The Effectiveness of Nusa Board Media on Student Learning Outcomes at Dahlanuddin SD Surabaya

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Abstract: The teacher's role in creating fun learning is very influential in the dissemination of the material. If in the process of delivering learning materials the teacher is not optimal and students are less interested in receiving the material, it will affect the process of understanding students in the material presented. This study aims to determine the effectiveness of Nusa Board media on the learning outcomes of class I students at SD Dahlanuddin Surabaya. This study uses a quantitative approach with the One Group Pretest-Posttest method. The subjects of this study were the first-grade students of SD Dahlanuddin Surabaya. Data collection techniques using tests in the form of pretest and posttest. The data analysis techniques used were instrument analysis, validity test, reliability test, assumption test using One-Sample Kolmogorov-Smirnov test, and paired T-test hypothesis test. The results of this study indicate that there is a difference in student learning outcomes before and after the implementation of Nusa Board media with an average pretest score of 66.8 and an average posttest score of 86.25. The increase in the average score of students is also evidenced from the results of the statistical test output analysis of the paired T-TEST (2 tailed) test which shows sig (2.tailed) 0.000 < 0.05. It can be concluded that hypothesis 1 is accepted, which means that there is a difference between the learning outcomes on the score pretest and posttest, and it can be concluded that the Nusa Board media is effective in improving the learning outcomes of first grade students at Dahlanuddin Elementary School Surabaya.

Keywords: Learning Outcomes, Effectiveness, Nusa Board Media.

INTRODUCTION

One of the lessons currently being promoted by the Ministry of Education and Culture is: “The Counting Movement”. The Ministry of Education and Culture as explained (kemendikbud, 2020) is a counting movement. In simple terms, counting can be interpreted as the ability of students to understand and apply the concept of numbers and can be skilled in realizing arithmetic operations in everyday life.
However, in fact, the results of the numeration test conducted to measure aspects of understanding the basic operational concepts of numbers, Indonesia is always below the average. Based on the results of the 2018 PISA test (Kemendikbud, 2019) under the organization under the OECD (Organization for Economic Co-operation and Development) shows that Indonesia is in the lowest rank. The lowest score in PISA in 2003 was 360 points. While the highest PISA scores in 2018, Indonesian students earned 379 points. The average score of Indonesian students at PISA 2018 is the second highest in the entire period of PISA implementation.

One of Nadiem Makarim's efforts to overcome the low number of numeracy is the emphasis on concrete/real contextual learning (Syahril, 2020). Because according to (Dewi & Primayana, 2019) the task of the teacher in the classroom is not only to convey information to achieve learning objectives but also to create a student learning experience, the teacher must strive for activities in the classroom to provide the widest opportunity for student experience.

The ability of proficient students in arithmetic is a reflection of the teacher in delivering material during learning (Sri Hartatik & Nafiah, 2020). All teachers, especially elementary school teachers, are expected to be able to master and teach basic material as a provision for students to be competent in numeracy at the next level. Because students' ability to count will be very important in everyday life (Hartatik & Fitriyah, 2017). Students who are good at numeracy will be able to quickly understand problems that use various kinds of numbers and symbols in everyday life and be able to analyze information in graphic form.

Previous research has proven that the teacher's presentation in delivering concrete material will be easily understood by students and not easily forgotten (Primayana, 2018). Research (Prastowo, 2019) also explains that the use of media during learning can increase mastery of learning outcomes reaching a percentage of 93.3%. This means that the use of media is very influential in improving learning outcomes and the quality of learning.

Windiyani et al., 2018 also explained in their research, that the lack of teachers in optimally utilizing learning media makes students bored and not interested in receiving material. If teachers can use learning media in a concrete way, then student learning outcomes will be obtained optimally. Wahyuningtyas & Sulasmoro, 2020 From several research explanations, it can be concluded that concrete and interesting learning media can improve student learning outcomes.

The use of learning media that is less than optimal, especially in learning arithmetic also occurs at Dahanuddin Elementary School Surabaya. SD Dahanuddin Surabaya is a private elementary school located on Jl. Gununganyar Tambak I/3, Gunung Anyar Tambak, District. Gununganyar, Surabaya City.

Based on the researcher's observations while being a student at the "Teaching Campus", many student learning outcomes have decreased, especially thematics in the field of mathematics. Lack of teacher creativity in choosing and utilizing interesting learning media is one of the factors that decreases student learning outcomes. The teacher only focuses on the blackboard and explains it using the lecture method (conventional and abstract). This is also a factor in the low student learning outcomes during the learning process. So that most of the students became bored and unmotivated when learning took place, even 4 of them fell asleep. Student learning outcomes in thematic learning of mathematics material also decreased below the KKM of 75.

The purpose of this study is to find out and analyze how the effectiveness and differences in student learning outcomes using concrete media in learning mathematics by not using media. Researchers want to help the process of understanding and learning outcomes regarding numeracy skills, especially in addition and subtraction of integers from 1-20 to grade 1 students at SDN Dahanuddin Surabaya by creating an innovative learning media named "NUSA BOARD".

NUSA BOARD is a learning media in the form of a board but has been designed with Nusa cartoon figures to attract students' attention. The learning media that the researcher developed has advantages over learning media in general. One of these advantages is that this learning media is equipped with a more concrete operational way of adding and subtracting arithmetic operations on whole numbers 1-20 so that students will understand the material presented faster. It is also
equipped with a story question spinner that can increase student activity in solving problems in everyday life (problem solving).

Based on these problems, it is necessary to conduct research to find out how effective the application of "NUSA BOARD" media is to the learning outcomes of 1st grade students of SD Dahanuddin Surabaya. From the results of this experiment, it is hoped that the learning media "NUSA BOARD" can increase student activity and better learning outcomes.

METHODS

This type of research uses One-Group Pretest-Posttest Design in which in this design there is a pretest before being given treatment and a posttest after being given treatment. The existence of pretest and posttest can see the results accurately, because researchers are able to distinguish between learning outcomes before and after the treatment is given. This design can be described as follows:

\[ O_1 \times X \times O_2 \]

\[ O_1 = \text{Pre-test value before being given treatment} \]
\[ O_2 = \text{Post-test value after being given treatment} \]
\[ X = \text{treatment (Application of NUSA BOARD media)} \]

The research subjects used were the first-grade students of SD Dahanuddin Elementary School in Surabaya, totaling 20 students. In the data collection process, the pretest and posttest test methods were used. The data analysis techniques used were instrument analysis, validity test, reliability test, assumption test using One-Sample Kolmogorov-Smirnov test, and paired T-test hypothesis test.

This research is broadly divided into three stages, namely the preparation stage, implementation stage and post-implementation stage.

1. Preparation Stage
   a. Conduct a literature study related to the formulation of the problem to be studied. The literature study includes a study of the application of concrete media, learning outcomes, and the effectiveness of learning media in improving students' mathematics learning outcomes.
   b. Making research instruments in the form of subjective essay test questions.
   c. Making Learning Implementation Plans (RPP) and teaching materials study.
   d. Making judgments on expert lecturers on the instruments, learning media and lesson plans that have been made. This is intended so that the instrument that will be used actually measure the variables contained in the study.
   e. Conducting trials of research instruments.
   f. Revise research instruments.
   g. Selecting the research sample.
   h. Prepare research permits for schools, where research is carried out.

2. Implementation Stage
   a. Children are invited back to remember math lessons with material addition and subtraction of integers from 1-20.
   b. Provide a pre-test before the learning activities are carried out to determine students' initial abilities. Pre-test is done by subjective test as many as 10 questions.
   c. The teacher starts learning by applying the media "NUSA BOARD"
      1) The first stage, the teacher forms a group, 1 group 2 students.
2) The second stage, the teacher prepares the Nusa Board media and fruit objects as support and question spinners.
3) The third stage, the teacher takes the question spinner and gives it to one of the group members at random, the group that gets the question spinner must come forward and spin the question spinner.
4) The fourth stage, when the question spinner stops, students are required to open the questions that have been designated by the spinner needle according to the symbol. Students read story questions carefully and work on story questions and are practiced directly in operating the addition and subtraction of whole numbers 1-20 on the media "NUSA BOARD"
5) The fifth stage, the teacher provides reflection with students on the material that has been studied. Next, the teacher concludes and provides a review of all student answers, then the teacher formulates conclusions with the students.

d. Give post test to students to find out the final ability of students after being given treatment with the same subjective test as the pre test.

3. Post-implementation stage
   a. Collect pre-test and post-test results
   b. Analyze and process data from the pre-test and post-test results for each student
   c. Draw conclusions about improving student learning outcomes
   d. Compile research reports

RESULT AND DISCUSSION

Based on the analysis of the question instruments with validity and reliability tests, the results of the validity and reliability tests used as pretest and posttest questions can be seen in Table 1. There are 10 questions that are worthy as pretest and posttest questions. Reliability test which means "trustworthy" so that the instrument in the study can be relied on for data collection because the instrument is good. The instrument can be declared reliable if the reliability coefficient (r11) > 0.6. The results of the analysis of the pretest and posttest instruments in this study are:

1. RELIABILITY TEST

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
<th>Cronbach's Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.813</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 1. The results of the pretest instrument reliability analysis

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
<th>Cronbach's Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.737</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 2. The results of the posttest instrument reliability analysis

From both the pretest and posttest tables, the results of the reliability test show that the pretest and posttest variables with a total of 10 items are reliable, because they have an alpha value greater than the standard alpha, namely: (0.6).
2. Student Learning Outcomes Before and After Using Nusa Board Media

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Valid</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>20</td>
</tr>
<tr>
<td>Mean</td>
<td>66.8000</td>
<td>86.4000</td>
</tr>
<tr>
<td>Median</td>
<td>65.0000</td>
<td>89.0000</td>
</tr>
<tr>
<td>Mode</td>
<td>63.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>6.12673</td>
<td>13.34719</td>
</tr>
<tr>
<td>Minimum</td>
<td>53.00</td>
<td>50.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>80.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

From the table above, it can be seen that the results of the pretest descriptive analysis consisting of 10 questions were filled out by 20 respondents (students). The data has the highest score of 80.00, minimum value of 53.00, average value (Mean) 66.5, median 65 and standard deviation 6.12673. From these data, it can be seen that of the 20 students who finished working on the pretest questions, only 5 students and 15 students who did not complete the test. From these data can be described through the following diagram:

Table 3. Percentage of Pretest Results for Dahlanuddin Elementary School Surabaya

Based on the bar chart above, it can be seen that the percentage of students' pretest scores who meet the minimum completeness criteria (>70) are 25% of the 20 students and the scores that do not meet the minimum completeness criteria (<70) are 75% of the 20 students. From these data, it can be seen that before using the "Nusa Board" media, most of the students did not understand the material for adding and subtracting whole numbers 1-20 on theme 5, sub-theme 5, 1st learning.

While the results of the posttest descriptive analysis consisting of 10 questions were filled out by 20 respondents (students). The data has the highest score of 100, the minimum value of 50.00, the average value (Mean) 86.4 median 89 and the standard deviation (SD) 13.34719. From these data, it can be seen that of the 20 students who completed the posttest questions as many as 17 students and only 3 students who did not complete the posttest. From these data can be described through the following diagram:
Based on the bar chart above, it can be seen that the posttest scores of students who meet the minimum completeness criteria (>70) are 85% of the 20 students and the scores that do not meet the minimum completeness criteria (<70) are 15% of the 20 students. From this data, it can be seen that after using the "Nusa Board" media, most of the students have understood the material for adding and subtracting whole numbers 1-20 on theme 5, sub-theme 5, 1st learning.

3. Test Assumptions and Hypotheses

<table>
<thead>
<tr>
<th>Table 5. Normality test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One-Sample Kolmogorov-Smirnov Test</strong></td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal Parameters</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>66.8000</td>
<td>6.12673</td>
</tr>
<tr>
<td>Posttest</td>
<td>86.4000</td>
<td>13.34719</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Most Extreme Differences</th>
<th>Absolute</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>.172</td>
<td>.172</td>
<td>-.168</td>
</tr>
<tr>
<td>Posttest</td>
<td>.154</td>
<td>.154</td>
<td>-.148</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>.122c</td>
</tr>
<tr>
<td>Posttest</td>
<td>.200c,d</td>
</tr>
</tbody>
</table>

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

The testing process carried out by researchers using SPSS version 26 software tools. Based on table 9 it can be seen that the independent and dependent variables meet normal assumptions (p > 0.05). The results of the P values are 0.068 > 0.05 and 0.200 > 0.05 which can be concluded that the distribution of pretest and posttest data in this study is normally distributed.

The hypothesis test in this study uses a comparative test, namely the t test. The t-test in this research hypothesis test is used to determine whether or not there is a significant (convincing) difference between the two means. The results of hypothesis testing in this study using SPPS 26 calculations with the following results:

<table>
<thead>
<tr>
<th>Paired Samples Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>Pair 1 Pretest</td>
</tr>
<tr>
<td>Pair 1 Posstest</td>
</tr>
</tbody>
</table>
Based on the calculation results of SPSS Paired samples statistics pretest and posttest above, it can be concluded that the average pretest score of 20 students is 66.8 with a standard deviation of 6.12673 and a standard error of 1.36998. While the average posttest value increased by 86.4 with a standard deviation of 13.34719 and a standard error of 2.98452. From the results of the average pretest and posttest, it can be seen that the use of Nusa Board media can improve student learning outcomes at Dahlanuddin Elementary School Surabaya.

### Table 6. Hypothesis testing

<table>
<thead>
<tr>
<th>Paired Samples Test</th>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Deviation</td>
</tr>
</tbody>
</table>

Based on the results of the t test (2-tailed) above, it can be seen that the value of sig (2 tailed) is 0.000 < 0.05. It can be concluded that Ho is rejected and Ha is accepted. This means that there are differences in student learning outcomes before and after using the NUSA Board learning media on the learning outcomes of grade 1 students at SD Dahlanuddin Surabaya.

Based on the results of the test analysis above, it can be seen that the application of MEDIA "NUSA BOARD" can effectively improve the learning outcomes of grade 1 students at SD Dahlanuddin Surabaya. This is supported by Piaget's theory (Istiqomah & Maemonah, 2021) which stated that "elementary school children are children who are in the concrete operational phase. Learning by using media in this phase students will be easier and more effective in understanding the concepts being studied because learning involves physical and mental activities with activities of seeing, touching and manipulating visual aids according to the characteristics of students. curiosity, and interested in exploring the surrounding environment".

This can be seen from the results of the average pretest and posttest which initially obtained an average of 66.8 spread between scores of 53 to 80 increased to 86.48 which spread between scores of 80 to 100. This means that Nusa Board media in learning, especially the addition and subtraction arithmetic operation material for grade 1 (which is in the concrete operational stage) is very effective, because with Nusa Board media students can play. play an active role in learning by operating concretely and independently by using the icons that have been provided. Students are also able to find solutions independently (problem solving) from the questions given and present the results of these questions and are carried out with full responsibility.

Effective learning is learning that allows students to learn easily, fun and achieve the expected learning objectives. According to Binangun and Hakim in Hakim et al., 2021 stated that Mathematics learning is carried out according to the conditions and needs of students, this is intended to make learning effective and fun for students. To overcome this, a media is needed to help learning in the classroom (Hada et al., 2021), because the current development of science and technology demands science and technology innovation-based learning (Ismail et al., 2020), and the innovation in question is media with props.

According to Estiningsih in (Nurhasanah, 2022) teaching aids are learning media that contain or present the characteristics of the concepts being studied. This is also in line with (Nasaruddin, 2018) that what is meant by teaching aids is a tool to explain or realize mathematical concepts. So that these props are expected to attract attention and arouse students' interest and motivation in learning. Thus, the use of media props "NUSA BOAD" will greatly affect the effectiveness of the learning process given to students.

Previous research has also proven that learning media can improve learning outcomes. Research (Cut Eva Nasryah, Arif Aulia Rahman Aristia, 2020) explains that the use of illustrated...
piggy bank learning media can improve student learning outcomes by reaching a percentage of 90%, namely 18 out of 20 students. Research (Haruna, 2022) also explains that the application of Board Game media can effectively improve student learning outcomes. This is evidenced by the late student scores from 41.38% to 89.66%. From this increase, it can be seen that the use of Board Game media can improve student learning outcomes with classical mastery by 80%.

Research from (Yosepina Handarini, 2019) also proves that the application of Funnel Counting media for children with learning difficulties at SDN 18 Kota Luar, Padang can improve student learning outcomes which originally obtained an average score of 14.00 to 80.00.

Based on several theories and previous research, it has been explained that the use of media in learning, especially mathematics learning, is very influential in improving students' understanding and learning outcomes. This is also proven in the research on the application of the "NUSA BOARD" media with the results of the hypothesis analysis test (2-tailed) sig (2-tailed) value is 0.000 < 0.05. it can be concluded that Ho is rejected and Ha is accepted. This means that there are differences in student learning outcomes before and after using the learning media "NUSA BOARD" on the learning outcomes of grade 1 students at SD Dahlanuddin Surabaya.

With the media "NUSA BOARD" is expected to provide solutions and facilitate the delivery of integer operations. Media created by teachers must facilitate the delivery of concepts, and cultivate students' 4C skills (Communicative, Collaborative, Critical Thinking, Creative). So that students can improve the quality of learning and achieve learning objectives well.

CONCLUSION AND SUGGESTIONS

Based on the results of processing data analysis on research data and discussions regarding the application of the "NUSA BOARD" media in improving student learning outcomes, it was concluded that there was a significant increase in student learning outcomes after the application of the "NUSA BOARD" media in mathematics lessons with the addition and subtraction of numbers round from 1-20. The increase in student learning outcomes can be seen from the difference in pretest scores with an average of 66.8 spread between scores of 53 to 80 and posttest scores with an average of 86.4 spread between scores of 80 to 100. The results of the hypothesis analysis test also strengthen the statement that there is an increase in learning outcomes. obtained using t-(2-tailed) sig (2-tailed) value is 0.000 < 0.05. it can be concluded that Ho is rejected and Ha is accepted. This means that there are differences in student learning outcomes before and after using the "NUSA BOARD" learning media on the learning outcomes of grade 1 students at SD Dahlanuddin Surabaya.

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