

Research Article

Using Kamishibai Media in Thematic Learning to Increase Students' Knowledge of Environmental Education

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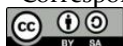
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Abstract

Global environmental damage emphasizes the importance of environmental education (EE) at schools since it can be a tool for achieving sustainable development. As thematic learning, environmental education is integrated into several core subjects in the Indonesian primary school curriculum. For the teachers, it is essential to plan and design appropriate learning methods based on the physical, emotional, and cognitive stages of primary students. Kamishibai seems suitable for EE learning at primary school. It can help students to understand EE content. This study aimed to analyze the Kamishibai methods in thematic learning to increase the students' knowledge of EE. The method used in this study was pre-experiment with the research design of the one-group pre-test and post-test design. The 5th grade students were participated in the study. A test was administered before and after the Kamishibai implementation to determine the students' knowledge of EE. As a result, it was found that the students' understanding of EE was higher than before the Kamishibai implementation. The result also showed the students' ability to retell the story at the end of the Kamishibai implementation. These result indicated that Kamishibai strengthened students' memory. In conclusion, Kamishibai increased students' knowledge of EE.

Keywords: Environmental education; kamishibai; students' knowledge; thematic learning

1. Introduction

Humans live in their environment and interact with components of the physical environment, both biotic and abiotic components. Before technology was introduced and human needs were still few, the relationship between humans and the environmental components was still harmonious. Humans were not excessive in taking natural resources, so they did not cause significant ecological damage. However, as technology advances and human needs increase, they tend to become exploitative. This behavior not only decreases the number of natural resources but also decreases their quality (Danish et al., 2020). As reported by the International Union for Conservation of Nature (IUCN) (2021), there were increasing numbers of threatened species by 2021. Therefore, the main priority now is to find ways to restore the quality of natural resources and preserve it for the welfare of humankind.

Considering global environmental damage, changing our lifestyles and the way we think and act are needed. We need new skills, values, and attitudes that lead to a more sustainable future to achieve this change. Therefore, the concept of Education for Sustainable Development (ESD) should be promoted at every school level (UNESCO, 2017). ESD would emphasize the ecological protection and human-nature relationship. It is believed to be able to overcome the problem of environmental damage (Liu and Lin, 2014). In the city of Kitakyushu, Japan, schools teach the concept of ESD as part of the learning curriculum, such as making a green campus, using environmentally-friendly products, implementing 3-R waste management (reduction, recycling, reuse), and promoting sustainable lifestyles. According to the Ministry of Education, Culture, Sports, Science, and Technology of Japan (2017), schools should facilitate learning that can reduce environmental burdens and coexist with the harmony of nature. Thus, the schools are expected to become a "delivery base for environmental and energy education" for the region.

Environmental education (EE) is a tool to achieve sustainable development. It is not only an integral part of sustainable development but also a driving factor for it (Bhat et al., 2018). Therefore, EE must be included in the school curriculum (Paredes-Chi and Alva, 2018). EE learning in the Indonesian school curriculum is similar to the Japanese curriculum, integrated with other subjects, but has different learning strategy (Rachman and Matsumoto, 2019). However, the overall objective of EE is basically to develop environmentally-conscious citizens and motivate them to participate actively in managing their environment. The underlying aims are to enable students in schools to build knowledge of EE, increase the awareness of environmental problems, and play an active role in finding and implementing solutions that they face in their lives.

One of the factors supporting the success of EE teaching is the teachers' skill to make practical EE learning through a variety of learning methods using different kinds of aids (Shabiralyani et al., 2015; Karhami and Supriyati, 2019). The teachers need to realize that students' learning experiences are necessary to their physical, emotional, and cognitive stages. Kordaki and Agelidou (2017) have proposed storytelling as a key teaching strategy for achieving the goals of education for sustainability. Visual media is enhancing critical thinking of the students, develop their interest, and explain the concepts in a simple way (Shabiralyani et al., 2015). It can create engaging learning and encourage students in the learning process. Kamishibai is an example of the type of the storytelling that can be used in EE learning. This relies on two human senses at the same time, namely hearing and sight senses. Cuban stated that these two senses have a significant impact on the acquisition of student knowledge. According to him, students acquire knowledge of 11% is from the sense of hearing, and 83% is from the sense of sight (Shabiralyani et al., 2015).

Kamishibai is a Japanese paper drama performance that uses picture cards as a silent visual media to accompany dramatic narratives (Ishiguro, 2017). Each Kamishibai story consists of teacher guides, twelve to sixteen beautifully colored pictures cards, and instructions on using the story card (Vukov, 1997). In this study, the story of Kamishibai is related to the environmental education theme. Besides the teachers, the students can become a narrator of their own stories about their lives and future aspirations (Staley et al., 2017). This makes the atmosphere of the classroom more attractive (Lavalle and Briesmaster, 2017). The latest studies showed that Kamishibai gave positive outputs. Students have a positive response to learning by using Kamishibai (Astutik and Mulyana, 2021). In addition, Kamishibai increased students' creative thinking skills in problem-solving, awareness, and the response to the disaster (Rachman et al., 2017; Sundawa et al., 2020). However, these studies had not examined the aspects of students' knowledge. Students' understanding of EE plays an essential role in developing students' attitudes and behavior to contribute to sustainable development. Therefore, we conducted this study to analyze the use of Kamishibai in thematic learning to increase students' knowledge of EE.

2. Methods

The research method was used in this study was the pre-experiment method with the one-group pre-test and post-test design. This study used an experimental class that was given treatment, namely Kamishibai. A knowledge test of waste management was given before and after the Kamishibai implementation (Fraenkel et al., 2012). The one-group pre-test and post-test design can be seen in Table 1.

Table 1. Pretest and post-test design (Fraenkel et al., 2012)

Group	Pre-test	Treatment	Post-test
Treatment	O ₁	X	O ₂

Information:

O₁ : Pre-test to see the students' knowledge of EE before the Kamishibai implementation.

X : Implementation of the Kamishibai.

O₂ : Post-test to see the students' knowledge of EE after the Kamishibai implementation.

The research objects were 5th grade students (11 – 12 years old), from Bandung primary school, Indonesia. While the instrument used was a test of EE knowledge. The test contained the knowledge of environmental education in the multiple-choice form consisting of 17 questions. The questions between pre-test and post-test were the same. The students were also given the assignment to retell the story in written form after the Kamishibai implementation. The data analysis technique in this study was carried out quantitatively. The formula for calculating the scores of students' knowledge of EE and students' story retelling ability are shown in the equation (1).

$$Score = \frac{Score\ Acquisition}{Maximum\ Score} \times 100 \quad (1)$$

Then, we calculated the mean by adding up all the scores and dividing this sum by the total number of scores (Fraenkel et al., 2012). In symbolic form, the formula for computing the mean looks like this:

$$\bar{X} = \frac{\sum X}{n}$$

The mean was categorized as in Table 2.

Table 2. The mean category

No.	Grade (%)	Category
1.	81 – 100	Very good
2.	61 – 80	Good
3.	41 – 60	Moderate
4.	21 – 40	Less
5.	0 – 20	Very less

The research procedure in this study is shown in Figure 2.

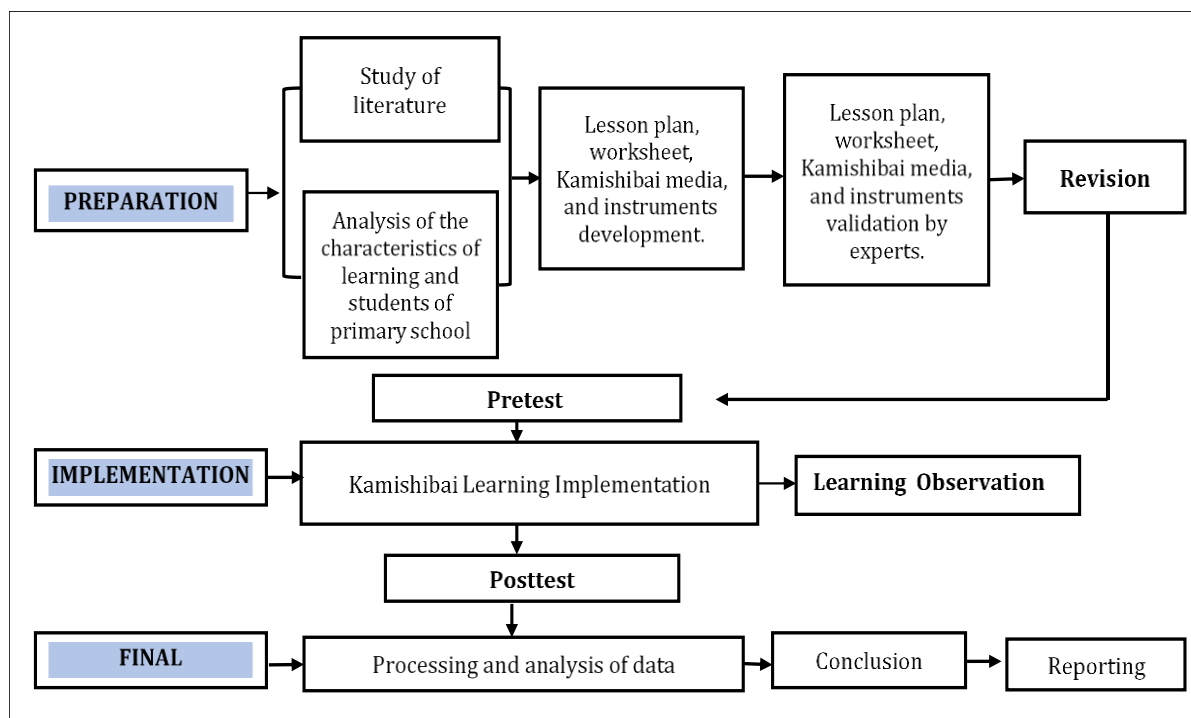


Figure 2. Research procedure

Figure 2 shows that, in general, the data collection procedure consists of three stages, namely the preparation, implementation, and final stages. The first stage was preparation. We studied the literature regarding the research variable. The school analysis stage was where the researchers analyzed the need for the development of instructional learning. We conducted the observations and the interviews at several elementary schools in Kitakyushu City, Japan, and Bandung City, Indonesia. The stages of the school analysis included: 1) learning analysis, which aims to determine the EE learning process in schools which are the research subjects; 2) analysis of the characteristics of the learning method and media used as the primary information in learning; 3) analysis of the characteristics of students, which conducted through observation and interviews. At this stage, we determined which media needs to be developed based on the results of the school analysis. In this study, Kamishibai was selected to support thematic learning. Then, we designed a lesson plan, worksheet, Kamishibai media, and an evaluation instrument for our research. Then, we developed and validated these instruments to test their feasibility. Inputs from experts were used for instrument improvement.

The second stage of this research was the implementation stage. We implemented the EE learning using Kamishibai. Previously, students were given a pre-test to see the students' prior knowledge of EE. After implementing Kamishibai, students were given a task to retell the story in written form and a post-test to see the students' understanding of EE after learning. During learning, the researchers observed the implementation of Kamishibai media in thematic learning. The last stage was the final stage. At this stage, we analyzed the data so that a conclusion could be drawn.

3. Result and Discussion

3.1 Result

Students were given a pre-test and post-test to find out the increase in students' knowledge of EE through Kamishibai in thematic learning. The test contains knowledge of environmental education in the multiple-choice form. The results of descriptive statistics analysis pre and post-test are presented in Table 3.

Table 3. Descriptive statistics of the students' knowledge of EE in the pre and post-test

Statistical Parameters	Pre-test	Category	Post-test	Category
Maximum	86.7	Very good	100.00	Very good
Minimum	26.70	Less	46.70	Moderate
Mean	59.27	Moderate	75.56	Good
Std. Deviation	21.71		16.65	

As shown in Table 3, the mean score of the students' knowledge of EE was 59.27 in the moderate category (pre-test). While in the post-test, the mean score of the students' knowledge of EE was 75.56 in the excellent category. It was found that the student's knowledge of EE enhanced after Kamishibai implementation. This enhancement can also be seen in the maximum and minimum scores on the pre-test and post-test. The maximum score of post-test was 100 of a possible 100. While, the maximum score of the pre-test was 86.7. Although in the same category, but the maximum score of post-test was higher than the maximum pre-test score. Also, as shown in the minimum score parameter, the minimum category score had changed from more minor to moderate by the Kamishibai implementation. The findings indicated the effectiveness of the pre-test in facilitating students understanding of environmental education, especially in the topic of waste management. Figure 3 presents the increase of the students' knowledge of EE.

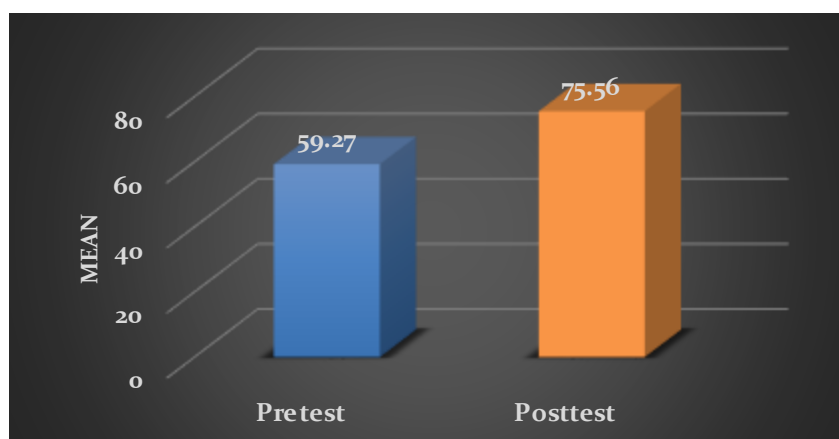


Figure 3. The increase of the students' knowledge

Figure 3 shows that the mean post-test was higher than the mean of the pre-test. The mean score increase was 16.29. This increase has not demonstrated an optimal result. In the post-test, the students' EE knowledge just reached good category yet very good category. That was due to the lack of learning meetings. As we know that to build a new concept and understanding to the students, a continuous learning process is needed. However, the study results indicate that Kamishibai had a positive impact on the students' knowledge. We also examined the effect of the Kamishibai enforces students' story retelling ability. The students were asked to retell the story of Waste Management in written form after they finished watching the Kamishibai show entitled "I Manage Trash." Table 4 presents descriptive statistics of the students' story retelling ability.

Table 4. Descriptive statistics of the students' story retelling ability

Minimum	Maximum	Mean	Std. Deviation
56.25	100.00	77.78	15.97

Table 4 shows the students' story retelling ability after implementing Kamishibai was 77.78 (good category). This finding indicated that the students could understand the story's content and

remember the storyline well after watching Kamishibai. The result showed that Kamishibai could strengthen students' memory and content understanding. It helped them to increase their knowledge of EE.

3.2 Discussion

Schools are expected to play a significant role in the action against the problem of environmental damage. Many schools in Kitakyushu promoted the ESD by planning learning activities for one year and placing environmental education activities on the curriculum agenda in each class. It is an integral part of quality education, inherent in the concept of lifelong learning (UNESCO, 2017). ESD had been promoted at schools in Kitakyushu by the launching an of eco-school environmental education program. They integrated EE with other subjects. This allows the inclusion of environmental education material in teaching and learning activities. Japanese Ministry of Education, Culture, Sports, Science, and Technology (2017) proposed that the themes that can be used are environmental issues such as compost, global warming, forest conservation, and biodiversity. Observation and interview data were obtained from some primary schools in Kitakyushu, Japan. They provided environmental education through subjects and daily experiences. It was found that Ichimaru and Akasaki primary schools taught endangered species conservation. Sone-higashi primary school, a school directly adjacent to the tidal land, implemented environmentally-friendly learning, such as composting, building a solar panel, and picking up the trash. Then, Sugao-Nakatani primary school (school close to the Murasaki River) made some exciting learning activities, including making small runnel for firefly larva house, making fireflies village from bamboo behind the school, checking the condition of baby fireflies every day, making bamboo charcoal, purifying river water using bamboo charcoal, and making plant fertilizer. These activities can cultivate the students' ability to maintain the environment.

Similar to the Japanese curriculum, Indonesia also integrated EE material with other subjects. EE materials presented in thematic learning include good health and well-being, clean water and sanitation, affordable and clean energy, waste management, go green, climate change and its impacts, forest conservation, biodiversity, plant and animal conservation. This is per the guidelines for the presentation of EE material made by the North American Association for Environmental Education (NAAEE) (2004) and UNESCO (2017) that EE materials should be fair and accurate in describing environmental problems, issues, and conditions. EE material, namely waste management, was integrated with the Indonesian Language and Natural Science in this study. The teacher taught waste management and its impacts on the ecosystem through a non-fiction story entitled "I Manage Trash." According to UNESCO (2017), teaching approaches that engage the thematic topic of EE in promoting sustainability also work on facilitating students' competencies (including knowledge, skills, attitudes, and behavior).

Besides experience, some schools in Kitakyushu used various learning methods with different aids to help students learn environmental education. Kamishibai seems suitable for EE learning. Kamishibai, a form of dramatic storytelling, can help teachers deliver the EE material favorably (Ishiguro, 2017; Hernawan et al., 2021). The result of our study found that the student's knowledge of EE increased through Kamishibai. Previous studies reported similar positive results. Through Kamishibai, the students could creatively solve environmental problems (Rachman et al., 2017). Sundawa et al.'s study (2020) showed that the Kamishibai method had increased students' awareness and response to the disaster. Furthermore, students gave positive response to Kamishibai learning (Astutik and Mulyana, 2021). Various color picture cards related to the story were used in Kamishibai to accompanied dramatic narratives. Mimata et al. (2010) argued that using pictorial story in EE learning can build deeper learning material.

The interesting images and responses presented in Kamishibai are providing textual information (Lavalle and Briesmaster, 2017). Visual and vocal observations during Kamishibai learning helped the students obtain a meaningful experience, strengthen their stories of natural phenomena, and form long-term memories. Students' perceptions of EE also resulted from their interaction with the story in

Kamishibai. Storytelling aims to provide the information for the students so that it can be used to recognize their emotions and be able to do problem-solving (Martinus and Chaniago, 2017). That effect can still be apparent when students face a more controversial sustainable issue (Lin and Li, 2018).

Our study found that the students' knowledge increase of EE actually was still not optimal. At the end of the Kamishibai implementation, the students' knowledge of EE did not reach an excellent category. One of the contributing factors was the limited number of learning meetings. In this study, students just were given one session. We know that to change students' concept, build a new idea, and understand EE optimally, a continuous learning process is needed. Therefore, the addition to the number of meetings is necessary for creating their conceptual change. Learning activities using Kamishibai must be repetitive and must be prompted by the teacher's modeling. These concepts the student idea of their Zone of Proximal Development (ZPD), so they achieve an autonomous role in their learning process (Vygotsky, 2012).

Our study also found that Kamishibai promoted the students' story retelling ability. Using Kamishibai in the classroom is a great way to introduce a story to students. The story about "I Manage Trash" was written simply, took the form of short dialogue, and included a storyteller voice so that the audience's imagination and images filled the details. Kamishibai created an interactive and attractive learning atmosphere, so the students were interested in learning. Using the strategy of story picture cards allowed students to use images as visual support to strengthen students' memory of story plots. As a result, they could retell a story that they had been seen and heard. Yazici and Bolay (2017) argued that the narrative form of storytelling could enhance students' literacy skills, including story retelling ability. Kamishibai stimulated the senses of hearing and sight of students. Cuban stated that these two senses have a significant impact on the acquisition of students' understanding (Shabiralyani et al., 2015). We have analyzed that students who were able to retell stories also had a good understanding of EE. Therefore, the students' storytelling ability through the Kamishibai method could extend the students' understanding of EE.

4. Conclusions

This study presents the critical contribution of Kamishibai in terms of increasing the students' knowledge of environmental education. The result showed that the use of Kamishibai in thematic learning increased students' knowledge of EE. Kamishibai was interesting for students, so they were willing to learn. The utilization of various color picture cards accompanied by dramatic narratives helped the students gain an understanding of environmental education concepts. In addition, the finding indicated that the students' story retelling ability improved through Kamishibai. There was the involvement of hearing and sight senses forming long-term memories of story plots. Due to limited meeting learning in our study, the result showed the students' knowledge of EE and the students' story retelling ability were still not optimal. Therefore, the Kamishibai learning meeting needs to be added. Teachers are expected to create exciting stories and pictures in other EE issues. Besides teachers, students can create stories, make picture cards, and be a storyteller. These can make learning more interactive and attractive. In addition, students gain a deeper understanding of the EE concepts.

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