Science in children's stories for elementary school

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Abstract. Science is one of important subjects for elementary school students. It will be very pleasant for students if the science is presented in an interesting form. One of them is through children's stories. This study aims to explain the content of science in Indonesian children's stories. The data source of this study is 56 stories of children at the national level competition from 2011-2014. The research data was obtained by repetitive reading techniques, notes, and classifying text (words, phrases, and sentences) based on the category of science. Results showed that there is science content in several children's stories. However, the science texts presented are not based on scientific knowledge, but are based on observations in everyday life. In addition, the scientific content presented in the story is not entirely in accordance with the science curriculum in the elementary schools. The implication is that teachers can use science content in children's stories as an alternative to attract elementary school students to enjoy science.

1. Introduction
Science is one of the important subjects for elementary students. To obtain minimal competence, students need to have a positive interest and attitude towards it. To foster this attitude, science is presented in an interesting and fun way, such as developing children's views on science through role playing [1], using content to improve understanding of science students [2], and optimizing the use of certain television programs to encourage students' attraction to science [3].

In some countries, science is strived to be carried out by maximizing the learning process. One of them is optimizing the support of science learning models through curriculum-based making in school [4]. However, these methods and efforts do not necessarily correspond to the context and circumstances of students in developing countries (such as Indonesia). The limited cost of conducting learning is an obstacle. In addition, the rigidity of the curriculum that has an impact on freedom of time utilization does not allow teachers to develop models freely because they have to pursue material targets that are set centrally so that the quality of processes that pay attention to the learning context is neglected. Therefore, the science learning process needs to be complemented by pleasant contextual experiences, one of which is through stories with science content. This contextual experience can intensify student involvement in learning. This is considered important in creating fair science learning opportunities [5].

The study of stories focused on science content is carried out in Turkey, namely the scientific elements in several Cypriot Folklore. Kayhan [6] Some research on children's stories in Indonesia is focused on the content used as reinforcement for elementary school character education [7] and oriented to strengthen the social value of elementary students [8]. Other research focuses on certain topics in the story, including studies of certain local wisdoms [9] and gender construction [10]. Therefore, this study will focus on explaining how science exists in Indonesian children's stories.
2. Methods

This study uses content analysis methods. Subjects or sources of research data were 56 children's stories collected in four volumes of the Naskah Terbaik Lomba Menulis Cerita Anak (Best Manuscript of Children's Story Writing Competition/ BM CSWC) from 2011-2014. The BM CSWA was chosen as the research data source because (1) it represents the children's story because the work was written by elementary school children so that it really represented the children's perspective; (2) the work truly represents the story of Indonesian children because it was written by children from all parts of Indonesia; and (3) the work is of high quality because it was chosen through a rigorous selection process (thousands of participants) in the national writing competition. The technique of data collection is done by recording scientific text data in the form of words, phrases, and sentences in the story into the data table. Begin by selecting and reducing data according to the science category. Furthermore, analysis and verification of data is carried out through triangulation until the data is saturated until a conclusion can be drawn on the data.

3. Results and discussion

The results of the analysis show that science is found in several children's stories. The text about science appears as an inseparable part of the story. Delivered as the storytelling of the characters or as a narrator's description.

In the story titled My Fish Today by Ahek Horiq Manaf Iha, science is found in the text "Rowing boats are made of wood and run by rowing. And fiber boats, boats that are run by machines. Wooden boats can only fit two to five people. While fiber boats can carry 20 to 30 people"

The sentence describes the science of physics, especially about the law of Archimedes. The law of Archimedes is an expression of the situation of a submerged object that will get a lift that is proportional to the liquid that is transferred due to being pushed by the object. This law also explains the concept of floating, floating, and drowning. An object will float on liquid if the weight of the object is smaller than the buoyant force received by the object. The object will float if the weight of the object is the same as the buoyant force received by the object. The object will sink if the weight of the object is greater than the buoyant force received. If it is associated with the density of the object and the density of the liquid, the object will float if the density of the object is smaller than the density of the liquid. Conversely, if the density of an object is greater than the density of a liquid, the object will sink.

Wood and fiber have a density greater than sea water but construction of a boat that has a cavity, while the cavity is filled with air so that the density of wood and fiber on average becomes smaller than sea water. As a result, both boats float [11]. Even though you can float together, a boat made of fiber of the same size has a lighter mass, making the boat made of fiber get a greater lift than a wooden boat. Thus, a boat made from fiber can cover more loads than a wooden boat.

Mathematically in floating conditions apply \( F_{\text{lift fiber}} > F_{\text{lift wood}} \)

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\begin{align*}
m_{\text{total fiber}} \cdot g > m_{\text{total wood}} \cdot g \\
m_{\text{total fiber}} > m_{\text{total wood}} \\
m_{\text{boat-fiber}} + m_{\text{cargo}} > m_{\text{wooden boat}} + m_{\text{cargo}} \\
\text{if } m_{\text{boat}} < m_{\text{wooden boat}} \\
\text{then } m_{\text{cargo-fiber}} > m_{\text{cargo-wood}}
\end{align*}
\]

In the story it is not described about Archimedes law, differences in density, or boat construction. However, it immediately explained the differences in the load capacity of wooden boats and fiber boats. Story writers who live on islands in their daily activities often use both boats. So based on his observations and experiences he can write such things. In other words, science content in the story can be used by the teacher as an entry point to foster students' curiosity in learning further science concepts.

Next, in the story titled A Dandelion by Meiza Maulida Munawwaroh, science is found in the text "Gently cover this Dandelion pollen with tears that don't stop. Strong winds took him, the powder flew
in search of a new place that was destined by the Almighty. They will grow into happy sweet clumps. "The sentence contains biological science, especially about how to breed Dandelion flowers. In the story there are specific biological terms mentioned, namely "pollen" as a tool for the generative propagation and propagation of flowering plants. so that the story can be a source of knowledge about how to breed one plant. Besides that, the text quote can be an entry point to teach further related science concepts, for example explaining that pollen is a modification of sperm cells. Cytologically, pollen is a cell with three nuclei, each of which is called the vegetative core, the generative nucleus I, and the second generative nucleus, as well as knowledge of other Dandelions. Thus, science content in the story can be used as a lightener of science learning that attracts students' attention and interest.

Next, the story titled Obedience Brings Salvation by Umi Indah Probolestari. Science found in the text "Oh, bro, it looks like the rear tires are a bit windy. It can make danger right? Try if we are in high speed in the middle of a busy road, suddenly it will become runny. We can fall, "I asked. The sentence contains physics in particular about tire pressure. Pressure on the tire is a collision of air particles inside the tire against the tire wall. This pressure can increase as the air enters the tire or increases the air temperature in the tire. These two factors cause the tire to leak, especially in high speed conditions which cause the wheel to spin faster. However, in the story, the concept of pressure is conveyed using lay language, not scientifically explained using physical terms. The assumption is that the author's knowledge of the concept of pressure (on the tire) is based on observing his experience so that he can write it down. In other words, science content in the story remains useful as knowledge for the reader and can be used by the teacher as a way to attract attention and generate students' curiosity in learning more comprehensive scientific concepts.

Science in children's stories can be categorized as didactic content in literature. This is in accordance with the opinion Abrams [12] which states that the didactical literature to explain certain knowledge, theoretical and practical topics is in fictional, imaginative, persuasive, and impressive forms. On this context, science content was packaged in a story frame. The simplicity of the shape and limitations of content, resulting in science in the children's story is not appropriate when used as the main ingredient in science learning in elementary school. Another thing that needs to be considered, namely the use of science content needs to be adjusted to the teaching material to be relevant. However, the quality of knowledge and the manner in which it is light and attractive can be a curiosity that motivates and attracts elementary students to learn more about science. Stories that are considered "light" make students feel more comfortable reading and receiving them. As the findings of Mares et al. [3] that science material contained in references or mediums that are not directly (explicitly) labeled with science are preferred by children. In other words, the limitations of science content in the story have their own strength in communicating science to readers, especially children. This is in line with the opinion of Holbrook et al. [13] that children’s fiction has considerable potential as a medium to inform technology.

4. Conclusion
We conclude that there is a scientific content in Indonesian children's stories, covering the fields of biology and physics. This content is considered useful for increasing children's scientific knowledge. However, some of the material is not in accordance with the elementary school curriculum.

However, the science texts are not based on scientific knowledge, but are based on observations in everyday life. In addition, the scientific content presented in the story is not entirely in accordance with the science curriculum in the elementary schools. The content of elementary teaching material is the source of elementary teaching material.

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