Children storybook design to solve plastic waste problem

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Abstract. Indonesia is ranked as the 2nd largest country in the world as waste producer. There are approximately 332 tons of waste produced in Indonesia daily. In addition to the nature of plastic that is difficult to decompose, plastic waste in Indonesia is also caused by the lack of awareness and knowledge about the dangers and negative impacts of plastic waste. This study aimed to educate about plastic waste in children by using story book. This research applied descriptive qualitative method. The strategy adopted in this study was designing a story book that could be used as a story telling material to explain the impact of plastic waste to children. This storybook is entitled Erika and the Trash. It uses interesting and imaginative stories that children love. In addition, this book also has games that children can play. The primary media chosen was a children story book and the supporting media were posters, keychains, acrylic stands, and pins. This storybook can be used by parents as a way to tell about the danger of plastic waste to children.

1. Introduction
Indonesia has a variety of problems, some of which are related to environmental issues. Environmental issues are essential because the quality of the environment will have direct impacts on the quality of human life. In addition, the quality of the environment today will bear impact on the next generation’s life in the future. As cited from the official Greenpeace Indonesia website, several problems have been identified as environmental problems in Indonesia. These problems include a decrease in the quality and damage of coral reefs, plastic waste, air pollution, and deforestation. All of these problems have the same impact which is climate change. This has fatal consequences for human survival. Environmental pollution due to waste is increasing. If there is no effort to overcome it, the inevitable impact is worrisome [1]. The waste problem arises due to the lack knowledge and poor waste management. As a result, people become accustomed to littering, which in the future can impact the source of environmental pollution and disease for humans. School-age children are a group that is vulnerable to infection. Children are the future generation that can be taught to instill a wiser mindset regarding plastic waste in their environment. By providing insight about plastic waste, children can understand the meaning of caring and become sensitive to their environment from an early age [2].

Based on the background above, children can be guided and given knowledge regarding plastic waste from an early age. The author designed a book entitled “Erika and the Trash.” It is a storybook about plastic waste for elementary school children. Through this design, it is hoped that children can become a part of the community that preserves the environment's integrity, especially from the problem of plastic waste. Plastic waste according to Manik, as environmental pollution is the entry or the inclusion of living things, substances, energy, or other components that enter in the environment that results in changes in the environmental order so that ecological quality drops to a certain level, which causes environment

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becomes less or can no longer function following the allotment [3]. The most intricate problem with plastic waste is that it is non-biodegradable [4]. It takes a very long time to be removed from the earth. The uncontrollable use of plastic is increasingly worrying. Moreover, plastic waste also makes the air temperature on earth hotter each day.

Considering that plastic waste problem has dangerous impacts on the survival of human life in the present and future, all groups of the society have the responsibility to deal with this problem, including elementary school children. School-age children are a group that is vulnerable to disease. By providing insight about plastic waste, children can understand the meaning of caring and become sensitive to their living environment from an early age. Children who receive education and coaching about health from an early age are expected to have healthier habit and knowledge. They will be more responsible adults when they grow up. Providing insight for elementary school children as a stimulus for developing their thinking skills about plastic problems and their concern for the environment can be done in various ways. Using a story or knowledge book is one of the ways that can be implemented by parents and family at home. The storybook design “Erika and Trash” for elementary school children can be used to stimulate learning and increase children’s awareness about plastic waste. A storybook that operates in a light and simple way can be learned and easily grasped by elementary school-age children. Books were chosen because books are one of the best ways to convey information. Books can also be used to improve children’s reading habits that are now decreasing. In the reading process, the brain will work to process the words and visualize images that can stimulate and improve children's intelligence and creativity.

2. Research methods
In this study, descriptive qualitative research method was applied. Qualitative research is used to understand phenomena experienced by the research subject such as behavior, perceptions, motivations, actions, and etc., holistically [5]. Descriptive research collects data in the forms of words and language in a particular natural context and uses various natural methods.

The research subjects were the community, and the object was elementary school children (aged 6 - 12 years). The research target was the community, especially students of elementary school. The location of this research was the city of Surakarta. The primary data in this research were obtained using interviews. An interview is a question and answer process with or without guidance [6]. This interview was carried out with competent resource persons in the field of the research, namely the chairman of the Indonesian Association of Environmental Experts.

3. Results and discussion
The design of the "Erika and the Trash" storybook in this study was created by considering several aspects such as creative concepts, visual standards, media selection & placement, and cost prediction. The author conducted a series of research to prepare for the production of the storybook. In determining the creative concept of the storybook design, the characteristic of the target audience needed to be determined. Unique Selling Position (USP) is the uniqueness of a product that becomes its distinct value against the competitors, especially those having the same theme. The use of USP is expected to add interests to the product. The uniqueness in the storybook "Erika and The Trash" is the stories and illustrations that are interesting and suitable for children, especially those in primary school. With the storybook, it is hoped that readers, especially children, can understand the problem of plastic waste in the environment around them. In addition, it is expected that children can preserve the environment by reducing the impact of plastic waste so that the environment can be sustained for a long time. In this book, there are also mini-games about plastic waste, so that children not only do the learning process, but also the playing process with the games in it. Parents will also benefit from this storybook because children will spend more time studying than spending all the time on the smartphonescreen. In designing this storybook, various important elements were used, including:
3.1. Illustration books as the main media

3.1.1. Visual verbal strategy in the book cover. On the cover of the storybook “Erika and the Trash”, an illustration displays the figure of Erika, the main character in this story, with a close on her confused expression. Some pieces of plastic trash floating above Erika’s head are also shown. The title of the book “Erika and the Trash” is also displayed at the top of the book. In the title writing, there is also a description of the book storyteller and illustrator.

3.1.2. Book content. The storybook “Erika and The Trash” tells the story about a child character named Erika who has a bad habit of littering plastic waste. One day, Erika fell asleep and was visited by some plastic trash that woke her up. Erika was very shocked because the plastic waste that she met could talk. Moreover, the plastic waste she met was the food and drinks packaging that she bought previously. The plastic waste then brought Erika to the Mother Earth**, a female environment guardian who informed Erika about the impacts of plastic waste. She told Erika about her littering habit. In the end, Erika felt sorry, and then she promised the Mother Earth that she would throw garbage in its place and look after the environment. This book features Erika's story and has mini-games such placing stickers, filling in puzzles, finding differences in pictures, and connecting lines related to plastic waste.

3.2. Non-verbal visual strategy

3.2.1. Illustration. The illustration style was inspired by an illustrator named Yizhibazi from China. As for style coloring, the author was inspired by Maria Triquell who features the crayon effect in her work.

3.2.2. Typography. In designing a picture storybook, the selection of font elements is important, especially to make the writing easy to read by children [7]. The following is the font types that were used in the design of “Erika and the Trash” storybook.

3.3. Supporting media for book’s illustration

3.3.1. Headlines. Headlines have an essential role in a book. Headlines that are exciting and clear can make it easier for the reader in finding information about the parts of the book they are looking for [8].

3.3.2. Creative strategy. The creative strategy used in designing the storybook "Erika and the Trash" is using stories that highlight the impact of plastic waste. From an early age, children will be introduced to the impacts of plastic waste so they will be inspired to take care of their selves and their environment. In addition to presenting stories, the book also features some mini-games related to plastic waste. With these mini-games, children can play while learning. This will give children a positive activity. The premise of the story is that Erika is a child who likes to buy various kinds of snacks. But she often throws away her rubbish carelessly. Until one day, she was met by 3 creatures and someone named Mother Earth. Later, Erika's view of plastic waste changes.

3.3.3. Storybook visualization. Figure 1 shows the storybook Erika and the Trash has a total of 50 pages. 45 pages of the book contains stories and five pages contains mini-games. The displayed sentences are not more than eight lines to avoid boredom. In addition, the color used are typically bright colors that children like. Several scenes show the impact of plastic waste. The display of the book was made as attractive as possible so that children are more interested and can understand the meaning of the illustrations. An example is the flooding caused by plastic waste which is described side by side with the illustration.

Figure 2 as a prefaces the book, which is opened with the story character, Erika who likes to buy various kinds of snacks. But her hobbies does not followed by good habits, Erika often throws away. One day she was met by 3 creatures and someone named Mother Earth as a story character. It was at that moment that Erika's view of plastic waste is changing.
Figure 1. cover book of the book "Erika and the Trash" in Indonesian language

Figure 2. Font page of the book "Erika and the Trash"

Figure 3. Content of the book "Erika and the Trash"

Figure 3, that on the left side shows a collection of garbage that is submerged in water and the text on the right explains about the overflowing water. For example, flood effects described side by side. Image on the left as garbage that is submerged in water and on the right explain from overflowing water causing flooding.
Figure 4. Mini-games as a part of the book "Erika and the Trash"

Figure 4 as the mini games that are displayed related with issue of garbage plastic. Below are some of the mini games that discuss about plastic waste. An example of a game for learning at the same time is a crossword puzzle about plastic waste. After reading the whole story, the child can answer crossword puzzles easily. Besides, other mini games is helping Erika to throw the trash in the trash can shaped in the maze game.

4. Conclusion
This storybook adopts a colorful style, bright but not flashy. The arrangement in this storybook is customized according to the target audience of elementary school children. The layout is not too complicated so that it does not make the reader feel confused. In the end, this book can be a learning tool for children and assist parents in educating children about the dangers and impacts of plastic waste. This book can be used as an educational medium using creative and communicative learning method that encourages children's imagination. With parental direction, children can apply what they get from the book's contents so that they can become adults that help maintain and sustain the environment, especially the environment where they live.

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