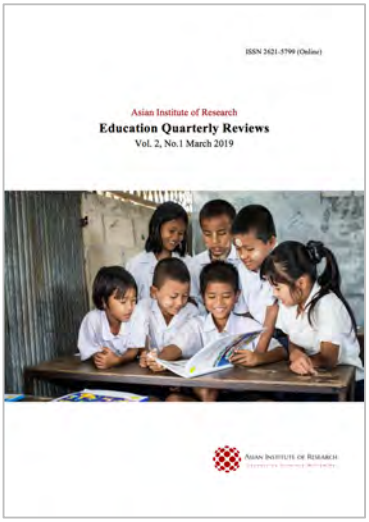

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Influential Mathematical Realistic Learning Approach Upon Mathematical Communication and Positive Aptitude of Junior High School of Kartini Sei Rampah

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Abstract
This study is virtually intended to comprehend influential Mathematical Realistic Learning Approach (MRL) upon mathematical communication aptitude of Junior High School RA Kartini Sei Rampah, to overview has the interactive learning approach, and Initial Mathematical Cognition (IMC) found upon mathematical communication power and positive aptitude. Typically this observation regarded as quasi-experiment. Populated Samples took place on Junior High School R.A. Kartini Sei Rampah. With 34 students of VII-3 held as the class of experiment and 34 students of VII-6 held as the class of control by purposive sampling method. Analyzed data applied ANOVA 2 trace. The proceeds: (1) There is influential approach of (MRL) found upon mathematical communication aptitude, (2) There is IMC approach found, (3) There is an interaction between learning approach and Initial Mathematics Cognition which influencing mathematical communication power, and (4) There is found not any interaction between learning approach and initial mathematics cognition in forcing positive aptitude in which learning working out with MRL approach more better than conventional learning approach.

Keywords: Initial Mathematical Cognition (IMC), Positive Aptitude, MRL approach

1. INTRODUCTION

Mathematics deemed as a complicated subject and obnoxious to most students. Woodward (2004) argues students who are vexed about mathematics complaining such things as nervous, incapable of concentrating, empty-minded, apprehended, when they are confronted with a test of mathematics. The students who are anxious against mathematics will cause an effect into their works, consequently underprivileged to retain mathematics, despite taking a long time being taught. Furthermore, the adeptness is somewhat found low particularly in the national test in Indonesia. The observation unfolded, the information inferred that students are seemingly not getting actively involved to foster brainstorms, students absorbed information passively and less-motivated in learning mathematics instead. This case led to much vexations among educators because mathematical science is playing a prominent part in elevating social economic development of a certain country.

In view of how important mathematics is, therefore mathematics is being reinforced ones of the subjects to become main concerns in each phase of education should be taken by students, despite mathematics considered is tough. Corresponding to Russefendi (in Resi, 2017) mathematics (math science) for kids generally a disliked subject. But they are required importantly to study it. This circumstance rendered a picture that mathematical cognitive considered poor, which leads to a poor sense of competition as well over math science progress itself.

Manullang & Ragagukguk (2016) declared the purpose to learn mathematics is to prepare students to deal with great scientific changes through exercises, acting by analogical thinking, rational, critical, smart, ingenious, effective.

Acep (in Mufarrihah, Kusmayadi, and Riyad) classified mathematical cognition in 5 cognitive standards as: (1) Mathematical Communication, (2) Mathematical reasoning, (3) Mathematical Problem Solving, (4) Mathematical Connection, (5) Mathematical Representation.

Mathematical communication skill is mostly necessary for learning mathematics. There are two reasons why that mathematical communication is pondered importantly in learning mathematics to have thriven among students. First, mathematics is not just an instrumental aid to think, an aid to finding out pattern, to resolve or conclude, instead mathematics is a precious instrument to communicate various ideas clearly, apt and thoroughly, Secondly, being a social activity of learning mathematics, mathematics regarded as an interaction facility among students and inter-communication between teachers and students as well.

Students who have good mathematical communication ability will comprehend the learnt mathematical concept thoroughly. Therefore, mathematical communication skill is one of the aspects which is necessarily noted in learning mathematics, and a cause of realistic mathematical learning approach over mathematical communication skill can be unveiled. Nonetheless, in fact, students' mathematical communication skill is found poor. These things are revealed on the grounds spot. One of a mathematical teacher's statement in RA Kartini Sei Rampah denoted that the students are experiencing quandaries to complete the proposed test, mostly when resolving with narration.

In other words, the lack of skill in communicating mathematical matters into symbolic language, graphic, image, or to create others conjecture is found poor that's why it is tough to present solution over submitted problems.

But beyond initial mathematical cognition and communication skill, there is a psychological aspect which is giving a contribution to the one's success to working out the tasks well. The psychological aspect is an attitude. Attitude is a tendency of one who accepts or declines a certain concept, a set of ideas, or an individual group.

Mathematics could be defined as a concept or an abstract idea in which its reasoning treated by axiomatic deductive. This means can be responded by students differently, likely to receive well or otherwise, so interaction between learning and initial mathematics cognition upon realistic mathematical approach more better rather than students; spatial adeptness which is taught through conventional approach. There is an interaction between learning approach and school rating toward students' spatial skill betterment

Hasanuddin (2010) with respect to how to develop Junior High School students' potential critical thinking through a realistic mathematical approach. Unfolded that: (1) there is a different betterment of students' potential critical thinking between those who are prevailed mathematical realistic with regular learning, (2) there is a different betterment of students' critical thinking based on school rating, (3) there is a different betterment of students' critical thinking based on gender, (4) there is no interaction between learning approach with school rating upon betterment of students' critical thinking, (5) there is no interaction between learning approach with gender toward betterment students' mathematical realistic learning.

Maulydia, Surya and Syahputra (2017) in research entitled the development of mathematical teaching material through realistic mathematical problem solving for junior high school Discovered that (1) Teaching materials are

effective relied on achievement: classical complement, TPK student learning and to respond activity. (2) Students' deftness in mathematical solving problem growing up and (3) Students' response is positive.

Zakaria and Syamaun (2017) relating to the effect of realistic mathematics education approach on students' achievement and attitudes toward mathematics. It is disclosed that there is a significant difference between MRL and Conventional approach in case of a feat. This research inferred there is no significant difference between MRL and conventional approach in respect with attitude toward mathematics. Applying the MRL approach to upgrade students' achievement but it is not on an attitude toward mathematics. MRL approach is driving students to participate in teaching and learning mathematics actively. MRL is an exact method to upgrade the teaching-learning process quality.

Others than cognitive and affective students, some observations had been taken in order to study students' positive attitude on mathematics. Saragih (2017) in concern with springing up logical thinking and positive attitude toward mathematics through Mathematical Realistic Approach. Brought to light that Mathematical Realistic Approach deserved to be considered implemented in any level of education in Indonesia in order to grow up logical thinking and students' attitude toward mathematics which ultimately can heighten student's learning outcome in mathematics.

Asante (2015) referring to secondary students' attitudes toward mathematics. Unconcealed that there is a significant difference in demonstrated attitude toward mathematics between males and females. School environment, teachers' attitude, and belief, teaching style and parental attitude identified as explaining factor which clarifying students' attitude on mathematics. Teachers and other stakeholders within the educational industry ought to arrange seminars and workshops to students, parents, teachers and institutional administrators to enhance and to promote a positive attitude toward mathematics.

Efil, Minami and Sitompul (2018) in light of the effect of concept mapping and Microsoft visio assisted cooperative learning model toward mathematical concepts understanding and emotional intelligence of Junior high school students. Divulges that (1) there is an influence of learning model (CMCL & conventional model) toward insight of mathematical concepts and students' emotional ingenuity, (2) there is no interaction between the learning model and initial Mathematical Cognition and students' emotional ingenuity, (3) comprehension of mathematical concepts and students' emotional ingenuity upon the class of experiment is better than students at conventional class.

Ones of the researches elucidated abo, and then the study assumed that initial mathematical cognition factor touching in the learning process, either by cognitive (in this case mathematical communication skill) or by affective (in this case students' positive attitude).

Alluded to some results of observations of students' initial mathematical cognition and their interaction in the mathematical learning process then researches are interested in shifting them in research. Therefore, the difference of initial mathematical cognition needs further be inspected, including, that related to mathematical communication and positive attitude toward mathematics.

2. METHODOLOGY OF RESEARCH

This study is categorized into *quasi-experiment*, Applied designed research is *pretest, posttest control group*. There are classified samples: experiment classification and control classification which proposed pretest in the form of IMC test and posttest with using the paralleled instrument. There is three types of the variable within this research: Dependent Variable, Independent Variable, and Concomitant Variable. Its independent variable is the IMC approach at the meantime its dependent variable is mathematical communication skill and positive attitude toward mathematics. The variable of control is Initial Mathematical Cognition.

2.1 Populations and Samples of Study

The population took place on whole students of Junior High School RA Kartini sub-district Sei Rampah in the academic year of 2018/2019 composed to 206 students. Technically taking samples applying *purpose sampling* from all students grade VII consisted of VII-3 as the class of experiment with treating MRL and the class of VII-6 as the class of control with a conventional learning approach.

2.2 Technical Instrument Data

The source of data acquired from the test of Initial Mathematical Cognition, the test of Mathematical Communication Skill and Inquiries of a positive attitude toward mathematics. Data analysis composed of an examination of normality, examination of homogeneity, and examination of the hypothesis. Examination of statistical hypothesis applying ANOVA formula two-ways direction. Whole statistical figures using a means of computer program SPSS 22. Syahputra (2016) said that a statistical model of the experiment is:

$Y_{ijk} = \mu + \alpha_i + \beta_i + (\alpha\beta)_{ij} + \sum_{ijk}$
with : i : 1, 2, 3
j : 1, 2

Explanation:
Y_{ijk} : observation score students' mathematical communication skill ke-k, upon IMC ke-i, which getting learning approach ke-j
μ : general average
α_i : additive impact of IMC ke-i
β_i : additive impact of learning approach ke-j
$(\alpha\beta)_{ij}$: Interactive impact of IMC ke-i and learning approach ke-j
$\sum_{ijk}$: Eror component

3. THE RESULT OF STUDY

The result of the study shows that there is no influence MRL toward mathematical communication skill. Revealed in Table 1 the figures of ANOVA two trace as:

Table 1. Test Result of ANOVA About Learning Impact Approach Upon Students' Mathematical Communication Skill

Tests of Between-Subjects Effects

Dependent Variable: Communication Skill

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3944.199[a]	5	788.840	4.409	.002
Intercept	182693.084	1	182693.084	1021.067	.000
IMC	1034.110	2	517.055	2.890	.063
Approach	739.514	1	739.514	4.133	.046
IMC * Approach	2120.742	2	1060.371	5.926	.004
Error	11093.271	62	178.924		
Total	268798.000	68			
Corrected Total	15037.471	67			

a. R Squared = .262 (Adjusted R Squared = .203)

On Table 1 appeared that learning factor, obtained value F_{count} of 4.133 and significant value of 0.046. Because of significant value 0.046 less than standard significant value 0.05, then H_0 declined, and H_1 accepted . likewise, assumed that there is an influence MRL toward mathematical communication skill.

The further observation result exhibits the influence of MRL approach toward a positive attitude on mathematics. ANOVA two ways directions are visible on table 2 below:

Table 2. Test Result of ANOVA About Learning Approach Influence toward Students' Positive Attitude

Tests of Between-Subjects Effects

Dependent Variable: Positive Influence

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1106.415[a]	5	221.283	2.000	.091
Intercept	248209.392	1	248209.392	2243.177	.000
IMC	437.185	2	218.593	1.976	.147
Approach	571.995	1	571.995	5.169	.026
IMC * Approach	29.399	2	14.700	.133	.876
Error	6860.350	62	110.651		
Total	355028.000	68			
Corrected Total	7966.765	67			

a. R Squared = .139 (Adjusted R Squared = .069)

On table 2 show that to learning factor, obtained value F_{count} of 5. 169 and significant value of 0.026. Because of significant value 0.0026 less then standard significant value 0.05, then H_0 declined, and H_1 accepted. Therefore, assumed that there is an influence of MRL approach toward a positive attitude on mathematics.

An observation about the impact of IMC toward Mathematical Communication Skill presented in Figure 1:

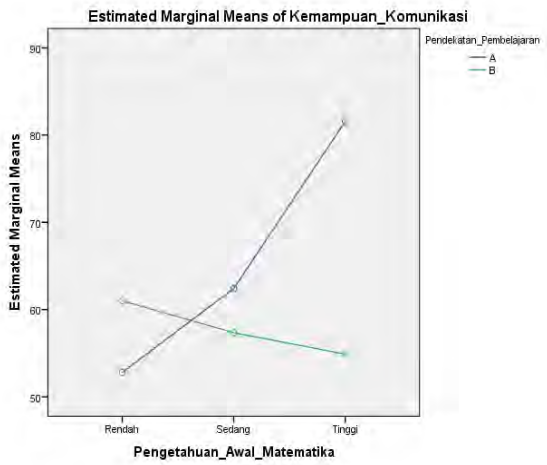


Figure 1. There is an interaction between the learning approach and IMC upon mathematical communication skill

Figure 1 above displaying how MRL approach more influential in achieving the potentiality of mathematical communication skill because of the acquired average score in the class of experiment more higher than average score acquired in conventional class. In lieu of the interaction between learning approach with IMC upon mathematical communication skill. Which means there is a simultaneous influence contributed by learning approach and IMC upon mathematical communication skill.

Meanwhile, figure 2 indicates an interaction between IMC and positive attitude its visible on figure 2 below:

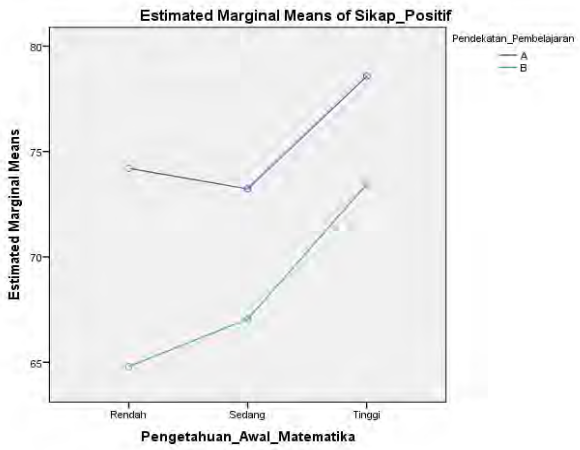


Figure 2. There is no interaction between the learning approach and IMC upon a positive attitude

Figure 2 above indicating how MRL more influential in achieving potential positive attitude at the class of experiment more higher than the average value which acquired at the conventional class. Despite interaction not found between learning approach and IMC in impacting positive attitude. Which means there is no simultaneous influence distributed by learning approach and IMC toward a positive attitude.

Students' exampled works in the Class of experiment and at the conventional class which anchored to mathematical communication skill test of number 2 exhibited on Figure 3. The sample of test number 2 as follows:

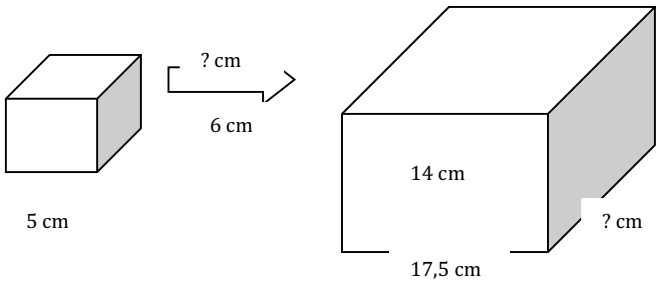
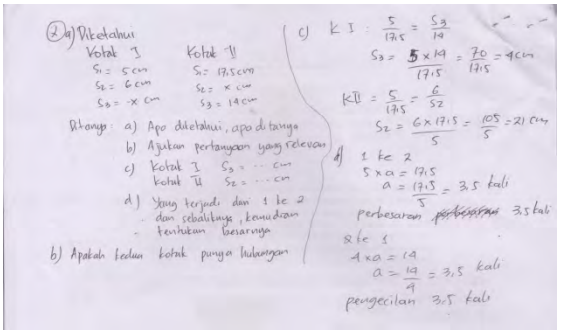


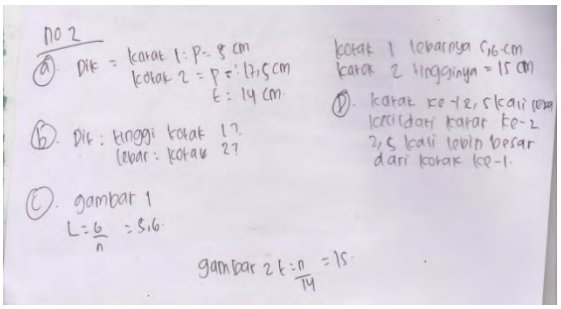
Figure 3. Box

a. Write down what is known and what is asked from figure 2 above completely
b. Suggest relevant questions from figure 2 above.
c. Define substantial side value in unkown part.
d. How come to the alteration of box 1 to box 2 and rather from box 2 to box 1. And specify substantial occurred diminution or magnification factor

The answer:



(a) Experiment



(b) Control

4. CONCLUSION

From students' answers above might be testified that the class of experiment is providing a complete solution and providing the correct answer. Mostly students at the class of experiment more better in solving a whole problem in examination than students in the conventional class. Meanwhile, in the conventional class, students' answer is found incomplete in order to make more easier solving problem, so the students are not getting the correct solution through.

In view of described observations result of the previous part, therefore can be drawn the conclusions as follows:

1. There is no influence of the MRL approach toward students' mathematical communication skill.
2. There is an influence of MRL approach toward students' positive attitude.
3. There is an interaction between the MRL approach and IMC in impacting students' mathematical communication skill.
4. There is no interaction between the learning approach and initial mathematics cognition in impacting student's positive attitude. These things can be interpreted as well that interaction between learning approach and students' IMC (poor, fair, high) making significant influence simultaneously upon mathematical communication skill and not causing significant influence simultaneously on a positive attitude.
5. Mathematical comprehensive concept power and emotional ingenuity which learning is applying MRL approachmore better than conventional learning approach.

RECOMMENDATION

In light of the findings within performing research, researchers endorsing some recommendation as follows:

1. To the Teachers
    - Learning mathematics with applying MRL approach can be expanded its implementation, not just on comparative materials but also on other mathematical materials learning.

- Implementing learning with MRL approach, teachers are supposedly being able presenting various insights and matters in conjunction with materials been taught, should be made as perception to students.
- Learning by MRL approach needs relatively more time, then within implementation, the teachers are expected to make effective time well.

2. Pertained Head of Institutions
   - Learning applying MRL approach with emphasizing mathematical communication skill and positive attitude it is quite absurd for teachers, therefore it is necessary to socialize by schools or relevant institutions in expectation to upgrade mathematical communication skill and positive attitude.
   - Learning applying MRL approach could be made as an alternative in upgrading mathematical communication skill and positive attitude into the main comparative discussion so that being able to turn it as an input into school to be fostered as an effective learning model to another main mathematics discussion
3. Successor Head Researchers
   - To the researches needmore further to do observations concerning MRL on other main discussions
   - To the more further researches, the observations should be complemented with incorporating various factors such as attitude factor and learning interest, the economical background of the family, etc. So the researches that concerning mathematical communication skill and positive attitude simply not infected by learning approach only.

References

Asante. K.O. 2015. Secondary Students' Attitudes Towards Mathematics. Journal Ife PsychologIA. 20 (1). 1

Efil. J.P. Minarni. A dan Sitompul. P. 2018. *The Effect of Concept Mapping and Microsoft Visio Assisted Cooperative Learning Model Towards Mathematical Concepts Understanding and Emotional Intelligence of Junior High School Students*. IOSR Journal of Research & Method in Education (IOSR-JRME). .8 (3). 1

Hasratuddin. 2010. Meningkatkan Kemampuan Berpikir Kritis Siswa Smp Melalui Pendekatan Matematika Realistik. Jurnal Pendidikan Matematika. 4 (2). 1

Hernawati, F. 2016. Pengembangan Perangkat Pembelajaran Matematika dengan Pendekatan PMRI Berorientasi pada Kemampuan Representasi Matematis. Jurnal Riset Pendidikan Matematika. 3 (1). 4

Manullang, M dan Rajagukguk, W. 2016. Some Factors that Affecting the Performance of Mathematics Teachers in Junior High School in Medan. Journal International Education Studies. 9 (4). 165

Maulydia. S.S. Surya. E dan Syahputra.E. 2017. The Development of Mathematics Teaching Material Through Realistic Mathematics Education to Increase Mathematical Problem Solving of Junior High School Students. IJARIIE. 3 (2). 1

Mufarrihah, I. Kusmayadi, T.A dan Riyadi. 2016. Kemampuan Komunikasi Matematis Siswa Kelas IX Sekolah Menengah Pertama dalam Memecahkan Masalah Matematika Berdasarkan Tipe Kepribadian Siswa (Studi Kasus di SMPN 1 Gondangwetan Pasuruan). Jurnal Elektronik Pembelajaran Matematika. 4 (7). 657

Resi, B.B.F. 2017. Faktor-Faktor yang Mempengaruhi Minat Belajar Siswa Terhadap Mata pelajaran Matematika Kelas IX-B SMPS Dharma Nusa Flores Timur Tahun Ajaran 2016/2017. Skripsi. Yogyakarta: Universitas Satanata Dharma. 5

Saragih. S. 2017. *Menumbuhkembangkan Berpikir Logis dan Sikap Positif terhadap Matematika melalui Pendekatan Matematika Realistik*. ResearchGate.

Syahputra. E. 2013. Peningkatan Kemampuan Spasial Siswa Melalui Penerapan Pembelajaran Matematika Realistik. Journal Cakrawala Pendidikan. 3 (4). 1

Syahputra, E. 2016. Statistika Terapan untuk Quasi dan Pure Experiment. Medan: UNIMED PRESS

Woodard, T. 2004. The Effects of Math Anxiety on Post-Secondary Developmental Students as Related to Achievement, Gender, and Age. 9 (1). 1

Zakaria1. E dan Syamaun. M. 2017. The Effect of Realistic Mathematics Education Approach on Students' Achievement And Attitudes Towards Mathematics. Mathematics Education Trends and Research. No.1