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Efforts to Improve Mathematics Learning Outcomes Using Napier Bone Teaching Aids for Elementary School Students

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ABSTRACT

Purpose of the study: This research aims to improve mathematics learning outcomes in multiplication calculation operations using Napier bone teaching aids so that an active, creative, enjoyable learning process can be produced and ultimately complete learning outcomes can be achieved.

Methodology: This research was conducted using mixed methods, namely quantitative methods and qualitative methods. The qualitative method was carried out using a type of classroom action research. Meanwhile, quantitative methods use observation techniques, and formative tests are analyzed using descriptive techniques. The sample for this research was 33 fourth grade elementary school students, consisting of 16 boys and 17 girls. The sampling technique uses simple random sampling. Data analysis techniques use percentage statistics and qualitative using miles and huberman.

Main Findings: The results of observations carried out in cycle I followed by a formal test showed data in the form of a class average result of 45.75. In cycle II the average student formal test result was 61.21 and the difference between cycles I and II proved that there was an increase in student learning outcomes. In cycle III the average formal test result was 72.12. Meanwhile, the students' achievement of the Minimum Completeness Criteria) has been achieved in accordance with the class KKM achievement standard, namely 87.9%.

Novelty/Originality of this study: The novelty of this research is that it is a means of creating interesting activities and games that encourage direct learning and foster a deeper understanding of multiplication.

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1. INTRODUCTION

Mathematics is one of the main subjects, a mandatory subject at every level of primary and secondary education. Until now there are still students who are less interested in mathematics and their mathematics learning achievements have not shown optimal results [1]–[3]. The problem that often arises is that students are forced to mechanically memorize things that have been conveyed by the teacher, so that students do not have the courage to express opinions, are not creative and independent, let alone think innovatively [4]–[6]. Apart from that, the approach to learning mathematics still uses the traditional approach, namely sitting down and taking notes and memorizing. Learning becomes boring, uninteresting and the results are unsatisfactory.

Making learning fun to get good learning results requires a good understanding of concepts and procedures. According to [7]–[9], Some of the difficulties that students often experience in learning mathematics include:

1. Difficulty Understanding Concepts: Mathematics involves many concepts and principles that may be difficult for some students to understand. They can face difficulties in understanding basic concepts such as numbers, mathematical operations, equations, or geometry.
2. Fear and Lack of Confidence: Some students may feel afraid or lack confidence in learning mathematics. They may have negative beliefs about their own math abilities, which can hinder their motivation and performance.
3. Lack of Connection to the Real World: Students may have difficulty seeing the relevance of mathematics to everyday life. Lack of practical application in learning mathematics can make students lose interest and motivation.
4. Difficulty Solving Problems: Mathematics involves the ability to solve problems. Students may have difficulty analyzing problems, planning strategies, and implementing appropriate steps to find solutions.
5. Lack of Concrete Understanding: Some mathematical concepts, such as fractions, decimals, or algebraic equations, can be abstract and difficult to understand concretely. Students may have difficulty relating the concept to a visual or practical representation.
6. Lack of Practice and Computational Skills: Mathematics also involves practice and computational skills. Students may have difficulty with arithmetic operations, calculations, or problem solving that require strong computing skills.
7. Lack of Understanding of Mathematical Language: Mathematical language has special terms and notations that may be difficult for some students to understand. Difficulty in understanding mathematical terminology or symbols can hinder overall understanding.
8. Lack of Appropriate Learning Resources: Students may have difficulty in finding the right learning resources or learning methods that suit them. Teaching methods that do not suit students' learning styles can make it difficult for them to understand and master mathematics.

It is important for teachers and parents to identify the difficulties experienced by students in learning mathematics and provide supportive learning approaches to help them overcome these difficulties. Learning outcomes are basically abilities in the form of new skills and behavior as a result of training or experience gained [10]–[12]. Student learning outcomes not only include cognitive aspects (knowledge and understanding), but also include affective aspects (attitudes, values, motivation) and psychomotor (physical skills)[13]–[15]. A holistic understanding of student learning outcomes helps teachers evaluate learning effectiveness, identify student needs, and design appropriate interventions. It is also important to remember that student learning outcomes do not only depend on the quality of teaching, but are also influenced by other factors such as student motivation, the learning environment, and the support provided by the family and community.

These factors are important as reasons to adopt a comprehensive and holistic approach in evaluating and understanding student learning outcomes [16]–[18]. Learning outcomes are obtained from the evaluation carried out by the teacher at the end of the lesson [19]–[21]. Student learning outcomes can be measured in various ways, such as tests, exams, projects, structured assignments, performance assessments, or observations. Learning outcomes in mathematics subjects can be improved by using teaching aids. Teaching aids are objects or materials used in learning to help students understand concepts or subject matter in a more concrete or visual way.

One common example of props is a model or replica [22], [23]. Teaching aids are three-dimensional models that represent objects or systems being studied in mathematics subjects such as Napier bones [24]. Napier's bone, or also known as Napier's finger, is a mathematical prop that is used to perform multiplication and division operations [25]. Napier Bones was a precursor to logarithms and was used before the use of modern calculators. Napier bones consist of a number of rods or blades made of hard materials, such as wood or metal. On each stem, there is a row of numbers carved or printed. Each bar has a different number scale, which is often a logarithmic number series. In use, the two Napier bone blades are arranged in such a way that the numbers located on the blades can be used to perform multiplication or division operations [20]. By moving the bars, the user can multiply or divide numbers by finding the result on the appropriate scale.

Based on the results of previous research, it was found that the development of Napier's Bones is a multiplication calculation operation for students in class 3 of SDN 13 Sitiung Dharmasraya Regency that can be used, is considered very practical and effective[26]. So the research is a form of implementation of previous research, namely to measure the effect of teaching aids to improve mathematics learning outcomes in multiplication calculation operations.This research was previously carried out with the aim of improving student learning outcomes and used Napier bone props with 2 test cycles [25].Meanwhile, in this research, there is an update with the aim of improving student learning outcomes by using Napier bone props for 3 formative test cycles.

The urgency of conducting this research is to empower teachers by providing effective tools to engage students and improve teaching methodology. The novelty of this research is that it is a means of creating

interesting activities and games that encourage direct learning and foster a deeper understanding of multiplication. This research aims to improve mathematics learning outcomes in multiplication calculation operations using Napier bone teaching aids so that an active, creative, enjoyable learning process can be produced and ultimately complete learning outcomes can be achieved.

2. RESEARCH METHOD

2.1. Types of Research

This research uses mixed methods, namely qualitative methods and quantitative methods. Mixed methods research is a research approach that combines elements from quantitative research and qualitative research in one study [27], [28]. In mixed methods research, researchers use both approaches to collect, analyze, and interpret data with the goal of gaining a more comprehensive and in-depth understanding of the phenomenon under study.

The qualitative method uses classroom action research with 4 stages: planning, implementation, observation, and reflection. Meanwhile, quantitative methods use observation techniques, and formative tests are analyzed using descriptive techniques. This research design is sequential explanatory with strengthening of qualitative methods. Sequential explanatory research design (sequential explanatory research design) is a type of mixed research design that prioritizes quantitative research with additional explanations from qualitative research [29], [30]. In this design, quantitative research is conducted first, followed by qualitative research which is used to explain or provide in-depth understanding of the findings that emerge from the quantitative research.

2.2. Population and Sample

The population of this study was fourth grade elementary school students. The sample for this research was 33 fourth grade elementary school students, consisting of 16 boys and 17 girls. The sampling technique uses simple random sampling.

2.3. Research Instrument

This research instrument is documentation for qualitative methods and formative test sheets for quantitative data. Qualitative data collection techniques were obtained from documentation studies to strengthen quantitative data obtained from student formative tests. Skilled data analysis techniques using Miles and Huberman. The quantitative data analysis technique is descriptive analysis in the form of percentages as follows:

$M \frac{\Sigma x}{N}$ …..... (1)

Information:

M = average value

Σx = sum of all values

N = the number of students

2.4. Research Procedure

This research procedure begins with observation, distributing questionnaires, collecting information and data, followed by processing and analyzing data, interpreting the results of the analysis and drawing conclusions.

3. RESULTS AND DISCUSSION

Mathematics is a scientific discipline that studies patterns, structure, space and mathematical relationships. Mathematics subjects involve understanding and applying mathematical concepts, theories and methods in problem solving. Learning mathematics requires dedication, practice, and deep understanding. With hard work and persistence, mathematics can be learned and utilized in various aspects of life. To measure students' ability to understand mathematics lessons, KKM is needed.

KKM is the limit score or level of achievement that must be achieved by students in order to be considered to have achieved completeness or passed the subject. KKM scores in mathematics vary depending on the curriculum and educational policies in force in each country or educational institution[30], [31]. KKM standards are usually set based on basic competencies or learning objectives to be achieved in mathematics subjects[31], [32].KKM in mathematics subjects functions as a reference for assessing students' abilities in understanding, applying and solving mathematical problems according to the specified level of difficulty. KKM also helps in measuring students' learning progress and providing feedback about their achievements in mathematics subjects[33]. It is important to note that the KKM is only a minimum standard, and students are expected to continue to improve their understanding and math skills beyond the KKM. The main goal of learning mathematics is to ensure that students understand mathematical concepts, are able to apply them in real contexts, and have good problem solving skills.

One of the principles of assessment in a competency-based curriculum is to use criteria as a reference, namely using certain criteria to determine student graduation. The lowest criteria for declaring students have achieved completeness are called Minimum Completeness Criteria (KKM)[34], [35]. In the elementary schools that the researchers conducted, the school maintained a standard for individual/class KKM achievement, namely a minimum score of 60. Meanwhile, the minimum completeness criteria (KKM) in the national/ideal standard follow the national level percentage, so it is expressed with a maximum number of 100 (one hundred). The maximum score of 100 is the ideal completion criterion. The national completion target is expected to reach a minimum of 75.

Minimum completeness criteria are a common reference for educators, students and parents of students. Therefore, parties who have an interest in assessment in schools have the right to know. Education units need to carry out outreach so that information can be accessed easily by students and/or their parents. Minimum completeness criteria must be included in the Learning Results Report (LHB) as a reference in responding to student learning outcomes. The use of mathematics teaching aids in learning can have a positive impact on student learning outcomes. According to research from[36]The following are some of the benefits of using mathematics teaching aids in improving learning outcomes:

1. Concretization of Concepts: Mathematics teaching aids can help students to understand mathematical concepts concretely. For example, the use of geometric manipulatives such as geometric objects or tangrams can help students visualize and understand the properties of plane shapes and geometric figures.
2. Hands-on Experience: Mathematics teaching aids allow students to have hands-on experience in carrying out mathematical operations. For example, the use of Napier finger numbers or an abacus can help students understand multiplication or addition operations in a concrete and interactive way.
3. Increase Involvement: The use of mathematics teaching aids can increase student involvement in the learning process. Attractive and interactive teaching aids can make students more enthusiastic about learning mathematics, which in turn can increase their motivation and interest in this subject..
4. Developing Problem Solving Skills: The use of mathematical teaching aids can help students develop problem solving skills. Students can use teaching aids to formulate problems, look for patterns, test hypotheses, and explore solutions visually and manipulatively.
5. Cooperative Learning: Mathematics teaching aids can be used in cooperative learning, where students work collaboratively in groups to solve mathematical problems. This teaching aid can facilitate discussion and interaction between students to build better understanding.

However, it is also important to remember that the use of mathematical teaching aids should be supported by appropriate pedagogy. Teachers need to ensure that the use of teaching aids is well integrated in learning and linked to clear learning objectives. Apart from that, evaluations also need to be carried out to see to what extent the use of mathematics teaching aids contributes to the achievement of student learning outcomes.

3.1. Cycle 1

Research result

In cycle I, data was searched using formal tests as a data collection instrument. In providing an assessment of student learning outcomes, research refers to the achievement of students' KKM targets for the course of learning by paying attention to the following aspects:

1. Completed, if the student's score reaches the specified KKM target, namely 60.
2. Incomplete, if the student's score does not reach the specified KKM target.

In research conducted on the learning outcomes of fourth grade elementary school students during implementation in cycle I, the data obtained are shown in table 1 as follows.

Table 1. Formative results of cycle 1

No	Name	Mark	KKM		Completeness	
			individual	National/ideal		
1.	A	90	60	75	T	T
2.	B	0	60	75	TT	TT
3.	C	40	60	75	TT	TT
4.	D	90	60	75	T	T
5.	E	50	60	75	TT	TT
6.	F	0	60	75	TT	TT
7.	G	60	60	75	T	TT
8.	H	40	60	75	TT	TT
9.	I	30	60	75	TT	TT
10.	J	80	60	75	T	T
11.	K	50	60	75	TT	TT
12.	L	50	60	75	TT	TT

13.	M	40	60	75	TT	TT
14.	N	60	60	75	T	TT
15.	O	50	60	75	TT	TT
16.	P	40	60	75	TT	TT
17.	Q	40	60	75	TT	TT
18.	R	70	60	75	T	TT
19.	S	60	60	75	T	TT
20.	T	30	60	75	TT	TT
21.	U	40	60	75	TT	TT
22.	V	40	60	75	TT	TT
23.	W	50	60	75	TT	TT
24.	X	0	60	75	TT	TT
25.	Y	60	60	75	T	TT
26.	Z	60	60	75	T	TT
27.	AB	40	60	75	TT	TT
28.	CD	40	60	75	TT	TT
29.	EF	80	60	75	T	TT
30.	GH	30	60	75	TT	TT
31.	IJ	30	60	75	TT	TT
32.	KL	40	60	75	TT	TT
33.	MN	30	60	75	TT	TT
Average				45,75		

Based on the results of observations in the first cycle, out of 33 students, it turned out that many students did not complete the individual KKM standards and the national/ideal KKM standards. Only 10 students (33.3%) completed the individual standards, while only 10 students (33.3%) completed the national/ideal KKM standards. only 4 students completed (12.1%). And based on the number of students, the average number of classes is 45.75. This is because students do not pay enough attention to learning, there are still many students who play alone and talk to themselves when learning takes place, and there is a lack of teachers in providing teaching aids to students so that students are not able to accept the new methods given to make multiplication calculations easier. Many students still talk to themselves and play alone when learning takes place. It turns out that many students are still confused about the new model of teaching aids in understanding it.

Reflection

In carrying out reflection, researchers use data results in the form of values and events that hinder learning while learning is taking place. Based on observations of learning outcomes, things that need to be improved in the next cycle are as follows:

1. Many students have not achieved the specified KKM targets, both on individual KKM standards and national/ideal KKM standards..
2. Many students don't know or understand the teaching aids that I just introduced.
3. From the teacher, the socialization of these teaching aids has not been accepted by students so that students are confused about understanding them. There are several students who have not achieved the minimum completeness score. This is due to the newly introduced props

In general, cycle I was not conducive, and student learning outcomes did not reach the specified KKM standards. This must be something that must be addressed in the implementation of cycle II.

3.2. Cycle 2

Research results

From observations made on the learning outcomes of fourth grade elementary school students during the implementation of cycle II, data was obtained as shown in table 3 as follows.

Table 2. Formative results of cycle II

No	Name	Mark	KKM		Completeness	
			individual	National/ideal		
1.	A	100	60	75	T	T
2.	B	80	60	75	T	T
3.	C	80	60	75	T	T
4.	D	100	60	75	T	T
5.	E	60	60	75	T	TT
6.	F	80	60	75	T	T

7.	G	80	60	75	T	T
8.	H	80	60	75	T	T
9.	I	80	60	75	T	T
10.	J	80	60	75	T	T
11.	K	80	60	75	T	T
12.	L	100	60	75	T	T
13.	M	60	60	75	T	T
14.	N	60	60	75	T	TT
15.	O	40	60	75	TT	TT
16.	P	60	60	75	T	TT
17.	Q	80	60	75	T	T
18.	R	80	60	75	T	T
19.	S	60	60	75	T	TT
20.	T	80	60	75	T	T
21.	U	80	60	75	T	T
22.	V	60	60	75	T	TT
23.	W	40	60	75	TT	TT
24.	X	40	60	75	TT	TT
25.	Y	60	60	75	T	TT
26.	Z	80	60	75	T	T
27.	AB	80	60	75	T	T
28.	CD	80	60	75	T	T
29.	EF	40	60	75	T	T
30.	GH	80	60	75	TT	TT
31.	IJ	80	60	75	T	T
32.	KL	60	60	75	T	TT
33.	MN	80	60	75	T	T
Average				72,12		

In cycle II, students began to understand what was taught and instructed by the teacher compared to cycle I, this was because the teacher conducted socialization before learning began. From the student learning results, there was an increase in students' ability to solve problems, as evidenced by 33 students, 25 students (75.8%) completed and 8 students (24.2%) did not complete. Meanwhile, in the national/ideal KKM standard assessment, it has not yet reached the expected target, but is quite good in achieving national standards, namely 12 students (36.3%) completed (T), better than cycle I, namely only 4 students. This means that there is an increase in students' abilities in learning outcomes.

Reflection

After observing the learning in cycle II, the following results were obtained:

1. Students no longer feel confused about how to solve multiplication using Napier bone props.
2. Students are focused on what is instructed by the teacher.
3. More than 50% of students have answered the formative test questions correctly. This can be seen from the achievement of individual KKM standards.
4. The achievement of National standards has not yet reached the KKM achievement target, but is quite good..
5. From the teacher, there were no obstacles in preparing the lesson because previously students were taught it first at the end of the lesson in cycle I.

In general, the implementation in cycle II has gone well. From the student learning results, there was an increase in students' ability to solve problems, as evidenced by 33 students, 25 students (75.8%) completed and 8 students (24.2%) did not complete. This means that there is an increase in student abilities in student learning outcomes. Even though more than 50% of students have completed the formative tests in cycle II, the scores obtained are not satisfactory enough so it is necessary to hold cycle III.

3.3. Cycle 3

Research results

From observations made on the learning results of class IV elementary school students during the implementation of cycle II, data on formative test results in cycle III were obtained as shown in table 3 as follows:

Table 3. Formative results of cycle III

No	Name	Mark	KKM		Completeness	
			individual	National/ideal		
1.	A	80	60	75	T	T
2.	B	60	60	75	T	TT
3.	C	60	60	75	TT	TT
4.	D	80	60	75	T	T
5.	E	60	60	75	T	TT
6.	F	60	60	75	T	TT
7.	G	60	60	75	T	TT
8.	H	60	60	75	T	TT
9.	I	80	60	75	T	T
10.	J	80	60	75	T	T
11.	K	40	60	75	TT	TT
12.	L	80	60	75	T	T
13.	M	40	60	75	TT	TT
14.	N	60	60	75	T	TT
15.	O	60	60	75	T	TT
16.	P	40	60	75	TT	TT
17.	Q	60	60	75	T	TT
18.	R	80	60	75	T	TT
19.	S	60	60	75	T	TT
20.	T	40	60	75	TT	TT
21.	U	40	60	75	TT	TT
22.	V	60	60	75	T	TT
23.	W	60	60	75	T	T
24.	X	60	60	75	T	T
25.	Y	60	60	75	T	TT
26.	Z	80	60	75	T	T
27.	AB	80	60	75	T	T
28.	CD	80	60	75	T	T
29.	EF	80	60	75	T	T
30.	GH	40	60	75	TT	TT
31.	IJ	40	60	75	TT	TT
32.	KL	60	60	75	T	TT
33.	MN	40	60	75	TT	TT
Average				61,21		

In cycle III, almost all students focused and paid attention to what the teacher said, this was because the teacher prepared the lesson optimally. Apart from that, the learning carried out in cycle III is no longer foreign to students. This can be seen from observations made by researchers who observe students' interest in participating in learning. From the student learning results, there was an increase in students' ability to solve problems, as evidenced by 33 students, 29 students (87.9%) completed and 4 students (12.1%) did not complete. Even at national level standards it has reached more than 50%, which can be seen from 33 students, 22 students (66.7%) completed. There were even 3 students who got a score of 100, meaning there was a significant increase in students' ability to achieve learning outcomes in mathematics learning using Napier bone teaching aids. As well as the standard of learning success when out of a total of 33 students at least 85% have reached the individual KKM, so the results in cycle III are 29 students (87.9%) who have completed it. This means that the PTK which carries the title of improving the results of class IV mathematics learning in the multiplication calculation operation using Napier bone props at SDN Sidorejo Lor 06, Salatiga City has been completed. This level of success can be seen from achieving the class KKM target of at least 85%.

Reflection

After observing the learning in cycle III, the following results were obtained:

1. Students already understand the use of Napier bone props.
2. Most students are focused on following the instructions given by the teacher.
3. Has met the class KKM target.
4. Most of the students answered the formative test questions correctly, there were 3 students who answered all the questions correctly.

In general, the implementation of cycle III has gone well. From the student learning results, there was an increase in students' ability to solve problems, as evidenced by 33 students, 29 students (87.9%) completed and 4 students (12.1%) did not complete. In fact, there were 3 students who got a score of 100, meaning there was a significant increase in students' abilities in student learning outcomes in mathematics by using Napier bone props in the multiplication calculation operation. In cycle III, it has been said to be a good success in terms of student learning outcomes. The results of the recapitulation of students' mathematics learning outcomes in cycles I, II and III using Napier bone props can be seen in table 4 and table 5 below.

Table 4. Results of recapitulation of complete learning outcomes for cycles I, II, and III on individual/class KKM standards

Results	CycleI	CycleII	CycleIII
Complete	10 student (33,3%)	25 student (75,8%)	29 student (87,9%)
Not finished	23 student (69,7%)	8 student (24,2%)	4 student (12,1%)

Table 5. Results of recapitulation of the completeness of learning outcomes for cycles I, II, and III on the national/ideal KKM standards

Results	CycleI	CycleII	CycleIII
Complete	4 student (12,1%)	12 student (36,3%)	22 student (66,7%)
Not finished	29 student (87,9%)	21 student (63,7%)	11 student (33,3%)

From the observations, it turns out that mathematics learning in elementary schools previously did not use teaching aids at all, the teacher only taught multiplication by storing. This is one of the factors causing why student learning outcomes in mathematics subjects at these schools are low[37]. Even though teachers are required to be more creative in implementing learning. There are some students who cannot or are unable to do multiplication questions. The learning outcomes are also less than the Minimum Completion Criteria (KKM) that have been determined[38], [39]. After holding mathematics lessons using Napier Bones teaching aids at elementary school, we can see that students' interest in taking Mathematics lessons was quite high, because there was something new in the learning, even though initially (cycle I) there were only a few students Only those who pay attention and the learning results in the formative tests are still less than the predetermined KKM, this is because there is a teaching aid that they are new to.

During the second cycle, student learning outcomes in participating in mathematics learning were visible, this can be seen that more than 50% of students focused on participating in mathematics learning using Napier Bones teaching aids. This is because the teacher has conducted socialization for students before learning begins. That learning mathematics in multiplication calculation operations using Napier Bones teaching aids will make it easier for students to work on problems. The level of student learning outcomes has also increased, this can be seen from the results of the formative tests that have been carried out, more than 50% of students have completed their studies. In cycle III, students are used to learning Mathematics using Napier Bones teaching aids, so the teacher only focuses on observing students and correcting students' work.

Some of the students were focused on learning Mathematics, only one or two students were still joking and playing around with their friends [8], [39]. And there are only one or two children whose grades still appear to be less than the specified KKM target, this is because these students are transfer students from other schools. And from the results of observations made by researchers, the students' abilities were lacking, both in terms of writing, behavior and mental health. Of the 33 students, 29 students or 87.9% have obtained scores in accordance with the KKM that has been determined, there are even 3 students who have received a perfect score, namely 100. This means that the PTK which carries the title is an effort to improve class IV mathematics learning outcomes in the multiplication calculation operation using teaching aids. Napier's bones in elementary school have been completed. This level of success can be seen from achieving the class KKM target of at least 85%. This shows that learning mathematics using Napier Bone teaching aids can improve student learning outcomes in participating in mathematics learning.

Research regarding efforts to improve student learning outcomes using teaching media has been carried out by[40], Previous research aimed to measure the influence of PowerPoint teaching media which can improve student learning outcomes. Meanwhile, the current research has been updated by applying teaching media in the form of the Napier bone model which can be directly practiced by students and the results obtained show that this teaching media can improve students' mathematics learning outcomes in multiplication operation material. The results of previous research found that mathematics learning with the help of teaching aids improved mathematics learning outcomes[41].The difference is that previous research was not specific to one learning topic. This research focuses on the topic of mathematics learning Multiplication Calculation Operations. In harmony with the results of previous and current research, it shows that in learning mathematics, the help of teaching aids is needed to improve students' understanding so that student learning outcomes can be better.

The research implication is that efforts to integrate Napier Bones or similar tools in the teaching of multiplication to elementary school students demonstrate a commitment to improving the quality and efficacy of mathematics education, which has the potential to provide benefits to students' learning experiences and outcomes.The limitations experienced by researchers at this time are that they are limited to only multiplication material and the teaching media is only napier bones. For this reason, in further research we can expand the material and use different teaching media to produce better data/information.This research is limited by only looking at student learning outcomes in the use of teaching aids in the form of napier bones.

4. CONCLUSION

Based on the research results, it can be concluded that learning using napier bone teaching aids can improve students' mathematics learning outcomes on the subject of multiplication arithmetic operations in fourth grade elementary school students. In the observations carried out in cycle I, followed by a formal test, data was obtained in the form of a class average result of 45.75. In cycle II the average student formal test result was 61.21 and the differences between cycles I and II proved that there was an increase in student learning outcomes. In cycle III the average formal test result was 72.12. Meanwhile, the students' achievement of the Minimum Completeness Criteria (KKM) has been achieved in accordance with the class KKM achievement standard, namely 87.9%. So learning mathematics on the subject of multiplication calculation operations can increase student interest and learning outcomes in class IV at SDN Sidorejo Lor 06 Salatiga.Recommendations for further research, the researcher recommends that further research be carried out regarding the assistance of learning media to improve students' understanding of mathematics learning material.

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