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1 FOREWORD FROM CHAIR OF THE CONFERENCE

The 3rd UPI International Conference on Primary and Early Childhood Education (UPI ICPECE 2019) held on, 2019 in Bandung, Indonesia. The aim of UPI ICPECE 2019 is to provide a platform for educators, researchers, artists, scholars, managers, and graduate students from different cultural backgrounds to present and discuss research, developments and innovations in the fields of Primary and Early Childhood Education.

There are four invited keynote speakers; Prof. Adrian Rodgers, Ph.D., Dr. Bustam Kamri, Dr. Leli Halimah, M.Pd., and Dr. Yunus Abidin, M.Pd. and 30 parallel speakers exploring 16 sub-themes: (1) Assessment and student achievement; (2) Citizenship, local wisdom and character education; (3) Curriculum Development and Innovation by Schools and Teachers; (4) Diversity and Inclusive Education; (5) Educational Effectiveness and Quality Assurance; (6) Guidance and Counseling; (7) Home, School and Community; (8) Language and Literacy; (9) Learning in and out of Classroom; (10) Policy and Social Context of Education; (11) School Leadership and Management; (12) Supporting Transition – Interfaces at Pre-primary, Primary and Secondary Levels; (13) Teacher Education, Leadership and Professional Development; (14) Teaching and Education Innovation; (15) Tomorrow's Classrooms and ICT; and (16) Gender Awareness in Education. The attendance of this international conference on primary and early childhood education comes from Indonesia, Malaysia, US, and some other country.

Finally, as the chair of the organizing committee, I would also like to extend my sincere gratitude and highest appreciation to the invited keynote speakers, parallel speakers, participants, and the organizing committee members who have fully committed to continuously supporting the completion and success of this conference.

Bandung, November 2019
Chair of the Organizing Committee,

Dr. Yunus Abidin

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2 INCREASING CALCULATION SKILLS PRIMARY STUDENTS USING REALISTIC MATHEMATIC EDUCATION APPROACH

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Abstract

2 The education problem in Indonesia is that the teachers use memorizing method for the students. The rating conducted by PISA (OECD, 2009) and TIMSS (The World Bank, 2011) shows that only few of Indonesian students are able to associate the abstract concepts in mathematics problems with their reasoning skill. The phenomenon also happened to Primary students in Merapi Mountain. Most of the students got less understanding at mathematical calculation. It was seen from their average scores in daily quizzes which were under MMC (Minimum Mastery Criteria) and their 2ational examination in 2014 scores which were 6 for mathematics subject. The research focuses on increasing of the calculation skills of the students by using Realistic Mathematic Education. The Realistic Mathematic Education uses imaginable problems and media, such as traditional food and things around Merapi Mountain for the students. The populations of the research were 60 st 3ents including grade III, IV, and V primary school between 9-11 years old. Th 2 research used the model of action research from Hendricks (2006). The results of the research shows that the calculation skills of the students grade III increased up to 56%, grade IV increased up to 43%, and grade V increased up to 73%.

Keywords: Calculation skills, realistic mathematic, student

INTRODUCTION

In the constitution number 20 year 2003, education means conscious and well-planned effort in creating a learning environment and learning process, so that learners will be able to develop their full potential to acquiring spiritual and religious strengths, develop self-control, personality, intelligence, morals, and noble character and skill that one need for him/herself for the community, the nation, and the state.

The issue is that the teachers usually use memorizing method to teach the students and the other methods, such as learning review, the use of a certain procedure, grouping, and problem solving are rarely used by the teachers (The World Bank, 2011).

Based on the rating held by Programme for International Student Assessment (PISA), Indonesia ranked 57th out of 65 countries for Mathematics (OECD, 2010). The low achievement in Mathematics is also revealed by *Trends in International Mathematic and Science Study* (TIMSS) in 2007. TIMSS said that Indonesia ranked 36th out of 49 countries on international rating scale (The World Bank, 2011). The result of the ratings from PISA and TIMSS shows that very few students in Indonesian are able to associate the abstract concept of mathematics by using reasoning skill.

This phenomenon also happened to Ban primary school grade III, IV, and V in Merapi Mountain where most of the students did not understand the mathematics operations well. It was seen from their Minimum Mastery Criteria (MMC) and their Mathematics National Examination's results in year 2014 which was 6. The headmaster of Ban primary school said that her students found difficulty in learning mathematics, especially the operations.

Mathematics is not an isolated skill that is far from people's lives, it appears in almost all of people's daily life. Mathematics is aimed to develop the reasoning skill through an inquiry, exploration and experimental activity; it can become a tool to solve the problems by using pattern of thinking and mathematical model and as a communication tools. (Depdiknas, 2003). Therefore, for some students, mathematics lesson can be very complicated and boring because the lesson that they get in the schools is only centralized in the black/white board and books. If a student does not like Mathematics, his/her scores will be low.

They think that the formula in mathematics is difficult to understand. The difficulty they experience when learning the non-contextual lesson happens because the mathematics concepts they learn are not meaningful for them, besides they are also required to acquire the mathematics at a formal level (Keiran, 1992) whereas the primary students are still in the concrete calculation stage, so they need realistic and contextual learning process.

Based on the problems above, the researcher conducted a research titled "Increasing Calculation Skills Using Realistic Mathematics Education". The aim of the research is to improve the calculation skill of the students by using the realistic mathematics education. By using the realistic mathematics education, the students hopefully will be able to understand the concepts and solve their daily problems related to number operations by using the media, such as traditional food and things around Merapi Mountain. The researcher expects that the theme of this research is different from the other researches, so that the originality of the research can be accounted in the future.

1. Main Body

1.1 Problem Formula, Objectives, Planning/Strategies

In order to accomplish the research problem, according to the background of the research, the researcher formulated two problem formulations:

1. How is the increasing of the students' the mathematical calculation skill after they used the realistic mathematics education?
2. How effective is the realistic mathematics education to increase the students' mathematic calculation skill?

Based on the problem formulation above, the objectives of the research are:

1. To know how the increasing of the students' mathematics calculation skill is after they used the realistic mathematics education.
2. To know how effective the realistic mathematics education is to increase the students' mathematics calculation skill.

The researcher applied the action research as the plan to increase the students' calculation skills. The action research was conducted because the researcher wanted to know how to increase the students' calculation skills and to know how effective the use of Realistic Matematic Education to increase the students' calculation skill in Ban Primary School is. It was in line with the statement of Stringer (2007), "Action research is a systematic approach to investigation that enables people to find effective solution to problem they confront in their everyday lives" (p. 1). Therefore, the researcher used action research as the main plan to employ the Realistic Matematic Education to solve the mathematics problems faced by the children.

THEORY

Theoretical Reviews

1. Realistic Mathematics Education

Realistic Mathematics Education is an approach in learning Mathematics that uses connection to the real world and emphasizes on the situation that is able to be imagined by the children (Van den Heuvel in Wijaya 2012). The meaningfulness concept in mathematics is the main concept of Realistic Mathematics Education. According to Freudenthal (Van den Heuvel and Panhuizen, 2005), the learning process will occur if it is meaningful for the students. The knowledge will be meaningful for the students if the learning process is done in a context or realistic problem. A realistic problem is not merely a problem in the real world. The problem is realistic if the problem can be imagined or it is real in minds of the students

2. Calculation Skills

Calculation skills is the ability to use logical reason and numbers (Triyuda, Yuline and Ali, 2013). The calculation skill is related to mathematical operation, such as addition, subtraction, multiplication, and division (Desmawira, Sumekar and Rahmahtrisilvia, 2013). Those basic mathematical operations are always faced by the students when they do the mathematics problem. Triyuda, Yuline, and Ali (2013) also states that in order to increase the children's calculation

skills, it is not only by giving them formulas or theories about mathematics, but the games can also become the solution to increase the students' calculation skills. In line with the opinion of Imrayanti (2012) also states that the students' calculation skills become low is because of the use of the uninteresting and unvaried method or strategy of teaching. Therefore, the interesting and fun methods are useful to increase the children's calculation skills.

METHODOLOGY

Developing the Research Model and Hypothesis

This research used the model of action research from Hendricks (2006). The action research model has three components: (1) reflect (2) act (3) evaluate. In the reflection step, the researcher found that the students had problems with their mathematics. The researcher proved the problem by giving them a pre-test. The results of the pre-test showed that their mathematics scores were below MMC. Then, the researcher came with the idea of the use of Realistic Mathematics Education to increase the students' calculation skills. In the action step, the researcher used seven traditional food and three things which are easily founded in Merapi Mountain, they are marbles, seeds, and rocks.

The seven traditional food and three things are used to implement the concept of calculation skills to the students. The use of media in realistic mathematics education hopefully can motivate the students to learn mathematics realistically. Thus, the students will be eager to learn mathematics because they realize the important of the materials to solve their daily life problems.

In the evaluation step, the researcher conducted a post-test to find the results of the implementation of the Realistic Mathematics Education. The Hypothesis of this research is that Realistic Mathematic Education is able to increase the students' calculation skill.

Populations and Instruments

The populations for the research were 60 students of primary school in grade III, IV, and V between 9-11 years old. They are from Ban Primary School in Ban, Sleman, Yogyakarta, Indonesia. The instruments for the pre-test were 25 mathematics problems for grade III and 30 for grade IV and V including the materials of the mathematical operations, such as addition, subtraction, multiplication, division, and the combination of the operations which had been adjusted for the students.

Data Analysis and Trial the Model

The data for the analysis are gathered from the score of the post-test. Firstly, the researcher collected all of the pre-test's results. Then, the researcher classified the results according to their grades. The results of the pre-test showed that the average score of the grade III students was 50 in average, the grade IV students was 53.8, and the grade V students was 42. Next, the researcher compared the results of the pre-test with the MMC. The researcher found that the results of the pre-test are below the MMC. In order to examine the hypothesis, the researcher used Realistic Mathematics Education. During

the implementation of the Realistic Mathematics Education, the researcher used different kinds of traditional food and things around the Merapi Mountain, which were marbles, seeds, and rocks to help the students apply the concept for solving their daily problems. The foods that they used as the media were *gethuk*, tofu, snake fruits, *jadah*, tempeh, *slondok renteng*, and candies. The things around them that they used were marbles, seeds, and rocks.

After the researcher applied the Realistic Mathematics Education, the students did the post-test which was as valid as the pre-test. Thus, the researcher compared the average results of the pre-test and the post-test of the students.

RESULT

1. How to Increase the Mathematic Calculation Skills of the Students

In order to increase the students' calculation skill, the researcher used 7 traditional food and 3 things which are easy to find in Merapi Mountain as the media in learning the realistic mathematics.

1) Marbles

Primary students usually use marbles to play, but in realistic mathematics education, marbles are used as media to teach the concept of integer addition. In order to make it easy for the student understand the concept of integer addition, the students were given a realistic problem related to the marbles and they were asked to solve the problem by using the marbles as the media. After the students understood the concept of the addition by using the marbles, the students were given daily-life problems and were asked to solve the problems by using the reasoning skill they got from learning the concept of integer addition.

2) *Gethuk*

Gethuk is a traditional food that is found in abundantly in Merapi Mountain. *Gethuk* is made of sweet potatoes which are boiled until they are soft and easy to cut. Those are why the researcher used *gethuk* as the media to teach the concept of adding fractions. During the implementation, the students were given a realistic problem related to *gethuk* and the students were asked to solve the mathematics problems by cutting the *gethuk* by themselves.addition.

3) Seeds

Seeds are very easy to find in Merapi Mountain. Usually, the seeds in this area were used for livestock or for feeding birds or cattle. In realistic mathematics education, the researcher used corn seeds, peanuts, red-beans, and soy-beans, to teach the concept of subtraction. The students were given daily-life problems related to the seeds, and then the students solved the problems by using the seeds as the media. After the students understood the concept of subtraction, the students were asked to solve the realistic mathematics problem by using their reasoning skill without the media.

4) Tofu

Tofu usually is used as a side dish. However, in the realistic mathematics education, tofu is used as a media to learn the concept of subtracting fraction. The tofu that the researcher used was *bacem*, so that the students can cut it easily. At the beginning, the students discussed about some simple illustrations related to the fractions in their daily life. Then, the students were asked to cut the tofu according to the fraction they were asked. After they cut the tofu, they learnt that the tofu they cut is the minuend and the tofu they took away is the subtrahend. Finally, they knew that the tofu that was left was the difference or the result. Furthermore, the students were asked to complete the tasks related to the problem they face every day after they understand the concept of fractions.

5) Snake fruits

Snake fruit is one of the particular fruits found in the Merapi Mountain. Snake fruits are used as the media to teach the concept of integer multiplication. In order to simplify the way the students understand the concept of integer multiplication, the students were given realistic problems related to snake fruits. After the students understood the concept of the integer multiplication by using the snake fruits as the media, they were given some problems related to their daily life by using the concept they had learnt.

6) *Slondok Renteng*

Slondok renteng is a traditional food that can be found in Merapi Mountain. It's shape is like ring and it is made of cassava. The researcher chose *slondok renteng* as the media because *slondok renteng* consists of some *slondok* rings and it is easy to divide. It will make the students understand the concept of dividing the integer easily. Then, the students were given some realistic mathematics problems related to the integer and were asked to solve the problems by using the concept that they had learnt.

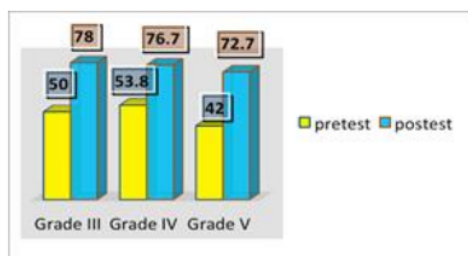
7) *Jadah and Tempeh*

Jadah and tempeh are famous traditional food from Merapi Mountain. The researcher chose *jadah* and tempeh as the media to teach the concept of multiplication and division of fractions. Moreover, they are easy to find and they are suitable for teaching multiplication and division of fraction. The fraction consists of numerator and denominator that cannot be separated. In the implementation, the *jadah* is the numerator and the tempeh is the denominator, so that the students were able to differentiate the numerator and the denominator easily.

2. Improving the students' calculation skills

The Realistic Mathematics Education was able to increase the students' calculation skill. It can be seen after conducting the post-test and comparing the post-test's results to the pre-test's results. The results of comparing the pre-test and the post-test of the students are revealed in graph 1.

Graph 1. The graph of the students' calculation skill



The graph shows the increasing of the scores before and after the program. In the pre-test of grade III, the score is 50. It increases up to 78 and the increasing is 56%. In the pre-test of grade IV, the score is 53.8. It increases up to 76.7 and the increasing is 43%. In the pre-test of grade V, the score is 42. It increases up to 72.7 and the increasing is 73%.

DISCUSSION AND CONCLUSION

In conclusion, the Indonesia's realistic mathematics approach increases the calculation skills of the primary students of Ban grade III, IV, V. The increasing can be seen from the students' initial scores (pre-test) and the students' final scores after the research has been conducted (post-test). The average score of the pre-test of the grade III students is 50 and it increases up to 56%, so that the average score of the post-test is 78. Meanwhile, the average score of the pre-test grade IV is 53.8 and it increases up to 43%, so that the average score of the post-test is 76.7. On the other hand, the average score of grade V is 42 and it increases up to 73%, so that the average score of the post-test is 72.7. Therefore, the realistic mathematics education the researcher used obviously increased the students' calculation skills in terms of the addition, the subtraction, the multiplication, the division, and the mixed operation.

Limitation and Further Research

During the research, the students have to participate in the pre-test, the learning processes, and the post-test, so that the results are valid because the students follow all steps in the research. For the other researchers who want to conduct the same research, they can use the other kinds of food or things that are easy to find around the area they research.

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