Advances in Social Science, Education and Humanities Research, volume 488
Proceedings of the 5th Annual International Seminar on Transformative Education and Educational Leadership (AISTEEL 2020)

Analysis of Students Mathematic Communication Ability in the Implementation of Realistic Mathematics Learning in Class V Elementary School of Markus Medan

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ABSTRACT
This study aims to describe the quality of mathematical communication skills of students who are given learning using the Realistic Mathematics Learning approach to the fraction material. This type of research is a qualitative descriptive case study. The subjects of this study were 40 grade students of Medan Markus Private Elementary School, then the subjects were analyzed qualitatively in terms of ability indicators (high, medium and low), aspects of errors and aspects of empty answers. The research instruments consisted of: tests of mathematical communication skills and interview guide sheets. Data analysis techniques include data collection, data reduction, data presentation, and drawing conclusions. The results showed that mathematics learning in class V at Markus Medan elementary school was still not optimal, this was due to the lack of trust of students in solving the problems given which was seen from students who were less enthusiastic and did not pay attention to the implementation of learning, and mathematical communication skills of class V students. Overall students' mathematical communication skills are good. This is because most students have met several indicators of mathematical communication skills, namely the ability to connect real objects to mathematical ideas, the ability to express everyday events with mathematical symbols in presenting mathematical ideas in writing and the ability to explain ideas. daily situations and mathematical relations, in writing or in pictures. In this study, students can describe the appropriate structure on the problem, namely the area of the garden.

Keywords: *Qualitative analysis, Mathematical Communication, Realistic Mathematics*

1. INTRODUCTION

Mathematics is a subject that is taught at every level of education. In the learning process, mathematics is known to have concepts that require sufficient activity to study and understand them because these concepts are generally abstract. Apart from that, mathematics is also a means of logical, analytical and systematic thinking. Therefore, mathematics plays an important role in the development of science and technology. Given this important role of mathematics, mathematics learning carried out at each level of education should be implemented in accordance with what is expected.

Mathematics will succeed and have an impact if it is based on mathematical power, one of which is mathematics as a medium for communicating ideas (*mathematics as communication)* so that if someone who is good at mathematics will be able to communicate ideas or ideas that he understands to others [1] .

Learning mathematics means learning to understand learning to define and communicate ideas and ideas that exist in graphs, diagrams, pictures, variables and symbols. Conversely, learners are also required to be able to communicate ideas and ideas using the language of mathematics [2]. Therefore, m atematika is one of the subjects of primary interest, but the math is still a difficult lesson to learn the students, even a frightening lesson for most students.

There are several difficult math factors, including: 1) Difficulty communicating ideas into the language of mathematics when given questions that are related to everyday life. Learning difficulties are children who

have difficulty learning mathematics, not children who have a below average level of intelligence, but they have a normal level of intelligence or even have a superior level of intelligence, but these children experience difficulties in one or several specific areas, but in the field. - another area the child can excel at. Children who have difficulty learning mathematics are called dyscalculia [3].

This problem is also seen in Markus Medan elementary school, it is obtained data that students' mathematical communication skills are still low with the finding of low mathematical communication symptoms from the test results given by the teacher. These symptoms include: (1) The majority of students have not been able to express mathematical ideas in the form of images , d iagram and graphs, (2) Most of the students have not been able to provide an explanation in mathematics with the correct language and easy to understand and in making mathematical models, (3) Most students have difficulty making mathematical questions that have been studied, (4) At the end of the lesson, many students cannot make conclusions about what they have learned. Based on the test on integers in grade V Markus Medan elementary school, it was found that the students' level of ability to understand and express situations in mathematics was still low.

One of the mathematical abilities that must be mastered in learning mathematics is communication skills. Important indicators to be understood and obtained by elementary school students are (1) Writing down mathematical ideas in words; (2) Writing mathematical ideas into mathematical models; (3) Linking images to mathematical ideas; (4) Describe the completion procedure. For that students must have good mathematical communication skills.

Therefore, teachers are required to be more creative and able to find alternative solutions to children's learning problems. Especially in the learning process carried out in schools, the teacher must be able to integrate and harmonize the activities and creativity of the teacher with the activities and creativity of students in a harmonious and dynamic manner, moreover the teacher must be able to generate active participation of students in the classroom, and be able to interpret more. learning activities in class, especially in mathematics.

One learning model that is considered appropriate in improving mathematics communication skills is the Realistic Mathematics approach. The meaning of mathematical concepts is the main concept of the realistic mathematical approach. In this case, the problem to be solved does not always have to be in the real world (real - *world problem),* but can be found in everyday life. A problem is said to be "realistic" if the problem can be imagined (imaginable*)* or real (estate*)* in the minds of students. In the REALISTIC approach to mathematics, realistic mathematical problems are the main foundation in finding concepts [4] .

Theoretically, it can be concluded that the use of a realistic mathematics approach in classroom learning has a positive effect on students' mathematical communication skills. This can be seen from the suitability between indicators in students' mathematical communication skills with the advantages possessed by the realistic mathematics approach learning model. Therefore, it is necessary to do further in analyzing student learning outcomes about mathematics communication skills taught using a realistic mathematics approach in Markus Medan elementary school. This study discusses the improvement of students 'mathematical communication on fractions as well as the difficulties and mistakes of students in solving students' mathematical communication problems in the application of realistic mathematics learning.

2. THEORETICAL REVIEW

2.1. Learning Mathematics in Primary Schools

Learning is a mental process that occurs in a person, causing changes in behavior [5]. The characteristics of learning are (1) Learning is acquiring and mastering; (2) Learning is memorizing information or skills ; (3) The memory process involves the cognitive storage, memory, and organization systems ; (4) Learning involves conscious active attention and acting according to events outside and within the organization ; (5) Learning is parallel, but subject to forgetfulness ; (6) Learning involves various forms of practice, perhaps practice that is cut with rewards and laws ; and (7) Learning is a change in behavior [6]. Based on this opinion, it can be concluded that learning is a change in knowledge, skills and attitudes based on the experience that has been passed.

Mathematics comes from Latin, *matheneim,* or *mathema* which means learning or things learned while in Dutch mathematics is called *wiskude* or exact science which is all related to reasoning [7] . The term mathematics (English), mathematic (German) or mathematick / wiskunde (Dutch) comes from another word mathematica, which was originally taken from the Greek word, mathematike, which means relating to learning. The word has the root word mathema which means knowledge or knowledge (knowledge, science) [8]. The word mathematike is closely related to another similar word, namely mathematein which means learning (thinking)**.** Mathematics includes aspects of numbers, algebra, geometry and measurement as well as statistics and probability [9].

Learning mathematics for students is the formation of a mindset in understanding an understanding and in reasoning a relationship between these meanings. In mathematics learning, students are accustomed to gain understanding through experience about the properties that are owned and not owned by a set of objects

(abstraction). Students are given experience using mathematics as a tool to understand or convey information, for example through equations, or tables in mathematical models which are simplifications of story problems or other mathematical description problems.

2.2. Realistic Mathematics Learning Model

Learning model with a realistic approach emphasizes how students find concepts or procedures in mathematics through encouraging contextual problems, students are directed to independent or cooperative learning situations in small groups.

In the realistic mathematics learning process, there are five principles of learning phenomena, namely : (1) Learning is a constructive activity that is stimulated by concreteness; and teaching involves using questions that can be realized by students themselves ; (2) Learning is a long-term process that moves from concrete to abstract; and teaching includes pointing students' teaching from informal mathematical knowledge to formal mathematics ; (3) Learning always involves a socio-cultural context; and teaching includes providing opportunities to communicate and collaborate with groups ; and (4) Learning is the construction of knowledge and skills towards structural forms; and teaching involves various interrelated aspects [10].

Based on this explanation, the realistic approach aims to develop students' ability to translate mathematical concepts from the real world into symbols.

Based on the characteristics and principles of RME, a realistic mathematical approach to mathematics learning can be formulated as follows:

a. Step 1: The teacher conditions the class to be conducive. Learning realistic mathematics requires conducive classroom conditions, so that students can develop their abilities optimally. Therefore, the teacher acts as a facilitator of classroom conditions in order to create a conducive atmosphere by managing the learning infrastructure and learning atmosphere.
b. Step 2: The teacher presents and explains contextual problems. The teacher conveys and explains contextual problems, so that students can understand the correct contextual problems. Contextual problems conveyed by the teacher can be problems related to everyday life and also matters related to students. The theme of the contextual problem is adjusted to the concepts and algorithms that are understood by students. Apart from being conveyed by the teacher, contextual problems can come from around the students themselves.
c. Step 3: Students solve contextual problems Either individually or in groups, students solve contextual problems in their own way under the guidance of the teacher or not. Problem solving activities are centered on finding concepts and algorithms in mathematics, carried out by student discovery through or re-creation activities by modeling informal problems that are continued in formal solving. To get problem solving and discovery of concepts or algorithms in mathematics, students always carry out reflection activities, namely reviewing things that have been done to get the expected results.
d. Step 4: Making conclusions from group discussions or the results of class discussions, the teacher immediately instructs students to make conclusions on solving contextual problems and generalizing the concepts or algorithms found. The teacher acts as a mediator, who conducts direct discussions so that it is processed dynamically and democratically, so as to reach a collective conclusion
e. Step 5: Confirmation of the tasks or conclusions of the results about solving the contextual problem and the generalization results of the concepts or algorithms obtained are confirmed again by the teacher. This is done so that the understanding that has been obtained by students becomes more solid. To make solid knowledge and skills that have been acquired by the teacher, so that the teacher provides practice problems that must be done individually or in groups by the teacher. That the completion of assignments can be done in class or at home [11].

2.3. Mathematical Communication Skills

Mathematical communication skills are the ability / skills of a student to be able to express and interpret mathematical ideas orally, in writing, or to demonstrate what is in a math problem [12] . There are at least two important reasons why communication in mathematics learning needs to be developed among students. First, *mathematics as language* , meaning that mathematics is not just a tool to think (*a tool to aid thinking*), tools to find patterns, resolve problems or draw conclusions, but the math is also *"an invaluable tool for communicating a variety of ideas Clearly, precisely, and succinctly* Second , *mathematics learning as social activity* : meaning, as a social activity in learning mathematics, as a vehicle for interaction between students, and as a means of communication between teachers and students [1 3] .

Mathematics as a communication has five types of activities, namely: writing (*writing*), represents (*representing*), listening (*listening*), reading (*reading*), and delivered orally (*talking*) [1 3] . Then the Mathematical Communication Ability referred to in this study includes the students' ability in: (1) Explaining an idea or situation from a picture or graphic that is explained in their own words in written form ; (2) State a situation with pictures or graphics ; (3) Stating the situation into a mathematical model .

3. RESEARCH METHODS

This study uses descriptive quantitative research using the case study method. Based on the descriptive qualitative approach in this study, all facts, both written and oral, from human data sources that have been observed and other related documents that are described as they are, are then reviewed as concisely as possible to answer the problem.

The research was conducted in the odd semester of the 2019/2020 school year, with a schedule coordinated with school activities carried out from October to December 2019. This research was conducted at the Markus Medan Elementary School. The subjects in this study were 18 students of Class V private elementary school Markus Medan, who received learning with a realistic mathematics approach learning model on the subject of fractions.

Based on the data collection techniques used, this research instrument uses interview guides and documentation guides. This data collection process includes the process of entering the research location as well as being at the research location and collecting research data. The data collection method required in this study is a test of students' mathematical communication skills and documentation.

The data analysis techniques used in this study were data collection, data reduction, data display, verification and conclusion confirmation. Qualitative research must reveal objective truth. Therefore, the validity of the data in a qualitative study is very important. Through the validity of the data, the credibility of qualitative research can be achieved. In this research, to obtain the validity of the data, it is done by triangulation.

4. RESEARCH RESULT

The test of students' mathematical communication skills is carried out in 75 minutes. This mathematical communication ability test was followed by all students in class VA, namely 18 students. This mathematical communication ability test is carried out individually. Before implementing the test, the teacher first asks students to look at the instructions for working on the questions at the top of the questions.

Table 1. Description of Students' Mathematical Communication Ability

Minimum Completeness Criteria Indicator	N	x_{min}	x_{max}	
Overall Mathematical Communication Ability	18	25	100	73.89
Write	18	1	4	2.83
Draw	18	1	4	2.38
Mathematical Expressions	18	0	4	3.11

Based on Table I of the 18 students who were sampled, the average value (*mean*) for all students' mathematical communication skills was 73.89. The value range of 25-100 means that students 'low mathematical communication skills at a minimum score of 25 are 2 students and the highest students' mathematical communication skills are in a maximum score of 100 as many as 4 students. The standard deviation value is 24.75 and the *mean is* 69.44, which means that the data is less varied, the standard deviation value is smaller than the *mean* .

Furthermore, the results of the mathematical communication skills test will be used as a reference for researchers to determine students' mathematical communication skills. Then later checking will be carried out with the results of interviews with research subjects, this checking technique is also called triangulation technique.

Table 2. Average Result Of Mathematic Communication Ability Test

No.	Score Interval	The number of students	Percentage	Category
1.	≥ 70	9 people	50%	Height (T)
2.	50 - 70	6 people	33%	Medium (S)
3.	<50	3 people	17%	Low (R)
Total		18	100%	-

Based on Table 2, it is found that there are students who occupy each ability grouping. There were 9 students who had high ability, 6 students who had moderate ability, and 3 students who had low ability.

1. Mathematical communication skills in terms of high ability grouping

In this study, the interview subjects for mathematical communication skills with high classification were T-1 , T-2 , and T-3 . The results of the analysis that have been carried out from the results of tests of mathematical communication skills and the results of interviews in general are able to meet the five indicators of mathematical communication skills, namely

indicators 1 to indicator 3.Of the three indicators of mathematical communication skills, subjects with high ability grouping have been able to complete completely.

On indicator 1, the subject's mathematical communication skills with high ability grouping (T1, T2 and T-3) can write down the information that is known and asked completely, so that subjects with high ability grouping are able to connect real objects to mathematical ideas.

In indicator 2 the subject's mathematical communication skills with high ability grouping (T-1) can use mathematical symbols in solving problems. The subject (T-2) uses mathematical symbols in solving problems, but does not use them when writing what is known and asked. The subject (T-3) can use mathematical symbols in solving problems .

In indicator 3, students' mathematical communication skills with high ability grouping can describe the shape of the part that matches the illustration of the question along with its size. This can be seen from the subjects T-1 , T-2 and T- 3 which can describe parts to describe the area of gardens, parks and corn plants. The three subjects can describe the areas of the requested location from the questions accompanied by a description of the size, so that students with high ability grouping are able to explain ideas, daily situations and mathematical relations in writing or with pictures.

Based on the above discussion, students' mathematical communication skills with high ability groupings can be categorized as good. This is because students with high ability groupings can write mathematical representations in the form of formulas used in solving mathematical problems. Students with high ability groupings also show the use of mathematical language well, namely by writing mathematical symbols in writing mathematical problem solving even though they do not use mathematical symbols when writing what is known and what is asked. Students with high ability grouping can also describe the appropriate shape accompanied by a description of the picture and can provide a clear flow of thought, namely by writing down the steps, and can use various forms of representation, namely by doing calculations and writing conclusions correctly.

2. Mathematical communication skills in terms of medium ability grouping

In this study, the interview subjects for mathematical communication skills with auditory learning styles were S-1 , S-2 and S- 3 . On indicator 1 of mathematical communication skills, the subject of moderate ability grouping (S-1 , S-2 and S- 3) can write down the information that is known and asked completely. During learning, the teacher always emphasizes by reminding repeatedly so that students pay attention to the information that is known and asked, because this is very important in solving problems.

In indicator 2 the subject's mathematical communication skills with moderate ability grouping (S-1) can use mathematical symbols in solving problems. In medium grouping subjects (S-2) can use mathematical symbols in solving problems but do not use them when writing what is known and asked. In medium grouping subjects (S- 3) can use mathematical symbols in solving daily problems in writing.

In indicator 3, students' mathematical communication skills with moderate ability grouping can describe the parts that match the illustration of the question but are not accompanied by a description of the size. This can be seen from the S-1 subject who can describe parts of the garden in accordance with the illustration of the question but does not write a description of the size in the picture. Likewise, the S-2 subject can describe the area of the garden to describe the appropriate part but is not accompanied by a description of the size , and the S- 3 subject can describe the area of the garden to describe the part that is suitable for size but is less able to express the situation in a mathematical model .

The ability of communication skills with ability grouping mathematical students were categorized either. This is because students with moderate ability groupings can write mathematical representations in the form of formulas used in solving math problems. Students with moderate ability grouping also show the use of mathematical language well, namely by writing mathematical symbols in writing mathematical problem solving even though they do not use mathematical symbols when writing what is known and what is asked. Students with moderate ability groupings can also describe the appropriate shape even though it is not accompanied by an image caption. In addition, the moderate ability grouping subject can provide a clear flow of thoughts, namely by writing down steps, and can use various forms of representation, namely by doing calculations and writing conclusions correctly.

3. Mathematical communication skills in terms of low ability grouping

In this study, the interview subjects for mathematical communication skills with a kinesthetic learning style were R-1 and R-2. The results of the analysis that has been carried out from the results of tests of mathematical communication skills and the results of interviews of subjects R-1 and R-2 are unable to meet all indicators.

On indicator 1, the subject's mathematical communication skills with low ability groupings (R-1 , R-2 and R- 3) are unable to write down the information that is known and is asked completely. Based on this, it can be concluded that subjects with low ability grouping are not able to present mathematical ideas in writing.

In indicator 2 the mathematical communication skills of the low ability grouping subjects (R-1 , R-2 and

R- 3) cannot use mathematical symbols in solving mathematical problems and are unable to use mathematical symbols on what is known and asked. Based on this, it can be concluded that subjects with low ability grouping are not able to present mathematical ideas in writing.

In indicator 3, the mathematical communication skills of the subject with the grouping of low ability subjects (R-1 , R-2 and R- 3) also cannot describe the shape that matches the problem but does not make the size in the image according to the problem. Based on this, it can be concluded that subjects with low ability grouping are unable to explain ideas, daily situations and mathematical relationships in writing with pictures.

Students' mathematical communication skills with low ability groupings can be categorized as poor. This is because students with low ability grouping are sufficient in showing the use of mathematical language and forms of mathematical representations. This can be seen from students with low ability groupings who do not write down known information and are asked completely and do not describe the shapes that match the questions. Students with low ability groupings can provide a clear flow of thoughts. This is because students with low ability groupings can write down the appropriate steps. In addition, students with low ability grouping also use a form of mathematical representation with some success. It can be seen that students can do calculations but write conclusions that are still wrong.

5. CONCLUSION

Based on the results of this study, it can be concluded that the mathematical communication skills of the fifth grade students of Markus Medan Elementary School are generally said to be good. There are still difficulties and mistakes of students in solving students' mathematical communication problems in the application of realistic mathematics learning, especially in the low category of mathematical communication skills. This is because most students have met several indicators of mathematical communication skills, namely: (1) The ability to connect real objects into mathematical ideas. (2) Ability to express daily events with mathematical symbols in presenting written mathematical ideas. (3) Ability to explain ideas, daily situations and mathematical relations, in writing or in pictures.

AUTHORS' CONTRIBUTIONS

The results of this study are expected to provide a significant contribution of thought as input to knowledge or scientific literature that can be used as study material for academic people who are studying education and learning in children, especially regarding improving students' mathematical communication skills using a realistic mathematics approach.

ACKNOWLEDGMENTS

The authors say you to Medan State University. The authors thank the Graduate Studies Program Basic Education Program which has provided support. Thank you for Mr. Bornok Sinaga, and Mr. E. Elvis Napitupulu as supervisor.

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