Application of Field Trip Model in Improving Mathematical Literacy Ability of Elementary School Students

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Abstract. This study aims to improve the mathematical literacy skills of elementary school students through the application of field trip models. This type of research is an experiment with Pretest-Posttest Control Group Design. The instruments used were tests of mathematical literacy skills and student response questionnaires. From the results of the study it can be concluded that the effective application of the field trip model is able to improve the mathematical literacy skills of elementary school students. This is indicated by the results of the experimental class N-Gain 0.71 higher than the control class with an average of 0.39. And than the results of student questionnaire responses to the field trip model, it obtained an average of 4.4 with the agreed category, meaning students gave a positive response.

1. Introduction

Primary education, especially elementary school (SD), is a very important and fundamental level of education in an effort to produce quality Indonesian people who have a large role, both in preparing students to jump in the community and to fulfill the requirements to attend secondary education [1]. SD function is to provide knowledge, attitudes and basic skills to students. Elementary education institutions provide a number of subjects that are consumed by students, one of the subjects that has a big contribution in preparing students for reasoning is mathematics. In Indonesia mathematics is one of the compulsory subjects students must learn from elementary school to university level. Therefore mathematics also functions to organize and improve the sharpness of student reasoning, so that it can clarify problem solving in everyday life; practice communication skills using numbers and symbols; train students to always be truth oriented by developing a logical, critical, creative, objective, rational, careful attitude, discipline and able to work together effectively; and train students always think regularly, systematically and structured in a clear conception.

The purpose of learning mathematics in educational unit level curriculum (KTSP) is students have the ability to understand mathematical concepts, explain the interrelationships between concepts and apply concepts or algorithms flexibly, accurately, efficiently and precisely in problem solving; use reasoning on patterns and traits, make mathematical manipulations in making generalizations, compile evidence or explain mathematical ideas and statements; solve problems that include the ability to understand problems, design mathematical models, complete models and interpret solutions obtained; communicate ideas with symbols, tables, diagrams or other media to clarify the situation or problem; and has an attitude of appreciating the usefulness of mathematics in life, namely having curiosity,

attention and interest in learning mathematics, as well as being tenacious and confident in problem solving.

Looking at the objectives to be achieved in the description above, there is a conformity with the objectives of PISA, namely that students have mathematical literacy skills. According to the 2012 PISA draft assessment framework mathematical literacy is defined as a person's ability to formulate, apply, and interpret mathematics in various contexts, including the ability to reason mathematically and use concepts, procedures, and facts to describe, explain or estimate phenomena or events. Another opinion states that mathematical literacy is the power to use mathematical thinking in solving everyday problems to be better prepared to face life's challenges [2]. Mathematical literacy skills are not only limited to the ability to use numerical aspects in mathematics alone, but also involve broader knowledge.

From the results of research conducted by PISA and TIMMS, it shows that Indonesia is in a category that still needs much improvement in mathematics learning [3]. Factors of input, process, and output in mathematics education need to get more attention for the purpose of increasing mathematics education in Indonesia. Weak mastery of mathematical concepts in elementary school is caused by several factors, including student difficulties in understanding concepts, unavailability of teaching aids, and the absence of media that support learning. Teachers in providing mathematics learning are not yet applicable to everyday life, so students become less aware of the benefits of mathematics for real life.

The alternative solution that can be used to answer the above problem is to apply the field trip model in mathematics learning. Field trips are instructional trips, school visits, or school trips, for learning purposes, where students interact with design, display, and performances to get a connection of experience with ideas, concepts, and subject matter [4].

A number of studies show that field trips are very important activities in learning. Field trips affect the value, pedagogy, interests and attitudes of students [5]. Other studies show that field trip activities contribute to building student knowledge [6]. Supporters of constructivism learning theory emphasize the importance of activity, participation, communication, culture and language in the human learning process. The social aspects of learning are elaborated in the context of learning outside the classroom. Learning outside the classroom can improve social relations and learning through a variety of ways including participating in activities [7]. The field trip carried out in this study is outlined in a model that can be used as a reference in carrying out field trips.

There are seven things that need to be considered in applying the field trip model [8]. The seven things include: a) Determining community resources as a source of teaching and learning. b) Observe the suitability of learning resources with school goals and programs. c) Analyze learning resources based on pedagogical values. d) Connecting learning resources in field trips with the curriculum. e) Creating and developing field trip programs logically and systematically. f) Carry out field trips in accordance with the objectives, material, and effects of learning, in a conducive climate. g) Analyze goals, achievements, difficulties, and things that need to be prepared before and after the field trip.

2. Method

Research method uses the quasi-experimental method, to examine the extent to which a given treatment has an impact on improving the mathematical literacy skills of elementary school students. This type of research is an experiment with Pretest-Posttest Control Group Design. This research was conducted in the fifth grade of SDIT (Integrated Islamic Elementary School) Al-hikmah Depok in the first semester of 2018/2019 academic year on fractions, by taking one control class and one experimental class which amounted to 20 students each. The research instrument used was the provision of mathematical literacy questions, and student response questionnaires.

The experimental class is given the treatment of field trip and mathematical literacy learning, while the control class does not receive field trip treatment but only gets mathematical literacy learning treatment. The field trip in the experimental class was carried out by visiting "Domino Pizza" to provide students with an understanding of fraction material and its application in daily life.

3. Results and Discussion

Mathematical literacy is very important, because it emphasizes the ability of individuals to form, apply, and interpret mathematics in various life contexts. These capabilities include mathematical reasoning and the application of mathematical concepts, procedures, facts and tools to describe, explain, and predict phenomena [9]. This is what connects mathematics that is learned in the classroom with various kinds of real world situations. Mathematical ability is needed in various aspects of life to form a mindset in adapting to the development of science and technology [10]. The content of mathematics lessons that have been developed in the 2013 curriculum considers it important to balance mathematics with numbers and without numbers (images, graphics, and patterns). To be able to understand mathematics without numbers, good literacy skills are needed [11].

Efforts to facilitate the understanding of mathematical literacy that is good for students, we need a fun and applicable learning with the real world to support mathematical literacy. These learning activities can be carried out through field trips that are full of meaningful experiences for students in the real world.

Field trip is learning that can be carried out in natural settings in the context of investigation, through observation of real-world phenomena students learn directly, formulate problems based on observation, conduct investigations, process and analyze data, and make an explanation of a phenomenon. Field trips not only allow students to be actively involved in learning, but also help understand the learning process and learning experience in real-world settings. In addition, field trips are fun activities for students, learning is more challenging than learning in class [12].

The field trip model in this study is interpreted as a narrative description to describe procedures or field trip steps in achieving a specific goal, and these steps can be used to measure success or failure in achieving elementary literacy abilities of mathematical students. The steps in the field trip model consist of three stages, namely the preparation stage, the implementation phase and the final stage.

The increase in mathematical literacy in this study is caused by several factors in students, among others, a) feeling of pleasure during learning, especially during field trips, so that students have their own motivation in working on the problem, b) feeling in the matter of mathematical literacy tells their own experiences, c) previous mathematical understanding that has been obtained from the teacher, and d) the age of students. While the factors from outside the students include motivation from the teacher, the ability to teach the teacher and the location of the field trip visited. This is in line with the results of the study, which revealed that the teacher's ability to carry out learning contributed positively to students' mathematics learning outcomes. From the results of the research that has been described, the field trip model provides positive stimulation to increase the mathematical literacy of elementary school students [13].

The results of the descriptive analysis of students' mathematical literacy abilities through the application of field trip models. In this case the ability of students is grouped based on a person's ability adjusted to mathematical literacy abilities included in the domain of PISA study assessment. The group of students' mathematical literacy abilities includes mastery of the material, mastery of knowledge and skills and problem-solving abilities from the knowledge gained to be used to solve problems that exist in everyday real life.

The results of the analysis of students' abilities in terms of content, process and context in solving mathematical literacy questions include the following groups; a) Students are able to master mathematical content in working on mathematical literacy questions. The ability of students to master

mathematical content is good, because the problem is made with clear content so the questions are more directed and easily explained by students, b) The ability to master the mathematical process in solving mathematical literacy problems develops itself after students work on the problem, c) The ability to master the context Mathematics students have a good category, which can clarify students in solving problems, mastery ability in a good mathematical context makes it easier for students to find the right way and answers to work on mathematical literacy questions.

The effectiveness of the field trip model in this study is determined by two indicators, namely the competency of student learning outcomes and student responses to the field trip model. Learning is said to be effective when it reaches the desired target, both in terms of learning objectives and student learning outcomes that are maximum [14]. (Sinambela, 2017). The average competency of student learning outcomes through pretest and posttest and N-gain can be seen in the following table:

Class	No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Average
	Pretest	8.0	16.0	24.0	20.0	24.0	28.0	16.0	24.0	16.0	24.0	40.0	8.0	8.0	36.0	4.0	32.0	44.0	44.0	44.0	36.0	24.8
Control	Posttest	40.0	57.3	57.3	46.7	52.0	53.3	60.0	54.7	42.7	61.3	68.0	37.3	49.3	61.3	41.3	52.0	64.0	69.3	69.3	52.0	54.5
	N-Gain	0.3	0.5	0.4	0.3	0.4	0.4	0.5	0.4	0.3	0.5	0.5	0.3	0.4	0.4	0.4	0.3	0.4	0.5	0.5	0.3	0.39
	Pretest	24.0	24.0	32.0	16.0	40.0	16.0	36.0	28.0	28.0	32.0	24.0	20.0	36.0	28.0	32.0	24.0	24.0	32.0	40.0	32.0	28.4
Experiment	Posttest	90.7	78.7	97.3	93.3	73.3	46.7	93.3	61.3	65.3	94.7	96.0	74.7	69.3	81.3	86.7	80.0	69.3	81.3	97.3	78.7	80.5
	N-Gain	0.9	0.7	0.9	0.8	0.6	0.4	0.9	0.5	0.5	0.9	0.8	0.7	0.5	0.7	0.8	0.7	0.6	0.7	0.9	0.7	0.71

Table 1. Average pretest and posttest values

Based on the table above, the experimental class obtained the lowest N-gain, namely 0.4 (medium category) and the highest N-gain 0.9 (high category) higher than the control class. The average N-gain of the experimental class is 0.71 higher than the average of the control class 0.39, thus the effectiveness of using the field trip model in the experimental class is higher than the control class that does not use the filed trip model. This finding is in line with the results of the study (Estawul, 2016), which states that there are statistically significant differences in student academic achievement using the field trip strategy and conventional methods, the experimental class gets better results than the control class [15]. This is also in line with research (O. Caliskan, 2011), which concluded that effectively the PISA problem with the natural context is able to bring up student literacy skills in the form of basic mathematical abilities [16]. Thus the field trip model has high support in terms of achieving student mathematical literacy. So that it can be said that the field trip model is effective in terms of increasing mathematical literacy abilities.

Table 2. Students	' Response to the	Field Trip Model
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No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Average
Experiment	4.8	4.5	4.3	4.3	4.4	4.5	4.8	4.4	4.7	4.5	4.4	4.3	4.2	4.3	4.7	4.5	4.5	4.2	4.3	4.3	4.4

Seeing the table of student responses to the field trip model above, obtained a mean of 4.4 with the agreed category. This shows students give a positive response to the application of field trip models to improve students' mathematical literacy abilities. Data on student responses to field trip models were obtained from filling out student questionnaires. The level of response of students can be known through the average score of 20 questions. Each question item is related to students' response to the field trip model.

4. Conclusion

Based on the results of the research that has been carried out it can be concluded that the application of the field trip model is able to improve the mathematical literacy skills of elementary school students. The effectiveness of the application of measurable field trip models through the test results of the experimental class's mathematical literacy abilities gained a mean of 80.5 higher than the control class with an average of 54.5. Students give a positive response to the field trip model shown from the results of the questionnaire with the agreed category, it shows that students are happy with field trip activities in mathematics learning.

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