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The Effect of Learning Model and Creative Thinking at Vocational High School 7 Medan

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***Abstract*— An abstract is a brief summary of to analyze: (1) Comparison between student mathematics learning outcomes taught by Realistic mathematical approach model with Means Ends Analysis model (2) comparison of mathematics learning outcomes of students who have high creative thingking skills and low creative thingking skills (3) interaction between learning model and creative thingking style towards student mathematics learning outcomes. The sample was divided into two classes, the experimental one class taught with the realistic mathematic approach model and the experimental two class taught with the Means Ends Analysis model. The data in this study were analyzed by two-way ANOVA. The results of the study show that: (1) From the results of the calculation of the hypothesis obtained F_{count} = 80,02. For the distribution value of F_{table} = 3.99 then this result shows that F_{count}> F_{table} so that gives a decision that Ho is rejected and Ha is accepted. The research hypothesis proposed meaning that the mathematics learning outcomes of students taught realistic mathematic approach model are higher than the mathematics learning outcomes of students who are taught by Means Ends Analysis model. (2) From the results of the calculation of the hypothesis obtained F_{count} = 8,81. For the distribution value of F_{table} = 3.99 then this result shows that F_{count}> Ft_{able} so that gives a decision that the research hypothesis proposed is mathematics learning outcomes of students who have a high creative thingking skills are higher then low creative thingking skills (3) From the results of hypothesis calculations obtained F_{count} = 7,42. For the distribution value of F_{table} = 3.99 then this result shows that F_{count}> F_{table} so that gives a decision that Ho is rejected and Ha is accepted. The proposed research hypothesis is that there is an interaction between learning models and creative thingking skills towards student mathematics learning outcomes**.

Keywords*— *Learning Model; Realistic Mathematical; Means Ends analysis model; Creaive Thinking

I. INTRODUCTION

Education is an important thing in human life as a means to improve the quality of Human Resources. Through education, various aspects of life are developed in the learning process so that it can have a direct impact on human life. Mathematics is a subject that is taught at every level of the school, which plays a significant role in the world of education. Mathematics has contributed a lot and made a significant contribution to the progress of human civilization. According to Nuriadin (2013) studying mathematics, can be used as a means to develop the ability to think and solve calculation problems. Until now, only a few people understood the importance of learning mathematics. To overcome this problem, a variety of new methods were made in teaching mathematics. Teachers are required to be more creative and innovative in teaching mathematics lessons to students, so that mathematics can be more fun and interesting to learn. But in reality teachers / educators teach mathematics not in accordance with mathematical characteristics. So that the basic mathematical abilities of students are still low, they often have difficulty communicating the resolution process. To improve the learning outcomes, then a teacher must be able to choose and determine the learning model in accordance with the subject matter and student learning needs. One solution is to implement a learning model.

One alternative learning model that can improve creative thinking skills is learning that provides space for students to be able to find and build their own concepts and can develop students' thinking skills. The learning model that can be applied is Realistic Mathematics Education (RME). Realistic Mathematics Education learning model is an approach that places the reality and experience of students as the starting point of learning where students are given the opportunity to construct their own formal mathematical knowledge through existing reality problems.

Means Ends Analysis learning model is one of the learning models which is a variation of learning with solving Suherman's problem (2008: 6). The presentation of material in this learning model was carried out with Suherman's heuristic problem solving approach (2008: 6). Because the presentation of material presented is based on heuristics, the presentation of material is not done by routine algorithms satay (destination).

In addition to learning factors that are more focused on the learning model used, other factors that influence student mathematics learning outcomes are the ability to think creatively. The ability to think creatively is one of the mathematical abilities so that it becomes one thing that is very important in learning mathematics because mathematical material is understood and understood through creative thinking which is done by practicing solving mathematical problems. The ability to think creatively is one of the basic capital that must be possessed by students to face competition in the global era. The importance of creative thinking skills to

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be developed is also reflected in the educational objectives of the national education goals National Education Law Number 20 of 2003 article 3 namely to develop potential students to become human beings who believe and fear the Almighty God, have noble character, are healthy, knowledgeable, capable creative, independent, and a democratic and responsible citizen.

II. REVIEW OF THE LITERATURE

A. *Mathematics learning outcomes*

Arikunto (2012: 49) suggests that learning outcomes are the results obtained after learning activities, learning outcomes are expressed in the form of numbers, letters and words such as good, medium and less. Supatmono (2009: 5) states that mathematics is a science that is not far from the reality of human life. Still in Supatmono, etymology, mathematics originates in the Latin language manthanein or mathemata which learns or things learned. In Dutch it is called wiskude or exact science which is all related to reasoning. Sri Esti Wuryani (2002: 72-73) states about Mathematics learning namely "One important principle is that most elementary school children are still in the stage of concrete operational development. This means that lessons in elementary school must be as concrete as possible and truly experienced. Mathematics Lessons should use concrete objects to show concepts and let students manipulate objects representing mathematical principles. Based on the description above, it can be concluded that vocational mathematics learning is a process that occurs between instructors and learners as a result of ideas, processes and reasoning that aims to create an understanding of mathematical concepts, use reasoning on patterns and traits, problem solving, communicating ideas and attitudes appreciate the usefulness of mathematics in life.

B. *Creative Thingking*

According to Uno (2013) states that creative thinking is a form of thinking, trying to find new relationships, get answers, methods or new ways to respond to a problem, or produce new artistic forms. According to Johnson (2013: 289) suggests that creative thinking is looking for opportunities to change things for the better. Creative thinkers see themselves living in a context, family context, school, city, or ecosystem, and they try to improve this context. According to Haerudin (2011: 289) creative thinking is a thought process to find something that can change or improve any condition so that it becomes better. So that the opinion implies that the benefits of creative thinking are changing one's condition from the bad to the better.From the above theory it can be concluded that creative thinking is a form of thinking to find new answers, methods or new ways of responding to a problem to solve a problem.

C. *Learning Model*

Arends (2012: 22) states the teaching model leads to a particular learning approach including its purpose, its syntax, its environment, and its processing system. Trianto (2011: 22) states that the learning model is a plan or pattern that is used as a guide in planning classroom learning or learning in a tutorial to determine learning tools. Learning models are conceptual frameworks that describe systematic procedures in organizing learning experiences. to achieve certain learning goals and serve as a guide for learning designers and instructors in planning teaching and learning activities.

The learning model is an attempt to reach the goals that have been found. Associated with teaching and learning, the learning model is interpreted as general patterns of activities of teachers and students in the realization of teaching and learning activities to achieve the goals outlined.

D. *Realistic Mathematical*

The realistic mathematics learning approach is an alternative learning approach used in teaching and learning activities. In order for the learning process to run well, of course, it must have principles in its implementation. In realistic mathematics learning there are principles of learning. Marpaung (2003: 5-6) says the main principles of learning mathematics in PMR are: (1) Principle of Activity. This principle states that mathematics is a human activity. Mathematics is best learned by doing it yourself; (2) Principles of Reality. This principle states that mathematics learning starts from real-world problems that are close to student experience (realistic problems for students). (Note: realistic for students means not always related to the real world, can also be from another world but can be imagined by students). If mathematics is taught apart from the experience of students, then mathematics is easily forgotten; (3) The Principle of Gap. This principle states that students' understanding of mathematics through various levels is from finding (to invent) informal contextual solutions to schematization. Then the acquisition of insights and resolutions formally; (4) Braid Principles. This principle states that mathematics material in schools is not broken into aspects (learning strands) that are taught separately; (5) Principles of Interaction. This principle states that learning mathematics can be viewed as a social activity other than as an individual activity; (6) Guidance Principle.

E. *Means Ends analysis model*

According to Rahmawati (2013) states that Means is a tool or method that can be used to solve problems, while Ends Analysis is the ultimate goal of a problem. According to Fitriani (2009) states that Means Ends Analysis is a process or way to solve problems into two or more sub-objectives and then worked in succession in each of these sub-objectives.According to Suherman (2008) states that Means Ends Analysis is a learning model of variation between problem solving methods and syntax that presents material in heuristic-based problem solving approaches, elaborates into simpler sub-problems, identifies differences, arranges sub-problems so that connectivity occurs. From the description above it is clear that a Means Ends Analysis method is a varied learning model between problem solving methods and the syntax in presenting the material using a heuristic-based problem solving approach, namely solving a problem in two or more sub-objectives.

III. METHODOLOGY

This research was carried out at SMK 7 Medan. The study was carried out in March 2019 in class X . The sample in this study consisted of two classes namely class X-PM1 totaling 34 students as an experimental class, and class X-PM2 totaling 34 students as a control class. The experimental class and control class are taken by Cluster Random Sampling technique, which is the technique of taking samples from the population randomly without regard to the strata in the population. The variables in this study are PMR and MED learning models as independent variables, students 'mahematics learning outcomes as dependent variables and students' creative thinking as moderator variables. The research design was done by Postes Only Control Group Design and can be seen in TABLE I.

TABLE I. POSTEST ONLY CONTROL GROUP DESIGN

Learning Model (A) / Creative Thingking (B)	PMR (A_1)	MEA (A_2)
High (B_1)	A_1B_1	A_1B_2
Low (B_2)	A_2B_1	A_2B_2

To observe students' creative thinking that is after students are grouped based on the type of creative thingking, then the students will have low and high creative thinking. The research design used is factorial design 2 x 2, which compares PMR learning models and MEA. The instrument in this study was to use 25 multiple choice test questions to measure learning outcomes, and test to detect who have a high creative thingking and low creative thingking. Hypothesis testing using two-way variance analysis technique (2x2 factorial design) with a significant level of 5%.

IV. RESEARCH AND CONCLUSION

From the results of the analysis calculation about the difference in mathematich learning outcomes students who are taught with PMR learning models are $\bar{X}$= 79,00 and MED models learning $\bar{X}$ = 74,79 obtained the calculation result of Fh is 80,02 and the Ft table price is 3,99. With according to research findings concluded, that the research hypothesis which states: mathematics learning outcomes students taught with PMR learning models higher than the results of studying mathemaics students taught by the MED model at the level confidence α = 0,05 has been tested the truth.

The results of the analysis of variance analysis about the difference in learning mathematich outcomes between students who have a high creative thingking and low creative thinking with an average of $\bar{X}$ = 84,27 and $\bar{X}$ = 71,77 . Fh = 8,81 and price table for α = 0.05 with dk (1) obtained Ft = 3,99 so it canstated Fh (8,81)> Ft (3,99). students who have a high creative thingking at the level of trust α = 0,05 the truth has been tested

Results of Calculation of Interaction Between Learning Model and Creative Thingking Against Student Mahematic Learning Outcomes done with Factorial 2 x 2 ANOVA obtained results Fh calculation = 7,42 with table price Ft for the confidence level (α) of 0.05 with dk = 1 is Ft = 3,99 so it can be stated Fh (7,42)> Ft (3,99), thus can concluded the hypothesis statement research which states: there interaction between learning models and creative thingking towards the results of learning mahematics students have tested the truth at the level significant α = 0,05.

References

[1] Alpusari, M. & Putra, R.A. (2015) . The Application of Cooperative Learning Think Pair share (TPS) Model to Increase the Process Science Skills in Class IV Elementry School Number 81 Pekan Baru City. *International Journal of Science and Research (IJSR). Vol 4 : 2319-7064*

[2] Departemen Pendidikan Nasional. (2003). *Undang-Undang Republik Indonesia No. 20 Tentang Sistem Pendidikan Nasional*. Jakarta: Departemen Pendidikan Nasional Republik Indonesia.

[3] Depary, S. (2013). Model pembelajaran dan Gaya berpikir terhadap hasil belajar fisika. *Jurnal Teknologi Pendidikan, Vol.6. No. 1: 979-6692*

[4] DePorter, Bobbi dan Mike Hernacki. (2009). *Quatum Teaching*. Bandung : Kaifa

[5] Dol, S.M. & Halkude, S.A. (2017).An EffectiveWay to Improve Problem Solving Skill using TPS, T24S and T21S: A Comparative Study. *Journal of Engineering Education Transformations. Volume 30,. No. 3, : 2394-1707*

[6] Hanim, S.A. & Ashari, K. (2016). Pengaruh strategi pembelajaran dan gaya berpikir terhadap hasil belajar bahasa indonesia siswa. *Jurnal Teknologi Pendidikan. Vol. 8. No. 2 : 2407-7437*

[7] Isjoni. (2011). *Pembelajaran Kooperatif Meningkatkan Kecerdasan Komunikasi Antar Peserta Didik*, Pustaka Belajar, Yogyakarta.

[8] Khalid, A. & Azeem, M. (2012). Constructivist Vs Traditional : Effective Instructional Approach in Teacher Education. *International Journal of Humanities and Social Science.* 2 (5) : 170-177

[9] Lie, A. (2007).*Cooperatif Learning,* Grasindo, Jakarta.

[10] Ofodu, G. O. & Lawal, R. A. (2011). Cooperative Instructional Strategies and Performance Levels of Students in Reading Comprehension. *International Journal of Emerging Sciences. Vol. 3 No. 2: 103–107.*

[11] Poonam, Sarita. (2017). The use of innovative strategies to enhance quality of classroom interaction . *International Journal of Advanced Research and Development. Volume 2; Issue 4; Page No. 137-141 : 2455 – 4030*

[12] Santrock JW. (2004). *Psikologi Pendidikan Edisi Kedua*. Jakarta: Kencana Prenada Media Group

[13] Sharma,H.L & Poonam. (2016). Constructivist Approach for Teaching English: Making sense of Paradigm shift from the Traditional Approach. *International Journal of Science and Research (IJSR).; 5(10):788-792.*

[14] Slavin. (2009).*Cooperative Learning*. Nusa Media, Bandung.

[15] Taylor C, Lillis C, Le More P. (2000). *Fundamentals of nursing the art and science of nursing care B. Third Edition.* Philadhelpia: Lippincott

[16] Trianto. (2011).*Mendesain Model Pembelajaran Inovatif-Progresif,* Kencana, Jakarta.

[17] Wartono. (2003). *Strategi Belajar Mengajar Fisika*. Malang: JICA