skills, teachers can design learning processes that actively involve students. A learning model is a way to create effective learning (Fuchs et al., 2014). At that time, the teacher applied the active activities of students during the teaching and learning process and created teaching materials that had divergent questions. An alternative solution that can overcome the problems in mathematics education is to increase both the quantity and quality of learning through a cooperative learning model.

In other words, the CORE learning model is a learning model that can be used to make students active in building their knowledge. In creating their understanding, students are required to interact with their environment.

The steps of CORE Learning based on both are 1). Students connect their previous knowledge with their prior knowledge through a given problem (*Connect)*. 2) Students creatively investigate a problem, identify, formulate and integrate their knowledge in a mathematical problem (Integrating). 3) Students can cooperate and transfer their knowledge to their friends (Transfering). 3) Teachers and Students evaluate the results of their work (Evaluating).

The learning process in the classroom using the Interventionist *Dynamic Assessment.* Dynamic Assessment provides assessments to students before, during, and after learning so that students' cognitive, affective and psychomotor abilities can be seen. The learning process using the CORE model uses a dynamic assessment interventionist assessment in its implementation. Dynamic Assessment provides information on learning abilities and techniques, academic success and failure, efficient teaching strategies, and motivational, emotional, and influencing factors that affect cognitive processes. Dynamic Assessment is focused on the learner's ability to respond and intervene. A.D. was developed based on Vygotsky's theory of cognitive development called The Zone of Proximal Development (Z.P.D.). Research conducted by (Wightman and Roney, 2013) assessed the performance needed to determine student understanding. The teacher focuses more on the assessment system (Naeini & Duvall, 2012). In the implementation of dynamic Assessment, the Assessment is integrated in learning (Kartono, 2011) and, in its implementation, requires skills or expertise from the teacher (Davin & Ave, 2016).

The purpose of this study is to find out (1) the average increase in mathematical creative thinking skills using the CORE model with dynamic *Assessment* better than the usual learning model (2) students' creative thinking skills in the high, medium, and low categories using the CORE model with dynamic Assessment achieving minimum completeness (K.K.M.) (3) the effect of students' self-confidence on the ability to think creatively in mathematics by using the CORE model with dynamic Assessment.

The benefit study is to help teachers improve their learning approach, foster self-confidence in students, and develop creative thinking skills. Then this research can be used as a reference in further research.

METHODS

Methods Include: The type of study used is a quasi-experiment. The research was carried out in one of the senior high schools in the Ciamis district. There were four classes of class X1 students in this study, while the samples taken were two classes, namely classes X1-A and X1-B. Research by random sampling. Researchers took two subjects where one subject was an experimental class using the CORE model and one class as a control class with the usual model carried out in style. The reason for selecting the sample subject is that it is adjusted to the characteristics of heterogeneous students and able to work together. The instrument used is to use creative thinking skills questions that consist of Fluency, Flexibility, Originality, and elaboration indicators. For the device of creative thinking skills, testing the innovative ability test data for validity, reliability, discriminatory power, and

difficulty level. Calculation of the level of fact,

On the self-confidence scale, students who use CORE and regular learning are carried out after the posttest. The variables are to be measured using a Likert scale. Answers from respondents have a Gradation from very positive to negative. The variables in this study have a gradation of 15 questions for positive statements and 15 questions for opposing opinions.

RESULTS AND DISCUSSION

Based on the processing of the pretest, posttest, and normalized gain of students' mathematical creative thinking abilities, the mean scores, and standard deviations were as follows.

Table 1. Statistics of Pretest, Posttest, and Normalized Gain scores creative thinking skills

	$\bar{X}$ And S	Experiment (CORE) Pretest (%)	Postes (%)	(g)	n	Control Pretest (%)	Postes (%)	(g)	N
creative thinking skills Ideal score = 20	$\bar{X}$	4.61 (22.88)	12.27 (61.36)	0.50	33	4.61 (23.03)	10.45 (52.27)	0.38	33
	S	1.48	2.35	0.15		1.56	2.60	1.16	

Based on the table above, the average pretest in the experimental class is 22.88% and in the control class is 23.03%, the category of creative thinking ability is low. After doing research, the practical class posttest results reached 61.36%, including the moderate type, while the control class averaged 52.27%, including the intermediate category.

The mathematical creative thinking ability of students who received CORE learning was better than those of students who received ordinary education to achieve learning outcomes and improve creative thinking skills. Data processing using statistical test results and processing with SPSS. Before statistical testing, the normality and homogeneity of variance of the posttest scores and the normalized gain of the mathematical creative thinking ability of the two samples tested.

The data normality test conducted to determine whether the sample came from a normally distributes population or not normally distributed, using the Kolmogorov-Smirnov statistical test with a confidence level of 0.95 or a significant level. $\propto = 0.05$. The test criteria, namely:

If Sig > 0.05, then the sample comes from a normally distributed population.

If Sig is 0.05, then the sample comes from a population that is not normally distributed.

In the following, the results of the data processing of the posttest experimental class and control class posttest data are presented. Based on the calculation results, the sample is usually distributed based on the SPSS. Test results

Table 2. Creative Thinking Ability Normality Test

	Learning	Kolmogorov-Smirnova Statistics	df	Sig.	Note.
Think creative	CORE	.092	33	.200	Normal
	Normal	.107	33	.200	Normal

Based on the data in Table 2, it can be seen that Sig. in the experimental class and the control class 0.200 where the value meets the criteria of Sig. > 0.05, then Ho is accepted, which means the sample comes from a normally distributed population. Then the data tested for homogeneity. Because the data is homogeneous, a t-test was conducted to determine the average increase in students' mathematical creative thinking abilities. This can be seen in the following table.

Table 3. t-test Mathematical creative thinking skills

		Levene's Test for Equality of Variances		t-test for Equality of Means
		F	Sig.	Sig. (2-tailed)
KBK	Equal variances assumed	.522	.473	.003
	Equal variances not assumed			.003

Based on Table 3, the increase in students' mathematical creative thinking skills is 0.003, which means Implementation of the CORE Model with Interventionists *Dynamic Assessment* to Improve Mathematical Creative Thinking Ability Students are better than students who receive ordinary learning. This is by the results of the research (Fatah et al., 2016), which shows that the ability to think creatively is better than ordinary learning, where the study uses open-ended questions by the instrument questions from the CORE model.

The average learning completeness test was carried out to determine whether the average ability of students who had received learning with the CORE model with Interventionist *Dynamic Assessment* better than those whose learning using the usual Approach has reached the K.K.M. By hypothesis.

The criteria used in if the price is accepted Ho. The following are the results of the t-count calculation (Sugiyono, 2011). $t_{count} \geq \mathrm{t}_{table}$

H0: the average value of creative thinking ability reaches K.K.M. $\boldsymbol{\mu 0 \geq 65}$

H1: the average value of creative thinking ability does not reach the K.K.M. average.$\boldsymbol{\mu 0 < 65}$

Based on the calculation results $t_{count} \geq t_{table}$, namely 1, 8534≥ 1, 69389, the learning model achieves minimum completeness.

Next is the linear regression test, which is used to determine the effect of students' self-confidence on students' mathematical creative thinking skills using the CORE model with dynamic Assessment. The statistical data results show that the magnitude of the correlation or relationship value is 0.080. From the output, the coefficient of determination is 0.35, which means that the effect of students' self-confidence is 35%.

The average posttest value shows that the experimental class is higher than the control class. However, the average of the practical class and control class is low. So to see the significance, it is necessary to test two means.

The results of the posttest data analysis of the experimental class and the control class using the Kolmogorov-Smirnov and Mann-Whitney tests.

Then, the normalized n-Gain analysis for the experimental class and the control class was performed using the Kolmogorov-Smirnov test. In the practical and control categories, the significant value that shows more than the sign is used. Ho is accepted, which means a large sample from a normally distributed population. So it can be concluded that this test has a normally distributed population, so the homogeneity of variance test is carried out. The study results obtained that Ho was rejected, which means that the increase in creative thinking skills of students whose learning uses the CORE model is better than those whose education uses a conventional approach.

Based on the facts and data above, creative thinking skills can be increased by using the CORE approach. This is following research that shows that student learning outcomes improve with Dynamic Assessment (Khaghaninejad, 2015). Students who use the CORE model can be faster and better at receiving the material being taught, including in the learning process; students are made as comfortable as possible in the classroom so that students are easy to accept the material being taught.

The existence of group discussion activities allows students to interact with each other so that students can communicate with each other, ask questions, express opinions, respond to the views of other students and explain the results of their work in class. This can spur students to be more active in exploring their potential in finding answers to what is being asked.

After the learning process is carried out, a self-confidence scale is given to determine the students' self-confidence in the experimental and control classes. Based on manual data processing, the self-confidence attitude scale data shows that the average self-confidence of students in the practical class and control class is different, although not too significant.

Based on the results of statistical testing, the selection of the two classes that will be used as research samples comes from populations that are not normally distributed. This means differences in students' confidence who use learning with the CORE model and ordinary learning. The results of the analysis of the attitude scale data of the

experimental class and the control class using the Kolmogorov-Smirnov and Mann-Whitney tests. In the practical course, the significant value that shows less than or equal to the significance used is then Ho is rejected, which means that the sample comes from a population that is not normally distributed. In contrast to the control class, more than the significant value used, Ho is accepted, meaning that the sample comes from an average population.

The level of self-confidence of students in the experimental class is the same as in the control class. This may occur because students feel happy during learning, where both types relate material content to everyday life so that students see mathematics as a role in everyday life. Apart from that, students are stimulated to think and find out how to complete the given task with full confidence that they can do it. This is following the results of research from (Effie Maclellan, 2014). The review found self-confidence as a strong and stable psychological construction that involves students' self-regulation in learning activities.

CONCLUSION

Based on the results of the study, it can be concluded that (1) the average mathematical creative thinking ability of students who are taught using the CORE model with the Interventionist *Dynamic Assessment* more than the average mathematical creative thinking ability of students who are taught using ordinary learning models, (2) mathematical creative thinking skills using the CORE model with Interventionist *Dynamic Assessment* achieve completeness of at least 65, (3) students' self-confidence affects the ability to think creatively by 35%. The level of self-confidence of students in the experimental class is the same as in the control class. This may occur because students feel happy during learning, where both types relate material content to everyday life so that students see mathematics as a role in everyday life. Apart from that, students are stimulated to think and find out how to complete the given task with full confidence that they can do it.

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