Developing Learning Materials Based on Realistic Mathematics Education with Malay Culture Context to Improve Mathematical Communication Ability and Self-Efficacy of Students in SMPN 2 Talawi

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Abstract This study aims to: 1) analyzing the effectiveness of learning materials that developed through realistic mathematics education with Malay culture context (RME-MCC); 2) analyzing the improvement of students mathematical communication ability by using learning materials that developed through RME-MCC; 3) analyzing the attainment of self-efficacy students by using learning materials that developed through RME-MCC. This research is a development research conducted in two stages, namely the first stage of developing learning materials through RME-MCC using a development model 4-D, and the second stage testing the learning materials through RME-MCC developed in classes VII-1 and VII-2 SMPN 2 Talawi. Learning materials generated from this study are: lesson plans, teacher books, student books, worksheet, and mathematical communication ability tests. From the results of trial I and trial II, it was obtained: 1) the learning materials through RME-MCC met the valid and effective criteria; 2) there is an increase in students mathematical communication ability by using learning materials through RME-MCC, in the trial I obtained an average score of pretest 53,13% and a score of posttest 68,75%, and in the trial II with an average score pretest 65,63% and score posttest 87,50%; 3) the attainment of self-efficacy of students taught using learning materials through RME-MCC in the trial I obtained an average of 81,34% and in the trial II 86,59%. Based on the results of the study it was suggested that mathematics teachers seek mathematics learning using learning approaches and learning materials that integrate local culture in mathematics learning.

Keywords: developing learning materials, 4-D models, RME-MCC, mathematical communication ability, self-efficacy

Cite This Article: Sri Ayu Bintang Lestari, Sahat Saragih, and Hasratuddin, "Developing Learning Materials Based on Realistic Mathematics Education with Malay Culture Context to Improve Mathematical Communication Ability and Self-Efficacy of Students in SMPN 2 Talawi." *American Journal of Educational Research*, vol. 6, no. 11 (2018): 1473-1480. doi: 10.12691/education-6-11-5.

1. Introduction

Mathematical communication is defined as planned interaction in classroom setting, which includes strategies such as questioning, discussions and group activities. The purpose of mathematical communication is to encourage students to express, share and reflect on their ideas [1]. Rahmi, Nadia, Hasibah, and Hidayat [2] state that one of the mathematical ability that must be possessed by the students is the ability of mathematical communications. Mathematical communication ability need to be trained and familiarized with students because they are students' provision in expressing their ideas or ideas to solve mathematical problems or problems found in everyday life both verbally and in writing. Through mathematical communication, students will be able to analyze problems and express mathematical ideas into mathematical symbols so that they can solve problems or problems given both orally and in writing.

But the reality that occurs in the field of students' mathematical communication ability is still low. This can be seen from the preliminary study conducted by researchers on 30 students of class VII of SMPN 2 Talawi by giving algebra material questions related to mathematical communication ability. From the results of the students answers, only 4 students (13,3%) were able to answer the questions correctly according to the instructions given, while 26 students (86,7%) could not solve the problem correctly. Based on the results of student answer analysis there are several indicators of mathematical communication ability that students do not have, among others: students have not been able to formulate ideas or state the situation in the form of a correct mathematical model and students have not been able to provide an explanation of the conclusions obtained in writing.

In addition to equipping students with good mathematical communication ability, students also need to develop self-efficacy. Katz [3] states that self-efficacy is defined as peoples beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Furthermore Bandura [4] explained that self percepts of efficacy influence thought patterns, actions, and emotional arousal. In causal tests the higher the level of induced self-efficacy, the higher the performance accomplishments and the lower the emotional arousal. Siriparp [5] also suggests that students with high self-efficacy are generally less anxious, more confident, and perform better. The importance of self-efficacy is also stated by Al-Baddareen, Ghaith, and Akour [6] that people not only need to have the ability and knowledge to execute a task successfully, but they also need to have a certain level of expectation for success. Judgments of personal efficacy affect what students do by influencing the choices they make, the effort they expend, the persistence and perseverance they exert when obstacles arise, and the thought patterns and emotional reactions they experience. From some of these opinions it can be concluded that self-efficacy has an important role in the learning process so that the active role of the teacher is needed to develop self-efficacy students.

In connection with the above description of self-efficacy, the authors found some indications of the low self-efficacy of students in SMPN 2 Talawi. Based on the author's observation, during the learning process takes place most students feel reluctant to ask questions about material that is not yet understood. Students also feel uncertain in expressing ideas or answers given by the teacher. In addition before trying to do the exercises or questions, students often complain that the exercises or questions are difficult to solve. This can indicate that self-efficacy is student still low, students do not have the confidence to express ideas and do not have confidence in their own ability to be able to complete the exercise or the questions given by the teacher.

One of the determinants of good or bad learning systems in schools is the teacher. Therefore the teacher should be able to carry out the learning process well. Based on the observations of researchers, the low mathematical communication ability and self-efficacy of students related to mathematics learning designed by the teacher, namely there are still some deficiencies in the learning materials used by teachers such as lesson plans made by teachers have not been adapted to the characteristics of students, besides mathematics learning materials designed by the teacher has not encouraged students to develop mathematical communication ability and the absence of worksheet from teachers that can train students to develop mathematical communication ability and self-efficacy of students.

In addition to learning materials, the low mathematical communication ability and self-efficacy of students also relate to the learning education used by the teacher. In the learning process the teacher still uses a conventional education so that the learning process has not run optimally. Therefore it is necessary for teachers to choose a learning education that can help develop mathematical communication ability and self-efficacy student. One of them is learning using a realistic mathematical education (RME).

RME was first introduced and developed in the Netherlands in 1970 by the Freudhenthal Institute. Based on Hans Freudenthal's thinking, mathematics is considered a human activity and must be linked to reality [7]. In addition, Frudenthal believes that students should not be regarded as passive receivers of ready-made mathematics. According to him education must direct students to the use of various situations and opportunities to rediscover mathematics in their own way [8]. In RME, learning starts from contextual problems (real world) for students who emphasize ability, discussion, and giving arguments so that students can use mathematics to solve problems with a more meaningful process. The same thing was stated by Arisetyawan, Suryadi, Herman, and Rahmat [9] that the use of real event in their daily activities for student will make learning of mathematics more meaningful and fruitful.

Referring to the Functions and Objectives of National Education, as stipulated in Law No. 20 of 2003 article 3, curriculum developing must be rooted in the culture of the nation, the life of the nation at present, and the life of the nation's future. The education process is a process of developing the potential of students so that they are able to become heirs and developers of national culture. Through education, various cultural values and advantages in the past were introduced, studied, and developed into the culture of himself, society and the nation in accordance with the times, where students live and develop themselves [10]. To be able to develop the potential of students so that they are able to become heirs and developers of national culture, it is necessary to integrate culture into learning in schools so that learning is more effective and meaningful. This was also supported by the statement of D'Entremont [11] that curriculum developers and mathematics educators should take advantage of the cultural diversity of students to enhance the learning of mathematics through social and cultural activities.

Judging from the framework of developing systems education and integrating culture into mathematics learning, the application of RME based on the local cultural context (Malay culture) is in accordance with the idea of decentralization of education carried out as an effort to improve the effectiveness and efficiency of regional education to increase its potential independently, one of the ways is by developing learning materials through RME with the context of local culture (Malay culture) which is expected to develop students 'mathematical communication ability and self-efficacy, and increase students knowledge about their culture. In connection with the learning of cultural contextual mathematics, Yusra and Saragih [12] stated that the lifting of mathematics learning with joyful learning Malay cultural context based learning can provide positive changing to the students, good communication ability and motivation to learn mathematics, as well as increasing the students knowledge about the Malay culture. Based on the description, it is expected that the developing learning materials using realistic mathematical education with the local culture context can improve mathematical communication ability and self-efficacy students.

2. Research Method

This research is a development research with the 4-D Thiagarajan model, which consists of four stages: define, design, develop and disseminate.

2.1. Subjects and Research Objects

Subjects in this study were students of class VII-2 and VII-1 of SMPN 2 Talawi in the academic year 2018/2019 which amounted to 32 students. While the object in this study is a learning materials developed through a realistic mathematics education with Malay culture context (RME-MCC) on social arithmetic, namely lesson plans, teacher books, student books, worksheet, mathematical communication ability test and questionnaire self-efficacy student.

2.2. Procedures for Developing Learning Materials

This research is divided into two stages, namely 1) development of learning materials which include lesson plans, teacher books, student books, worksheet, mathematical communication ability test and questionnaire self-efficacy student; 2) try out learning materials based RME-MCC in class VII/2 and VII/1 of SMPN 2 Talawi.

2.3. Instruments and Data Analysis Techniques

Instrument used in this study is an instrument to measure the validity and effectiveness of the learning materials developed, namely validation, test and questionnaire sheets.

2.3.1. The Validity of Learning Materials

Materials are validated to experts, namely five validators by giving a score of 1 to 5 in each column of assessment based on aspects: (1) format, (2) language, (3) content, and (4) illustration. Furthermore, the overall expert judgment is processed by calculating the average score to get the validity assessment criteria as follows:

Table 1. Criteria for Validity Level

No	*Va* or Average Value Total	Criteria Validity
1	$1 \leq Va < 2$	Not valid
2	$2 \leq Va < 3$	Less valid
3	$3 \leq Va < 4$	Enough valid
4	$4 \leq Va < 5$	Valid
5	$Va = 5$	Very valid

Description:
Va: Value of determining the validity level of learning materials based RME-MCC.

Based learning materials meet the expected validity if the average rating validator of all learning materials is valid or very valid. If it has not been reached, it needs to be validated again until valid. Furthermore, the mathematical communication ability test and self-efficacy

were students tested outside the sample class to measure the validity and reliability of the instrument. The validity of the item is calculated using the correlation formula Product Moment [13]

$$r_{xy} = \frac{N\sum_{xy} - (\sum_x)(\sum_y)}{\sqrt{\left\{N\sum x^2 - (x)^2\right\}\left\{N\sum y^2 - (\sum y)^2\right\}}} \qquad (1)$$

Description:
r_{xy}: the correlation coefficient between the item score and total score
x: score items
y: total score
N: the number of students who take the test (sample).
Reliability coefficient was calculated using the formula Alpha [14]

$$r_{11} = \left(\frac{k}{(k-1)}\right)\left(1 - \frac{\sum \sigma_h^2}{\sigma_t^2}\right) \qquad (2)$$

r_{11}: reliability coefficient test
k: the number of test items
$\sum \sigma_h^2$: the amount of variance test scores of each item
σ_t^2: the total of variance.

2.3.2. The Effectiveness of Learning Materials

Hasratuddin [15] states that the effectiveness of the learning materials developed is determined based on: (1) classical student learning completeness at least 85% of students who take the mathematical communication ability test have obtained a minimum score of 71; (2) the attainment of the learning objectives of each mathematical communication ability test item at least 75%; (3) a minimum of 80% of the many subjects studied gave a positive response to the developed components of the learning materials based RME-MCC; and (4) the learning time used does not exceed ordinary learning.

2.3.3. Improving Mathematical Communication Ability

The amount of communication ability improvement is calculated by theformula *N-gain* of Hake [16] as follows:

$$N - gain = \frac{skor\ postest - skor\ pretest}{skor\ ideal - skor\ pretest} \qquad (3)$$

the gain index criteria as in the following table:

Table 2. Criteria for Normalized

Gain Score	Interpretation
$g \geq 0.7$	Height
$0.3 \leq g < 0.7$	Medium
$g < 0.3$	Low

2.3.4. The Attainment of Self-Efficacy

The attainment used in the instrument was self-efficacy student taken based on a scale Likert. The researcher applies the scoring guidelines for each statement, namely the scores for each positive statement are 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree)

and conversely for negative statement. Suwandi stated for determine the range of assessment of self-efficacy student the following criteria were used [17]

Table 3. Mastery Level of Self-Efficacy

No	Conversion Value		Category
	Number	Letter	
1	76-100	A	Very Good
2	51-75	B	Good
3	26-50	C	Fairly Good
4	0-25	D	Less Good

3. Research Results

3.1. The Description of Learning Materials Development Phase

Results of developing learning materials using the Thiagarajan 4D model are described as following:

Define

Based on observations on learning materials in SMPN 2 Talawi found some weaknesses in the learning materials used by teachers as the teacher has not developed lesson plans according to student characteristics, subject matter in the book used by teachers and students does not present problems not routines such as contextual problems related to the culture in the student environment, and students do not use worksheet as a support for learning activities. Furthermore, in the learning process the teacher still uses a conventional education, and the teacher is also not accustomed to giving confidence to students through motivational words so that students have self-efficacy in solving problems given.

Design

At this stage produced an initial draft of the lesson plans for 3 meetings, teacher book, student book, worksheet, mathematical communication ability test, alternative solutions, scoring guidelines, and questionnaire self-efficacy student. All results at this design stage are called draft I.

Develop

At this stage validates draft I the experts and then conducts field trials. The aim is to see the weaknesses in draft I so that it can be revised and refined the learning materials developed. The results of expert validation in the form of assessment of content validity which shows that all learning materials meet valid criteria, with a total average value of validation lesson plans is 4,53, worksheet is 4,49, teacher books is 4,53, and student books is 4,56. All mathematical communication ability test items and questionnaires self-efficacy student meet valid and reliable criteria. Instrument reliability is used to determine the test results. After calculation, the reliability of the mathematical communication ability test was 0,81 (very high category) and the questionnaire self-efficacy was 0,85 (very high category).

After the learning materials developed have met the criteria for validity, then the learning materials in the form

draft II were tested in the research place, SMPN 2 Talawi, here in after referred to as test I. Based on the results of trial I data analysis, it was found that the developing learning materials did not meet all effective criteria, so that improvements were made to produce learning materials that meet all the effective criteria set. Revisions were made based on the findings of the learning materials weaknesses in the trial I, namely for lesson plans related to the allocation of learning time, as well as on student books and worksheet related to the material being taught. After the revision is complete, trial II is conducted to determine the effectiveness of the learning materials, as well as the improvement of mathematical communication ability and the attainment of self-efficacy student.

Disseminate

This stage is the final stage in the 4-D development model. The results of this stage are to recommend to the mathematics subject teachers especially class VII school field trials to use learning materials based RME-MCC as an alternative learning on social arithmetic.

3.2. Results of Trial I

3.2.1. The Effectiveness of Learning Materials in Trial I

Based on the results of trial I data, it was found that the learning materials developed were not effective, because there were still some indicators of effectiveness that had not been achieved. In the trial I, the percentage of classical completeness achieved has not met the criteria for achieving classical completeness.
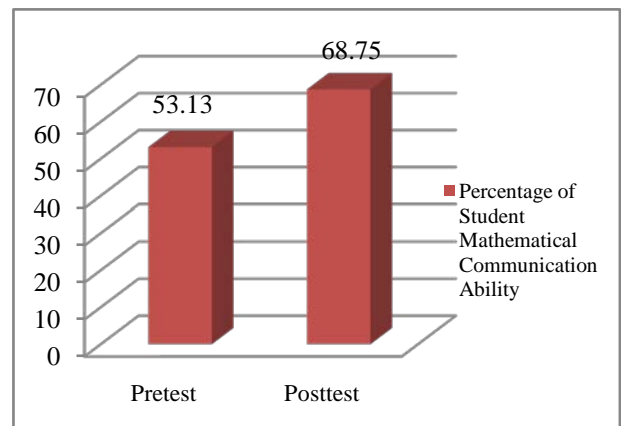

Figure 1. Classical Completeness Percentage of Student Mathematical Communication Ability in Trial I

Based on the picture above it can be seen that the classical completeness of the results of students' mathematical communication ability at pretest I test was 53,13% while in the posttest I test was 68,75%. In accordance with the criteria of classical student learning completeness, which is at least 85% of students who take part in learning are able to achieve a score of minimal 71, then the results posttest of mathematical communication ability in trial I have not met the criteria for achieving classical completeness because they only obtained a percentage of completeness 68,75%.

Furthermore, for the criteria achieving the learning objectives in the first trial I have not yet reached each item.
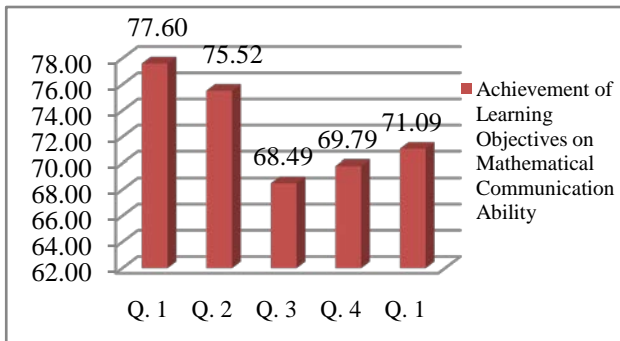
Figure 2. Attainment of Learning Objectives on Mathematical Communication Ability in Trial I

From the picture above shows that not all items have reached the achieving criteria for the learning objectives, only 2 items are questions number 1 and questions number 2 of 5 items that reach criteria for achieving learning goals at least 75%.

The indicators of effectiveness that have been fulfilled in the trial I are the attainment of learning time, namely the learning time used during the trial I is the same as ordinary learning, besides that is the response of students, namely students respond positively to the learning materials based RME-MCC with the average percentage of the total positive response of students in the trial I was 90,49%.

3.2.2. Improvement of Students Mathematical Communication Ability in Trial I

Improvement of student mathematical communication ability in trial I was seen through N-Gain from the results pretest and posttest of mathematical communication ability in the trial I. From the data obtained by students who received scores N-Gain in the range greater than or equals to 0,7 or experienced an increase in mathematical communication ability with the category "High" as many as 1 person, students who experienced an increase in mathematical communication ability with the category "Medium" or got a score N-gain is less than or equals to 0,3 and N-gain is less than 0,7 as many as 15 people and students who experienced an increase in mathematical communication ability with the category "Low" or got a score of N-Gain less than 0,3 as many as 16 people. While the average N-gain in trial I was 0.20 in the low category.

3.2.3. The Attainment of Self-Efficacy Student in Trial I

Based on the data obtained, the attainment of self-efficacy of students at the trial I most dominating is good category, which indicates that students at the trial I has good self-efficacy.

Figure 3. Results of Questionnaire Self-efficacy Student in Trial I

3.3. Results of Trial II

3.3.1. The Effectiveness of Learning Materials in Trial II

Based on the results of trial I data, it was found that the learning materials developed have been effective based on an indicator of the effectiveness of the learning materials that have been achieved. In the trial II the percentage of classical completeness achieved has met the criteria for achieving classical completeness.
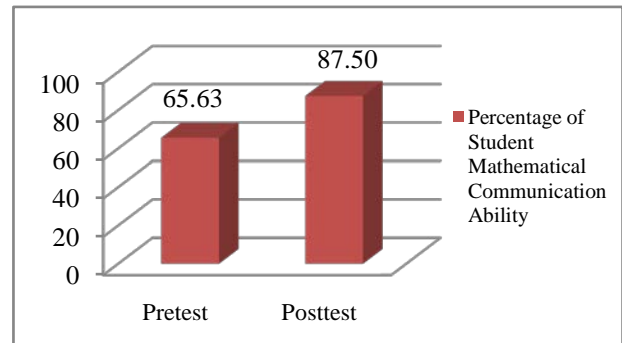

Figure 4. Classical Completeness Percentage of Students Mathematical Communication Ability in Trial II

Based on the picture above it can be seen that the classical completeness of the results of students' mathematical communication ability in pretest trial II was 65,63% while in the posttest trial II was 87,50%. In accordance with the criteria of classical student learning completeness, which is at least 85% of students who participate in learning are able to achieve a score minimum 71, then the results posttest of mathematical communication ability in trial II have met the criteria for achieving classical completeness.

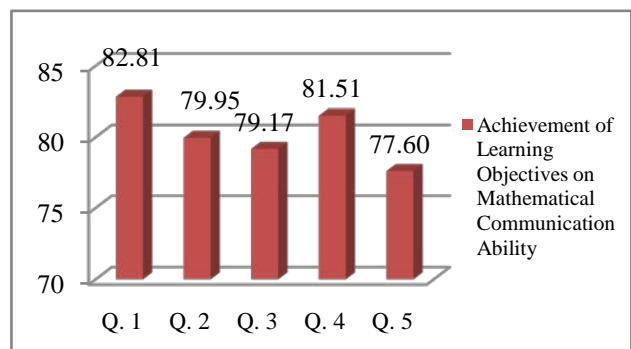Furthermore, for the criteria achieving the learning objectives in the trial II, it was achieved for each item.

Figure 5. Attainment of Learning Objectives on Mathematical Communication Ability in Trial II

From the picture above shows that each item on mathematical communication ability in trial II has a percentage minimal 75%. In accordance with the criteria for the attainment of learning objectives, the learning objectives are achieved with criteria minimal 75% on each item. Thus the attainment of learning objectives in trial II has been achieved.

The attainment of learning time in the trial II was three meetings, namely 6 x 40 minutes which meant that it did not exceed the usual learning time. Then the percentage of the average total positive response of students in the trial II was 94,07%, so it can be concluded that the students

response to the components and learning activities was very positive.

3.3.2. Improvement of Students Mathematical Communication Ability in Trial II

From the data obtained there were 3 students who received scores N-Gain in the range greater than or equals to 0,7 or experienced an increase in mathematical communication ability with the "High" category, 17 students experienced an increase in mathematical communication ability with categories "Medium" or got a score N-gain is less than or equals to 0,3 and N-gain is less than 0,7 and 12 students experience an increase in mathematical communication ability with the category "Low" or get an score N-Gain less than 0,3. The average gain in trial II was 0,32 in the medium category.

3.3.3. The Attainment of Self-Efficacy Students in Trial II

Based on the data obtained, the attainment of self-efficacy test II students at most dominating is good and excellent categories, indicating that students at trial II has a good self-efficacy.
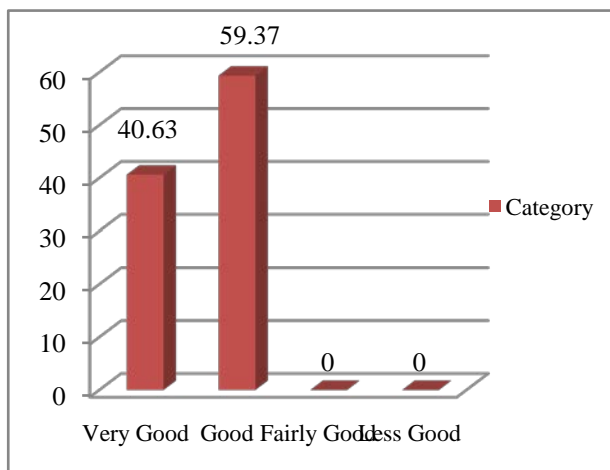

Figure 6. Results of Questionnaire Self-efficacy Student in Trial II

4. Discussion

4.1. The Effectiveness of Learning Materials Based on RME-MCC

Based on the results of the analysis posttest of the trial II, it was found that students mathematical communication ability have met classical completeness criteria. This is because the learning material and contextual problems that exist in student books and worksheet are developed in accordance with the characteristics and culture of students so that students can use prior experience to solve mathematical problems that make the learning process more meaningful. This is in accordance with Ausubel's learning theory which states that meaningful learning is a process of linking new information or material with concepts that already exist in one's cognitive structure [18]. This means that meaningful learning occurs when students try to connect new information or material in their knowledge structure to solve the problems they face. In

this connection, Rosa and Orey [19] stated that the implementation of ethnomathematical perspective in the school mathematics helps to develop students intellectual, social, emotional and political learning by using their own unique cultural referents to impart their knowledge, ability and attitudes.

In addition, student learning completeness is also influenced by the learning education used in the learning process namely RME-MCC which makes students interested in learning and actively involved in the learning process. The same thing was stated by Safitri, Surya, Syahputra, and Simbolon [20] that students are more active in the learning process by using RME than without using RME (traditional education). The learning process using RME-MCC-based learning materials can also help improve students 'cognitive abilities, one of which is students' mathematical communication ability. The same thing was stated by Noviani, Syahputra, and Murad [21] that Some of the above research results prove that RME can influence various cognitive domains of students in mathematics and it influences indirectly to students' affective domain. RME orientates constructivism of Vygotsky views that human construct mathematics concept adapt to their social environment. Furthermore Yosmarniati [22] also stated that the implementation of realistic mathematics education is able to improve math communication ability of students.

From the results of the analysis of the attainment of the learning objectives in the second trial, it was found that the attainment of the learning objectives had been achieved for each item. This is because learning is done using material and contextual problems that are close to the life and culture of students so that the material and contextual problems can be reached by students' imagination which makes students easier to find various possible solutions by modeling mathematical symbols and equations and resolve the contextual problem with the model found. This is relevant to Bruner's theory, because at the beginning of learning students do activities such as making observations in the environment or using knowledge from previous observations in the learning process (active phase). Furthermore, to help students understand contextual problems, in student books and student activity sheets presented drawings relating to contextual problems (iconic stage), and in the contextual problem solving process students perform mathematical modeling in the form of mathematical symbols and equations and complete the contextual problem with the model found (symbolic stage).

Research related to RME conducted by Widjaja and Heck [23] states that pupils taught by realistic education showed progress in their performance between the pre-tests and the post-tests. On the posttest they could give a greater number of correct answers. Furthermore Fauzan, Plomp, and Gravemeijer [24] concluded that the pupils' attainments in the experimental classrooms were significantly higher than the attainments of the pupils who had been taught using the traditional method. This is reinforced by the results of Yuliani and Saragih research [25], namely the attainment of learning indicators on the results of pretest trial I and pretest trial II have not been achieved for each item, while the attainment of learning indicators in the results was posttest II test achieved for each item. So it can be concluded that the attainment of

this learning goal shows that the use of learning materials developed meets the criteria of effectiveness.

Based on the attainment of learning time conducted during the first trial and trial II, the length of time learning using learning materials based RME-MCC did not exceed the usual learning time during this time, namely three meetings or 6 x 40 minutes. Thus the learning time used is in accordance with the criteria of attainment of learning time, namely the attainment of the learning time used is the same as the usual learning time, so it can be concluded that the attainment of learning trial I and trial II have been achieved and meet the criteria of effectiveness.

As for the results of the data analysis of the trial I and the trial II, it was found that the average percentage of students responses in each trial was positive, meaning that the students felt helped and happy with the learning materials based RME-MCC. Student responses given to each trial have reached a predetermined criteria category of 80%. This shows that the learning materials based on RME-MCC developed have met the effective criteria in terms of student responses. This is also supported by the results of research conducted by Maulydia, Surya, and Syahputra [26] that students respond to the teaching material that has developed through RME is positive because more that 80% students are interested to follow the teaching learning process by using the teaching material that has been developed.

4.2. The Improvement of Students Mathematical Communication Ability Using Learning Materials Based on RME-MCC

Based on the results of the improvement of students mathematical communication ability in the trial I and trial II, it showed that there was an increase in students mathematical communication ability by 15,62% in the trial I and occurred an increase of 21,87% in trial II. Meanwhile, an increase in the results of the posttest trial I and trial II was 18,75%. This shows an increase in students mathematical communication ability after using the learning materials based RME-MCC.

Improvement of student mathematical communication ability due to the learning process using RME-MCC materials begins with contextual problems, so that students can use prior experience in understanding and solving mathematical problems. Contextual problems are designed so that the learning process is more meaningful, so that it can be understood that the contextual problems provided can be used as a starting point in developing students mathematical communication ability. Furthermore, discussions conducted by students are a bridge of mutual help between students in understanding contextual problems.

With regard to RME and students mathematical communication ability, research conducted by Sinaga, Surya, and Syahputra [27] suggests that one of the characteristics of RME namely student centered learning can enable students to develop their mathematical communication ability in solving problems. In the learning process students are required to play an active role in solving problems and expressing their mathematical ideas to friends or teachers. In addition, other characteristics of

RME, namely interactive use are also the basis for developing students mathematical communication ability. Students are required to be able to use the language of mathematics and communicate it to express mathematical ideas correctly to friends, teachers, or others. Saragih [28] states that students who obtain learning based on realistic mathematics education have significantly better mathematical communication ability when compared to students who obtain ordinary learning. Based on the description and results of previous research above shows that learning with a realistic mathematical education is significantly better in improving students' mathematical communication ability. So it can be concluded that the learning materials based on RME-MCC have a positive impact on improving mathematical communication ability

4.3. The Attainment of Students Self-Efficacy Using Learning Materials Based on RME-MCC

Based on the results of questionnaire data analysis self-efficacy student in trial I and trial II showed the attainment of self-efficacy good student. This is because mathematics learning with the use of learning materials based RME-MCC presents meaningful learning with contextual problems that are closer to the student environment so as to make students actively interact between students and students or students with the teacher using prior experience and knowledge that students have. In connection with self-efficacy and mathematics learning attainment, Ayotola and Adedeji [29] stated that there is a strong positive relationship between mathematics self-efficacy and attainment in mathematics. Furthermore, Liu and Koirala [30] also stated the same thing that there is a positive relationship between self-efficacy and mathematical attainment. This shows that the realistic mathematics education is significantly better in improving self-efficacy student.

5. Conclusion

Based on the results of the analysis and discussion in this study, several conclusions are stated as follows:

a) Learning materials developed through RME-MCC have met the effective criteria, in terms of: (1) classical student learning completeness has been achieved in trial II, namely 87,50%; (2) attainment of learning objectives has been achieved in trial II, namely for question number 1 of 82,81%, for question number 2 of 79,95%, for question number 3 is 79,17%, for question number 4 is 81,51%, for question number 5 is 77,60%; (3) student response 94,07% has shown a positive response to the components of learning materials and learning activities developed; and (4) the learning time used does not exceed ordinary learning.

b) Mathematical communication ability of students with the learning materials based RME-MCC increased, in terms from the classical completeness of the posttest trial I of 68.75%, increasing to 87.50% in the trial II.

c) The achievement of self-efficacy of students with the learning materials based RME-MCC increased, in terms from the results of the self-efficacy questionnaire analysis of students in the trial I of 81.34%, increasing to 86.59% in the trial II.

6. Suggestions

Based on the results of the research and conclusions above, it can be suggested as follows:

a) Developing learning materials based RME-MCC have fulfilled the validity and effectiveness aspects, it is suggested to mathematics teachers to use learning approaches and learning materials that integrate local culture in mathematics learning such as learning materials based RME-MCC to develop students mathematical communication ability especially students of class VII SMP / MTs.

b) Researchers suggest to the reader and education practitioners to be able to conduct similar research and the deployment phase (disseminate) is expected to implement learning materials based RME-MCC on a broader scope in school SMP/MTs others.

Acknowledgements

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