
Big Book: Scientific Literacy of Students

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Abstract: The scientific literacy of students must be enhanced, for it can serve as a foundation for high-quality individual in science. This research's objective is to develop and examine the effect of Big Book on students' scientific literacy. This research is anticipated to provide knowledge and insights regarding the development of Big Book as the media in learning and to enhance the scientific literacy of students. In this research, the Design and Development Research (D&D) method with the ADDIE model was utilized. The results demonstrated that Big Book can be utilized effectively by students. Additionally, students were enthusiastic about learning using Big Book. This shows that the development of Big Book can enhance the scientific literacy of students.

Keywords: Big Book, scientific literacy, Design and Development Research (D&D),

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Introduction

The current state of education in Indonesia has not been able to lead students to scientific literacy based on the PISA (Programme for International Student Assessment) from 2006 to 2019 (Setiawan, 2020; Efendi et al., 2021). Another issue is the difficulty of implementing scientific literacy instruction by teachers (Syofian & Amir, 2019). As one of the literacies of the digital era, scientific literacy is the application of scientific concepts and approach to enhance decision-making skill, sociocultural engagement, and economic productivity (Karademir & Ulucinar, 2016). Scientific literacy enables students to comprehend the technologically and scientifically dependent environmental, health, economic, and other problems facing contemporary society (Angraini, 2014). Therefore, scientific literacy must be pursued in order to prepare students for future challenges. This implies that learning activities should be focused on the learning process and knowledge application.

Early introduction and implementation of scientific literacy-based learning is required on the basis of these numerous conditions and concerns. This can begin as early as the elementary school level (Setiawan, 2020). Scientific literacy is essential because it equips students with fundamental life skills, such as the ability to solve everyday problems. In addition, scientific literacy can serve as a foundation for high-quality individuals in science, which can, over time, contribute to the economic development of a nation (Kähler et al., 2020). Scientific literacy is required so that students can apply their understanding of a scientific concept in daily life (Sutrisna, 2021).

In light of the significance of scientific literacy, the Indonesian education system must provide solutions to enhance the scientific literacy of Indonesian students (Wandini et al., 2021). In this study, Big Book is developed based on the learning material. The term "big book" refers to an enormous book

dominated by illustrations and text which correspond to the level of the students. As a result of its large scale and engaging supporting images, using Big Book can help students concentrate on comprehending the learning material. Since elementary school students tend to prefer books with engaging illustrations, this Big Book can assist teachers in arousing students' interest in reading (Nurani & Mahendra, 2019).

The use of big book-based science textbooks can improve students' scientific literacy according to Wandini et al. (2021). However, the data collection in Wandini's study was limited to interviews and questionnaires, so researchers were unable to directly observe the effect. The literature study of Akhmad et al. (2021) also indicates that Big Book can substantially improve the scientific literacy of fifth-grade elementary school students. Big books have an effect on students' scientific literacy (Ikbal, 2021) and improve students' scientific literacy (Akhmad, 2022). Through scientific learning, students can also enhance their scientific literacy (Asyhari, 2015).

The Design and Development Research (D&D) method was utilized in this research. The D&D model was chosen in order to demonstrate the effect of using Big Book on students' scientific literacy. This research focuses on the specific research problem in the form of question: "Does Big Book affect students' scientific literacy?" This research is anticipated to provide knowledge and ideas regarding the development of Big Book as instructional media and to enhance the scientific literacy of students.

Method

The Design and Development Research (D&D) method was utilized in this research. The D&D model was selected because it is pertinent to the objectives of this research, which are to develop Big Book and examine its effect on students' scientific literacy. This research employed the ADDIE model, which consists of Analysis, Design, Development, Implementation, and Evaluation, as its development design model. The ADDIE model was selected for its stages of development are systematic and straightforward. In this research, all stages of the ADDIE model were implemented.

Analyze Stage

Student and media analysis is the first stage in this research. The purpose of the analysis activities is to determine students' scientific literacy and the type of learning media required by second-grade students at SDN 2 Matangkuli. At the end of the learning, students are expected to be able to provide knowledge and thoughts regarding the development of Big Book in learning and to improve their scientific literacy. This research analysis was started by administering questionnaires directly to all second-grade students at SDN 2 Matangkuli.

Design Stage

This stage was carried out by designing the Big Book. According to the results of the analysis, students still the basis of scientific literacy. This research employed the process skills of inquiring, observing, identifying, applying concepts, and reasoning. The cardboard, paper, pencil, and paint were used to generate the Big Book. The subsequent step was to integrate the Big Book with narrative.

Development Stage

Product Creation

The product was created with Canva. Researchers utilized the Canva to design the Big Book's illustrations and text. The design of the Big Book is tailored to the subject matter, which is healthy living behaviors for second-grade students. The large book was printed on A3-sized paper.

Product Validation

Following the creation of a product is product validation to evaluate products created by the researchers. Teachers of SDN 2 Matangkuli who were the experts in learning media and materials performed this product validation.

Implementation Stage

The stage that follows the development stage is the implementation stage by testing the Big Book to the students in the second grade of SDN 2 Matangkuli. The trial was conducted once with the product used, which was the validated Big Book. The implementation of learning using Big Book is consistent with the lesson plan.

Evaluation Stage

The final stage is evaluation to determine the quality of the Big Book, its educational utility, and its relationship to students' scientific literacy. The evaluation was based on the learning media and material experts, subject matter experts, and student responses to the Big Book. Determining assessment criteria, selecting appropriate assessment tools, and conducting assessments are general actions associated with the evaluation stage, in which teachers must determine the level of learning and recommend improvements (Hidayat & Muhammad, 2021). Teachers can evaluate students throughout the learning process using both formative and summative assessments.

This research instrument collects information via questionnaires. In this research, media experts' responses to the questionnaires serve as evaluation material for the product to be developed. The expert validation is displayed in Table 1 on a Likert scale from 1 to 5 (very little, less, sufficient, good, and excellent). The formula for evaluating media validity is shown in Equation 1 (Pribowo, 2018).

$$V = \text{TSEV} / \text{S max} \times 100\% \tag{1}$$

V: Validity

TSEV: Total Score of Empirical Validator

S max: The anticipated maximum score

Table 1. Expert validation questionnaires

Aspect	Indicator	Item
Display quality	Big Book is presented appropriately	The pictures illustrate the narrative in the Big Book The layout of the Big Book's display is appropriate The background on the Big Book pages is suitable The color composition of the Big Book's background and text is harmonious.
	The writing in the Big Book is legible and simple to comprehend.	The font is appropriate for third-grade students. The fonts in the Big Book are legible. The font size is suitable for third-grade students. The language employed is appropriate for third grade students.
Technical quality	The usage practicality	Big Book is easy to use by both teachers and students Students can utilize the Big Book independently
	The benefits of Big Book for both teachers and students	The narrative and pictures can improve students' scientific literacy The Big Book assists students in comprehending concepts

Student response questionnaire grids are provided on Table 2. The calculation of the questionnaire employed Guttman scale (Yes=1, No=0) which is presented in Equation 2.

$$\text{Suitability percentage} = \frac{\text{Total score of the questionnaire responses}}{\text{total number of the respondents}} \times 100\% \quad (2)$$

Table 2. Student response questionnaire grids

Aspect	Indicator	Item
Media Quality	Big Book benefits the students	Do you enjoy learning using Big Book?
		Does the Big Book make it easier for you to learn the subject matter?
		Can using this Big Book increase your enthusiasm for learning?
	The appropriate display of Big Book	Do you like the pictures and text presented in the Big Book?
		Can you see the pictures presented in the Big Book clearly?
		Can you read the text presented in the Big Book clearly?
Content quality	The content in the Big Book is appropriate	Are the colors in the Big Book interesting?
		Is the material presented in the Big Book coherent and clear?
	The pictures in the Big Book are appropriate	Can you understand the material presented in the Big Book easily?
		Are the pictures in the Big Book pertinent to the material you are learning?
	The language used in the Big Book is appropriate	Do the pictures in the Big Book help you understand the material?
		Is the text presented in the Big Book pertinent to the pictures?
Technical quality	Accessibility for the students	Does the text in the Big Book help you understand the material?
		Is the Big Book user-friendly?
		Can you use the Big Book independently?

Results and Discussion

Analysis of Questionnaire Scores of Material Experts and Media Experts

Expert validation is used as an assessment of the feasibility of the developed Big Book. Based on the expert validation questionnaire, Table 3 provides a summary of the data.

Table 3. Expert validation results

No.	Validator	Questionnaire Items												Score
		1	2	3	4	5	6	7	8	9	10	11	12	
1	Validator A	4	4	4	4	4	4	5	5	5	4	4	5	52

The calculation based on the validation result:

$$\begin{aligned} V &= \frac{\text{TSEV}}{\text{S Max}} \times 100\% \\ &= \frac{52}{60} \times 100\% \\ &= 86.66\% \end{aligned}$$

Based on the assessment criteria of one of the teachers whom the researchers observed, he viewed that the developed Big Book was able to illustrate the content of the reading and was appealing to students, as evidenced by the suitability of the background color with pictures and writing so that both the letters and the pictures are clear. In addition, the language used in the Big Book is appropriate for elementary students, so that students are interested in learning. With a validity rate of 86.66%, the

results of expert validation fell into the “very valid” category (Pribowo, 2018). This demonstrates that the Big Book formats are appropriate and can be applied to the elementary students although there are some rooms for improvement in certain areas.

Score Analysis of Students' Questionnaires Responses

The effect of using Big Book on students' scientific literacy was determined with the aid of student responses. Table 4 depicts the result of the students' responses to the Big Book.

Table 4. Score of Students' Questionnaires Responses

No.	Student	Questionnaire Items															Score
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	M	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
2	NN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
3	SN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
4	A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
5	HN	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
6	MK	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
7	NM	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
8	IY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
9	MA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
10	GK	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
		Total															150

Percentage = The total score/maximum score x 100%
 = 150/150 x 100%
 = 100%

The calculation of the percentage of student responses to the developed Big Book indicates that the Big Book meets the criteria for being classified as excellent. It can be concluded from these calculations that students are enthusiastic and content when using the Big Book to learn. The students' enthusiasm for this learning increases their interest in scientific literacy. This demonstrates that the development of Big Book can enhance the scientific literacy of students.

Conclusion

Scientific literacy, as one of the literacies of the digital era, is the output of knowledge and approaches related to scientific concepts and processes that refine students' skills in personal decision making, participation in sociocultural engagement, and economic productivity. There is a need for interesting media to improve students' scientific literacy, one of which is Big Book. Big book is a large book that is dominated by images and written content, made to suit the age level of students. This research findings utilizing the ADDIE method showed that students can effectively use the Big Book. Additionally, students are enthusiastic about learning using Big Book. This implies that the development of Big Book can enhance the scientific literacy of students.

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