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Self Regelated Through Mathematics in Contexts (Mic) Approach Based on Local Culture Module to Improve Math Representation

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Abstrack

The purpose of this study is to describe the mathematical representation ability of students based on self regulated and module-based learning with a Mathematics In Contexts (MIC) approach with local culture. This research is a mixed method type of concurrent embedded design, with the subject of the research being the VIII MTs grade students. Negeri 1 Lamongan. The results obtained are Mentoring with a module-based MIC approach containing local culture effective towards mathematical representation with an average completeness above 70 with a value of 77.96; there is a positive influence of self regulated on the ability of representation of 73.1%; The mathematical representation ability of students has increased by 0.48 with the medium category. The ability of student representation can be classified into three aspects including visual aspects, symbolic aspects and verbal aspects. Students with high self regulated are able to master the three aspects of representation very well indicated by the average value obtained in the visual aspect of 100 then in the symbolic aspect 91.07 and in the verbal aspect 79.17. Students with self regulated are mastering visual and verbal aspects that stand out by getting an average rating of 87.50 in the visual aspect and 79.17 in the verbal aspect, while in the symbolic aspect getting an average score of 66.07. Students with low self regulated are able to master the verbal and visual aspects well, namely by obtaining a verbal average value of 70.83 and a mean visual value of 67.50 while the symbolic aspect obtains an average score of 51.79. Based on the results of the study, it is suggested in doing assistance with students who have moderate and low self regulated more intensively so that students are more independent, enthusiastic, and recognize their own potential for their mathematical representation abilities.

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INTRODUCTION

According to (Rangkuti, 2014: 112) mathematical representation is a description, translation, disclosure, symbolism, or modeling of ideas, ideas, mathematical concepts, and the relationships between them contained in a particular configuration, construction, or problem situation displayed by students in various forms as an effort to obtain clarity of meaning, show understanding, or find solutions to the problems they face.

Although representation has been stated as one of the standard processes, but its implementation is not a simple matter. The limited knowledge of students 'habits of learning in class in the conventional way has not made it possible to grow or develop students representational power optimally. The underdevelopment of students' representational power, especially in junior high school students, students are rarely given the opportunity to present their own representations, in line with information deduced from the results of Hudiono's preliminary study in 20 05 (in Hudiono, 2005) stating the results of his preliminary interviews, that according to the teacher's representations such as tables , images are delivered to students, as a complement in the delivery of material, and rarely pay attention to the representations developed by students. Thus the teacher teaches representation is limited to conventional, students tend to imitate the steps of the teacher, students are never given the opportunity to present their own representation that can improve the development of student representation power in learning mathematics. Hudiono further stated, that students who work on math problems related to the ability of representation, only a small proportion of students can answer correctly, and most of the others are weak in utilizing the ability of representation they have.

The material taught by VIII grade students is to build a flat side room. In constructing flat side space for junior high school level, the material provided is in the form of calculating the surface of cubes, beams. The application of the material can be in the form of daily problems and is around the environment itself, so that it requires good representation ability in solving the given problems. However, based on preliminary research by researchers, when students work on problems, students have difficulty in representing a real problem. Students have difficulty representing story problems in the form of mathematical models, lacking understanding of the basic concepts regarding the construction of flat side spaces. This is because students rarely use the representation of images, tables and mathematical models to help them think in solving problems.

Fasha (2017: 88), learning with discussion models using the Mathematics in Context (MIC) approach is better than other methods, because of the correspondence between discovery theory and Mathematics in Context (MIC). In his research shows the classification and characterization of mathematical models, as well as the definition of "mathematical models". (Camarena, 2003) shows the skills and cognitive influences in constructing mathematical models in context.

Mathematics in context consists of mathematical assignments and questions that are designed to stimulate mathematical thinking and to promote discussion among students (Fasha, 2017: 88). (Gravemeijer, 2000) states that the three principles of Mathematics in context are (1) guided reinvention and progressive mathematizing (2) didactial phenomenology and (3) self-developed models. So that the core of independence learning with the Mathemtics in Context approach is that students can learn mathematics in any context, where students do not feel bored to learn mathematics. So much so that motivation to learn mathematics can grow on its own and does not have to wait for the teacher to teach in class. The process of MIC is that students are often given assignments in accordance with the material then a discussion is carried out to obtain a solution / solution given. Thus the researcher can see the high, low independence of student learning.

According to Good (Slameto, 2003) self regulated is learning done with little or no help from outsiders. Meanwhile, according to Umar and Sulo (2005) the driving force of learning activities comes from their own volition, self-choice and responsibility in learning.

Based on this understanding, it can be said that self regulated is an effort made for independent learning activities on the basis of his own motivation and solving the problems being faced. Someone who applies the learning bath will experience changes in learning habits, namely by way of organizing themselves so they can determine learning goals,

learning needs and strategies used in learning by leading to predetermined goals (Yuniawatika, 2011).

When students are given an assignment, they complete it with the help of existing modules. The module provided consists of a summary of material and practice questions / assignments. In this case the module can be interesting and see the independence of students in learning mathematics, so students who learn do not feel bored and easy to understand. Therefore the existence of a given assignment routine, makes students want to try to learn independently to complete the task

The module that can be made to see the independence of student learning is a mathematics module with the character of raising local culture. Thus the existence of local content-based mathematics modules makes students think and discuss that things that are around can be calculated with mathematics.

In this study, the object used was junior high school students. Middle school students (children entering adolescence / puberty) is a transition / maturation of learning and addressing a problem, especially in this case mathematical material. Because students in elementary school study more often or complete schoolwork with the help of others. Sometimes students in completing school work are still done by their parents. Due to the high school period, students have higher self regulated, therefore during junior high school is the right time to develop student self regulated based on mathematical contexts with the help of modules. Thus it will make students independent in learning and can improve mathematical representation.

Researchers conduct research by providing MIC-based modules containing local culture to students through mathematics teachers who teach in class. Then from the module students can read and work on the questions in the module. Before being given a module, the researcher will provide initial test questions to see students' mathematical representation abilities. Students who are given a module, when experiencing difficulties in understanding and working on existing questions can ask researchers outside class hours. The ability of mathematical representation and student self regulated after being given a module with MIC approach can be seen by giving the final test questions. Based on the results of the preliminary test, final test, and student self regulated questionnaire, then an analysis will be conducted.

The formulation of the problem in this study is how the effectiveness of the MIC approach based on local culture-loaded modules on the material of flat-side geometry on mathematical representation, and How the mathematical representation of students through the MIC -based module approach to local culture-based modules on the material on flat-side space in terms of self regulated.

METHOD

This research is a mixed method type Pre-Experimental Design type One-Group Pretest-Posttest Design. This research begins with a preliminary study, then quantitative and qualitative data collection followed by analysis and interpretation of the data.

Research conducted at MTs Negeri 1 Lamongan with population were students of class VII first academic year 2018 /2019. Samples were selected one class is class VIII A with the number of students 40 students. To weld the given MIC module based local culture and do the categorization in terms of students self regulated (self regulated high, medium, and low). Each category of self regulated is then taken by 2 students to be the subject of research.

Quantitative data collection techniques performed with the test. While qualitative data collection techniques using questionnaires, interviews, and documentation. Quantitative data was tested using normalitas value, correlation test, average difference between the sample means, gain test, and regression of mathematical representation and the student's self regulated. Whereas qualitative data analysis follows the concept of Miles & Hubermen (2007) with the following steps, namely data reduction, data display, and conclusions.

RESULTS AND DISCUSSION

Validation result of the learning device shown in table 1 below.

Table 1. Learning Tools Validation Results

Assistance Device	Validator Code	Average Score	Category
Module	V1, V2	4,175	Good
Guidebook for using the module	V1, V2	4.50	Very good

From table 1, can be concluded that the average score of all devices of assistance is 4.34 in the good category, so that the assistance devices that have been prepared are suitable for use in research.

The results of the validation of the research instruments are presented in table 2 below.

Table 2. Results of Research Instrument Validation

Research Instruments	Validator Code	Average Score	Category
Mathematical Representation Test Questions	V1, V2	4.50	Very good
Interview guidelines	V1, V2	4.50	Very good

From table 2, it can be concluded that the average score of the instrument is 4.50 with a very good category, so the instruments that have been prepared are suitable for use in research.

From the assessment of the results of the assistance, it was found that the results of the Mathematical Representation Ability Test were normally distributed with a value of sig = 0.052. Correlation test results from the final test of student self regulated obtained that the final test score on student self regulated has a high correlation of 0.855. Because r arithmetic = 0.855> r table = 0.316, it is evident that there is a significant relationship between student self regulated with mathematical representation. Based on the two-party test calculations on one sample t-test obtained t count 5.488 with a degree of freedom 39 and a significant value of 0.034. Because the significant value is smaller than the alpha value of 0.034 <0.05, so the decision making by comparing the value of t, which is t arithmetic> t table or 5.488> 2.02269, the average value of the final test of students is not the same as the value of 70.

Based on the normalized test calculations, it was concluded that student self regulated increased by moderate criteria. The recapitulation for individual improvement is as follows.

Table 3. Individual Improvement

Criteria	Many students	Percentage
High	0	0%
Medium	25	62.5%
Low	15	37.5%

From Table 3, it can be seen that 62.5% of students who received assistance with a MIC approach assisted by modules containing local culture experienced an increase in student self regulated in the medium category, and 37.5% of students experienced an increase in student self regulated in the low category.

The effect of the independence of student learning on mathematical representation is very large. This can be seen from the results of the students' final tests which showed improvement after being given assistance by observing the independence of student learning. To determine the effect of student self regulated on mathematical representation obtained using a regression model $Y = \beta_0 + \beta_1 X + \varepsilon$.

that $\hat{Y} = a + bX$, where a = a constant number of unstandardized coefficient. 19,310. This figure is a constant number which means that if there is independence of student learning (X) then the final consistency test value of representation (Y) is 19,310. b = regression coefficient number, the value is 0.780. This figure implies that for every 1% increase in the level of student self regulated (X), the student's final test score (Y) will increase by 0.780.

Because the regression coefficient value is positive, then it can be said that student self regulated (X) has a positive effect on the student's final test score (Y) so that the regression equation $Y = 19.390 + 0.780X$. R square value is 0.731, which means that the effect of student self regulated (X) on the student's final test score (Y) is 73.1% while 26.9% of students' final test scores are influenced by other variables that are not examined.

Based on the recapitulation results of the students' self regulated questionnaire, high group students have an effort in completing Mathematics tasks without delaying doing them. High group

students also tend to work on questions based on their own initiative and are more willing to express opinions when there are questions that are not understood. In addition, self-confidence in the ability possessed is the main asset in high group students without relying on answers from friends. This means students in high groups have high self regulated, especially Mathematics material. Likewise with middle group students. Self regulated that is apparent from the group is still a small level of effort in completing Mathematical tasks, and sometimes procrastinating in doing it. Sometimes the work done will be done if just remember. Initiative in doing Mathematics tasks is not completely. In expressing opinions, middle group students only occasionally ask questions about material that is not yet understood. However, confidence in their abilities has emerged from them. This shows that the middle group students have self regulated are still in a level that is not high enough.

For low group students, self regulated is not much different from middle group students. The level of effort in working on math problems is still relatively small. Low group students also always delay when it comes to work. The initiative that emerges is also not pure from oneself. This means there is still the role of parents in learning activities at home. In terms of asking teachers about unclear material, it is also not used properly, because the opportunity to ask questions is left alone, even though there is material that is not understood well. However, self-confidence in the ability possessed is still half or can be said to still doubt. Low group students have very little self regulated and are low on high groups and medium groups.

Self regulated Students after mentoring, experienced a fairly high increase. From the assistance that has been carried out, 6 students will be taken as the focus of research in the high group, medium group, and low group categories. Taking a group category, each was represented by 2 students, namely 2 students from the high group, 2 students from the medium group, and 2 students from the low group. Students selected from the high group are students with S10 and S14 codes, for medium group students are students with S24 and S39 codes, while for low group students are students with S28 and S35 codes. To obtain deeper and more complete information, interviews were also conducted for the six selected students.

From the two high group students, each student has strengths and weaknesses in each phase. Like S10 students, the value of the learning design phase 3.45 is higher than the evaluating phase of 3.56. But the reflecting phase 3.38 is a relatively low phase compared to the other two phases. In contrast to S14 Students who have a learning design phase with a fairly high category (moderate) 3.44. the evaluating phase in S14 students was relatively low 3.17, and the reflecting phase was the highest phase 3.52.

Of the two medium group students, each student has strengths and weaknesses in each phase. Just as S24 students have a 2.94 learning design phase value higher than the 2.89 evaluation phase. However, the reflecting phase of 2.77 is a relatively low phase compared to the other two phases. In contrast to S39 students who have the highest reflecting phase of 3.15 compared to the other two phases of the learning design phase 2.47 and the evaluation phase 2.83.

In the low group students have a reflection phase which is quite high compared to the other phases. S35 students have a reflection phase of 2.15 and S28 students have a reflection phase of 2.45. In the evaluation phase the two students have the same value of 2.06 and for the phase of designing learning S35 students have a lower phase value of 1.81 compared to S28 students of 1.99. Based on the results of the self regulated, to find out the results of self regulated significantly need a mathematical representation test and interviews with the six students. So there needs to be more assistance for Low Group Students. The phase of student self regulated graphically can be seen in Figure 1.

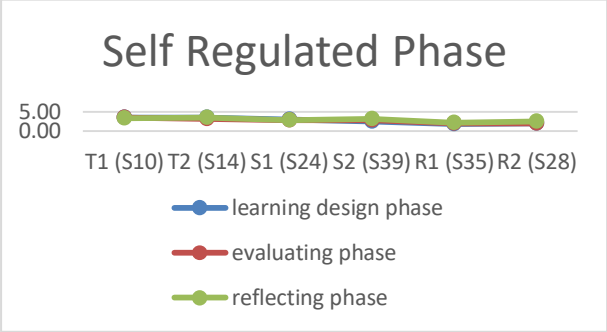

Figure 1. Students Self Regulated Phase

The final test results can S10 students are able to identify problems then write down things that are known and asked of the questions. S10 students are also able to write down what is known, asked and answered by including the correct unit. This shows S10 has been able to analyze new things that have been obtained. From the results of his work, it appears that S10 students are able to generate ideas or answers that are relevant to the given problem. As a whole, S10 students have very good mathematical representation, in the visual, verbal and symbolic aspects.

Final Test Results S14 students are able to identify problems from the questions given then write down the things that are known and asked of the questions. In terms of writing down what is known, asked, and answered from the questions, S14 students are very complete in writing units. S14 has been able to write down important things about what was asked of the problem. From the results of his work, it appears that S14 students have been able to produce ideas or answers that are relevant to the problems presented.

From the results of his work, it can be seen that in providing answers to the way or the idea itself is very good. It can be said that S14 students have very good mathematical representation, with visual, verbal and symbolic aspects.

The results of the S24 students 'Final Test work obtained information about the ability to generate ideas or relevant answers from students' mathematical problems quite well. For the ability to produce diverse answers, S24 students write their own way. During the mentoring activities, students have sufficiently demonstrated their ability to provide answers to their own ideas or ways. However, the ability to describe the results in detail S24 students is quite good even though there are some steps that are not presented in sequence. This shows that S24 students show their mathematical representation ability is at the middle level or good enough. In the visual and verbal aspects of S24 students are still lacking, so the need for deepening the questions - stories and learning to re-express the information available.

The final test results obtained information that S39 students are less able to identify problems then write down things that are known and asked of the questions. Overall, S39 students' mathematical representation is good enough. But in the visual aspect is not good, S39 students need a discussion about the story that involves the visual aspect.

From the results of the Final Test it can be seen that S28 students have been able to identify problems and write down things that are known from the questions quite well. This means that S28 has made use of the initial knowledge gained in solving problems. At the unknown stage, S28 students have written things that are known from the problem, but there is a slight error in writing mathematical symbols. Overall, S28 students' mathematical representation ability is still lacking.

Final Test Results S35 students have been able to identify problems and recover things that are known from the questions quite well. In the known stage, S35 students have written things that are known from the problem, but there is still something missing in the writing. At the stage of long-term memory S35 was able to explain the conclusions being asked even though the conclusions given were not quite right. Overall, S35 students' mathematical representation ability is still lacking.

Based on the results of the regression calculations, it was found that the independence of student learning has a linear relationship or a positive influence with the ability of mathematical representation. This is in accordance with the opinion of Zimmerman (2000) that self regulated is a personal assessment of an individual's ability to organize and carry out his work program in achieving predetermined goals, and he will assess the level, generality, and strength of all activities and contexts.

The effect of self regulated given to students' mathematical representation ability is indeed high enough to help when the teacher wants to know a student's mathematical representation ability, which is 73.1%. There is still 26.9% of students 'mathematical representation ability influenced by other factors such as social factors, students' psychological conditions, physical conditions of students when the representation assessment is carried out, and other things that are not done by researchers.

CONCLUSION

Assistance with a module-based MIC approach containing local culture was declared effective by fulfilling (1) the average value of the representation

ability of Grade VIII students of MTs Negeri 1 Lamongan exceeds the Completeness of the Teaching Curriculum which is above 70 with an average grade of 77.96 (2) there is a positive influence of student self regulated on student representation ability of 73.1% (3) The average value of students' mathematical representation ability has increased (gain) by 0.48 with the medium category.

The ability of student representation can be classified into three aspects including visual aspects, symbolic aspects and verbal aspects. Students with high self regulated are able to master the three aspects of representation very well indicated by the average value obtained in the visual aspect of 100 then in the symbolic aspect 91.07 and in the verbal aspect 79.17. Students with self regulated are mastering visual and verbal aspects that stand out by getting an average rating of 87.50 in the visual aspect and 79.17 in the verbal aspect, while in the symbolic aspect getting an average score of 66.07. Students with low self regulated are able to master the verbal and visual aspects well, namely by obtaining a verbal average value of 70.83 and a mean visual value of 67.50 while the symbolic aspect obtains an average score of 51.79. Based on the results of the study, it is suggested in doing assistance with students who have moderate and low self regulated more intensively so that students are more independent, enthusiastic, and recognize their own potential for their mathematical representation abilities.

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