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Improvement in mathematics learning outcomes on addition and subtraction material for 1st-grade students at SDN 3 Mulyoarjo using concrete media

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***Abstract*—** *Mathematics is a difficult subject for some elementary school students. And it is considered a nightmare because it is very difficult to solve and understand.The foundation of learning mathematics is addition and subtraction. Therefore, students, especially first-grade elementary school students, must be given a strong foundation in addition and subtraction so that they can easily solve mathematical problems. Teaching methods or strategies, as well as learning tools, are absolutely necessary to engage students. The formulation of the problem in this research is to improve the mathematics learning outcomes on addition and subtraction for first-grade students at SDN 3 Mulyoarjo through the use of concrete media. This research aims to improve students' ability to operationalize addition and subtraction with the help of concrete objects, and it is also expected to be beneficial for students, researchers, and parents. To achieve this goal, classroom action research was conducted with 26 first-grade students at SDN 3 Mulyoarjo, carried out in 2 cycles. The method used in this research is a qualitative approach that describes the actual problems in the field, which are then reflected upon and analyzed based on supporting theories, followed by the implementation of field research. The data obtained in this study were through observation, monitoring, discussion, and evaluation. The results of this study show an improvement from the pre-action activities, cycle I, and cycle II. In the pre-action research, 35% of the students achieved learning completeness. After the intervention using concrete objects, the completion rate increased to 85%, and in the subsequent cycle, all students achieved learning mastery. Mathematics learning using concrete media is conducted in stages, namely: (1) presentation of material, (2) formation of groups and numbering, (3) group thinking, (4) group presentation, (5) awarding, and (6) drawing conclusions, can improve learning outcomes and student activity at SDN 3 Mulyoarjo.*

***Keywords*—** *Addition, subtraction, elementary school mathematics, concrete media*.

I. INTRODUCTION

Mathematics is a science that deals with numbers. Everything related to it encompasses all forms of operational procedures. All of that is used in solving problems related to numbers. Thus, all forms of operations such as addition, subtraction, multiplication, and division are ensured to be studied in the field of mathematics. The development of mathematics teaching in schools is greatly influenced by many interrelated factors. These factors include the students, teachers, the subject matter itself, and the environment. Student factors, for first-grade elementary school children, are still closely related to the world of play that

always involves concrete objects. When they enter elementary school age, they experience difficulties when reading questions that consist only of text and numbers without any concrete objects. Regarding the teacher factor, sometimes teachers teach monotonously, which is less engaging for students .In the learning process, a teacher is required to always be productive, creative, and innovative in creating a learning process that is interesting, enjoyable, and gives a sense of meaningfulness to students. This is evident in their poor grades when completing assignments.

Students have scores below the Minimum Passing Criteria (KKM) of around 65%, while those above KKM are 35%.Given these results, a special strategy is needed to teach mathematics in the addition and subtraction material. Because the material is the foundation for solving further problems. One way to improve students' learning outcomes in addition and subtraction is by using realia/media tools. Hamalik in Arsyad (2013:19) stated that the use of media learning in the teaching and learning process can stimulate desire and new interests, stimulate motivation and learning activities, and even bringing psychological influences on the students. Ibrahim (196:432) explains the importance of learning media because media learning brings and evokes feelings of joy and happiness for the participants students and renew their enthusiasm, helping to solidify their knowledge in the minds of the students and bringing the lessons to life.

Realia media are media in the form of real objects such as straws, marbles, matchsticks, toothpicks, etc., used as learning materials or sources. According to Mulyani Sumantri (2004:178), concrete media generally functions as (a) an aid to create an effective teaching and learning situation, (b) an integral part of the overall teaching situation, (c) laying the foundations of concrete and abstract concepts to reduce understanding that is verbalistic in nature, (d) developing students' learning motivation, (e) improving the quality of teaching and learning. According to Mulyani Sumantri (2004:178), in general, concrete media functions as (a) an aid to create an effective teaching and learning situation, (b) an integral part of the overall teaching situation, (c) laying the foundations of concrete and abstract concepts to reduce verbalism, (d) developing students' learning motivation, (e) improving the quality of teaching and learning.

II. METHOD

The purpose of this research is to improve the process and outcomes of mathematics learning on addition and subtraction for 1st grade at SDN 3 Mulyoarjo by using concrete media, which is why this research is a classroom action research (CAR). One of the characteristics of classroom action research (CAR) is the presence of real actions. The action is carried out in a natural setting (not in a laboratory) and is aimed at solving practical problems. The approach used in this research is a qualitative approach. In qualitative research, data collection is conducted descriptively and then written in a report. The data obtained from this research consists of words, images, and not numbers .The researcher is assisted by one observer who is always present, and their presence is absolutely necessary because this research uses a qualitative approach. The position of the researcher in this study is as a planner, executor, collector, analyzer, data interpreter, and finally as the reporter of the research results.

During the implementation of the research, the presence of the researcher in the field serves as both the researcher and the executor of the learning, as well as the observer for data collection. This research was conducted in 2 cycles, with the first cycle consisting of two meetings and the second cycle consisting of three meetings. At the end of each action, the researcher and the observer reflect on the implementation of the action. In this research, the researcher acts as a first-grade teacher, so besides working on collecting and analyzing data in the field, the researcher also plays a direct role in the learning process from planning, teaching implementation, to assessment. The type of data collected is qualitative data, in the form of observations, discussions, and assessments.

III. RESULTS AND DISCUSSION

As explained in the background of this research, first-grade students experience difficulties in solving math problems related to addition and subtraction. They experience difficulties because they are still closely associated with the playtime in kindergarten. Indeed, when viewed from the background of the students who enter SDN 3 Mulyoarjo, it is very heterogeneous. Due to the heterogeneity of the students' backgrounds, their thinking patterns are also heterogeneous.

In addition, the teacher teaches monotonously, which is less engaging for the students. In the learning process, a teacher is required to always be productive, creative, and innovative in creating a learning process that is interesting, enjoyable, and gives a sense of meaningfulness to the students. Indeed, when viewed from the background of the students who enter SDN 3 Mulyoarjo, it is very heterogeneous. Due to the heterogeneity of the students' backgrounds, their thinking patterns are also heterogeneous. Indeed, when viewed from the background of the students entering SDN 3 Mulyoarjo, it is very heterogeneous. Due to the heterogeneity of the students' backgrounds, their thinking patterns are also diverse.

In Cycle 1, the learning process begins with the teacher conducting a question-and-answer session with the students about the topics to be studied, using clear and concise questions. However, the questions do not motivate the students, resulting in them not answering the questions firmly and their responses not aligning with the questions. Next, the teacher conveyed the objectives and steps of the lesson with clear and easy-to-understand sentences, but the language used was not coherent, causing

the students not to listen attentively and engage in other activities. In explaining addition and subtraction, the teacher delivered the material according to the lesson plan, and the sentences used were clear and easy to understand, but there were no pauses or intonation in the delivery, causing the students to not listen attentively and engage in other activities. Next, the teacher gave students the opportunity to ask questions about the material they didn't understand, but no one asked any questions. After that, the teacher distributed the worksheets that needed to be completed, but the teacher did not allocate time for them to be done, so the students did not work on them diligently. Next, the students were given the opportunity to discuss and work on the assignment, but the teacher did not guide them, so the students did not cooperate. Then the teacher gave the students the opportunity to solve problems on the whiteboard, but the teacher did not ask the other students to be quiet, causing the class to become noisy. Next, the teacher gives individual exercises to the students, but the teacher does not explain the questions that the students do not understand, so the students work dishonestly. As a conclusion, the teacher guided the students to summarize the material, provided reinforcement and motivation through stimulating questions and appreciation, but the intonation and language used were unclear, causing the students to lose enthusiasm and the classroom atmosphere to become chaotic. As a conclusion, the teacher guides the students to summarize the material, provides reinforcement and motivation to the students by asking stimulating questions and giving appreciation, but the intonation and language used are unclear, causing the students to lose enthusiasm and the classroom atmosphere to become chaotic.

In cycle 2 of the learning process, it begins with the teacher conducting a question-and-answer session with the students about the topics to be studied, using clear, concise questions that motivate the students. As a result, the students answer the questions firmly and their responses align with the questions. Next, the teacher conveys the learning objectives and steps with clear, easy-to-understand sentences and a logical sequence of language, so that students listen attentively and do not engage in other activities. In explaining the addition and subtraction material, the teacher delivered the content according to the lesson plan, using clear, easily understandable sentences with pauses and intonation in their pronunciation, so that the students listened calmly and did not engage in other activities. Next, the teacher gives students the opportunity to ask questions about the material they do not understand, and many students ask questions. After that, the teacher distributed the worksheets that needed to be completed, and the teacher allocated time for the students to work on them diligently. Next, the students were given the opportunity to discuss and work on the task by distributing concrete media such as beads, ice cream sticks, and buttons, and the teacher guided the students so that they could collaborate. Then the teacher gives the opportunity to the group representatives to present their results in front of the class, and the teacher instructs the other students to be quiet, so the class does not become noisy. Next, the teacher gives individual exercises to the students and explains the questions that the students do not understand well, so that the students can complete them honestly. As a conclusion, the teacher guides the students to summarize the material, provides reinforcement and motivation to the students by asking stimulating questions and giving appreciation to the students with clear intonation and language, so that the students are enthusiastic and the classroom atmosphere remains orderly.

In the pre-cycle of daily test learning outcomes, data was obtained showing that students who achieved scores according to the Minimum Completeness Criteria (KKM) of 70 were 30.8% (8 students), and students who scored below the KKM were 69.2% (18 students), indicating that improvements are needed.

In cycle 1, the daily test learning results showed that 69.2% (8 students) achieved scores according to the KKM 70, while 30.8% (8 students) scored below the KKM, indicating the need for improvement. In cycle 2, the results of the daily test showed that 96.2% (25 students) achieved scores according to the KKM of 70, and only 1 student scored below the KKM, so no improvements were needed.

Assesment Sheet

No	**Name**	**Inisial**	**Result**		
			Pre cycle	First Cycle	Second Cycle
1	ACHMAD ALFARIZI	AA	56	65	74
2	ACHMAD BURHAN	AB	74	86	90
3	ADINATA HARI	AH	75	77	90
4	ALEXANDRIA F	AF	76	79	82
5	ALWAN ZAHRON	AZ	70	74	86
6	AMIRA NURIL	AN	70	73	87
7	ANGELITA STAQIF	AS	80	85	90
8	ANNORA AURORA	AA	62	67	75
9	BANYU LINTANG	BL	54	65	76
10	CANTIKA NINDY	CN	60	69	81
11	DENIA AYU	DA	67	69	80
12	DHARA AQILA	DA	64	67	76
13	ERLANGGA R	ER	50	55	70
14	FELISA R.	FR	88	92	92

15	FERI PUTRA	FP	85	72	95
16	FIDELA REMA NUR	FR	80	88	90
17	FINOLA NUR	FN	64	79	84
18	FITRI NURHAFIZHA	FN	69	74	89
19	GIFTA AIDILA	GA	60	74	77
20	IBRA AURELIA	IA	85	89	91
21	KANAYA POETRI	KP	66	70	75
22	KARRAMA PUTRA	KP	70	86	89
23	KEYSHA ZHEVARA	KZ	74	70	78
24	LIVIASARI DEWI	LD	86	90	92
25	MAULANA KAISAR	MK	80	70	75
26	MOCH FAHRI	MF	60	63	80
JUMLAH			1731	1952	2137
RATA-RATA			66,6	75,1	82,2
MIN			48	57	71
MAX			90	93	95

The lesson implementation plan is derived from the syllabus to guide student learning activities in an effort to achieve basic competencies. The lesson plan is developed for each basic competency that can be implemented in one or more meetings .Teachers design lesson implementation plans for each meeting according to the scheduling at the educational institution. According to Rusman (2011:7), the components of the lesson implementation plan include: (a) subject identity, (b) competency standards, (c) basic competencies, (d) competency achievement indicators, (e) learning objectives, (f) teaching materials, (g) time allocation, (h) teaching methods, (i) learning activities consisting of three components: initial activities, core activities, and closing activities, (j) learning evaluation. In Cycle I, the teacher as a researcher prepared a lesson plan, and the assessment conducted by the collaborator found several aspects that were not maximally implemented, including: (1) the teacher was unclear in formulating the learning objectives, (2) the teacher did not pay enough attention to the allocation of time in the learning process using realia media, and (3) the completeness of the assessment instruments.

Based on the notes from Cycle I, the lesson implementation plan using realia media in Cycle II was revised and improved according to the collaborator's evaluation results from Cycle I. However, there are still several aspects that have not been achieved, such as managing the allocation of time for each stage of learning and the clarity of the assessment procedures. From the data analysis conducted, the assessment of the RPP in the first and second cycle activities carried out by the collaborators showed an increase in the average IPKG 1 score. In cycle I, the average score was 3.00, whereas in cycle II, the average score was 3.68.The teachers' ability as researchers in preparing lesson plans increased by 17%.

IV. CONCLUSION

Based on the results of the implemented learning improvement, the researcher can draw the following conclusion:The use of concrete objects in the topics of addition and subtraction can provide an enjoyable experience for students, resulting in an increase in learning completeness and student activity in participating in the learning process as expected. This can be seen from the percentage increase in learning completeness as follows :

1. Initial study: students who completed 40% or 11 students
2. First cycle: the percentage of students who completed the course increased to 61% or 16 students
3. Second cycle: students who completed it increased to 89% or 23 students

Student participation and activity in learning also experienced an increase, from 72% in the first cycle to 90% in the second cycle. With the improvement in student learning achievements from the initial study to the second cycle, where there is an increase in learning achievements in each cycle, the proposed hypothesis is as follows: If Mathematics learning on the topics of addition and subtraction uses concrete media, then there will be an increase in the learning achievements of first-grade students at SDN 3 Mulyoarjo.

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