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Mathematical Literacy Abilities of Fifth-Grade Students in View of Adversity Quotient in Hands on Activity-Based RME Learning

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Abstract

The purpose of this study was to identify patterns of fifth-grade students' mathematics literacy abilities in relation to adversity quotient. This study is a combination form of sequential explanatory study, where quantitative data is the primary data. In this study, the population was class V of the Padarek region, and the sample consisted of SDN Padarek I and SDN Padarek III. The sample was selected by random sampling. The results of the study on hands-on activity assisted RME learning revealed a correlation between the achievement of each indicator and mathematical literacy. Quitter students may complete one pattern of literacy accomplishment indicators, namely formulating, whereas camper and climber students can fulfill all three patterns, namely formulating, employing, and interpreting. The quitter, camper, and climber process capability patterns meet all achievement indicators, namely communication, mathematizing, representation, devising strategies, using symbols, and using mathematics tools, but the indicators for using mathematics tools and devising strategies have not been optimally achieved. Based on the pattern uncovered regarding each student's mathematical literacy ability, it is recommended to maximize learning in order to get better mathematical literacy abilities.

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INTRODUCTION

Literacy is derived from the term "literacy" in the English language, which refers to the ability to read and write Ojose (2011) mathematical literacy is the capacity to comprehend and apply basic mathematics in daily life. A detailed integrated of mathematics will serve as a crucial tool for solving complex problems. This is because mathematics is a tool for developing a method of thinking that is crucial for both daily life and preparation for the future science and technology (Hudojo, 1998).

Stacey (2011) every individual must have the skill to use mathematics learnt in school in the actual world, which is filled with obstacles. In reality, elementary school (SD) and junior and senior high school (SMP and SMA) mathematics proficiency has been a major issue (Susanto, 2013).

The frequency with which Indonesia has participated in the PISA survey, which is conducted every three years, indicates that students' mathematics literacy remains relatively poor. Based on the PISA survey, the following information pertains to the mathematical literacy of Indonesian students.

Table 1 Participation of Indonesia in the PISA Survey

Year	Rating	Participant
2009	61	65
2012	64	65
2015	63	69
2018	72	79

According to the data presented above, student accomplishment continues to fall behind other participating nations, remaining in the fifth-to-last place. Aside from this, several findings at SDN Padarek III indicate that, when confronted with literacy questions, students continue to struggle, as evidenced by the following questions.

Each day, Pak Ading fills his vehicle with $6\frac{1}{4}$ liters of gasoline. Pak Ading filled for one week. How many liters of gasoline did Pak Ading purchase for a week?

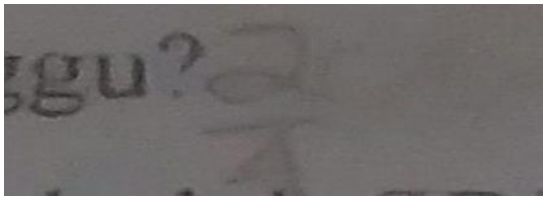

Figure 1 Students Answer

Under conditions like Figure 1.1 nearly all students responded directly by writing down their responses, without engaging in any horizontal or vertical mathematical activity, such as restating the problem in their own words and employing significant mathematical concepts. This is due to a lack of training in handling PISA questions that demand logic, argumentation, and creativity due to their contextual nature (Rumiati, 2011).

Wardono (2013) Educators can contribute to the improvement of students' problem-solving literacy by innovating mathematics education and inventing learning instruments. Mathematical instruction must be organized in order to encourage students' mathematical proficiency (Junaedi, I & Asikin, 2012).

Fauzan et al., (2013) students will have a wonderful opportunity to develop their own knowledge if they learn mathematics based on activities they encounter in everyday life, as seen in realistic mathematics education (RME)

learning. Maulana et al., (2009) when teaching RME, pay particular attention to informal features, and then seek for ways to help students transition to formal mathematics. Lange (2003) Informal mathematics is referred to as horizontal mathematization, while formal mathematics is referred to as vertical mathematization. In addition, adopting RME in the classroom involves two principles: the action principle and the interactivity concept. The concept of activity requires that students be treated as active participants in the learning process, whereas the principle of interactivity leverages interaction to encourage reflection and bring students to a deeper level of comprehension (Heuvel-panhuizen, 2020).

The RME learning principle according to Freudenthal as quoted by Maulana et al., (2009) students rediscover mathematics in a meaningful way. Important interactions in mathematics between teachers and students use a variety of problem-solving procedures, and students are not required to proceed more swiftly to abstract concepts.

Aisyah et al., (2007) in general, the RME learning processes begin with (1) Preparation, in which the teacher creates issues to be utilized as learning materials and media. (2) Introduction, namely that students comprehend the contextual issues offered by the teacher. (3) Students begin the learning process by describing the problem, solving the problem, and then comparing and discussing the solutions. (4) Concluding, after students and teachers have reached an agreement through debate, they draw conclusions.

The use of RME learning is combined with the use of visual aids to support student activities in problem-solving, which are referred to as hands-on activities, hence assisting students in finding solutions. Kartono (2010) Hands on activity is learning characterized by an activity designed to engage students in knowledge discovery by asking questions, engaging in activities, locating, collecting, and evaluating data, and drawing conclusions.

The benefit of hands on activity as cited by Riyanti in Fatir (2016) increase student interest in learning, motivate, reinforce memory, be able to overcome learning challenges, obtain student feedback, and most importantly, connect the concrete and abstract.

The role of hands-on activity in RME, students gain greater flexibility in processing information and making connections between the abstract and the concrete.

During the learning process, teachers are also recommended to be sensitive to their students' resilience when confronted with of difficulty. This resilience is connected to intellect in accomplishing tasks it is called adversity quotient (AQ). Adversity quotient has a role in overcoming context-related mathematical literacy challenges (Hadi, 2005). Every student may encounter difficulties while learning mathematics, but the most crucial aspect is finding the best solution.

There are three types of students in Adversity Quotient according to Stoltz (2000) is quitter type (Low AQ), in particularly, a group of individuals who lack the will to accept challenges and whose lives consist solely of survival. Camper type (Middle AQ) it is sufficient to halt the progress of a group of individuals who are willing to confront challenges but are unwilling to accept manageable and safe risks. Climber type (High AQ) namely groups who have the bravery to confront obstacles and challenges to complete their task and achieve their objectives.

METHOD

This study used a blend of sequential and explanatory types. This study was conducted at two elementary schools, Padarek I Elementary School and Padarek III Elementary School, with a sample of one experimental class and one control class. Quantitative data collecting techniques are conducted by assessing mathematical literacy. The collecting of qualitative data through interviews and documentation. Analysis of quantitative data employing the average similarity test, the normalcy test, the homogeneity test, the learning mastery test, the classical completeness test, the

average difference test, and the different mastery proportion test. Analysis of qualitative data with data reduction methods, data presentation, and findings.

RESULTS AND DISCUSSIONS

RME learning is considered effective if it meets the following criteria: (1) in hands-on activity-assisted realistic learning, the average level of mathematical literacy is beyond 62. (2) The average mathematical literacy skill in hands-on activity-assisted realistic learning attains at least 75% classical completion. The average mathematical literacy of students who engage in actual learning aided by hands-on activity is superior to their mathematical literacy in expository learning. (4) The proportion of fifth-grade students who have mastered mathematical literacy abilities through actual mathematics education with hands-on activity is greater than the proportion of students who have mastered these skills through expository learning.

The results of the research and data analysis indicate the following: First, the average mathematical literacy ability of students in classes where RME learning is supplemented by hands-on activities is 77.43. This value crosses the KKM limit, which is 62. This is consistent with earlier research indicating that the average RME student achieves the KKM limit (Fajriyah et al., 2020). Second, learning in the experimental class were able to get a KKM score of greater than 75%, according with the research findings by Fauziah & Mariani (2017) the classical completion rate for RME learning with an emphasis on hands-on activities is 85%. Third, the average mathematical literacy ability with RME learning is better than expository learning Febriyana & Suyitno (2018) dan Fauzana et al., (2020) the experimental class with its realistic learning process outperforms the control class. Fourth, students with RME learning demonstrate a higher proportion of mastery than students with expository learning, consistent with previous studies conducted by (Faozi et al., 2020).

The implementation of RME learning in schools is carried out over the period of five sessions through a series of activities that have been developed in accordance with the RME learning procedure; in the first stage, students are confronted with student life-related contextual difficulties. Efforts to present contextual challenges at the outset to make learning more meaningful and to encourage students to express their own ideas (Junaedi et al., 2015; Asikin & Junaedi, 2013).

At the problem-description stage, students write information in a known format on worksheets before writing it in the form of mathematical questions, which falls under the category of mathematically formulating situations, transforming contextual problems into mathematical questions, and horizontal mathematization activities. Van den Heuvel-Panhuizen (2003) said that RME level principle, students progress through many stages of comprehension where mathematization might occur.

As illustrated in the image below, during the problem-solving phase, students begin to create ways to answer questions using mathematical principles and hands-on activities.

Hands on activity giving students actual experience has a favorable effect, therefore hands-on activity is regarded the best way to motivate students to learn and enjoy mathematics (Holstermann et al., 2010; Yingprayoon, 2017)

Comparing and contrasting teacher answers affords each student the opportunity to voice their own thoughts and solutions, which they can then discuss with the teacher and other students (Widyati, 2014). At this point, the students and teacher determine the learning results, whether it be the discovery of concepts or solutions derived from each problem, and then restore the problem to its context in the real world (Mawaddah & Maryanti, 2016).

Based on the findings of study and discussion, the proposed criteria for effective learning are met. This demonstrates that the application of RME learning supplemented by hands-on activity increases mathematical

literacy. This is in line with previous research that learning RME is effective (Adjie et al., 2021 and Kusumaningsih et al., 2018). Additionally, RME learning contributes significantly to the development of children's capabilities (Papadakis et al., 2017).

Qualitative research to find patterns of mathematical literacy skills in terms of adversity quotient. Subject of this research is V grade which categorized adversity quotient quitter, Camper and Climber. After measuring the students' AQ, the following results can be obtained.

Tabel 2 Adversity Quotient Student Category

Category	Students Quantity	Percentage
Quitter	3	15
Camper	17	80
Climber	1	5

Questionnaire result adversity quotient become the basis for taking qualitative research subjects. The research subjects were taken 10% of the total of each category, 1 student for the quitter category, 2 students for the camper category and 1 student for the climber category.

Tabel 3 Pola Mathematical Literacy Patterns Based on Literacy Indicators

Question Number (Level)	Lieracy Indicators	Rank of Adversity Quotient			
		quitter	Camper 1	Camper 2	Climber
1 (4)	Formulating				
	Employing				
	Interpreting				
2 (5)	Formulating				
	Employing				
	Interpreting				
3 (3)	Formulating				
	Employing				
	Interpreting				
4 (3)	Formulating				
	Employing				
	Interpreting				
5 (6)	Formulating				
	Employing				
	Interpreting				

If referring to the achievement of indicators for each subject when answering level 3-6 reading comprehension questions, on the level 4 quitter question, campers 1 and 2 simply formulate mathematical issues. The level 5 quitter, camper 1, and climber generate mathematical questions, apply procedural concepts and facts to problem solving, and analyze, apply, and evaluate mathematical. outcomes. The level 3 quitter and climber simply formulate mathematical issues. The level 6 quitter formulates problems exclusively quantitatively.

Overall, in the learning process, several completed activities match the process indicator requirements. The outcomes of the accomplishments are displayed in the table below.

Table 4. Differences in Patterns of Mathematical Literacy Based on Process Indicators

Indicator Process	Rank of Adversity Quotient		
	Climber	Camper	Quitter
Communication	Writing important information from the problem into a mathematical situation with all variables	Writing down what is known and asked in full	Writing down what is known and asked simply
Mathematizing	Changing the problem into the form of a mathematical question to be answered	Changing the problem into a clear question	Changing the problem into question form
Representation	Translating the problem clearly into mathematics	Translating the problem into mathematics	Translating the problems into mathematics
Devising strategis	Using problem-solving strategies and mathematical concepts	Writing the strategy used in solving the problem, but in some questions the answer is direct without using a strategy	Have not employed ways to address mathematical problems
Using symbol	Using mathematical symbols for fractions, decimals, and percents	Using mathematical symbols for fractions, decimals, and percents	Using mathematical symbols for fractions, decimals, and percents
Using mathematics tools	Capable of performing multiplication, division, subtraction, and addition	Could perform multiplication, division, subtraction, and addition arithmetic operations, but there are still some incorrect calculations	Could perform multiplication, division, subtraction, and addition arithmetic operations, but the final solution is inaccurate

The pattern of mathematical literacy ability when evaluated as a whole from the process indicators does not differ significantly; however, on the strategic devising indication, camper students do not record a problem-solving approach, and for quitters, practically all questions lack a strategy. On the indicator for applying mathematics tools, quitter students conducted arithmetic processes but made

errors in the final result, while campers did calculation procedures but made a calculation error in one of the questions.

CONCLUSION

An effective learning process identified patterns of students' mathematical literacy skills in accordance with the indicators achieved for quitter students as a whole only fulfilling the formulating, camper, and climber indicators almost all indicators are fulfilled formulating, employing, and interpreting but at a certain level only the formulating indicators are met.

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