The Effects of Learning Media Based on Illustrated Story Books on Understanding Mathematical Concepts of Primary Schools

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ABSTRACT

The purpose of this study is to determine the effect of illustrated story book based learning media on the understanding of mathematical concepts by third grade primary school students. The method used in this study is quasi-experimental research. The aspect measured in this study is comparing two study groups. The experimental group is the one using instructional media based on illustrated story books and the control group is that using conventional learning media. The population of data in this study are third grade primary school students (54 students) at Sukoharjo district elementary school in the 2018/2019 school year. The population is divided into two classes, namely 28 students for the experimental class and 26 students for the control class. Data sampling was done by cluster random sampling. Data collection techniques consisted of tests and observations. The data were analysed using t-test and descriptive statistics. The results revelaed that illustrated story books based learning media influence the understanding of mathematical concepts. The learning outcomes of third grade primary school students showed a significant value of less than 0.05 which is equal to 0,000.

CCS CONCEPTS

• General and reference~Document types~General conference proceedings

KEYWORDS

Illustrated Storybook, Learning Media, Mathematic Learning, Primary School.

ICLIQE 2020, September 5, 2020, Surakarta, Indonesia

ACM ISBN 978-1-4503-7572-6/20/09…$15.00
https://doi.org/10.1145/3452144.3453777

1. Introduction

Mathematics is very important and needs to be given to students since elementary school to make students think logically, systematically, critically, and creatively (Mutmainah,2016). Mathematics contents include the concept of number, geometry, measurement, and data management. One of the teaching and learning problems encountered in explaining this topic is students' inability to understand concept. This problem is caused by the absence of teaching aids or media to help the learning process. As the result, teachers find difficulty in explaining the right and appropriate concept. And in the end, students only follow teacher instruction without a chance to develop and express their thought and idea. This situation often causes students not to understand the mathematical concept being taught and decrease their motivation in learning. As the result, students cannot pass the minimum score or passing grade for the subject. So, it is crucial to analyze and find a solution by providing appropriate media to improve teaching and learning process such as the availability of media that can encourage students to demonstrate their creativity based on their knowledge.

Learning media is everything that can be used to channel messages from senders to recipients so as to stimulate the thoughts, feelings, attention and interests and willingness of students so that the learning process occurs in order to achieve learning objectives effectively (Rusman, 2011). The effort of the educational institution also needs the use of media. Media need to function as an educational instrument that shaping mindset and behavior (Zubaedi, 2011). The media need to play their role as educators which simultaneously influence the process of learning.

The use of learning media can attract the students' interest and motivation since it can clarify the presentation of messages and information to expedite and improve the learning process and students' learning outcomes; can improve and direct the students' attention to lead to the motivation learning for direct interaction; can overcome the limitation sensory channel, space, and time; and can provide students with similar experience about their environmental events, and enable the direct interaction with teachers, society and the environment. Visual-based or image-based media play a very important role in the learning process. Visual media can expedite the understanding and strengthen the memory. Visual can also foster the students' interests and can

provide a connection between the content of subject matter and the real world. To make it effective, visual should be placed in meaningful contexts and the students must interact with the visuals to ensure that the information process takes place. Visual media or commonly known as images is a colorful world that triggers the children's imagination and also develops their aesthetic appreciation. It attracts the children's emotional world which positively influences their mental development, gives recognition to the world and living things in it; therefore, it is needed for the children's development, especially in building awareness and creativity.

An illustrated storybook is a book which includes pictures and accompanied by short narration to explain the story. The illustrated storybook is considered to encourage children imagination and creativity. In addition, the reading of the illustrated storybook will help children understand the relationship between stories and pictures. The functions of the illustrated storybook are to help children develop their emotion, to help children learn about the world; to help children learn about other people, interaction, and feeling development; to help children to gain pleasures; to help children appreciate the beauty of something; and to help children stimulate their imagination and creativity (Mitchell, 2003). The benefits of using an illustrated storybook are that it can be adjusted to children mental development who are still in the stage of concrete thinking and more efficient for children to understand the illustrated story (Elizabeth, 2016). This, indirectly, supports the purpose of this current study that the use of an illustrated storybook influence on the concept mastery.

From several studies that have existed previously stated that the low achievement of mathematics learning also occurs in Indonesia. In a study conducted by Kintoko (2014) said that the understanding of concepts in mathematical material received much attention from education experts, especially regarding the learning process at school. Empirical evidence in the field shows that there are still many students who have difficulty in understanding concepts in mathematical material.

The data is supported by the results of the pretest assessment conducted by the researcher. From the results of the pretest that has been done, there are 80% of students who get grades below the minimum for understanding concepts in mathematical material. The factor of low student achievement is also caused by the learning process that is still centered on the teacher in other words the teacher is the figure of the messenger. Yet along with the development of educational technology, the role of the teacher is no longer the only source of learning in the learning process. Students can actively obtain information from various media and learning resources. Apart from the results of the achievement, the data was also strengthened by observations and interviews with the teacher. From interviews with teachers obtained information that the existence and variety of media used by teachers are still very limited, especially in teaching material in mathematics learning. The teacher still has difficulty in instilling concepts in students against understanding concepts that are applied to real objects around.

Based on the above problems, media is needed as a tool that can be developed not only to assist teachers in the teaching process in learning, but also helps students master the understanding of mathematical material concepts. One of the learning media that can be developed is in accordance with students' interests and interests. In the results of interviews that have been conducted, most students like illustrated storybooks rather than textbooks, so a mathematical illustrated storybooks is made to foster students 'interest in learning and help students' understanding of mathematics material. Illustrated storybooks is one of the media which most of the presentation is in the form of pictures. From a picture can mean a thousand languages in it. Through pictures can be shown to anyone about everything and abstract ideas can be translated in a more realistic form (Anitah, 2009: 8).

Based on the decision taken by researchers to develop a media based on illustrated storybooks. The reasons for the selection of these media are adjusted by the function of illustrated storybooks that play an important role in their use of children, including illustrated storybooks (1) can help children in the development and development of emotions, (2) can help children to learn about the world, (3) can help children learn about other people, existing relationships occur, and the development of feelings, (4) can help children to get pleasure, (5) can help children to appreciate beauty, (6) and can help children to stimulate imagination (Mitchell in Nurgiyantoro, 2005: 159).

The advantages of illustrated storybooks in primary school mathematics learning are that it can (a) adjust the mental development of children (primary school students) who are still in the stage of concrete thinking, (b) more efficient for children (primary school students) in understanding the contents of the illustrated material, (c) can assist students in embedding the concept of mathematical material in the surrounding objects that are packaged in an interesting media that is an illustrated storybooks and (d) there is no instructional media based on a story book that is used in the learning process in primary schools, (e) can be a media that can help students to learn independently.

2. Methodology

2.1. Research Goal

The purpose of this study is to investigate the effect of using illustrated story books based learning media on the understanding of mathematical concepts by third grade students in primary schools. This research shows their learning outcomes after using illustrated story books based learning media. In particular, this study aims to explain: (1) the increase in learning outcomes in mathematics learning using illustrated story books based learning media, (2) the implementation of illustrated story books based learning media in mathematics learning by third grade students in primary schools, and (3) the comparison between learning using

illustrated story book based learning media and conventional learning media.

2.2. Sample and Data Collection

The method used in this study is quasi-experimental research. The sample selection from this study are carried out by cluster random sampling. The data sample in this study are grade III primary school students (54 students) in two elementary schools in Sukoharjo district in the academic year 2018/2019. They are divided into 28 students for the experimental class from Primary School Gayam 5 Sukoharjo and 26 students for the control class from Primary School Tangkisan 3 Sukoharjo. Data collection techniques consist of tests and observations. The data are tested using pretest and posttest. The analysis of the data used is t-test and descriptive statistics. The result of t-test is usedas a prerequisite test in the form of normality and homogeneity tests.

2.3. Analyzing of Data

The data were analysed using SPSS 23 software. Analysis of variance and t-test was performed to determine the differences in the scores of variables. In this test, the significance level of the t-test was 0.05. If $thet_{obs} < 0.05$ then it is accepted. If $thet_{obs} > 0.05$ then it is rejected. Independent sample t-test was used to calculate data.

3. Findings / Results

The results of understanding the concept of mathematics learning by students through pretest and posttest with 20 multiple choice questions are as follows:

Table 1. Data Value of Understanding Concepts by students (scale 0-100)

Numb. Students	Experiment Class		Numb. Students	Control Class	
	Pretest	Post Test		Pretest	Post Test
1	33	60	1	47	67
2	53	83	2	40	60
3	50	83	3	33	67
4	40	70	4	53	80
5	33	70	5	30	53
6	53	83	6	47	60
7	40	63	7	40	73
8	57	80	8	50	63
9	47	80	9	43	63
10	40	67	10	33	53
11	33	60	11	37	63
12	43	63	12	47	67
13	43	80	13	57	73
14	57	80	14	37	60
15	47	67	15	33	63
16	50	87	16	47	67
17	50	87	17	30	57
18	47	87	18	43	67
19	53	80	19	50	70
20	30	63	20	57	77
21	47	77	21	23	53
22	37	83	22	47	70
23	57	87	23	27	60
24	40	70	24	53	73
25	30	73	25	57	73
26	57	83	26	57	77
27	37	77			
28	37	73			
Average	44.286	75.714	Average	42.949	65.756

Based on table 1, the average pretest value in the experimental class was 44.286 and the posttest was 75.714. Whereas in the control class, the average pretest value was 49.949 and the posttest was 65.756. Before conducting a hypothesis test, their understanding of mathematical learning concepts was first tested to determine the normality and homogeneity of the data. Based on the normality test, the significance level of the experimental class using instructional media based on illustrated story books was 0.287 and the significant level of the control class was 0.937. Between the experimental class and the control class reached a significant level > 0.05. It can be assumed that the value of the distribution of students' understanding of concepts by using instructional media based on illustrated story books and conventional learning media is normally distributed. Homogeneity test results in learning originating from populations have homogeneous variants.

4. Discussion

The analysis of the needs of illustrated storybooks based learning media on the understanding of mathematical learning concepts in the preliminary study aims to get responses from students and teachers about the media used in learning activities, as well as the need for illustrated storybook based learning media on the understanding of mathematical learning concepts. Data on this needs analysis was obtained through interviews, observations and document analysis. The needs analysis in this preliminary study was conducted at two primary schools in Sukoharjo, namely Primary School of Gayam 05 and Primary School of Tangkisan 03.

Observation was carried out by observing the activities carried out by the teacher and students while learning mathematics. The results of the teacher's observations during the activity of delivering mathematics material showed the same results at the two schools, namely the teacher in delivering less interactive material with students, in conveying only fixated on the material in the textbooks used, the teacher only used handbooks. Observations on students when participating in mathematics learning activities in class indicate that many students tend to be

passive in participating in learning mathematics, when students are tested in understanding the concept of material only mentions what was instructed by the teacher but have not been able to fully understand the material being learned, students' understanding of the concept is still weak, the student handbook used for learning is limited to student worksheets and mathematics textbooks.

The interview in the study aims to gather information about the condition of the mathematics learning media and the needs of the learning media. The results of the interview obtained information that the mathematics material felt by the teacher is still difficult to understand by students, the learning resources/media used also only presents limited material. The teacher also believes that important literacy skills are owned by students. In addition, student mathematics learning outcomes are still relatively low. According to the students interviewed, they want mathematics learning media in the form of interesting and fun to learn.

Based on the data above (effectiveness test), it can be said that the experimental class using illustrated story books based learning media has a higher level of understanding the mathematical concept when compared to those using conventional learning media. The learning media based on illustrated books has a positive influence on the understanding of the concept of mathematics learning by third grade students at Primary School Gayam 5 Sukoharjo. In line with the results of this study, a study conducted by Amir (2015) and Woo (2011) which that that "learning by using media can improve learning outcomes". This is in line with the opinion of Fitri (2012), Ria (2014) and Maulana (2010) said that "learning using illustrated storybook media can improve students'cognitive abilities".Based on the discussion of the results of the study, it is said that using learning media based on illustrated storybook can improve conceptual understanding and creativity of the students of primary school.

5. Conclusion

Based on the results of this research and hypothesis testing, it can be concluded that the learning media based on illustrated story books influences the understanding of mathematics learning concepts by third grade students at Gayam 5 Sukoharjo Primary School in 2018/2019 school year. Based on the results of hypothesis testing using independent sample tests, it is proven that the learning media based on illustrated story books influences the understanding of students' mathematical learning concepts with the results of a significance level of 0,000 < 0.05. Thus, it can be considered that understanding the concept of the experimental class is higher than the control class.

ACKNOWLEDGMENTS

Acknowledgements are given to everyone who has helped in this article.

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