

Effectiveness of *Garis Bilangan Pandawa* Media for Improving The Learning Motivation and Skills on Counting Integers Operations on Integrative Thematic Learning of Grade IV Students

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Abstract— Student learning outcomes are highly influenced by motivation and learning materials. The problem in the field indicated that the student's motivation is low and integer operations is one of the difficult learning materials. Learning media become one of the ways that can be used to improving learning motivation and help students in understanding a material. This research aims to reveal the effectiveness of *Garis Bilangan Pandawa* for improving the learning motivation and skills to counting integers operations on integrative thematic learning of grade IV students. This research was quasi experiment with pretest-posttest group design. The subjects of the study were grade IV students and teachers from four elementary school in Cangkringan, Sleman, Yogyakarta, Indonesia. The instruments were motivation learning questionnaire and skill test completed integer operations. The data analysis used the independent sample t-test and paired sample t-test at the significance level of 0.05. The results show the *Garis Bilangan Pandawa* media effectively for improving the learning motivation and skills to counting integers operations on integrative thematic learning of grade IV students. The effectiveness of the media can be seen from the result of independent sample t-test and paired sample t-test which shows a significance value of 0.000.

Keywords— *garis bilangan pandawa media, motivation, integer operation skills*

I. INTRODUCTION

Learning activities in primary schools are basically meaningful learning processes. Meaningfulness is not only obtained through listening to teacher explanations, but also activities that enable students to gain a pleasant learning experience. Learning experiences that provide immediate experience for students can have a positive impact on learning something new. Thus, if more senses are used, the information obtained by students will be more and more.

The meaningful experience contained in the learning process should not only aim to teach knowledge information, but also provide opportunities

for students to develop the ability to recognize the culture. In relation to philosophical foundation, primary school curriculum serves to develop a learning experience that provides an opportunity for students to master the competencies required for life in the present and future, and at the same time continue to develop their skills as heir to the nation's culture [1]. Therefore, the learning process is not only glued to the delivery of subject matter but also expected to convey the cultural values that exist in the student learning environment. Based on the above explanation, it can be said that learning needs to be designed in order to provide a meaningful learning experience and provide opportunities for students to know culture.

Meanwhile, the success of the learning process can be influenced by several factors such as student motivation. Students who are high in achievement of motivation will perform differently on certain academic tasks than when working independently. Students with low in achievement of motivation will need more supervision, direction, and structure in some curriculum areas. The student with high motivation will require little encouragement or direction, if he is working in an area that he values, [2]. Another factor affecting the success of the learning process is the coverage of the material being studied. The more difficult a subject matter understood by the students the lower the learning outcomes.

Learning media become one of the ways that can be used to cultivate learning motivation and help students in understanding a material. Media can expand people's everyday experiences, and they can contribute to the cognitive organization of these experiences [3]. The use of media can make learning more interesting to students' attention so as to be able to grow learning motivation [4].

Based on the results of interviews with teachers of class 4 to some schools in Cangkringan District in Indonesia, it was obtained information that one of the material that is difficult to understand by the students is about integer counting operations, where teachers

are still finding them difficult especially to teach materials about integer operations to students with low level of learning motivation. Based on the results of field observations and literature studies it is obtained information that it is due to the lack of learning media for integers, and puppets that have not been optimized as learning media. Furthermore, in terms of textbooks of lessons used in schools number lines picture is the most used to explain the integer operations. In fact, some research results show that the learning media that has been developed is the result of modification of the number line. Such as, black-white buttons, card puppets, dolls, and number line from cork. However, these media have not been able to survive if used too often.

To overcome these problems, it is important to use or develop other media for teaching integer operations. The type of media to be used or developed is the number line. Elementary textbooks that are frequently used are the number line to present a visual representation of numbers and operations [5]. Number lines are generally used to teach integer operations but they are still limited to images and other modifications made of paper or cork that are less durable.. Therefore, the line number media to be developed should be made of stronger and more durable materials.

One of the development of number line media is *Garis Bilangan Pandawa* media. This media was feasible to use in learning. This media can be alternative solution for the problems because they are developed like number line that made from wood and the puppet that can be used by the student. This research aims to reveal the effectiveness of *Garis Bilangan Pandawa* for improving the learning motivation and skills to count integers operations on integrative thematic learning of grade IV students.

II. RESEARCH METHOD

A. Data

Data were collected using questionnaire and test techniques. Questionnaires were used to obtain students' motivational data, while tests were used to measure skills completing the student's integer operations. Before using them, questionnaire about students' motivation to learn and test questions were first validated by experts. The data already obtained were then tabulated and converted into qualitative data with reference to the conversion guide. Furthermore, the data were analyzed to determine the effectiveness of *Garis Bilangan Pandawa* media in improving learning motivation and skill of completing integer operation with normality test, homogeneity test, independent sample t-test and paired sample t-test with significance level of 0.05

B. Method

The *Garis Bilangan Pandawa* media used for this experimental study was validated first to the media and material experts. Valid results indicate that the media is feasible and can be used or tested to students. The type of research used is quasi experiment with pretest

- posttest group design. Here is a picture of operational field trial design.

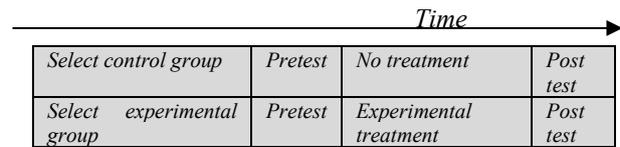


Fig. 1. Pre- and posttest design (creswell, 2012: 310)^[6]

A description of the course of quasi research experiment can be seen from the steps as follows:

- 1) Define classes for control and experiment groups. The experimental group and the control group must be no significant difference qualify.
- 2) Do pre test to find out the motivation and skills of completing the operation of integers in the experimental and control classes at the first of the lesson.
- 3) Teachers in the experimental group class carry out learning activities using *Garis Bilangan Pandawa* media.
- 4) Teachers in the control group class carry out the usual learning activities that is with the line number picture media.
- 5) Teacher with two observers observing the process of learning using the observation sheet.
- 6) Do post test to find out the motivations and skills of completing the operation of student integers in the experimental and control classes at the end of the lesson.
- 7) Input motivation learning data and pretest-posttest data to SPSS 16.
- 8) Finally, analyze data with SPSS 16 to test of normality, test of homogeneity of variances, independent sampe t-test, and paired sample t-test to motivation learning data and pretest-posttest data of integers operations student.

III. RESULTS AND DISCUSSION

A. Result of Learning Motivation Questionnaire Data

A questionnaire about students' motivation to learn is given to determine student's learning motivation. Measurement of learning motivation is done in the field of operational field testing, the fourth grade of Bronggang Baru Elementary School as the experimental class and fourth grade of Kepuharjo Elementary School as the control class. In this operational test activity, the control class acts as a comparison class. The control class is useful for knowing the difference between treated classes and not treated classes. The experimental class in this research is the fourth grade of Bronggang Baru Elementary School. The treatment given in this class was in the form of *Garis Bilangan Pandawa* media for the matter of integer operations. Furthermore, the data have been analyzed with two stages: independent t-test and paired sample t-test. Here are the results of the calculation and analysis of each test.

1) Data of Independent Sample t-Test Learning Motivation

After calculating the normality and homogeneity test, the next step is to conduct an independent sample t-test. This test is used to determine whether there are differences in the average of two unpaired samples. Here is a summary of test results of independent sample t-test for student motivation questionnaire data.

TABLE I. THE RESULT OF INDEPENDENT SAMPLE TEST T-TEST OF LEARNING MOTIVATION DATA

Data	Sig.	Result
Pra learning motivation between control and experiment classes	.823	There is no significant difference
Post learning motivation between the control and the experiment classes	.000	There can be a significant difference

Based on the table above, pra learning motivation between control and experiment classes has no significant difference, while the significance value for the post learning motivation shows a significant difference. Based on these two results, there is a difference in the outcomes between pra and post learning motivations. This shows that there is a significant difference between the students' learning motivation of the control class whose learning activities are conducted with the usual method, with the experimental class whose learning activities use *Garis Bilangan Pandawa* media.

2) Data of Paired Sample t-Test Learning Motivation

The questionnaire data of learning motivation obtained are used to analyze the effectiveness of *Garis Bilangan Pandawa* media. The effectiveness of media on students' learning motivation can be seen by comparing the questionnaire score of learning motivation before and after the use of *Garis Bilangan Pandawa* media within the learning activities. The following data is the comparison of the results of students' learning motivation in the control and experimental class.

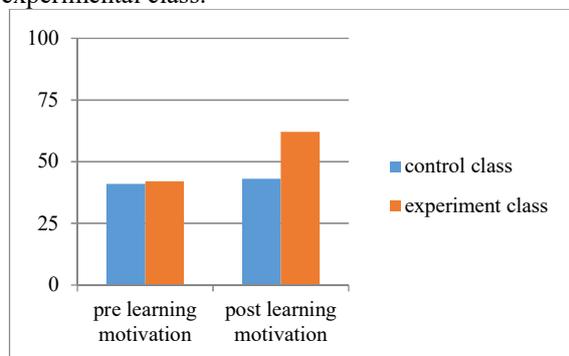


Fig. 2. Comparison of student's learning motivation in control and experiment class

Based on the diagram above it can be explained that the average score of pre learning motivation in the

control and experiment class is almost the same, yet the average score of post learning motivation in the control and experiment class shows a significant difference.

The effectiveness of *Garis Bilangan Pandawa* media was tested using paired sample t-test. For more details, the following test results paired sample t-test with SPSS 16.

TABLE II. RESULTS OF PAIRED SAMPLE T-TEST LEARNING MOTIVATION DATA

Data	Sig	Result
Pair 1 pra and post learning motivation in the control class	.056	there is no significant difference
Pair 2 pra and post learning motivation in the experiment class	.000	there are significant differences

Based on the table above, it is obtained that in the control class there is no significant difference between pre and post learning motivation. Meanwhile, in the experimental class there is a significant difference between pre and post learning motivation. Based on the two results above, it is found that in the control class there is no significance in terms of improving student's learning motivation, but in the experimental class there is a significant. Thus, it can be concluded that the *Garis Bilangan Pandawa* media is effective in improving the learning motivation of the students.

B. Results of Skills on Counting Integers Operations Test

Skills on counting integers operations test was used to know the students' counting skills about integer operations. This test was conducted in the field of operational field test, the fourth grade of Bronggang Baru Elementary School as the experimental class and the fourth grade of Kepuharjo Elementary School as the control class. In this operational test activity, the control class acts as a comparison class. The control class is useful for knowing the difference between the treated and non-treated classes. Meanwhile, the treatment given in the experimental class is was in the form of *Garis Bilangan Pandawa* media.

Furthermore, the data have been analyzed with two stages: independent t test and paired sample t test. Here are the results of the calculation and analysis of each test.

1) Data of Independent Sample t-Test Skills on Counting Integers Operations

After performing the normality and homogeneity test, the next step is to conduct an independent sample t-test. This test is used to determine whether there are differences in the average of two unpaired samples. The following is the summary of the results of the test results of independent sample t- test data pretest and posttest.

TABLE III. RESULT OF INDEPENDENT SAMPLE T-TEST DAYA PRETEST AND POSTTEST

Data	Sig. (2-tailed)	Result
Pre test between the control class and the experiment	.929	There are not significant difference
Post test between control and experiment classes	.000	There are significant difference

Based on the table above, there is a difference of results between pretest and posttest. The pretest values in the control and experiment classes were not significantly different, whereas for the posttest values of the two classes there was a significant difference. It shows that, the student's skill in counting integer operations in the control and experimental classes before being given the treatment turned out to be the same.

Meanwhile, the data on student's skills on counting integer operations in the control and experimental classes after being given the treatment showed different results. This indicates that there is a significant difference between students' skills in calculating integer operations in the control class whose learning activities were conducted with the usual method with the experimental class whose learning activities were treated by using *Garis Bilangan Pandawa* media. In other words, giving treatment in the form of using *Garis Bilangan Pandawa* media gives a significant impact to the experimental class.

2) *Data of Paired Sample t-Test Skills on Counting Integers Operations Test*

The skills on counting integers operations are used to analyze the effectiveness of *Garis Bilangan Pandawa* media too. The effectiveness of the media on the students' skills in calculating integer operations can be seen by comparing the pretest and posttest values using pandawa's pandemic in learning. The result of skill test to solve the problem of student integer operation in control and experiment class can be seen in the diagram below.

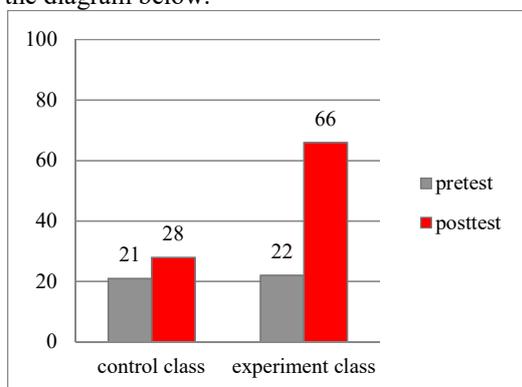


Fig. 3. Comparison of pretest and posttest in control and experiment class

Based on the diagram above it can be explained that the average score of pretest and posttest in control and

experiment class has increased. The increasing of experiment class is higher than control class. So, it shows that *Garis Bilangan Pandawa* media is effective for improving the skills to counting integers operations on integrative thematic learning of grade IV students.

The effectiveness of *Garis Bilangan Pandawa* media was tested using paired sample t-test. Data were tested with paired sample t-test to compare the pretest and post test data in the control class and compare the pretest and post test data in the experimental class. For more details, the following table shows he test results paired sample t-test with SPSS 16.

TABLE IV. RESULT PAIRED SAMPLE T-TEST DATA

Data	Sig. (2-tailed)	Result
Pair 1 Pre test and post test in control class	.085	there are significant differences
Pair 2 Pre test and post test in experiment class	.000	there are significant differences

Based on the table above, it can be concluded that the pretest and posttest values in the control and experimental class are significantly different. Although both groups experienced a significant difference, it turns out that the two classes have a difference in the average increase. The following table compares the pretest and posttest values in control and experiment classes.

C. Discussion

Based on the results of the research and analysis that has been done, the results show that the purpose of this study is achieved. *Garis Bilangan Pandawa* media proved to be effective in improving learning motivation and skill of completing integer student operation significantly. It became one of the successful forms of media use in the learning process as Manjale & Abel that instructional media is one of the important variables that enables teaching and learning process to sail successfully [7]. The success of media use is of course also based on the needs and problems faced by students.

Meanwhile, the use of *Garis Bilangan Pandawa* media is used to train students' skills in completing integer operations because the students can practice it directly. With this practical activity, the students' skills are more honed and the learning materials delivered can be received well. This is in accordance with Seth's opinion which says that the criteria for selecting media to motor skills' learning outcomes is that the teacher can directly utilize the practice of the skill, with informative feedback [8].

IV. CONCLUSION

The result of the research shows that *Garis Bilangan Pandawa* media is effective for improving the learning motivation and skills to counting integers operations on integrative thematic learning of grade IV students. The effectiveness of the media can be seen from the result of independent sample t-test and paired

sample t-test which shows a significance value of 0.000.

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