JOELI: Journal of Educational and Learning Innovation
Vol.1, No.1, July 2024 pp. 42 – 48
ISSN: 3063-3966 *(online)*

The Influence of the Realistic Mathematics Education (RME) Approach on The Ability to Think Creatively Mathematically in Terms of Student Learning Motivation

Muhdholifah[1], Shoffan Shoffa[2], Febriana Kristanti[3]

[1,2,3] Mathematics education, Universitas Muhammadiyah Surabaya, Indonesia

Article Info

Artikel History
Received : 5 June 2024
Reviewed : 11 June 2024
Accepted : 29 June 2024

Keywords:
Creative Thinking
Learning Motivation
RME Approach

ABSTRACT

This study aims to describe the interaction between the Realistic Mathematics Education (RME) approach and learning motivation on students' mathematical creative thinking skills. The research method used is experimental research with a quantitative approach and True Experimental Design Type Pretest-Posttest Control Group Design. The population of this study was all grade IX students of SMP Negeri 2 Surabaya, with class IX-J as the experimental class and class IX-I as the control class. Data collection techniques include tests (pretest and posttest), questionnaires, observation, and documentation. Data analysis was performed using t-test and two-way ANOVA. The results showed a significant interaction between the RME approach and learning motivation on students' mathematical creative thinking skills. The ANOVA test produced a Sig value of 0.027, indicating a significant difference between the pretest and posttest results in the experimental group. By providing a detailed methodology, this study aims to increase understanding of the research process and specific techniques used to investigate the interaction between the RME approach and learning motivation on students' mathematical creative thinking skills.

Please cite this article APA style as:
Muhdholifah, M., Shoffa, S., & Kristanti, F. (2024). The influence of the Realistic Mathematics Education (RME) Approach on The Ability to Think Creatively Mathematically in Terms of Student Learning Motivation. *JOELI: Journal of Educational and Learning Innovation*., 1(1), pp. 42 – 48.

Corresponding Author:
Muhdholifah
Mathematics education, Universitas Muhammadiyah Surabaya, Indonesia
**Email Correspondence: muhdholifah-2019@fkip.um-surabaya.ac.id*

1. Introduction

Learning mathematics is an activity, where mathematics learning classes are not only a place to transfer mathematics knowledge from teachers to students but can also be a place for students to rediscover mathematical ideas and concepts through the exploration of realistic problems (Priatmoko et al., 2018). Realistic is something real that is easily imagined by students. From these realistic problems, students are not only considered passive recipients who only know science, but students can rediscover mathematical ideas and concepts independently. Furthermore, students can apply the mathematical ideas and concepts found to solve everyday problems encountered.

One approach to learning mathematics that is oriented towards students' daily problem experience is the Realistic Mathematics Education (RME) learning approach. RME is said to be a learning approach because in the RME approach there are basic concepts that underlie the learning process. RME is an approach to learning mathematics that was first discovered in the Netherlands in 1971 by the Freudenthal Institute. Shoffa et al., (2020) explained that the RME approach is an approach to the mathematics learning process that starts from real life which aims to develop mathematical concepts/ideas and then apply these concepts to everyday life, so that by using this approach learning will become more meaningful and of course can be remembered by students longer. Real life is used as a reference to develop mathematical concepts. With the RME learning approach, students think more realistically in connecting contextual mathematical problems with real life. When students can understand and solve contextual problems independently, the different ways of solving and answering will be able to develop students' mathematical creative thinking skills, resulting in different and new solutions (Khotimah & As'ad, 2020)

Creative thinking is the ability to create and develop new things that are unusual and have something different compared to most people's ideas (Kholili, Shoffa, & Soemantri, 2021). As a teacher, the ability to think creatively must begin to be instilled in students. By thinking creatively, students can develop their skills and knowledge to find new things and innovations in their lives.

By learning mathematics can help students develop the ability to think logically, think critically and think creatively (Tong et al., 2022). For successful solving of mathematical problems requires the ability to think creatively. This ability is needed by students when solving problems or mathematical problems, especially in problems that are rarely given by teachers to students. When students face a problem, then apply the ability to think creatively, students can generate many ideas to solve the problem. However, learning in schools, teachers rarely provide activities to students that help develop their creative thinking skills so that students are less stimulated to think, behave, and behave creatively (Utami & Indarini, 2021).

From the facts found during the observation and interview conducted by researchers with one of the mathematics teachers, namely Kusdianah during the 2022 Introduction to School Implementation (PLP) program at SMP Negeri 2 Surabaya, several student behaviors were found when mathematics learning took place, namely 1) When the teacher explained the material in front of the classroom, several students were busy with their respective activities, such as playing, chatting

with desk mates, bending your head on the table etc. This is because students do not care and are not interested in the material taught; 2) When the teacher gives a contextual problem related to mathematical material, some students find it difficult to solve it, students look confused in interpreting the problem into mathematical form. This proves that students do not have the ability to think creatively mathematically on fluency indicators; 3) In solving math problems, many students solve by imitating the method given by the teacher. If there are different problems, some students cannot solve the problem. This proves that students do not have the ability to think creatively mathematically on indicators of new ways (originality); 4) Students lack enthusiasm to participate in mathematics learning due to lack of learning motivation possessed by students. In addition, the teaching and learning process still uses conventional methods that only focus on teachers. The learning process is more dominated by teacher activities than activities carried out by students. This causes students to be less active (passive) and only receive material that has been delivered by educators (Shoffa et al., 2020). The application of conventional methods causes students to only accept material and memorize formulas for granted, causing a lack of ability to solve mathematical problems with other alternatives. The use of inappropriate learning methods and the absence of abilities possessed by students cannot be separated from student learning motivation when participating in mathematics learning.

Learning motivation is the motivation that students must carry out certain learning activities that come from within a person or from outside to increase enthusiasm for learning (Mulyawan, 2012). Learning motivation can be a booster of student enthusiasm, but if it is lacking, learning motivation can weaken students' desire to learn. Students who learn without motivation must get less than optimal results.

Student learning motivation has a close relationship with the ability to think creatively. A person who is motivated to learn can not only solve routine problems but can also see various ways to solve a problem, which can give rise to creative thinking (Monica, 2020). The ability to think creatively of students can increase if the teacher always motivates students to understand the material explained during learning activities. Learning motivation is divided into two, namely high learning motivation and low learning motivation, the higher the motivation students have, the better the thinking ability they have (Putrianasari & Wasitohadi, 2015).

This research refers to several similar studies that have previously been conducted, the first reference is research that has been conducted by Suryaningsih, et al (2021) with the title Improving Students' Creative Thinking Ability through a Realistic Mathematical Approach. Based on the analysis of creative thinking test results, there is an increase in students' creative thinking skills with a realistic mathematical approach. The results proved that a realistic mathematical approach could improve students' creative thinking skills.

The second reference is research that has been conducted by (Monica, 2020). with the title The Effect of Open-Ended Learning Models on the Ability to Think Creatively in Mathematics Judging from Learning Motivation. From the results of data analysis, it is known that there are differences in the influence of open-ended learning models and direct learning on learning motivation and mathematical creative thinking skills. The results proved that the ability to think creatively mathematically can be viewed from student learning motivation.

Based on the description that has been explained, researchers are interested in carrying out research by applying the RME learning approach with the title "The Effect of the Realistic Mathematics Education (RME) Learning Approach on the Ability to Think Creatively Mathematically in terms of Student Learning Motivation".

2. Method

This type of research is experimental research with a quantitative approach. The research design chosen is True Experimental Design. In this design, the researcher can control all outside variables that affect the course of the experiment. One form of True Experimental Design is Pretest – Posttest Control Group Design. The design carried out was to compare the group obtained treatment (X) through scores obtained from the implementation of the pretest (O1) and posttest (O2). The purpose of this study is to determine the significant difference between the pretest and posttest results, whether the treatment has been given.

The target of the study was grading IX students of SMP Negeri 2 Surabaya. The sampling technique uses purposive sampling so that class IX J is obtained as an experimental class and IX I as a control class with the number of students in each class is 24 students. The selection of classes is according to the advice of the mathematics teacher and has characteristics that are relevant to the problem to be studied.

3. Results and Discussion

Results

After the data sample of pretest questions and posttest questions was declared normally distributed, there was no difference in learning outcomes and there was an average difference in the results of the mathematical creative thinking ability test between experimental and control class students. The next test is the Two-Way Analysis of Variance test contained in SPSS software version 24.0. The Two-Way Anova Test is used to determine if there are different influences and criteria tested to obtain the desired results. The pair of hypotheses of the Two-Way Anova test study in this study are.

H_0 : $\mu_1 = \mu_2$ or, there is no $H_0 : \mu_1 - \mu_2 = 0$positive influence of the RME learning approach with mathematics learning motivation on the mathematical creative thinking ability of experimental class students

H_1 : $\mu_1 = \mu_2$ or, there is $H_1 : \mu_1 - \mu_2 = 0$a positive influence of the RME learning approach with mathematics learning motivation on the mathematical creative thinking ability of experimental class students

The level of significance used is .5% $= (\alpha = 0{,}05)$

The criteria for hypothesis testing based on P-value or significance value (Sig.) are
If then accepted$P - value < \alpha H_0$
If then it is rejected.$P - value > \alpha H_0$
The results of the Two-Way Anova Test Test are listed in the Table below.

Table 1. Two-way Anova Test Results
Tests of Between-Subjects Effects

Dependent Variable: Think_creatively						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	13953.448[a]	5	2790.690	95.879	.000	.919
Intercept	114740.613	1	114740.613	3942.109	.000	.989
Model Learning	5322.641	1	5322.641	182.868	.000	.813
Category motivation	2533.813	2	1266.906	43.527	.000	.675
Type Learning * Categories motivation	230.098	2	115.049	3.953	.027	.158
Error	1222.469	42	29.106			
Total	189178.000	48				
Corrected Total	15175.917	47				
a. R Squared = ,919 (Adjusted R Squared = ,910)						

The results of the two-way ANOVA test contained in Table 1 are used to answer the hypothesis and problem formulation contained in this study. In Table 1 there is an inscription "Learning model * motivation category" which shows students' mathematical creative thinking ability in terms of differences in treatment when implementing learning in experimental and control classes and reviewed based on students' mathematics learning motivation. Regarding this, a value of Sig. 0.027 was obtained.

Based on the test criteria if the value is Sig or P-value, then it is accepted. This means that there are differences in mathematical creative thinking skills between students who have high, medium and low motivation to learn mathematics in experimental and control classes. Based on the differences in students' abilities, it can be concluded that there is an interaction between the RME approach and mathematics learning motivation on students' mathematical creative thinking skills $< \alpha H_0$.

Discussion

Students who are taught with the RME approach with different learning motivations (high, medium and low) are believed to affect their mathematical creative thinking skills. The ANOVA test result data listed in Table 1, obtained a Sig value of 0.027 which is smaller than the specified P-value or Sig. These results show that the RME approach and mathematics learning motivation have a simultaneous influence on students' mathematical creative thinking skills. The results of this study are supported by previous research which concluded that the RME approach and learning motivation have a relationship or interaction with students' mathematical creative thinking ability (Papalia & Feldman, 2014).

Based on this, the creative thinking ability of students from the high category of learning motivation has increased significantly on all indicators, the creative thinking ability of students from moderate motivation has experienced a significant increase in fluency indicators and new ways, the creative thinking ability of students from low motivation has a significant increase in fluency indicators and new ways. This happens because learning with a student-centered RME approach emphasizes active student involvement in the process of knowledge formation or construction as well as concept discovery.

The use of appropriate learning plays an important role in the development of students' cognitive patterns. The use of the RME approach in students who have

high mathematical learning motivation acquires high mathematical creative thinking skills, moderately motivated students acquire mathematical creative thinking skills that are medium or not greater than the mathematical creative thinking skills of highly motivated students, while students who have low motivation obtain mathematical creative thinking abilities that are low or not greater than the ability The mathematical creative thinking that moderately motivated students have.

An interaction can occur if the independent variable does not have a separate influence on the dependent variable (Kholili et al., 2021). In this case, the independent variable is the RME approach, the dependent variable is the ability to think creatively mathematically and there are other variables that can affect the dependent variable, namely student mathematics learning motivation. The interaction of the RME approach and learning motivation on students' mathematical creative thinking skills occurred in the implementation of learning at the first and second meetings.

In the first and second meetings, the dominating phase is the phase of understanding contextual problems, solving contextual problems, and comparing and discussing answers. In the phase of understanding contextual problems, the indicator of learning motivation that arises is the desire and desire to succeed while the indicator of creative thinking ability that arises is fluency. In the phase of solving contextual problems, the indicator of learning motivation that appears is happy to find and solve problems in everyday life while the indicator of creative thinking ability that appears is diversity (flexibility). In the phase of comparing and discussing answers, the indicator of learning motivation that appears is the existence of interesting activities in learning while the indicator of creative thinking ability that appears is a new way (originality). Based on this, it is known that there is an interaction between the RME approach and learning motivation on students' mathematical creative thinking skills.

4. Conclusions

Based on the analysis of the results of research that has been conducted on the influence of the Realistic Mathematics Education (RME) approach on the ability to think creatively mathematically in terms of the motivation to learn mathematics of grade IX students of SMP Negeri 2 Surabaya, it was concluded that there is an interaction between the RME approach and the motivation to learn mathematics on the mathematical creative thinking ability of experimental class students. This can be seen from the significance value obtained in the two-way ANOVA test is 0.027, where the significance value is less than 0.05 so it is rejected, and the alternative is accepted H_0.

The implication of this research is that mathematics teachers can use the RME approach as an alternative in learning mathematics, especially to improve students' mathematical creative thinking abilities. The application of this approach should also consider students' motivation to learn mathematics to maximize learning outcomes.

5. Acknowledgment

The author would like to thank the Muhammadiyah University of Surabaya for research support and the teachers and lecturers who have guided this research journey and do not forget the school where the research took place.

6. References

Kholili, A., Shoffa, S., & Soemantri, S. (2021). Pembelajaran matematika model discovery learning terhadap kemampuan berpikir kreatif siswa: Kajian meta analisis. *Jurnal Pembelajaran Matematika Inovatif*, *4*(6). https://doi.org/10.22460/jpmi.v4i6.1441-1452

Khotimah, S. H., & As'ad, M. (2020). Pendekatan pendidikan matematika realistik terhadap hasil belajar matematika siswa sekolah dasar. *Jurnal Imiah Pendidikan Dan Pembelajaran*, *4*(3).

Monica, Y. (2020). Pengaruh Model Pembelajaran Open Ended Terhadap Kemampuan Berpikir Kreatif Matematis Siswa SMA Ditinjau Dari Adversity Quotient (AQ). *Fakultas Tarbiyah Dan Keguruan Universitas Islam Negeri Raden Intan Lampung*.

Mulyawan, B. (2012). Pengaruh Pengalaman dalam Pelatihan terhadap Peningkatan Kompetensi Profesional Guru. *Jurnal Undiksha*, *11*.

Papalia, D. A., & Feldman, R. D. (2014). *Menyelami perkembangan manusia "experience human development"* (F. W. Herarti, Ed.; 12th ed.). Mc Graw-Hill Education (Asia) dan Salemba Humanika.

Priatmoko, A. P., Karim, K., & Sukmawati, R. A. (2018). Mengembangkan kemampuan berpikir kreatif siswa melalui pendekatan matematika realistik. *EDU-MAT: Jurnal Pendidikan Matematika*, *6*(1). https://doi.org/10.20527/edumat.v6i1.5125

Shoffa, S., Cahyono, D., Sumirat, L. P., Giap, Y. C., Sari, D. P., Krisnaputri, N. A., Aditantri, R., Nur, D. S. A., Lestari, D., Sandanafu, S. P., Mairuhu, D., Latuconsina, R., Rohmah, R., Nugraheni, V., Lestari, S., Permadi, B., Trinanda, O., Sari, A. Y., Ningrum, I. K., … Basith, A. (2020). Abdimas untuk Negeri: implementasi kinerja dosen dalam bentuk pengabdian di masyarakat. In *Chapter* (pp. 1–425). Agrapana Media.

Suryaningsih, T., & Astuti, M. A. (2021). Pengaruh Model Pembelajaran Open Ended terhadap Kemampuan Berpikir Kreatif Matematis Siswa Kelas IV pada Materi Pecahan. *Elementar : Jurnal Pendidikan Dasar*, *1*(1). https://doi.org/10.15408/elementar.v1i1.20892

Tong, D. H., Nguyen, T. T., Uyen, B. P., Ngan, L. K., Khanh, L. T., & Tinh, P. T. (2022). Realistic mathematics education's effect on students' performance and attitudes: A case of ellipse topics learning. *European Journal of Educational Research*, *11*(1), 403–421. https://doi.org/10.12973/eu-jer.11.1.403

Utami, F. N., & Indarini, E. (2021). Meta Analisis Pengaruh Pendekatan Matematika Realistik Terhadap Kemampuan Berpikir Kritis Pada Matematika Siswa di Sekolah Dasar. *Jurnal Basicedu*, *5*(2). https://doi.org/10.31004/basicedu.v5i2.852