THE USE OF PICTORIAL STORY AND NARRATIVE DIALOG MEDIA TOWARD MATHEMATICS LOGICAL THINKING ABILITY IMPROVEMENT OF ELEMENTARY SCHOOL STUDENTS

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ABSTRACT: The background study of this research is a fact that many students tend to dislike mathematic study. One of the reasons is uninteresting learning process, low students’ motivation, and the lack of focus in concept learnt. Pictorial story and narrative dialog media make the learning process more relax, fun and curious, and make students focus in concept learnt. The aim of this research is to discover how much this pictured story and narrative dialog media improve the logical thinking ability of students, and the significant effect of using these two different media on its improvement of mathematics logical thinking of elementary school students. This research used quantitative approach with contra-balance design. On the first step, the first group got a treatment with pictorial story media, while the second group got a treatment with narrative dialog media. On the second phase, the first group got narrative dialogue, and the second group got pictorial story media. The subject of this research is all of students in grade IV elementary school in Cileunyi, Bandung regency, West java province, Indonesia, while the sample is students in class IV A and IV C in elementary school laboratorium Cibiru, Cileunyi. The research instrument used mathematics exercise about mathematics logical thinking by theory validation and empiric. The result of the study shows that there is an improvement toward students’ mathematics logical thinking ability in medium level whose learning group used pictured story, while there is only a little improvement in low level whose group used narrative dialogue media. In additional, there is a difference significance improvement toward mathematics logical thinking ability between group that used pictured story media compared to group that used narrative dialogue media. Group that used pictorial story media has a better mathematics logical thinking than group that used narrative dialogue media.

1. Introduction

In general, mathematics learning process always goes to two different philosophies those are infallible absolutist and fallible-constructivist. Basically, infallible absolutist philosophy agreed that mathematics as a ‘ready’ knowledge which is impossible to be fault, so in teaching and learning process is rarely linked to students’ experience and the learning is aimed directly to the result, like concept mastery. On the contrast, in fallible-constructivist philosophy, mathematics knowledge is regarded as a result of social construction, where mathematics still has a possibility of wrong, so it is still open to be restructured and reformulated. In this belief, learning mathematics emphasizes more in the process of discovering or restructured concept, whether discovering something new or reconstruct existed ideas.

Keyword: Pictorial story media, narrative dialogue media, mathematics logical thinking ability.
When Infallible-absolutist philosophy is applied in elementary school, the learning situation is strict, dry and do not really draw students’ curiosity, uninteresting and do not make the student focus in learning concept. Whereas, fallible-constructivist is learning process that gives students a space to learn mathematics meaningfully, fun, curious and interactive.

Supporting elements in the study of mathematics in order to make it meaningful can be done by utilizing the media, such as pictorial story or narrative text dialog media. The characters of these two media can make students more concentrate and happy to learn, because it gives stories that can encourage student’s curiosity, and also can make students focus on the concepts contained in the story, either in the form of pictorial story or narrative dialog text media. By these considerations, the research problems are as follows.

1. How much is the improvement of mathematics logical thinking ability of elementary school students when learning math using pictorial story?
2. How much is the improvement of logical thinking ability of primary school students when learning math using narrative text dialogue?
3. Is there any significant difference in students’ mathematical logical thinking ability between the study using pictorial story media and the study using the narrative text dialogue media?

2. Theoretical Framework

The modern thinking defines that students’ learning toward mathematics must be done constructivist, where the students have the opportunity to build an understanding and knowledge of mathematics through a series of processes of interaction with the learning environment. Philosophy of mathematics education provides a strong basic toward learning implementation in doing math through learning that emphasizes the developing of social principles. Students discuss their mathematics ideas and communicate it, both to their peers and teachers. Through this process, students are learning to build a culture of learning in the classroom harmonious and helpful.

The purpose of teaching math in school is to help students to demonstrate their ability in understanding the concept, able to communicate the idea of mathematical ideas, able to use logical thinking, able to solve mathematical problems, and respect mathematics well. Logical thinking becomes one of the most important things that must develop when students learn mathematics, besides the other abilities. Logical thinking is the most essential skill in mathematics and should be able to develop soon. NCTM (2000) defines that mathematical logical thinking is student’s ability in solving mathematical problems, using models, facts, characters and relation to explain mind, deciding answer and result, using patterns and relation to analyze the solution and have a good attitude toward mathematics.

The use of learning media such as a pictorial story or narrative dialogue is possible to make the logical thinking process of students fast. Through the observation of pictorial story or narrative text dialog, students do a process of logical thinking, either deductively or inductively. Through observing the pictures or reading a
dialogue story that contains math concepts, students do the thinking process in order to develop logical thinking.

Pictorial story media can be formed as a favorite teaching material for students because it is presented with pictures, as well as comics. As the results of research conducted by Windayana, H., Priatna, D., and Kartika, E. (2012), the worksheet of Comics Settings can improve performance and enhance the students' learning attitudes in fourth grade of primary school. Through pictorial books, students read and study the mathematical concepts contained in the pictorial story. Meanwhile, the narrative dialogue story is a kind of media that is presented in dialogues which contain mathematical concepts. This kind of media requires students to concentrate to understand and interpret the dialog that contains the concepts of mathematics. These dialogues in narrative media contain mathematical concepts which are understood, internalized, thus make students to be used to positive things, such as well concentration, able to imagine and internalize.

3. Research Methods

The research was conducted at the Laboratory of Elementary School in Indonesia University of Education, Cibiru Campus, Cileunyi District, Bandung regency, West Java, Indonesia. This study used a quantitative approach, a quasi-experimental design with contra balance pretest-post test as it follows (Ruseffendi ET, 1994).

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X_2 & X_1 & O & O & O \\
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O & O & X_1 & X_2 & O
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Where O is the pre test or post test, X1 is a treatment of learning using pictorial story media, and X2 is a treatment of learning with narrative dialogue media. The subject of the study was all fourth grade students in elementary school in Cileunyi District, Bandung regency, West Java, Indonesia, while the research sample is students in grade IVA and IVC elementary school Cibiru Laboratory, Cileunyi District. The instruments of data collection were question sheets of mathematical logical thinking for fourth grade students. It was gained reliability coefficient through empirical validation test instrument that was 0.67 which is considered in a good level. Meanwhile, the coefficient of item validity correlation, level of difficulty, and distinguishing capability were in the category of good and medium.

4. Results and Discussion

Pre test was meant to see the beginning ability of students’ mathematical logical thinking ability toward the concepts to be learned. The pre test results of these two groups, respectively 32.06 and 32.33, with seeing the average score, it only has a difference of 2.86. By using Mann Whitney test (Uyanto, Stanislaus. S. 2009) it is gained that the value \( Z = -0.077 \) with a value of P-value of two-way 0.939. When it is compared with \( \alpha = 0.05 \), P-value is greater, or P-value > \( \alpha \), it means that Ho could not be denied. Thus the results of the pre test of both the treatment groups did not differ significantly. It means the students mastery of the material to be learned relatively similar.
After the second group received a pre test, then both groups were treated the first phase, namely the class IV A got treatment in the form of pictorial stories media use, while the IVC classes in the form of narrative dialogue media. After completing the first treatment, it is continued with a test, through post test 1. The average results of post test 1 from each groups is 72.33, for IVA group learning by using pictorial story, the result was 72.33, whereas for IVC group that are learning with narrative dialogue media, the result was 60.00, with a standard deviation respectively 11.04 and 9.01 and variance respectively by 121.95 and 81.25.

Then it is followed by the second phase by exchanging the treatment of each groups, in which IVA group got narrative dialogue media, while the IVC group got pictorial story media, then it was continued with a test, with post test 2. The average score of each result are as follows:

IVC group that used the pictorial story media got 66.00, while IV A group who got narrative dialogue media got 57.60, with each standard deviation and variance 15.02 and 17.23 respectively 225.50 and 297.08.

To find out how much the increasing due to the effect of media usage and pictorial story and narrative dialog text media of each group, it is used the gain test. The results of the index gain in the first phase using pictorial story media was 0.67 (moderate), while the use of narrative dialogue media was 0.35 (low level). In the second phase of index gain, it was obtained that the group using the pictorial story media was 0.51 (moderate), while the use of narrative dialogue media was 0.39 (low level).

The result Mann Whitney test of post test 1 obtained that the value $Z = -4.719$ with the value of P-value of 0.000 for two-ways. With $\alpha = 0.05$, P-value $< \alpha$ means that Ho is rejected. Thus the results of the first phase of treatment that mathematical logical thinking ability group IVA and IVC group were significantly different. Mathematical logical thinking ability of students using pictorial story media is better than the group using narrative dialogue media. So it can be concluded that the effect of using pictorial story media of 0.67 (moderate), while using only narrative dialogue media was 0.39 (low).

The result of Mann Whitney test obtained from post test 2 is Z value $= -2.159$ with P-value for two ways value was 0.031. With $\alpha = 0.05$, P-value $< \alpha$ which means Ho was rejected. Thus the results of treatment in the second phase was that mathematical logical thinking ability of IVC group that use pictorial story media was different than group IVA group that used narrative dialogue media. Mathematical logical thinking ability of students using media pictorial story was better than those using the narrative dialogue media. In other words, the second phase treatment was also affected by the using of pictorial story media of 0.51 (moderate), while the use of only narrative dialogue test of 0.39 (low).

From the above results, it can be concluded that actually learning mathematics by using the pictorial story media increases greater ability than using narrative dialog media. It is because learning with pictorial story media make students more motivated, controlled, focus to understand the meaning of a story that contains mathematical concepts, rather than learning only through a narrative dialogue media that is not completed with pictures. Students like colorful pictures in the story,
so the students feel happy and motivated to study. As it is stated by Yang, Gene (Windayana, H. Priatna, D., Kartika, E., 2012) that a colorful media can motivate students to learn, improve the quality of learning process and learning outcomes, make the understanding more permanent because the pages can be studied over and over, as well as a bridge to make students love reading. Similarly, the results of research conducted by Windayana, H. Priatna, D., Kartika, E. (2012), that the use of pictures media in the form of Student Worksheet comic settings can improve student achievement and make the students motivated to learn, comfort, and enthusiast in learning. It is in line with Hariyanto (2011), Dewanti, AY (2011), Yulicariatningsih, M. et al. (2010), and Maulana (2010) who concluded that the use of learning by pictorial story media as comic, can improve students’ achievement and attitudes to be better. It is in line with the constructivist view that the environment is a very important role in learning process, because through the environment, including media learning, students construct their experiences into knowledge. Through student interaction with the pictorial text media and narrative dialogue media, students are able to build knowledge. Pictorial story or narrative dialog text is learning media that contains pictorial dialog, concepts of mathematics. Through the this media, students are able to understand and interpret the mathematical concepts easier.

Student interactions with the environment in the form of learning media will make the logical thinking ability of students becomes easier and better, as it is stated by Piaget (in Trianto, 2010) that, experiences of physical and manipulation of the environment is essential for the occurrence of developmental changes, and interaction with peers, through communication, argumentation and discussion. They will help students to understand better that finally they can shape students logical thinking. Pictorial story and narrative dialogue media are one of the ways to help students get better comprehension.

5. Conclusion

In the first phase, there was an increase of 0.67 (moderate) and in the second phase, there was an increase of 0.51 (moderate) related to mathematical logical thinking ability of students learning to use pictorial story media.

The improvement of mathematical logical thinking ability of students learning to use the media narrative dialog text only reached a low level, namely 0.35 (low) in the first treatment phase and 0.39 (low) on the second phase of treatment.

There is significant difference of the students’ logical thinking ability between those who use pictorial story media and those who used narrative dialogue media. Students who used pictorial story media have better mathematical logical thinking than those who used narrative dialogue media.

References


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