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Development of Eco-Friendly Big Book Media to Increase Interest and Science Literacy of 1st Grade Students

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Abstract: Interest in learning and science literacy needs to be developed early on through learning media that is interesting, interactive, contextual, and environmentally friendly to form student awareness in protecting the environment. This study is a research and development (R&D) of Eco-Friendly Big Book Media for grade 1 elementary school students, which aims to increase students' interest and science literacy. This media is prepared with an interactive and varied approach, in order to increase the involvement of students in the learning process. This research uses the ADDIE development model, which includes the stages of analysis, design, development, implementation, and evaluation. However, this research was only carried out up to the validation stage for product feasibility testing, which involved qualitative and quantitative data analysis, focusing on validation by material experts and media experts as an evaluation step. The validation results show that the Eco-Friendly Big Book Media is very feasible to use, with a feasibility score of 96% from material experts and 95% from media experts. This media is expected to be an effective solution in supporting teachers to increase students' interest and science literacy, especially in grade 1 elementary school.

Keywords: Big book; Eco friendly; Media

Introduction

Education has an important role in shaping students' character and knowledge (Baena-Morales et al., 2020). The goals of education in Indonesia include developing students' potential to become individuals who are faithful, pious, intelligent and broad-minded. Basic education is the foundation for students to build academic and social skills (Maury Mena et al., 2025). One of the main subjects taught in elementary school is science. This subject not only introduces students to the basic concepts of natural science but also helps develop critical, analytical, and creative thinking skills from an early age (Efendi & Barkara, 2021; Maryono et al., 2021). A good understanding of science can equip students to face the increasingly complex challenges of life in the future.

Science literacy at an early age is very important because it is the initial foundation in building students' ability to understand the world around them. Science literacy includes the ability to read, understand, and apply scientific concepts in everyday life (Fuadi et al., 2020; Rafiquddin et al., 2025). At this age, science learning needs to be delivered in an interesting way and in accordance with the stages of children's cognitive development (Wahyuni et al., 2024). Students at this stage tend to understand information more easily through visual approaches, stories, and direct experience (Morgan et al., 2024; Sadly et al., 2025). Therefore, creative and relevant learning methods are needed so that science literacy can develop optimally.

The OECD's PISA 2025 Science Framework emphasizes the importance of students understanding and applying scientific concepts in sustainability, acting

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as "Agents in the Anthropocene" to preserve ecosystems and support sustainable development (OECD, 2023). Global challenges such as climate change and pollution demand the right knowledge, skills and attitudes. Indonesia, which is in the bottom 20 in the 2022 Environmental Performance Index (EPI), needs concrete steps to raise environmental awareness from primary education. This lack of science literacy not only affects students' academic performance, but also their readiness to face the era of globalization and rapid technological development.

The results of observations and interviews in several elementary schools, such as SD Idea Baru Kalasan, SD Muhammadiyah Kadisoka, SD Negeri Kalasan, SD Negeri Tamanan 3, and SD Negeri Pakem, show that students' interest in learning science is still low, which has an impact on their science literacy skills that are not optimal. One of the main causes of this problem, based on interviews with teachers, is the lack of interactive learning media that suits students' needs, so the monotonous delivery of material often makes them feel bored. In addition, observations of grade 1 students show that they tend to prefer spending their free time playing with friends rather than learning. This indicates that an uninteresting learning approach is one of the inhibiting factors in increasing students' interest in learning. This situation demands significant changes in learning methods so that students can feel more interested and motivated to learn science (Putri et al., 2024).

To overcome these problems, an effective solution is needed, namely the development of innovative and interactive learning media. One of the media that can be used is big books, which are large books designed with attractive illustrations and simple language (Defantari et al., 2024; Prawiyogi et al., 2021). Big books can provide a fun learning experience and motivate students to be more interested in science learning (Canuto et al., 2024). By using big book media, teachers can deliver material more attractively and interactively, so that students not only understand science concepts but also feel enthusiastic about learning. Big books have various advantages as learning media. Its large size allows students to see illustrations and text clearly, even when used in group learning. In addition, the attractive illustrations and simple text in big books help students understand science concepts more easily. Big books can also be designed with themes that are relevant to students' daily lives, such as the water cycle, weather changes and ecosystems. With this approach, big books not only increase students' interest in learning but also help them relate learning to real-life experiences (Sheehy et al., 2024).

The integration of environmentally friendly concepts in the development of big book learning media is one important aspect that needs to be considered (Al Idrus et al., 2020). By using eco-friendly materials, such as recycled paper and water-based ink, big books can be a medium that is not only educative but also supports environmental conservation. This eco-friendly concept is also in line with the values of sustainable education that teaches students to care about the environment from an early age (Denico, 2020; Riyana et al., 2022). In addition, the big book can be adapted to the project-based and thematic curriculum applied in grade 1 SD, so that the material presented is more relevant and in accordance with student learning needs. The development of this media also allows for the integration of local and cultural values, which can enrich student learning while preserving local wisdom.

The urgency of developing innovative and sustainable learning media is increasingly felt in the world of education, especially in the context of learning at the elementary school level. The big book media with eco-friendly content presents a novelty in the learning approach, as well as a sustainable solution to increase students' interest and science literacy. This research aims to develop big book media that is not only interesting and educational but also supports environmental sustainability. Thus, this media can provide long-term benefits for students, teachers, and education in Indonesia as a whole. The successful implementation of this big book is expected to not only improve science literacy but also build students' environmental awareness from an early age, creating a generation that is more caring and ready to face global challenges in the future.

Method

The research method used in this study is the development research method. According to Sugiyono (2016), research and development is an approach used to produce a product and test the effectiveness of the product. This research involves a series of steps that aim to create new products or improve existing products. The development model used in this research is the ADDIE model, which consists of five main stages, namely analysis, design, development, implementation, and evaluation (Arofah & Cahyadi, 2019). In the analysis stage, the needs and objectives of product development were identified. Furthermore, the design stage focused on designing the product structure. At the development stage, the initial prototype of the product is made based on the previously designed design.

This research is limited to the e-module validation stage by material experts and media experts. This means that the developed e-module product is only tested from the content aspect by material experts to ensure the

suitability and quality of the material, as well as from the design and media feasibility aspects by media experts. The implementation stage, which is the testing of e-modules in the field to end users, as well as the evaluation stage of the effectiveness of their use, has not been carried out. Thus, this research focuses on developing a product that is valid in terms of material and media, but does not include testing its effectiveness in the field.

Data related to the development process of the big book media development design with eco-friendly content was obtained through observations and interviews. Meanwhile, data on the feasibility of developing big book media with eco-friendly content was obtained through a validation questionnaire by material experts and media experts, which was then analyzed qualitatively.

Data analysis techniques in this study used qualitative and quantitative approaches. Qualitative data came from comments and suggestions given by material and media expert validators. Meanwhile, quantitative data was used to validate the feasibility of the products developed. This quantitative data was tabulated by converting qualitative data into quantitative form using a Likert scale (Widoyoko, 2015) with four assessment categories in material and media validation, which can be seen in Table 1.

Table 1. Likert Scale Guidelines

Criteria	Score
Sangat Baik	4
Baik	3
Kurang	2
Sangat Kurang	1

To convert validity data into percentage data using Formula 1.

$$\text{Vah/au} = \frac{Tse}{Tsh}\ x\ 100\% \quad (1)$$

Description:
Vah/au = Material/media expert validation results
Tse = Total score achieved
Tsh = Total maximum score

After the scores are calculated using the percentage formula, product feasibility is determined based on material and media validation guidelines. The assessment was carried out by material and media experts to evaluate the suitability of competencies, the accuracy of the content, and the relevance to the ability of students. The validation results provide an overview of product feasibility summarized in table 2 (Yudhanegara & Lestari, 2017).

Table 2. Terms of Assessment of Material Experts and Media Experts

Achievement Level %	Category
85.01 – 100.00	Very Good to Use
70.01 – 85.00	Reasonably Usable
50.01 – 70.00	Less Usable
01.00 – 50.00	Not worth using

There are five aspects assessed in the validation test by material experts, where each aspect is translated into 25 assessment indicators. Each aspect includes various important components that aim to ensure that the developed materials meet the predetermined standards. Details of the assessment indicators for each aspect can be seen in Table 3 as a reference that supports the feasibility evaluation process.

Table 3. Indicators of Material Expert Validation Assessment

Criteria	Total Indicators
Content eligibility	10
Language feasibility	6
Feasibility of Material Presentation	5
Cultural Appropriateness	2
Practicality of Use	5
Total Indicators	25

There are four aspects assessed in the validation test by media experts, each of which is translated into 20 assessment indicators. Each aspect covers various important elements related to media quality. Details of the assessment indicators for each aspect can be seen in Table 4 as a guide to evaluating media feasibility.

Table 4. Media Expert Validation Assessment Indicators

Criteria	Total Indicators
Media content feasibility	4
Appropriateness of media language	6
Appropriateness of media design	8
Appropriateness of cultural values	2
Total Indicators	20

Result and Discussion

Result

This research aims to develop Eco-Friendly Big Book Media to increase the interest and science literacy of grade 1 elementary school students. In the initial stage, researchers identified problems in five elementary schools in Kalasan District, Sleman Regency, Yogyakarta Special Region, namely SD Idea Baru Kalasan, SD Muhammadiyah Kadisoka, SD Negeri Kalasan, SD Negeri Tamanan 3, and SD Negeri Pakem. Identification was done through observations and interviews to understand the needs of product development. This

process helps researchers determine the specifications of the product to be developed.

The results of the analysis show that the available teaching materials are still limited, which has an impact on the low interest and science literacy of grade 1 elementary school students. Teachers tend to rely on textbooks as the main source of learning, without the support of interesting and interactive learning media. This condition encourages researchers to develop teaching materials that are more creative, relevant and fun for students, so that they can increase their interest in learning and their science literacy skills.

Big Book media was chosen as the learning media in this study because of its Eco-Friendly nature, which is designed to support the increase in interest and science literacy of grade 1 elementary school students. The Eco-Friendly approach to this media not only provides benefits in educating students about the importance of protecting the environment, but also provides an interesting and fun learning experience (M. Aulia et al., 2019). Big Book Media is expected to be an effective tool in introducing science concepts in a simple and fun way.

The Big Book Media development process begins with determining the Basic Competencies (KD) and Learning Outcomes (CP) to be achieved. This step is important to ensure that the materials developed are in accordance with the learning objectives expected in the applicable curriculum. A clear determination of KD and CP will guide the development of materials to suit the needs and level of understanding of students (T. Aulia & Liansari, 2023).

The creation of this media uses the Canva design platform, which allows the creation of visual displays that are attractive and easily understood by students. Canva makes it easy to arrange graphic elements, text, and images with a simple yet attractive layout, so that the resulting media is not only effective for learning but also appealing to students (Ardiyani et al., 2023; Ilyas et al., 2023).

The developed materials include basic science concepts that are relevant to the cognitive development of grade 1 students, such as the introduction of the environment, living things, and natural phenomena. The material is presented with a combination of simple text and visual images that support understanding, so that students can easily relate the information obtained to their daily experiences.

The product validation process is carried out by involving material experts and media experts to evaluate the quality and feasibility of the products developed. This assessment aims to identify the strengths and weaknesses of the product and provide recommendations for necessary improvements. Input from experts is very useful to improve the quality of the product to better suit the needs of students. The results of this validation are presented in Table 5 and Table 6, which show the evaluation results related to material and media aspects based on expert assessments.

Table 5. Data on Material Expert Feasibility Results

Variable	Material Expert Validation Results	Category	Trial Decision
Content eligibility	96%	Very Valid	Usable without revision
Language feasibility	76%	Fairly Valid	Usable with minor revisions
Feasibility of Material Presentation	74%	Fairly Valid	Usable with minor revisions
Cultural Appropriateness	93%	Very Valid	Can be used without revision
Practicality of Use	100%	Very Valid	Can be used without revision

Table 6. Data on Media Expert Feasibility Results

Variable	Media Expert Validation Results	Category	Trial Decision
Media content feasibility	72%	Fairly Valid	Usable with minor revisions
Appropriateness of media language	71%	Fairly Valid	Usable with minor revisions
Appropriateness of media design	73%	Fairly Valid	Usable with minor revisions
Appropriateness of cultural values	76%	Fairly Valid	Usable with minor revisions

Based on the findings that have been described, it can be concluded that the development of Eco-Friendly Big Book media must be revised based on validation by material experts and media experts. Furthermore, improvements were made in accordance with the direction and suggestions of the experts. The results of revisions made by researchers based on suggestions and comments can be seen in Table 7.

Table 7. Improvements from Comments from Material Experts and Media Experts

Validator	Comments	After Revision
Material Expert	Add the words "Under the guidance of parents"	

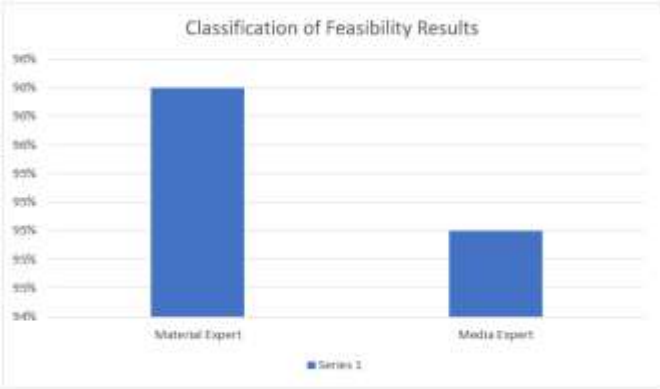
Validator	Comments	After Revision
	Sentence usage must be effective	
	Add activities to invite students to be creative	
	Add concrete examples for grade 1 students	
Media Expert	Use of colors, images should be interesting for 1st grade students	
	Clarity of fonts and colors for easy reading	
	Complete with the use of technology	

After the researchers made revisions based on suggestions and comments from material experts and media experts, the researchers then revalidated the Eco-Friendly Big Book Media for Grade 1 Elementary School. The results of this revalidation resulted in a feasibility classification which can be seen in Table 8, where the final validation score showed a significant increase after the revisions were made.

Table 8. Classification of Feasibility Results

Eligibility Results	Classification	Results
Material Expert	96%	Eco-Friendly Big Book Media for 1st Grade Students: Can be used without revision
Media Expert	95%	Eco-Friendly Big Book Media for Grade 1 Students: Can be used without revision

Diagram 1. Classification of Feasibility Results



Based on diagram 1, the validation results after going through the revision process of materials and media provided by material experts and media experts show that the Eco-Friendly Big Book Media for grade 1 elementary school students has met the eligibility criteria.

Discussion

Based on the results of material and media feasibility, Eco-Friendly Big Book Media for grade 1 elementary school students is declared very feasible to use. This is evidenced by the assessment of material experts with a feasibility value of 96% and media experts of 95%. The percentage shows that this media has met high quality standards both in terms of content and visual presentation. The results of this study are also in line with research conducted by Baiah & Fadiana (2024), which states that eco-friendly learning media has a significant impact in increasing the effectiveness of learning in elementary school students.

Learning media designed with an eco-friendly approach is very appropriate to be used to assist the learning process. This approach is not only relevant to the needs of modern education, but also able to instill values of concern for the environment from an early age (Pratama & Rohaeti, 2024; Zaki et al., 2023). This study also supports the results of Aditia (2024) research, which shows that environment-based learning media can increase student engagement and motivation in learning.

In addition, the eco-friendly approach of Big Book Media makes the learning process more interesting and fun. It integrates interactive content and attractive visuals so that students can learn with more enthusiasm (Fazel & Sayaf, 2025; Setiyaningsih & Syamsudin, 2019). Eco-friendly media can significantly increase students' interest in learning and science literacy (Kumar et al., 2024; Rahmadhea, 2024).

Eco-Friendly Big Book Media not only increases learning interest, but also plays an important role in improving students' science literacy. This media is designed with content and activities that support the development of critical thinking skills and understanding of science concepts in depth specifically designed for early childhood. This research is in line with the results of Marbun & Dwi (2024), who concluded that the development of eco-friendly media can help students understand science material in an easier and more relevant way. This media provides various interesting activities, such as interactive stories and activities with simple experiments, which are designed to foster students' interest in science.

The application of Eco-Friendly Big Book Media can also provide students with better learning opportunities. This media not only adds to the variety of teaching materials available, but also encourages students' critical thinking skills, creativity and collaboration (Ding, 2022; Pamorti et al., 2024). The use of innovative learning media can significantly improve the quality of learning, especially for students at the primary school level. With various features and innovative approaches applied, this media is expected to provide a more meaningful learning experience for students.

The results of the feasibility test from material and media expert validation, as well as supported by relevant research, show that the Eco-Friendly Big Book Media is very feasible to use to increase the interest and science literacy of grade 1 students. This media is designed to provide teaching materials that are interesting, varied, and in accordance with the needs of today's students. Based on the validation results, this media is proven effective in supporting active, creative and fun learning. Thus, it is expected that the use of Big Book Media can significantly improve the quality of science learning and enable students to learn more effectively and meaningfully.

Conclusion

The conclusion of the research and development of Eco-Friendly Big Book Media for grade 1 SD shows that this media has been comprehensively designed and successfully fulfills the objectives set. This media is designed to support the needs of students and teachers in five elementary schools in Kalasan District, Sleman Regency, Yogyakarta Special Region. Through a systematic development process, this media is proven to be able to increase students' interest in learning and science literacy. With an attractive design and appropriate materials, this media provides an innovative alternative in the learning process in the classroom, while building the character of students who care about the environment from an early age.

The recommendation from this research is that the Eco-Friendly Big Book Media be used as a more universal and flexible teaching model. This media supports the implementation of Merdeka Curriculum and strengthens the profile of Pancasila learners, providing an interactive, fun, and environmentally friendly learning experience. With the application of this media, it is hoped that it can improve the quality of education in Indonesia as a whole, especially in increasing students' interest in learning and science literacy from an early age, and overcoming the limitations of varied teaching materials in elementary schools.

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Conflicts of Interest

The authors declare no conflict of interest.

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