

Developing Pictorial Storybook on Alternative Energy for Primary School

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| Keywords: | Abstract |
|---|---|
| <p><i>Pictorial stories;</i></p> <p><i>Alternative energy;</i></p> <p><i>Literacy</i></p> | <p><i>The main objective of this research was to produce a pictorial story about alternative energy. The concept of alternative energy is discussed in thematic learning in class IV theme 2, subtheme 3, Learning 1. This product was made based on the limitations of the material in the 2013 Curriculum student book and the needs in the classroom. Based on a questionnaire from 27 students, 77% answered that they had never read a book/literature on alternative energy. Research & Development (R & D) method was applied in this research, with six stages: (1) Potential and problem analysis, (2) Data collection, (3) Product Design, (4) Product validation, (5) Product Design Improvement, (6) Product Design Testing. The data gathering techniques applied were interviews, observations, and questionnaires. The product was approved by two validators with 3.81 of 4 in average. This product will be worth testing after it has been revised. The trial was conducted on students and teachers. The student's score of understanding the contents was obtained at 2.94 (maximum score of 4). However, the teacher said that this product could be a media for literacy in the ecological topic. These pictorial stories helped them to realize integrated learning.</i></p> |

INTRODUCTION

Background

Learning is an activity to raise the initiative and role of students to undergo the learning process so that they can achieve educational goals (Apriliani and Radia, 2020). Learning media is one of the important aspects in achieving learning goals effectively (Masykur, Nofrizal, and Syazali, 2017). One of the media that is interesting and useful for primary students is pictorial story (Apriliani and Radia, 2020; Kurniawati and Koeswanti, 2020; Limiansih and Fauziana, 2020). According to Mitchell (Nurgiyantoro, 2005), a pictorial story

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(*cergam*) is a story containing images as well as interrelated text. Types of pictorial stories include fiction, history, information, biographies, folk tales, and true stories. Based on McElmeel's opinion in Krissandi (2017), information stories convey facts and data as they are, which are useful for adding skills, insights, and also theoretical provisions for readers. The characteristics of this comic include the availability of pictures/illustrations that are attractive and generally colorful from the cover to the content; there is a short narrative text which is meaningfully reinforced with related images on each page (Nurgiyantoro, 2005).

Pictorial stories are interesting media for children because they combine stories equipped with pictures and are written based on a certain point of view of an event (Limiansih and Fauziana, 2020). Students at the primary school level are at the stage of concrete operational cognitive development so that they tend to like real objects. On the other hand, the students also have elevated fantasy aptitude, so they need media that can channel creative imagination, namely picture book media (Wigianto, 2016).

The researchers are interested in developing literacy media about "Alternative Energy". This topic is essential for students to learn because of the increasing dependence of humans on fossil fuels (Limiansih and Fauziana, 2020). Even in the primary school (SD) level curriculum, one of the topics studied is about "Alternative Energy Sources". Alternative energy is a renewable energy source that will not be used up (Widodo, 2014). This energy source is created to anticipate if one day the energy source runs out. So far, humans have become very dependent on fossil fuels as an energy source, even though they are getting more used up; it is necessary to find potential alternative energy sources (Hugerat et al, 2011). Alternative energy is an energy substitute for fossil fuels. Fossil fuels are the mining of the living thing remains buried millions of years ago (Haryanto, 2013). Alternative energy is also substituted energy that can replace the role of petroleum. Alternative energy sources will never run out as long as nature is preserved. Several alternative energy sources can be utilized in human life, namely, energy derived from water, wind, sun, and geothermal (Herliani, 2003). The focus of this research is related to the alternative wind energy.

Indonesia is an archipelago country with a sea area that is much larger than the land area. Therefore, the presence of land winds and sea breezes that blow in the coastal area always alternate throughout the day and the year. This wind power can be engineered to produce wind energy (Sukandarrumidi, 2015). The existence of wind for the Bayu Power Plant (PLTB) can be obtained all the time, both day and night in a sustainable manner.

The researchers develop a story about "Alternative Energy" which also serves as a literacy medium for students. The series that are developed are entitled "*Ayo Mengenal dan Merawat Lingkungan sebagai Sumber Energi*" (Let's get to know and care for the environment as an energy source). The series contains three stories, namely (1) "*Mengenal Sumber-Sumber Energi di Sekitar Kita*" (Knowing the Energy Sources Around Us), (2) "*Kincir Angin: Mengubah Energi Angin menjadi Energi Listrik*" (Windmills: Converting Wind Energy into Electrical Energy), and (3) "*Menjaga Lingkungan sebagai Sumber Energi*" (Protecting the Environment as Energy Source). The picture book can be used as a literacy aid by grade IV primary teachers when teaching theme 2, sub-theme 3, learning 1 about changing forms of alternative energy. This picture book can also be used as an enrichment book for students.

Problem of Study

The concept of alternative energy is important for students to learn. Primary school students need to learn various kinds of alternative energy sources and their conversions, even they need to come to awareness to develop an attitude of loving the environment by wisely protecting alternative energy sources (Limiansih and Fauziana, 2020). Based on the

literature study of thematic books of class IV students theme 2, sub-theme 3, Learning 1; there is no information that discusses changes in the form of alternative energy. This is supported by the results of interviews with three grade IV primary teachers. The obtained data show that they had difficulty teaching the material about alternative energy because there are no supporting media. Teachers need media in the form of picture books that contain simple information about alternative energy that is easy for students to understand. The need for literacy media about alternative energy is also strengthened by data from a questionnaire distributed to 27 fourth grade students of SD Negeri Perumnas Condongcatur Yogyakarta. As many as 77% of students have never read interesting stories or literature containing material about alternative energy.

State of the Art

Researches on pictorial stories related to primary students and the content of science learning have been carried out by previous researchers. The learning media of pictorial stories have been developed and were useful in increasing the reading interest of primary school students (Apriliani and Radia, 2020). Similar research has also been carried out, regarding the use of pictorial stories as a medium to improve students' reading skills (Sukmadewi and Ganing, 2020). Both of these studies have inspired researchers to develop pictorial stories as literacy media for primary students, even though they were not related to the science topic. Pictorial stories can be used to improve reading literacy and character-building (Setiawati, 2013). The topic of the pictorial stories being developed was related to Natural Sciences (IPA), especially natural disasters. Natural science teaching materials in the form of thematic pictorial stories for theme 3 (Let's Love the Environment) class IV SD have also been developed (Ditanigtias, 2018). This study inspired the researchers that science-loaded stories help students learn better. Other research has also been carried out on the topic of developing learning media that can help students understand the concept of wind power generator and also the working principle of generators, but the product was intended for university students (Sumiati and Zamri, 2013).

Gap Study & Objective

Based on the previous research, pictorial stories are able to serve as a literacy medium for primary students. This media helps students to have better reading skills. In addition, science-based learning media have been developed in various forms. However, researches on alternative energy-related learning media, its benefits for the continuity of energy sources in the world, energy conversion technology, is still limited. Media related to this topic is still being developed for higher education, not primary school. This research aims specifically at developing learning media that serve to introduce the concept of alternative energy, energy source processing technology, and not to mention the introduction of environmental education. This research is expected to produce reading products as literacy media that can be used by primary level students with technology-literacy and more environmentally friendly.

METHOD

Type and Design

The type of research is Research and Development (R&D). This method is chosen because this study aims to produce certain products and to test the effectiveness of these products (Sugiyono, 2012). The output of this research and development is pictorial story hardware. There are 10 steps in R&D research, including: (1) Exploring Potentials and

Problems, (2) Data Collection, (3) Product Designing, (4) Product Design Validation, (5) Product Design Improvement, (6) Product Testing, (7) Product Repair, (8) Trial of Use, (9) Product Repair, (10) Mass Product Manufacturing. The stages carried out in this research were up to the 6th step. The researchers have not improve the product to mass production. In general, the research and development steps carried out are described as follows:

a. Potential and Problem Exploration

Potential analysis was carried out by document study, namely reviewing government documents related to the basic competencies that students needed to achieve as well as the 2013 Curriculum Teacher's Book and Student Book. Meanwhile, problem exploration was carried out by interviewing teachers and distributing questionnaires to students.

b. Data Gathering

The collected data were related to students' understanding of alternative energy. The purpose of collecting the data was to obtain an overview of the pictorial story content that the students needed. Data were collected using a closed questionnaire.

c. Product Design

Products were developed starting from the general design process (outline) to providing detailed content in them. The outline was developed according to the data on the students' understanding of alternative energy. The content of the story was developed by deepening the story and providing images based on the outline. Images were created directly and manually and then edited using the Adobe Photoshop program.

d. Product Validation

Validation aims to assess the product design to identify its weaknesses and strengths. The aspects of the pictorial story design assessment were language, writing format, and content. Validation was carried out by 2 validators consisting of primary school teachers and science experts.

e. Product Design Improvement Perbaikan Rancangan Produk

The design improvement was based on the qualitative input in the forms of criticism/suggestions from the validators.

f. Product Design Trial

The purpose of the product testing is to determine the quality and effectiveness of the pictorial story. Product trial was conducted on 28 fourth grade students of SD N Perumnas Condongcatur Yogyakarta and also to 10 teachers of SD Sanjaya Tritis Pakem. The trial process for fourth-grade primary school students was integrated into the learning activities carried out in class. After reading the pictorial story, the students then worked on the reflection questions. Students' answers to this question served as the measurement of pictorial story comprehension. Meanwhile, the trial process for teachers was carried out by providing training related to the use of pictorial story media as a literacy medium.

Data and Data Sources

There were two groups of data obtained from this study, namely data on potential and problem analysis as a basis for product development, and data on product quality. Both groups of data were obtained from teachers and students who were involved as respondents. The data mapping and its sources are detailed in Table 1.

Table 1. Data Mapping and Data Sources

| Data | Data Sources |
|--------------------------------|---|
| Potential and problem analyses | Three teachers of grade IV primary school 27 students of grade IV SD N Perumnas Condongcatur |
| Product Quality | |
| Expert Validation | 1 teacher of grade IV primary school |

| Data | Data Sources |
|--------------------|---|
| Product usefulness | 1 science lecturer 28 students of grade IV SD N Perumnas Condongcatur 10 teachers of SD Sanjaya Tritis Pakem |

The results of the preliminary data collection were then used by the researchers as a consideration in planning the content and characteristics of the pictorial storybook. While the second data, namely product quality data, served as the reference in the process of product improvement.

Data Collection Technique

Interview

The type of interview conducted in this study was a structured interview. A structured interview is an interview that is conducted with detailed guidelines resembling a checklist (Mahmud, 2011). In this research, the researchers used structured interviews. This interview aimed to analyze the research potential and problems. Interviews were conducted with three teachers of grade IV primary school using the interview guidelines as showed in Table 2.

Table 2. Interview Guideline for Teachers

| Variable | Indicator | Question |
|---|--|--|
| Pictorial Story (<i>Cergam</i>) | The availability of pictorial stor books for grade IV students | 1. Apakah ada buku cerita bergambar yang berisi tentang materi pembelajaran untuk siswa kelas IV? |
| | The use of pictorial storybooks as media for learning science The design of pictorial storybook needed by grade IV students | 2. How many pictorial storybooks for fourth grade students are available at school? |
| | | 3. Can pictorial storybooks be used in classroom learning?? |
| | | 4. According to you, what are the characteristics of pictorial storybook for fourth-grade students? |
| Learning science, Alternative Energy Materials (wind, water and sun). | Teacher's difficulty in explaining alternative energy learning materials | 5. Have you ever explained material about alternative energy sources and the process of changing alternative energy for fourth-grade students? |
| | | 6. Do you think that material about the sources and processes of alternative energy change need to be taught to fourth grade students? |
| | | 7. What difficulties have you experienced while helping students learn about alternative energy materials? |

| Variable | Indicator | Question |
|----------|--|---|
| | The students' activeness in participating in the alternative energy learning | 8. How active are the students when learning alternative energy materials? |
| | Efforts to overcome difficulties experienced in learning alternative energy. | 9. What have you done to overcome the difficulties experienced by th students in learning the alternative energy? |

Questionnaire

The research applied two forms of questionnaires, namely a closed questionnaire to obtain initial data (analysis of potential and problems) from fourth-grade primary school students. The grid for the initial data collection questionnaire is presented in Table 3.

Table 3. Outline of Questionnaire for Students

| Variable | Indicator |
|---|---|
| Pictorial Storybook (<i>Cergam</i>) | The availability of pictorial stor books for grade IV students The use of pictorial storybooks as media for learning science |
| Learning science, Alternative Energy Materials (wind, water and solar). | Student's difficulty in learning alternative energy materials |

Another questionnaire used was an open-ended questionnaire for product validation and data collection on the product quality (product usefulness) according to the teacher. Product validation contained 3 aspects of assessment, namely: language, writing format, and pictorial story content (presented in Table 4). After the product was validated and revised, it was then tested for use. Teacher responses after using the pictorial storybook were measured using a questionnaire as presented in Table 5. The questionnaire consisted of three questions with answer choice to a scale of 1-5 (scale 1: strongly disagree, 2: disagree, 3: doubt, 4: agree, 5: strongly agree). The teachers were also given the opportunity to complete the answers with descriptive explanations. This descriptive answer was analyzed qualitatively.

Table 4. Outline of Validation Instrument

| No | Validated Item |
|----|---|
| 1 | Language Bahasa Indonesia is according to EBI. Bahasa is easily understood by primary students. |
| 2 | Writing Format of Pictorial Storybook Using adequate literature. The completeness of pictorial storybook components (including cover, foreword, table of contents, contents of the storybook, literature, author's biography). Pictorial storybook contains pictures, diagrams, or graphics that fit the storyline. |
| 3 | Content The pictorial storybook contains three stories which are related to one another. |

| No | Validated Item |
|----|---|
| | <p>Three stories in the pictorial storybook support the main title of "Let's Know and Care for the Environment as a Source of Energy"</p> <p>The first pictorial storybook "Knowing the Energy Sources Around Us" contains an explanation of renewable and non-renewable energy sources.</p> <p>The second pictorial story "Windmills: Converting Wind Energy into Electrical Energy" describes the use of wind which can be converted into electrical energy by windmills.</p> <p>The third pictorial story "Protecting the Environment as a Source of Energy" contains an invitation to students to protect the environment.</p> <p>Pictorial story can be used as a literacy tool for primary students when learning the theme "Always Save Energy".</p> |

Table 5. Questionnaire of Pictorial Story Usefulness

| No. | Question |
|-----|---|
| 1 | According to you, can the book "Let's Know and Care for the Environment as a Source of Energy" be a literacy tool to help students learn about processing the energy of wind motion into electrical energy? Explain with supporting data / information. |
| 2 | According to you, has the book " Let's Get to Know and Care for the Environment as a Source of Energy" integrated information in the fields of Science-Arts-Technology-Mathematics-Engineering? Explain with supporting data / information. |
| 3 | What benefits can you get after using the book "Let's Get to Know and Care for the Environment as a Source of Energy"? Explain with supporting data / information. |

Data Validity

Data were collected using two techniques, i.e., interviews and questionnaires so that mutually reinforcing data could be obtained. Respondents who were involved also came from 2 primary schools, namely, SD Negeri Perumnas Condongcatur and SD Sanjaya Tritis Pakem. These two schools have geographically distinct features. Therefore, information about the product quality can be obtained from different respondents.

Data Analysis

The validation results are in the form of two data types, i.e. quantitative and qualitative. The quantitative data were in the form of scores, while the qualitative data were in the form of criticism, suggestions/input from the validators. The product quality score was obtained by calculating the following formula:

$$\text{Average score} = \frac{\text{Total number of the obtained scorest}}{\text{The sum of maximal score}} \times 100$$

Quantitative scores were converted into qualitative criteria using the Likert scale 1-4 scoring guidelines (Sugiyono, 2017), with criteria as presented in Table 6.

Table 6. Guidelines for Scoring 1-4 Scale

| Interval Score | Criteria |
|----------------|-----------|
| 3,26 - 4,00 | Very good |
| 2,51 – 3,25 | Good |

| | |
|-------------|----------|
| 1,76 – 2,50 | Not good |
| 1,00–1,75 | Poor |

RESULT

The pictorial story was developed based on the results of potential and problem analysis conducted on teachers and students. Based on the results of interviews with fourth-grade primary school teachers, it was found that there were no supporting learning media available to assist students in learning about alternative energy. The main learning resource used was thematic book theme 2 "Always Save Energy", sub-theme 3 "Alternative Energy". The teacher agreed that there were additional supplements related to the topic so that students could interpret the benefits of this topic for their lives. The pictorial story can be an alternative media.

Students' understanding of alternative energy was also the basis for making the pictorial story. Even though this topic has been studied, there were still students who were in doubt and did not understand the function of alternative energy (33%). As many as 45% of students were hesitant and did not even understand the various alternative energy sources in the environment. Based on these data, it was concluded that the general purpose of the program being developed was for students to (1) get to know energy sources in the surrounding environment, (2) understand the use of wind energy as alternative energy that can help humans obtain electrical energy, and (3) recognize the importance of having energy-saving habits.

The initial part of the pictorial story was designed to contain an explanation of the meaning, function, and sources of alternative energy. Next, the content of the pictorial story was related to the example of processing alternative energy sources into energy that was ready for human use. The end of the pictorial story explained how to conserve the environment as an effort to conserve alternative energy sources. In general, the pictorial story consisted of three parts. Each of them was developed starting from making a general design (outline) which is described in Table 7 below.

Table 7. Pictorial Story Outline

| No. | Main Idea |
|--|--|
| Subtitle 1: KNOWING THE ENERGY SOURCES AROUND US | |
| 1 | Data on electrical energy sources in Indonesia |
| 2 | Benefits and process of forming coal |
| 3 | Categorization of renewable and non-renewable energy sources |
| 4 | Introduction to the use of wind energy into electrical energy |
| Subtitle 2: WINDMILL: TURNING WIND ENERGY INTO ELECTRICITY | |
| 1 | Definition of sea breeze and land wind |
| 2 | Explanation of windmills (components, functions, work methods) |
| 3 | Introduction to efforts to protect the environment |
| Subtitle 3: KEEPING THE ENVIRONMENTAL FOR ENERGY SOURCE SUSTAINABILITY | |
| 1 | Environmental benefits as a source of energy |
| 2 | The importance of keeping the environment as a source of energy. |
| 3 | Various efforts to preserve the environment |

In addition to publishing stories, pictorial stories are also dominated by pictures/illustrations that clarify meaning. These pictorial stories are intended for primary students who are experiencing a concrete operational development stage, in which

students have the ability to think based on reality. Researchers develop stories using illustrated images and are made based on concrete things that are found in everyday life.

Illustrative images and text contained in the pictorial stories can stimulate the imagination of students and provide information about processing alternative energy sources. Besides, the pictorial stories are made colorful so that students are interested in reading and understanding the content of the pictorial stories. An example of the pictorial stories is shown in Picture 1.

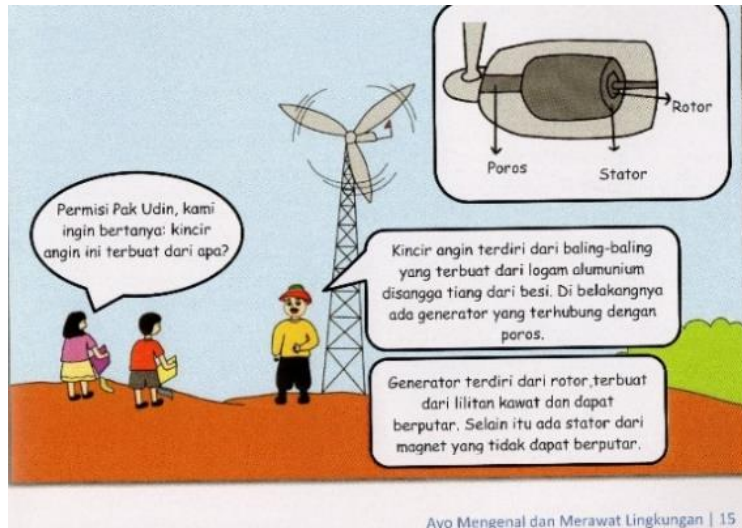


Figure 1: An example of the pictorial stories

The pictorial story was validated by two experts (science expert and teacher). The average score of the pictorial story obtained from the two validators was 3.81 which was very good (based on Table 1). The validators reviewed the quality of the pictorial story in 3 aspects, namely: language, writing format, and content. The aspect which has the best quality was the content. In detail, the scores for each aspect are presented in Table 8.

Table 8. Product Validation Score

| Aspect | Score | Criteria |
|----------------|-------|-----------|
| Language | 3,75 | Very good |
| Writing format | 3,67 | Very good |
| Content | 4 | Very good |
| Average | 3,81 | Very good |

Based on the average value, the pictorial story "Let's Get to Know and Care for the Environment as an Energy Source" deserves to be published after being revised. The pictorial story has been printed by Sanata Dharma University Press with ISBN 978-623-7379-09-6. The front and back covers of the pictorial storybook are shown in Picture 2.

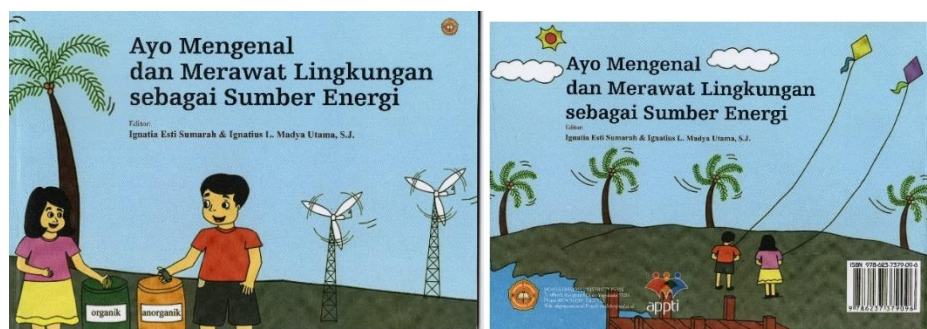


Figure 2: The front and back covers of the pictorial storybook

The quality of the pictorial story is also known based on the test result of the product used by the respondent. The product was tested on students as direct users of the product, besides, the product was also tested on the teacher as a subject that helped students learn to use the pictorial story as a means of literacy. The trials of the pictorial story were carried out by 26 students from 28 total students in grade IV SD Negeri Perumnas Condongcatur. Students were invited to read stories about natural resources that can be used as alternative energy. The product was used as an enrichment book when students learn the concept of alternative energy.

Students were invited to answer questions related to the content of the pictorial story. Students' understanding of the content of the pictorial story is detailed in Table 9.

Table 9. Students' Understanding of the Pictorial Story Contents

| Concept | Student Number answering the pictorial story content | Answer score of students (maks 4) |
|---|--|-----------------------------------|
| Areas in Indonesia that use wind potential as a source of electrical energy | 19 (73%) | 2,92 |
| General parts of windmill | 25 (96%) | 3,94 |
| Generator parts | 26 (100%) | 4 |
| Generator functions | 14 (53,8%) | 2,15 |
| How the windmill works | 11 (42,3%) | 1,69 |
| Average | 19 (73%) | 2,94 |

Based on Table 9, the average number of students who answered the questions according to the content of the pictorial story was 73%. Furthermore, when the quality of students' answers was reviewed, it was obtained an average score of 2.94 (maximum score of 4) in the good category. This score was obtained based on the value of the students' answers. The complete answer according to the content of the pictorial story has a maximum score of 4. If it was examined in more detail, the lowest percentage (42.3%) and the lowest score (1.69) appeared in the concept of "How a windmill works". In this question, students were asked to explain in their own language. Students' answers led to explanations that were similar to the content of the pictorial story. Low scores were influenced by the linguistic aspects of the students, not entirely by their limited knowledge of how windmills work., bukan sepenuhnya keterbatasan pengetahuan mereka tentang cara kerja kincir angin.

Researchers also conducted product trials with teachers in SD Sanjaya Tritis Pakem, which aimed at obtaining information about the benefits of the pictorial story in the learning process. It was expected that the pictorial story could be used by teachers as a

learning medium that integrates Science, Technology, Engineering, Art, Mathematics. Before the trial, the teachers were invited to discuss the importance of pictorial story media as a medium for learning literacy. One example was the pictorial story media developed by researchers for thematic learning in class IV, theme 2, sub theme 3, learning 1.

Next, the teachers were directed to use these pictorial stories in the learning process. After using it, the data on the teachers' response to the product were obtained as described in Table 10.

Table 10. Result of Product Trial with Teachers

| Aspect | Average Score (maks 5) | Description |
|---|------------------------|--|
| The use of a pictorial story as a means of literacy | 5 | Inspiring in making plans, helping students obtain information about natural resources, becoming a motivation for students to maintain the environment, language in the pictorial story can be used as a means of literacy, informative images in the pictorial story expands perspective in energy sources. |
| Pictorial story as a STEAM learning medium | 5 | The content of the pictorial story is integrated so that it helps students learn, the pictorial story contains STEAM components, animation / images as a combination tool. |
| The benefits of using pictorial story | 4,8 | Being open with various information, increase children's knowledge, easily introduce how to maintain the environment and energy concepts to children, get additional information about natural energy sources. |

DISCUSSION

The pictorial story about alternative energy is developed with the main characteristics, among others: containing information on alternative energy sources, examples of changing wind energy into electricity, and efforts to conserve alternative energy sources. This book can be a literacy medium in the school literacy movement, an enrichment book for thematic learning, as well as a reading book that is separated from learning. The pictorial story has 2 contents, knowledge and character education (environmental education).

a. Pictorial stories can be used as a medium for environmental/ecological education literacy

According to UNESCO, ecological education or care for the environment is a learning process that instills concern and care for the environment. Environmental education in elementary schools aims to form environmentally conscious attitudes and behaviors. The formation of attitudes and behaviors is the one that will trigger the sensitivity of students to think critically about every environmental issue, both to reduce environmental problems and take preventive measures.

The pictorial story that the researchers developed aims to help students (1) respect the environment (Respect for Nature) because humans and the environment are related: humans need the environment as a source of food and energy sources. Therefore, humans need to respect the environment by maintaining, caring for, protecting, and preserving the environment and all its contents. Humans are not allowed to damage, destroy, and the like. (2) being concerned about the environment (Caring for Nature) means that humans need to think about the impact that will occur on the environment if they have bad habits.

Based on the trial results with teachers, the information obtained shows that pictorial story can help literacy. Students can get information about various natural resources and

how to protect the environment through the reading process. In addition, the teachers argue that simple language and informative pictures help the students improve their knowledge. This is in accordance with Stewing's opinion (Hafid, 2002) stating that the pictures in the pictorial story can facilitate the readers to imagine, recognize story characters, understand stories from texts that use grammar or diction according to the intended readers. The pictorial story contains informative images that help students imagine the process of forming coal which takes a very long time. Through these images, students can learn to understand real phenomena that are difficult to see in life directly. In addition, the pictorial story also contains images of windmills components. These images help students recognize foreign objects that they may rarely find in everyday life, for example the rotor and stator.

The pictorial story that was developed through this research is for primary school students whose ages ranged from 7-12 years. It is expected that the pictorial story can encourage students to be interested in reading, understanding the meaning in pictures, and raising curiosity (Adipta, 2016). The facts supporting this opinion are also conveyed by the teachers based on the results of the pictorial story trials. The teachers argue that the pictorial story can attract the students to maintain the environment. When the pictorial story plays a role as an attraction, it is expected that it can invite the students' curiosity.

b. Pictorial stories can be used as a medium for integrated learning

According to Stroud and Baines (Khine and Areepattamanni, 2019), modern education increasingly leads to the integration of main elements that were originally different and separated. This is also the case in education in Indonesia today. The pictorial story is developed with reference to the characteristics of integrated learning management. The pictorial story contains multidimensional knowledge, including the fields of science, technology, mathematics, engineering, and the arts. When integrated, these fields are known as Science-Technology-Engineering-Art-Mathematic (STEAM). The content of the pictorial story contains knowledge related to science, namely various sources of energy, both renewable and non-renewable, leading to the concept of alternative energy sources. Indonesia has a variety of energy resources, such as oil and gas, geothermal, coal, peat, water energy, biogas, biomass, sun, wind, sea waves (Kholiq, 2015). In general, energy use/consumption in Indonesia still relies and depends on petroleum energy resources or fossil resources. Furthermore, the content of the pictorial story contains the process of utilizing wind as a source of electrical energy using windmills. Windmills consist of general components, including propellers, shafts, generators, and poles (Anindita, 2009). The concept of environmental preservation as an effort to conserve alternative energy sources is told at the end of the story. Mathematical concepts appear in the form of presenting data in diagrammatic form. Students can learn about the percentage through a diagram of the use of electrical energy sources in Indonesia. The concept of technology and engineering is also contained in the story through the exposure to windmill components and how they work. This is related to the tools and the process of using these tools to help human life. Apart from science, technology, engineering, mathematics, students can learn the art through pictures. The pictorial story contains images of various place backgrounds, living and non-living objects, color combinations, and shape compositions that can be analyzed by students.

Based on the trial results on teachers, it is obtained that the pictorial story has helped students learn in an integrated manner and contained a STEAM component. The teachers also argues that the integrating element in the pictorial story is the presence of informative animation / images.

CONCLUSION

Novelty and Contribution

The research concludes that the pictorial story contains general concepts of alternative energy, conversion of motion energy into electricity, and steps to conserve energy sources. The pictorial story has very good quality (validation score 3.81), especially in the aspect of content quality. Based on the results of the trial, 73% of students could understand the content of the pictorial story. In addition, the pictorial story can also be used by teacher as a literacy medium, a learning resource for integrated learning, as well as literature that is useful to expand students' knowledge about energy and environmental conservation.

Limitations and Future Study

This product is limited to the concept of alternative energy sources and the utilization of energy from wind. Other topics, such as processing energy from the sun, water, and other natural resources, have the potential to become topics for media literacy development.

Suggestion

The research suggests teachers use and develop literacy media for students. Apart from being an additional supplement of information, literacy media can also be used as a tool to realize integrated learning, motivate students to learn, and help character education. The literacy media that will be developed next is electronic media so that it is relevant for learning activities from home.

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