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The Influence of Discovery and CORE (Connecting, Organizing, Reflecting, and Extending) Learning Model on Students' Creative Thinking Skill

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Abstract

The topic currently discussed in Indonesia is the industrial revolution 4.0. One of the skills that covers the 4.0 industrial revolution is creative thinking. The ability to think creatively must be developed from the early age. One of which is by applying a learning model in accordance with the students' condition. In reality,Mathematics has not applied a learning model that triggers students' creative thinking skills. Furthermore, the question of creative thinking is currently experiencing a decline which can be seen in the average score of the national exam. Researchers concluded that students and teachers have not found the right learning model for creative thinking problems. The population in this research were eighth graders of junior high school in Madiun Regency. Therefore, the main focus is to apply the discovery the CORE learning model, and to see how the effects of the discovery learning model and the CORE learning model. The data analysis method used is one-way univariate analysis of variance.

Keywords: *Creative Chinking; Discovery Learning Model; CORE Learning Model*

1. Introduction

Education is one of the secondary needs in society life because education leads individual to develop their potential, and is a tool to achieve goals in the future according to what was conveyed by Jack Ma, the CEO of Alibaba Group, in the annual meeting of World Economic Forum 2018. He stated that the hardest challenge of this century is education (Whiting, 2018). In the current era of the industrial revolution 4.0, students are required to have higher-order thinking skills. One of which is creative thinking, especially in the field of Mathematics which is the basis of other knowledge, and is important for us to learn. By learning Mathematics, this ability can be easily measured because Mathematics is a subject that requires high-order thinking skills to be able to manipulate information and ideas in various ways according to the context (Yulianto T., Pramudya I. 2019).

Researchers have made observations, and get students' initial ability in fluency was 55.27%, in flexibility was 47.25%, and in novelty was 40.11%. It means, students still have difficulty in answering questions correctly, creating new solutions, and providing various correct methods of solving. Someone with creative thinking skill is able to provide various ideas in accordance with orders and produce various kinds of ideas or ways to solve a problem(Ulfah, U., Prabawanto S., Jupri 2017). Most students tend to

only do routine questions according to step-by-step instructions so that their creative ideas have not yet emerged (Tabach, M., & friedlander, 2016).

Creative thinking is the ability to find and solve mathematical problems which include indicators of fluency, flexibility, and novelty (Moma, 2015). This creative thinking skill can be obtained from the surrounding social environment such as teachers and students, which are sources of information in their learning environment (Siswono, 2018). This is supported by the opinion (Craft, A., Hall, E., & Castello, 2014) which states that developing students' creative thinking skills requires creative teachers. Creative teachers are they who are able to actualize all abilities to teach, train and guide students optimally according to the expected goals. This agrees with (Sitorus, 2016) that the teacher plays a role in producing students 'creative ideas through the learning model that can arouse students' curiosity in solving it. The ability to think creatively must be trained and developed by the teacher in their learning activities in the classroom. Teachers must try and use appropriate learning models that can foster students' creative thinking skill (Puspitasari, 2019). The learning process can be interpreted as interaction activities carried out by teachers and students to produce goals with learning models or learning media (Hajhashemi, K., Caltabiano, N., dkk, 2018). through the learning process, students can practice their ability to solve problems correctly so that learning outcomes will increase (Sahara R., Mardiyana. 2018). It is hoped that the learning model applied is fun, challenging, inspiring, and motivating, so that students are able to participate actively and provide sufficient space for their thought processes in an interactive, creative, and independent manner (Cankoy, 2010).

One of learning models that contribute to improve creative thinking skill is discovery learning model. Discovery-based learning model emphasizes the cognitive process of students looking for information by learning to actively discovery and investigate (Putriani, D., and Rahayu, 2018). One of them is the discovery learning model, a learning activity that involves students' knowledge in investigating and seeking information systematically in accordance with learning contexts (Suhana, 2014). Students collect new information independently obtained and then linked to existing knowledge (Cahyo, 2013). Furthermore, the active role that involves students in cognitive learning can foster students' curiosity so that students can be enthusiastic in seeking learning resources by themselves and can solve the problems they get (Dwijayanti L M., Na'im M, 2020). The steps of the discovery learning model are 1) Simulation of students who are given problems that cause curiosity in solving investigating them. 2) Student problem statements are given so that students can investigate the problem then formulated in the form of a hypothesis. 3) Students are asked to collect various information which are relevant to validating the hypothesis. 4) Students process the data and information obtained, 4) verification, students carry out an examination to prove whether the hypothesis is true or not. 5) Students make generalization that provides conclusion (Roza, 2018).

The CORE learning model is a learning-oriented constructivism. In this learning model students are active in developing their own knowledge by examining new information and then adjusting it to old information (Schunk, 2012). The CORE learning model (Connecting, Organization, Reflecting, and Extending) is a combination of four important elements of constructivism: knowledge connection, information organization, reflection, and knowledge expansion (Maftukhah, N, 2017). The steps for this learning model are 1) connecting: students link the previous material with the material to be studied, 2) organizing: students organize ideas on the material to be studied with the group, 3) reflecting: students discuss problems with the group guided by the teacher, 4) extending: the teacher gives the questions and the students work on the questions (Karyati, 2020). Through this learning model, students are able to actively interact with their groups, from actively analyzing problems to connecting previous concepts to new concepts (Virginiawaty K, 2019).

The purpose of this study was to determine the differences in students' creative thinking skills who are subjected to discovery, CORE, or conventional learning models. The hypothesis in this study is that there is a difference between discovery learning, CORE, and conventional learning models on creative thinking skills.

2. Method

This type of research is quasi-experimental research. The population in the research was eighth graders of state junior high schools of in Kabupaten Madiun in the 2019/2020 academic year. The sample in this research was 3 state junior high schools in Kabupaten Madiun. Each of which was taken 3 classes. The experimental group used discovery learning and CORE learning models, while the control group used the convenstional learning model. The sample was carried out using stratified cluster random sampling.

The population is divided into three categories: high, medium, low school categories. Next, three groups will be randomly selected which will produce one school from the high group, one school from the medium group, and one school from the low group. Two classes will be randomly selected for each school from each category. The subjects of this research consisted of an experimental class totaling 195 students.

Data collection techniques used was tests for creative thinking skills. The data analysis technique in this research used two-way ANOVA. Before testing, a balance test will be conducted to determine whether the initial ability in the experimental class and control class is in balance, and the initial ability data is obtained from the results of the pre-experimental test. Furthermore, after the initial requirements are met, it will be carried out for three months of implementing the discovery learning model and other models in the research sample. Before the two-way ANOVA is different, the data will be tested for normality and homogeneity test.

3. Results and Discussion

The research data will be summarized in the following table. The analysis of data summary is balance test, normality test, homogeneity test, variance analysis result, and comparison test.

Table 1. The Result of Balance Test

		Equal variances assumed	**Equal variances not assumed**
Levene's Test for Equality of Variances	F	0.850	
	Sig	.358	

Table 1 shows that the value of Levene's Test for Equality of Variances in the variable of creative thinking is $sig > 0.05$, so H_0 is accepted which means that the probability (significance) value of creative thinking with the similar variance is assumed as 0,358 greater than 0.05, so it can be concluded that the students' initial ability is similar.

Table 2. The Result of Normality Test

		DL	CORE	Direct
N		98	97	100
Normal Parameters	Mean	80,6548	74,3986	62,5417
	Std. Deviation	13,79003	14,84101	14,60891
Test statistic/ L Max		,084	,079	,083
Liliefors Table		,089	,090	,089

Based on table 2, it is obtained that L Max DL = 0.84 with the critical area of L L (0.05; 98) = 0.089, then L Max DL <critical area L, so that the H_0 test decision is accepted. Furthermore, L Max CORE = 0.079 with the critical area of L L (0.05; 97) = 0.090, then L Max CORE <critical area of L, so that the H_0 test decision is accepted. Direct L Max = 0.083 with the critical area L L (0.05; 100) = 0.089, then Direct L Max <critical area L, so that the H_0 test decision is accepted. It can be concluded that the population of DL, CORE, and direct learning models are normally distributed.

Table 3. The Result of Homogenity Test

		Levene Statistic	f1	df2	Sig.
Creative Thinking	Based on Mean	.434		292	.648

Based on table 4, p-value = 0,648 and $\propto = 0{,}05$, so $p - value > \propto$. Therefore, it is concluded that the variance homogenity is accepted, the data variance in DL, CORE, and direct learning is similar.

Table 4. The Result of Variance Analysis (ANOVA)

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	16782.951	2	8391.475	40.355	.000
Within Groups	60719.133	292	207.942		
Total	77502.084	294			

Table 4 shows that p value $= 0{,}000$ with $\propto = 0{,}005$, so $p > \propto$. It means H_0 is rejected. It can be concluded that the three learning models have different effect.

Table 5. The Result of Comparison Test

Multiple Comparisons

(I) Learning Model	(J) Learning Model	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
DL	CORE	6.25624*	2.06533	.011	1.1748	11.3377
	Langsung	18.11310*	2.04970	.000	13.0701	23.1561
CORE	DL	-6.25624*	2.06533	.011	-11.3377	-1.1748
	Langsung	11.85686*	2.05503	.000	6.8007	16.9130
Direct	DL	-18.11310*	2.04970	.000	-23.1561	-13.0701
	CORE	-11.85686*	2.05503	.000	-16.9130	-6.8007

Table 5 shows that:

(1) Discovery Learning and CORE learning model has the average difference of 6.25624 which shows that the creative thinking skill with discovery learning model is more effective than CORE learning model.

(2) Discovery Learning and direct learning model has the average difference of 18.11310 which shows that the creative thinking skill with discovery learning is more effective than direct learning model.

(3) CORE and direct learning model has the average difference of 11.85686 which shows that the creative thinking skill with CORE learning model is more effective than direct learning model.

Based on the ANOVA test, there is an effect of the learning model on creative thinking. Based on research conducted (Mawaddah, 2015), discovery learning can trigger students' creative thinking abilities by involving cognitive abilities, because this model provides students with the opportunity to seek as much information as possible regarding learning. This discovery learning model can also build the concept of understanding the problem which is cognitive learning and can create an atmosphere that can make students active in the classroom (Kasmiana., Yurizal, 2020). The learning process that is applied can affect student learning outcomes itself (Anggraini R D., Murni A, 2018). The steps in discovery learning can explore as many ways as possible by engaging the thought process and applying creative ideas in solving problems. Research conducted by (Mawaddah, 2015) states that discovery learning models have a significant effect on creative thinking than direct learning models.

Conclusion

Based on the explanation above, the ability to think creatively through discovery learning model has more significant positive impact compared to the CORE and conventional learning model. In accordance with the test results described, the discovery learning model is very feasible to be applied in classroom learning because this model emphasizes the process of finding various information that help students improve their cognitive skills. Therefore, educators need to know the application of appropriate learning models in the learning process in the classroom because if there is no suitable learning model, students' thinking skills will be difficult to develop in facing progress in the educational era. Researchers suggest applying discovery-based learning to mathematics lessons such as geometry.

References

Anggraini, R D., Murni A., & Sakur. (2018) Differences in Students' Learning Outcomes between Discovery Learning and Conventional Learning Models. *Journal of Physics: Conf. Series 1088 012070*.

Cahyo, A N. (2013). Panduan Aplikasi Teori-Teori Belajar Mengajar Intelektual dan Terpopuler. Jogjakarta: Diva Press.

Cankoy, O. (2010). Effect of a Problem Posing Based Problem Solving Instruction. *Journal of Education* 38, 11–24.

Craft, A., Hall, E., & Castello, R. (2014). Passion: Engine of Creative in an English University. *Thinking Skill and Creativity*, 13, 91–105.

Dwijayanti, L M., Na'im, M., and Soepono. (2020). The Effect of Discovery Learning Under Mind Mapping on Students' Results of History Learning at SMAN 1 Tenggarang. *Journal of Physics: Conf. Series* 485 012003.

Hajhashemi, K., Caltabiano, N., Anderson, N., & Tabibzadeh, S. A. (2018). Multiple Intelligences, Motivations and Learning Experience Regarding Video-Assisted Subjects in a Rural University. *International Journal of Instruction*, 11, 167–182.

Karyati,. & Sari, E. (2020). CORE (Connecting, Organizing, Reflecting & Extending) Learning Modelto Improve the Ability of Mathematical Connections. *Journal of Physics: Conf. Series* 1581 012028.

Kasmiana., Yurizal., and Syukri. (2020). The Application of Guided Discovery Learning Model to Improve Studentsconcepts Understanding. *Journal of Physics: Conf. Series* 1460 012122.

Maftukhah, N., Nurhalim, K., & Isnarto. (2017). Kemampuan Berpikir Kreatif Dalam Pembelajaran Model Connecting Organizing Reflecting Extending Ditinjau Dari Kecerdasan Emosional.3,267–276.

Mawaddah, N. (2015). Model Pembelajaran Discovery Learning Dengan Pendekatan Metakognitif Untuk Meningkatkan Metakognisi Dan Kemampuan Berpikir Kreatif Matematis."*Unnes Journal of Mathematics Education Research*, I.

Moma, La. (2015). Pengembangan Instrumen Kemampuan Berpikir Kreatif Matematis Untuk Siswa SMP. 4, 27–41.

Puspitasari, L. (2019). Analysis of Students' Creative Thinking in Solving Arithmetic Problem. *International Electronic Journal of Mathematics Education*,14, 49–60.

Putriani, D., and Rahayu, C. (2018). The Effect of Discovery Learning Model Using Sunflowers in Circles on Mathematics Learning Outcomes. *International Journal of Trends in Mathematics Education Researc*, 1, 22–25.

Roza, N. (2018). Practicality Of Mathematics Learning Tools Based On Discovery Learning For Topic Sequence And Series. *International journal Of Science and Technology Research*, 7(5), 236–41.

Sahara R., Mardiyana., & Saputro, D. (2018). Discovery Learning with SAVI Approach in Geometry Learning."*Journal of Physics: Conf. Series* 1013 0121125.

Schunk, D H. (2012). *Learning Theories an Educational Perspective*. Boston: VA.

Siswono, T Y. (2018). Pembelajaran Matematika Berbasis Pengajuan Dan Pemecahan Masalah. Bandung: PT Remaja Rosdakarya.

Sitorus, J., & Masyarati. (2016). Student Creative Thinking Process Stages: Implementation of Realistic Mathematics Education. Thinking Skills and Creativity. *Elsevier*, 22, 111–120.

Suhana, C. (2014). Konsep Strategi Pembelajaran (Edisi Revisi). Bandung: PT Refika Aditama.

Tabach, M., & friedlander, A. (2016). Algebraic Procedures and Creative Thinking. *ZDM Mathematics Education*, 53–63.

Ulfah, U., Prabawanto S., & Jupri, A. (2017). Student's Mathematical Creative Thinking Through Problem Posing Learning. *IOP Conf. Series: Journal of Physics: Conf. Series* 895 01209,.

Virginiawaty, K., & Saragih, M. (2019). The Implementation of Connecting, Organizing, Reflecting, Extendingto Improve Mathematics Connection Grade 11 Science Student at One of Christian Senior High School in Rantepao. *Journal of Physics: Conf. Series* 1307 012011.

Whiting, K. (2018). Jack Ma Wants To Go Back To Teaching. https://www.weforum.org/agenda/2018/09/jackma-wants-to-go-back-to-teaching/.

Yulianto, T., Pramudya, I., and Slamet, I. (2019). Effect of the 21st Century Learning Model and Problem-Based Models on Higher Order Thinking Skill. *International Journal of Educational Research Review*, 4, 749–755.