



The Effect of Multiliteracy Learning on Mathematical Literacy Skills of Elementary School Students

Lily Auliya Puspita^{✉1}, Isah Cahyani^{✉2}, Rahman³

Pendidikan Dasar Sekolah Pascasarjana, Universitas Pendidikan Indonesia, Bandung, Indonesia

✉ [1lilyauliya@upi.edu](mailto:lilyauliya@upi.edu), [2isahcahyani@upi.edu](mailto:isahcahyani@upi.edu)

Abstract. This research is motivated by the results of observations of researchers who showed that elementary school students on average were not used to receiving questions of mathematical literacy, so their abilities were low. The purpose of this study was to obtain a comprehensive picture of the effect of multiliteracy learning on students' mathematical literacy abilities. The research method used was quasi-experimental research with a nonequivalent control group design. The sampling technique used was purposeful sampling with a sample size of 60 students, consisting of 30 experimental group students and 30 control group students. Data collection methods used in this study are observation sheets, tests (open-ended questions), and documentation. The data obtained were analyzed using parametric statistical test, namely t-test. The results of data analysis show that the significance level is $0,0005 < 0,005$, so the hypothesis is accepted, so it can be stated that there are significant differences in students' mathematical literacy skills between students who take multiliteracy learning and direct learning with $\alpha = 0,005$ and $df = 58$. The application of multiliteracy learning can be used as a way to improve the mathematical literacy skills of elementary school students.

Keywords: multiliteracy, mathematical literacy skill, direct learning, elementary education, quasi experiment

INTRODUCTION ~ Literacy is one of the main requirements to make someone have life skills in the 21st century. In line with this, Fianto (2017) argues that the culture of literacy as a prerequisite for 21st century life skills must be developed by integrating it in family, school, and society. Life skills are described by Abidin (2015, p. 5), namely thinking competencies, work competencies, life competencies, and competence in mastering work tools. Thus, literacy activities must be able to be cultivated so that high literacy skills can be owned by everyone in the 21st century.

Literacy skills are very important to be taught to students since sitting in elementary school and carried out continuously. In harmony with Nirmala et al. (2018, p. 8357) which explains that

literacy skills taught in elementary schools are not done spontaneously, but must be continuous and intensive. Thus, students will reach the levels of development of expected literacy abilities. The important thing that marks this literacy ability is explained by Rahman (2018, p. 37), namely the ability of high understanding, critical thinking skills, the ability to collaborate and communicate.

In Rahman et al. (2018, p. 16), Literacy Ability in Indonesia is still far behind by other countries. In line with the savings, the results of the 2015 Program for International Student Assessment (PISA) survey showed Indonesia was ranked 64th out of 72 countries. The PISA score for reading only rose 1 point from 396 to 397. While the results of the scores from the Indonesia



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National Assessment Program (INAP), nationally students' reading ability was only 46.83%. (Ministry of Education and Culture, 2017). While the results of research conducted by Central Connecticut State University (in Amelia, et al., 2018), states that literacy writing Indonesia ranks 60th out of 61 countries. This shows that the ability to understand and use reading materials, especially document texts and writing skills for Indonesian children aged 9-14 years is still low. Thus, literacy must be fulfilled in daily life because the interest in reading and literacy of Indonesian children is a problem that must be dealt with seriously.

According to Abidin, et al. (2015, p. 35) suggested that "mathematical literacy ability is the ability to understand and use mathematics in various contexts to solve problems, and be able to explain to others how to use mathematics." Whereas according to Solomon (2009, p. 4) states that "mathematical literacy is a multi-power ability and mathematical methods effectively solve a variety of lives context. "Based on this opinion, it can be concluded that mathematical literacy is a person's ability to reason, represent, communicate, and solve mathematical problems that can be used effective for life.

However, in reality the mathematical literacy of a student in Indonesia is still low. This is in line with the data of observations made during the sit-in. It was found that in mathematics learning there were still

memorization systems or literary mathematics. After praying and singing Indonesian Raya together, the fifth grade students do the recitation or memorization of races 2 and 3. Whereas, after being given a question to describe the results of races 2 and 3, students are still confused. This is supported by interviews conducted with class V teachers who said that indeed this recitation or memorization had become a habit in the classroom to understand the concepts of all subjects.

In addition, the data obtained is that students are still difficult in working on mathematical questions that are presented in the form of story problems. Students are only able to write the results, without writing down how to get the results. This is supported by the results of interviews conducted by several students who stated that they did not like math stories because it was difficult and they were confused in completing it. In this regard, the difficulties of students in learning mathematics and solving story problems are strengthened by the results of the P4TK Mathematics Monitoring and Evaluation (in Abidin, p. 14) suggesting that "More than 50% of elementary school teachers revealed that most students had difficulty completing story problems. "This shows that indeed not all students are able to understand and associate mathematics learning with their lives.

If students are not able to understand and associate learning with their lives, then the student will not have the skills and life skills



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as expected. In addition, students also will not be able to think procedurally as a consideration for decision making. Even though in the modern world students are expected to be able to develop their abilities in the profession, their social and personal lives. Thus students' mathematical literacy abilities must be improved. The teacher as a facilitator who can assist students in developing their mathematical literacy skills, must have a lot of insight into the learning model that can maximize literacy skills. Thus, multiliteration learning as a multi-media and multi-modal learning model can be used to develop and improve the mathematical literacy skills of elementary school students.

In simple terms multiliteration-based learning is learning that focuses on students' critical thinking skills and student understanding and reasoning that pay attention to language use. According to Cope and Kalantzis (in Abidin, et al., p. 92), it was suggested that "Students who learn through a multiliteration approach will gain a high understanding."

Multiliteration learning was developed in accordance with the context of the 2013 curriculum learning, which was developed with a scientific approach to learning. In harmony with the opinion of Abidin (2015, p. 68) which states that "The stages - stages of multiliteration learning in general are inspired by a scientific approach to learning. "Meeting those opinions, according to Marocco (in Hayat and Yusuf p. 110) suggests that" The stages of the

multiliteration learning cycle are: 1) Involving; 2) Respond; 3) Elaboration; 4) Reviewing; 5) Presenting. "Based on the explanation, it can be concluded that the multiliteration learning cycle is applied with a scientific (scientific) approach with stages involving, responding, collaborating, reviewing, and presenting. But the learning is still common, meaning it can be used in various fields of study.

While mathematical literacy ability is the ability of students to formulate, identify mathematical concepts, and use mathematics to solve problems. Meeting these opinions, according to Solomon (2009, p. 4) suggests that "mathematical literacy is multi-power efficiency and mathematical methods effectively solve problems in a variety of lives context." Meanwhile, according to Abidin et al. (2015, p. 35) suggests that "mathematical literacy ability is the ability to understand and use mathematics in various contexts to solve problems, and be able to explain to others how to use mathematics." Based on these opinions, it can be concluded that mathematical literacy is a person's ability to reason, represent, communicating, and solving mathematical problems that can be used effectively for life.

METHOD

The method used in this study is a quasi experiment research method. This study was conducted to measure how much influence multiliteration learning has on the mathematical literacy skills of fifth grade



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students of elementary school. The quasi experiment design (quasi experiment) in this research is nonequivalent control group design. The population in this study were fifth grade students in one of the schools in Bandung, with 60 students. The sampling technique in this study used purposive sampling, so that two classes of groups were taken which were normally distributed, homogeneous, and had equivalent mathematical literacy skills.

One class was made into the experimental class which received treatment in the form of the application of multiliteration learning and one other class group was made into a control class that did not get treatment, only direct learning was applied. This research data is in the form of quantitative data supported by observation data. Quantitative data were obtained from scores on the results of mathematical literacy ability tests before the study (pretest) and scores on the results of tests of mathematical literacy skills after research (post-test), while observation data were obtained from observations of teacher and student activities during the learning process.

This research consists of four stages, namely, the preparation stage, the stage of data collection, the processing and analysis phase of the data, and the stages of preparing the research report. In this study, the results of scoring students'

mathematical literacy skills were carried out by statistical tests with the help of IBM SPSS 22 software. The statistical tests performed were normality, homogeneity, and t-test. The hypothesis proposed is that there are differences in the results of significant mathematical literacy skills between students who participate in multiliteration learning and students who take direct learning.

RESULTS

Based on the results of data analysis it was stated that there were significant differences in students' mathematical literacy skills between students who received multiliteration learning and students who received direct learning. This is indicated by the results of the t-test calculation. Hypothesis testing is done with a significance level of 5% ($\alpha = 0.05$) or a confidence level of 95% with degrees of freedom ($df = n-2$). Thus, $0.005 < 0.05$, there is a significant difference in mathematical literacy skills between the experimental groups who received multiliteration learning and the control group that received direct learning. The hypothesis which states that there are significant differences in mathematical literacy abilities of students who take multiliteration learning with direct learning, can be proved by the t-test performed using IBM SPSS 22 software, with the output presented in table 1.

Table 1. t-test of eksperiment and control class

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Nilai	Equal variances assumed	8.711	.005	6.408	58	.000	23.667	3.693	16.274	31.059
	Equal variances not assumed			6.408	46.273	.000	23.667	3.693	16.234	31.099

Based on table 1, it can be concluded that the hypothesis is accepted because the level of significance = 0.005 < 0.005 at ($\alpha = 0.005$) with $df = 58$. So, there is the effect of multiliteration learning on students' mathematical literacy abilities.

DISCUSSION

Before conducting the learning process, researchers prepare all the components of learning needed such as lesson plans, learning media, tools and materials for experiments. LKS, and evaluation questions that have been prepared by the researchers according to indicators of mathematical literacy as a research variable. In core activities, learning is carried out with multiliteration-based learning steps. However, before carrying out these steps, the researcher divides students into five groups, by way of students taking a paper roll containing the symbolic name of the Pancasila. The division of this group is indeed very good, because it will divide heterogeneous

groups in accordance with cooperative learning methods. However, in reality there are still many students who don't want to be in groups. This is because they do not like one of the group members. In addition, they also feel uncomfortable when in the group. This behavior is called negativism. In harmony with the opinion of Yusuf (in Nurihsan and Agustin, p. 51) which states that "Behavior that occurs as a reaction to the application of discipline or regulation given is called Negativism.

The researcher used multiliteration-based systematic learning steps with procedural steps as follows.

The first step is understanding the problem. At this stage, the teacher presents a problem through the LKS, which is presented in the form of illustrative stories. This problem is the starting point of students in learning the volume cube material. This is in line with the content standard in Permendiknas Number 22 Year 2016 (in Sadiq, p. 18) which states that "...



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mathematics learning should begin with the introduction of problems that are appropriate to the situation." When the teacher provides time for students to ask, there are none students who ask, students tend to be quiet. This is because students do not understand the LKS, ie students are less able to draw meaning or intent contained in the text. The ability to understand is the ability of students to draw meaning or intent contained in the text. In harmony with Abidin et al. (2015, p. 45), he stated that "When students are able to draw meaning or intent contained in the text, students have the ability to understand well." LKS presented is different from the LKS in Cycles I and II. In this cycle, LKS is based on inquiry worksheets that are equipped with pictures.

The second step is recording information. At this stage, students are instructed to identify the mathematical ideas they find when reading the text. The teacher found that most students were able to identify mathematical ideas based on the text provided in the LKS. This is indicated by students being able to write important information contained in the text. This is a good first step to solving problems. In line with the opinion of Abidin (2015, p. 52) argues that "The first step to solving problems is to classify information and identify ways to solve it."

The third step is to determine how to solve the problem. At this stage students cooperatively, brainstorming (brainstorming) in determining various

ways of solving problems contained in the text. Even though students are mutually receptive, students have determined how to solve the problem individually. So the discussion process is not going well. The students' behavior is selfishness (self-centered) so that they are more concerned with their own work. In harmony with Yusuf's opinion (in Nurihsan and Agustin, p. 52), he argues that "In elementary school students, selfishness or self-centered social behavior is still developing, which is egocentric in fulfilling their desires." But in this cycle the discussion has been going well.

The fourth step is to solve the problem. At this stage, students are cooperatively grouped frequency tables to calculate relative frequencies. The media is called a mathematical tool (Mathematical tools). In harmony with Abidin et al. (2015, p. 44), he argues that "Mathematical tools are tools used as bridges or assistance so students are able to solve problems." Students have been able to use frequency tables very well. Thus this indicates that students have understood the expected concept well.

The fifth step is to test the results of problem solving. At this stage the teacher instructs students to communicate the results of their discussion in front of the class using random techniques. One indicator of learning motivation is the duration of the activity. In harmony with Syamsudin (in Hamdu and Agustina, p. 83) who argued that "Learning motivation indicators include: 1) duration of activities, 2)



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frequency of activities, 3) resistance to activities, etc." By using the duration of activities effectively and pleasantly, students are more motivated.

The sixth step is producing work. At this stage, the teacher instructs students to make a "Mathematical Argument Card" using color cardboard. Students work well together and are very happy, because they make handicrafts from colorful folding paper and colored pencils. They like to decorate the card. multiliteration learning that takes place in the classroom is successful, because most students have been able to achieve the expected goals. The average percentage of successful implementation of learning reaches 72%. This shows that this achievement has exceeded 51%, because multiliteration based learning is said to be successful when the percentage of implementation reaches 51%. In harmony with Abidin (2016, p. 259) argues that "Multiliteration learning is declared successful when the percentage of student responses reaches 51%." It can be concluded that multiliteration based learning is successful because the percentage of student responses is above 51% at each step of learning. An increase from the previous cycle, so researchers will stop the study because the response of students has reached the specified criteria.

CONCLUSION

Based on the results of the research that the researchers have done, it can be

concluded that the application of Multiliteration-based learning can improve the mathematical literacy skills of fifth grade elementary school students. 1. Implementation of learning by applying multiliteration-based learning can increase student activity during the learning process, By applying Multiliteration-based learning, student learning activities become more meaningful, namely students ask, students use concrete media to find concepts and solve problems, read texts to identify ideas, and make work to pour conclusions on the learning that has been done. In addition, students also carry out activities to communicate the results of the discussion and provide responses. During the implementation of learning the teacher is only as a facilitator, so that student activities are more active and get a more meaningful learning experience. Thus, multiliteration learning has an influence on students' mathematical literacy skills.

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