Abstract— This purpose of this research to know: (1) the improving of mathematical communication ability through realistic mathematics approach based on Toba Batak culture is higher than students who are given regular learning, (2) there is no interaction between learning approach with Initial Ability of Mathematics (KAM) in improvement of students’ mathematical communication ability. This research type is quasi experiment. This research was conducted at SMP N 2 Dolok Panribuan. The population in this study is all students of class VII. Based on the results of the analysis, the research results are obtained: (1) improving of mathematical communication ability through realistic mathematics approach based on Toba Batak culture is higher than students who are given regular learning, (2) there is no interaction between learning and student’s early ability improving the ability of mathematical communication. Recommended by the teachers can use realistic mathematics approach based Batak Toba culture by presenting issues related to local culture as an alternative learning.

Keywords: Mathematical communication ability, Realistic Mathematical Approach Based on Toba Batak Culture

I. INTRODUCTION

The virtue in learning mathematics is the learning process. "the learning process should provide many benefits for students so that they can develop their full potential" [6]. Through the process of learning mathematics can also develop the character of each student so that it produces productive, creative, innovative, and affective students through strengthening integrated attitudes, skills and knowledge. The end result is an improvement and balance between students' abilities and character.

It means that is basic math skills of students who have been formulated as follows: (1) mathematical communication, (2) mathematical reasoning, (3) mathematical problem solving, (4) mathematical connections , (5) positive attitudes toward mathematics [4].One ability that is very important to be considered in mathematics learning is students' mathematical communication skills. Mathematical communication skills need to be mastered by students because in the world of education can not be separated from the role of communication. Mathematical communication skills need to be the focus of attention in learning mathematics, because through communication, students can organize and consolidate their mathematical thinking and students can explore mathematical ideas.

In fact students' mathematical communication skills are still not satisfactory. This can be seen from the low mathematical communication skills shown in the studies of obtained "the mathematical communication skills of students in class IX-1 of SMP Negeri 3 Labuhan Batu Upper Hulu is still low, because 13.33% of students class IX-1 which is able to explain mathematical ideas in writing with pictures, diagrams, tables or algebra and for categories of students able to express everyday language events or mathematical symbols as much as 26.76% " [11]. Likewise the results of other studies obtained that "students of class VII MTs have low mathematical communication skills, most of them only answer questions directly, unfocused and unthinkable [13].

There is another factor that allows influencing learning is the readiness and ability of students to take lessons is also determined by the initial ability of mathematics (KAM) owned by students. According that "the initial ability of students is the ability that has been possessed by students before participating in the learning that will be given". Early mathematical abilities (KAM) students are classified into high, medium and low groups. The initial ability of mathematics is a prerequisite that must be possessed by students in order to be able to follow the lessons well and smoothly [2].

Student learning outcomes are inseparable from and how teachers teach and students' responses to mathematics itself. During this time the learning that was carried out still used the usual approach where the process of learning mathematics which was generally carried out in schools (often called traditional learning), namely learning which began with the lecture method then given examples of the questions and finally the evaluation through practice questions. The problems of daily life are sometimes used on certain material but only appear at the end of the discussion or at the time of
II. RESEARCH METHODS

This type of research is quasi-experimental research. This research was conducted in SMP N 2 Dolok Panribuan the second semester of the 2017/2018 academic year. In this study sample selection conducted using cluster random sampling technique. Cluster random sampling, in this sampling, the population is divided into several groups or clusters. Randomly needed clusters were taken by randomization process. Each member in the randomly drawn clusters is the required sample [7]. Based on information from the principal of Dolok Panribuan 2 Public Middle School that all seventh grade students at SMP Negeri 2 Dolok Panribuan have been distributed / divided into each class with even abilities. Which means there are no special classes for smart students

Based on random sampling from 9 grade VII students at Dolok Panribuan 2 Public Middle School, students were chosen as samples of 2 classes, namely class VII-2 as an experimental class which was given learning with a realistic approach based on Toba Batak culture and class VII-3 as a control class who are given learning by being given an ordinary approach. Each number of students in the two classes is 32 students. As for the research design used in this study is the pretest-posttest control group design. Data analysis techniques used are analysis of variance (ANOVA).

III. RESEARCH RESULTS

Pretest is done to determine students' abilities before applying realistic mathematical approaches based on Toba Batak culture and the usual approach. Based on the pretest with 10 items obtained in the class realistic mathematics approach based on Toba Batak culture as many as 32 students, there were 7 students who had high ability, 20 students had moderate ability, and 5 students had low ability. Likewise, in the regular approach class there were 32 students, there were 4 students who had high abilities, 22 students had moderate abilities, and 6 students had low abilities. Before the data were analyzed, the normality of the data was tested using chi-square test and homogeneity test used Fisher's homogeneity assumption (Test-F) as a condition of qualitative analysis. The results obtained that the two classes come from populations that are normally distributed and homogen.

After that, it was analyzed using analysis of variance (ANOVA) to test 4 hypotheses proposed in the study with a two-way variance analysis test. The results of data analysis can be seen in the following table:
Based on table 1 above shows that the value of $F_{\text{count}}$ between rows ($F_{hr} = 4.399 > F_{\text{table}} = 4.000$) which means $H_0$ is rejected. So there is an increase in students' mathematical communication skills that are given learning through a realistic mathematical approach based on Toba Batak culture rather than students who are given learning through the usual approach. Then from table 1 above also shows that the value of ($F_{hrc} = 0.728 < F_{\text{table}} = 4.000$) thus $H_0$ is accepted. So it can be concluded that there is no interaction between the learning approach and the initial ability of mathematics to students' mathematical communication. This result can also be described through the following figure I:

![Fig 1 Interaction between Learning and KAM on Student Mathematical Communication Improvement](image)

**IV. DISCUSSION**

Based on the results of the above research, then the discussion in the study is:

**A. Mathematical Communication Ability**

Based on the results of the study obtained the average pretest results Mathematical communication skills in the experimental class, namely classes that use mathematics with a realistic approach based on the Toba Batak culture of 14.00 in the control class, namely classes that use regular learning by 14.156. In addition, the average posttest of mathematical communication skills in the experimental class is 17.625, while in the control class is 15.438. This shows that there is an improve in mathematical communication ability in the experimental class and control class.

To measure the magnitude of the improvement of communication skills carried out with the gain index in the experimental class and control class and find the average test results from the index of communication ability in the experimental class is 0.427 while in the control class is 0.24. The level of communication ability in the experimental class is higher in the class control.

In learning activities, students who have mathematical communication ability can help other students who have problems understanding the subject matter. The results obtained in this study indicate that mathematics learning with a realistic mathematical approach based on Toba Batak culture can improve the mathematical communication skills possessed by students.

The results of the study were carried out with the results of research conducted by the title of the research to improving problem solving and communication mathematical ability through the learning of realistic mathematics education for students of state junior high schools in Garut. Thus, based on the results of the study, it was found that the first and the first problem, namely improving the communication ability of students who were taught using a mathematical approach with a better approach than usual [1].

**B. Interaction between Learning Models with Students 'Initial Mathematical Abilities towards Improving Students' Mathematical Communication Ability**

Based on the average difference, it can be seen that students with low categories gain greater benefits from problem-based learning with the difference in high KAM scores (0.16), medium (0.11) and low (0.36). In this case, 'initial mathematical abilities have no effect on improving students' mathematical communication ability, because students with low 'initial mathematical abilities categories have a greater increase than 'initial mathematical abilities in the high and medium categories. So there is no interaction between learning and students 'initial mathematical abilities towards students' mathematical communication.

Before carrying out the research, the researcher suspected that there was an interaction between the learning model and the students 'initial mathematical ability to improve students' mathematical communication ability, so the researchers hypothesized that there was an interaction between the learning model and the students 'initial mathematical ability to improve students' mathematical communication ability.

However, the results obtained in the study indicate that there is no interaction between the learning model and the students 'initial mathematical ability to improve students' mathematical communication ability. This is known from the results of the two-way ANAVA test obtained from the significance value of 0.902 greater than the significance level of 0.05. So it can be concluded that in this study there is no interaction between learning (PMRBBBT and PB) with the level of initial ability of students (high, medium and low) to improve students' mathematical communication ability.

The results of this study are in line with the results that there is no interaction between learning factors with the factors of students' initial mathematical ability to improve logical thinking ability, mathematical communication ability, and positive attitudes toward mathematics [7].

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**TABLE I. THE RESULTS OF ANOVA TEST ANALYSIS OF MATHEMATICAL COMMUNICATION CAPABILITY**

<table>
<thead>
<tr>
<th>Source Varians</th>
<th>JK</th>
<th>RJK</th>
<th>$F_{\text{count}}$</th>
<th>$F_{\text{Table}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Columns (R) (Learning Models)</td>
<td>91,790</td>
<td>91,790</td>
<td>4,399</td>
<td>4,000</td>
</tr>
<tr>
<td>Between Rows (C) (Student Ability)</td>
<td>76,563</td>
<td>76,563</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Interaction (RC)</td>
<td>7,595</td>
<td>7,595</td>
<td>0,728</td>
<td>-</td>
</tr>
<tr>
<td>In Group (W)</td>
<td>625,990</td>
<td>10,433</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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The results of this study are in line with the results that there is no interaction between learning factors with the factors of students' initial mathematical ability to improve logical thinking ability, mathematical communication ability, and positive attitudes toward mathematics [7].
Thus, based on the results of research and discussion, it was found that the formulation of the second problem was answered and the second hypothesis was rejected, namely there was no interaction between the learning approach and the students 'initial mathematical ability to improve students' mathematical communication ability.

V. CONCLUSION

The conclusions that can be presented in this research are as follows:

1. The improving of 'mathematical communication ability and students self regulated learning taught through a realistic mathematical approach based on Toba Batak culture is higher than the improving of students' mathematical communication taught through regular learning

2. There is no interaction between the learning approach and the students 'initial mathematical abilities towards improving students' mathematical communication ability and regular learning.

REFERENCE


