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Development of SETS Based E-book Teaching Materials in Strengthening Science Literacy in Elementary School

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ABSTRACT

This study aims to produce one of the teaching materials that can be used for elementary school students to strengthen scientific literacy. The research method used is Research and Development (R&D), the subjects in this study were the 18th graders of Elementary School. Data collection techniques using observation, questionnaires and documentation. The results achieved in this study are developing SETS-based E-book teaching materials and testing the feasibility of the validation results of experts, teacher and student responses get a percentage of linguists 86%, material experts 82%, media experts 100%, student responses were 91.89%, teacher responses were 94% and got the criteria "very valid". So it can be concluded that this study resulted in a SETS-based E-book teaching language that was able to strengthen the scientific literacy of grade VI elementary school students who had been tested. By experts who get very valid eligibility criteria.

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A. INTRODUCTION

Science or science is one of the subjects in elementary school. Science can also be a way for students to learn more about themselves and those around them. Science is a series of concepts that are interconnected with concept charts that have been developed as a result of experimentation and observation and are useful for further experiments and observations (Firdausy & Prasetyo, 2020). In elementary school, science material has concepts related to the real world or the natural world around us.

As mentioned above, given the importance of this lesson, science education should be well integrated into the process of learning activities in schools. when studying in the 21st century, teachers need to acquire basic knowledge endowed with critical and creative thinking for students. Scientific literacy is one of the most important skills and should be strengthened by the students. Students with scientific literacy skills will be able to apply the knowledge learned to solve problems in good everyday life (Jufrida et al., 2019). According to (Winarni et al., 2020) Literacy skills are one of the main aspects of education to strengthen 21st century skills in learning competence. Therefore, students must be facilitated with learning that implements

their knowledge in real life. Learning is not only oriented to mastery knowledge but also oriented to the learning process.

Judging from the achievements in scientific literacy at PISA, Indonesian students' scientific literacy from year to year is still low. This situation is evidenced by the results of a survey conducted by the OECD. In 2012 Indonesia in 2015 Indonesian students were ranked 69th out of 79 countries with a score of 4038. While in the latest PISA results, in 2018 Indonesia was ranked 9th from the bottom or 71st with a score of 396. This shows that Indonesia has decreased by 7 points. Literacy has been familiar for us recently. The word literacy became the center of attention after various surveys, conducted by PISA and TIMSS, stated Indonesian students were low ranked (Ni'mah, 2019). Based on these data, the average scientific literacy ability of students is only at the stage of knowing basic facts, not to mention complex and abstract ones, as well as the application of concepts. Skills cannot be communicated and are related to different scientific topics. It can be concluded that Indonesia is a country with low scientific literacy. This is certainly a problem that needs to be resolved.

At the time of observation with teacher VI SDN Pilangbango during PLP II there were still some students who were passive when the teacher explained or gave material and also when the teacher asked the students did not respond or answered, besides that the teacher also only used teaching materials in the form of thematic books or package books so that students feel bored while learning. During an interview with a sixth grade teacher about scientific literacy, he said that strengthening students' scientific literacy is not easy, there are still many students who are not happy with reading books and this is also obtained from the results of the PAS (Semester Final Assessment) in 2021/2022 where the grades of students VI is still below the existing KKM average, the KKM content of science subjects is 75 and the results of grade VI students score an average of 58, indicating that 80% still do not meet the KKM criteria.

From these problems it can be concluded, things like this are influenced by several factors. Some teachers use direct teaching with learning resources in the form of textbooks and textbooks or other. If the textbook used is less interactive and does not encourage students to read it, then using an ebook can make it easier for students to learn, because the ebook they use contains pictures or videos that motivate students. according to (Raihan et al., 2018) The e-book is an innovation of teaching materials in the form of non-print with a shape resembling a printed book but was able to overcome the limitations of the printed book because it produces products in the form of soft files so efficient and economical distribution. Therefore, teachers positively welcome the development of SETS-based teaching materials to strengthen scientific literacy, especially in grade VI elementary school. Seeing the conditions and possibilities that exist at SDN Pilangbango, both students who need interesting IT-based materials and teachers who are still struggling to motivate students to strengthen their basic science education,

According to (Basam et al., 2017) science literacy learning is the development of scientific ability and creativity knowledge relevant to everyday life and career in decision making for problem solving. Based on the results of observations, it turns out that the class is still using traditional learning media such as printed books. Therefore, students are still very dependent on the teacher. Where is evidenced by several student attitudes that show, and record or plagiarize during the learning process. In addition, because students' understanding of the application of scientific concepts in daily life is still low, students' basic knowledge of science is also still low.

*E-book*is an electronic version of a book that contains various multimedia content such as audio, visual, and interactive.According to (Dewi & Agung, 2021) E-Book is an abbreviation of

Electronic Book which compiled from textbooks, then converted into digital formats and saved in certain formats. Where E-books can be presented in an electronic format so that they can display simulations by combining text, images, audio, and video, animation or navigation. According to (Rasmawan, 2020) ,The SETS approach requires learner to do investigation to complete problems in society and environment by using science and the technology they learn. From this, the researchers developed teaching materials in the form of SETS-based E-books as teaching materials that can be used to strengthen students' scientific literacy skills. From this, the researchers developed teaching materials in the form of SETS-based E-books which aim to be a teaching material that can be used to strengthen students' scientific literacy skills. Which is useful for strengthening the literacy of elementary school students, especially grade VI, making it easier for teachers to carry out learning and also making students understand the material better when taught.

B. METHODS

In this study, the type used is research and development (R&D). According to (Sugiyono, 2015), R&D is a research method used to produce a particular product to test the effectiveness of the product. The product developed in this research is an E-book with a SETS approach to strengthen scientific literacy. This research was conducted in class VI SDN Pilangbango, which is located at Jl. Pilang Widya No.4, Pilangbango, Kartoharjo District, Madiun City in 2022 during March to July 2022. The subjects of the research were 18 students of class VI SDN Pilangbango. The research and development procedures used in the study were derived from within this study with the Borg and Gall development model as the reference. The data analysis technique used is qualitative and quantitative.

1. Steps In this first step, assign a score to each criterion according to the provisions in the Table 1.

Table 1. Likert Scale

Criteria	Score
Strongly agree	5
Agree	4
Disagree	3
Don't agree	2
Strongly Disagree	1

(Sugiyono, 2015)

2. For this second step, a calculation is carried out for each question item using the following formula:
   a. Formula for expert validation

$$V = \frac{\text{TSe}}{\text{TSh}}\ x\ 100$$

   b. Formula for response questionnaire

$$\text{V} = 1 + \frac{V1 + V2 + V3}{3} = \cdots\%$$

(Sa'dun Akbar, 2017)

Information:
V : Validity Percentage, TSe : Total empirical score (Total score of assessment by validator), TSh : The maximum total score of the validation results.

3. The third or final step is to prepare a calculation result of the feasibility assessment, as shown in Table 2.

Table 2. Eligibility Criteria

Percentage Score	Information
81.00% - 100.00 %	Very Valid, can be used without repair
61.00% - 80.00 %	Fairly valid, usable but needs minor improvements
41.00 % - 60.00 %	Invalid, needs major improvement
21.00 % - 40.00 %	Invalid, unusable
00.00 % - 20, 00 %	Totally invalid, can't be used

(Sa'dun Akbar, 2017)

C. RESULTS AND DISCUSSION

1. Results

The results of this research and development are presented by researchers through data collection techniques, namely observation, questionnaires and documentation. Expert validation is carried out by providing E-book teaching material media to 3 validators who are experts in their fields, namely linguists, material experts, media experts. The results of the validation are used as a reference for revision improvements. The three validators gave an assessment of the E-book teaching material product using a rating scale of 5 = strongly agree, 4 = agree, 3 = disagree, 2 = disagree, 1 = strongly disagree. The following are the results of product validation assessed by material experts, linguists, and media experts

a. Material expert validation

Material expert validation conducted by one of the PGSD lecturers at PGRI Madiun University. Material expert validation was carried out on Tuesday, 7 June 2022 offline. Media validation was carried out aiming to determine the level of media validity of SETS-based E-book teaching materials to strengthen scientific literacy in thematic material for class VI, theme 6 sub-themes 1. The researcher prepared a material expert validation sheet to be filled out by the validator. The following are the results of the material expert validator, as shown in Table 3.

Table 3. Validation results by material experts

No	Aspect	Score obtained	Maximum score	criteria
1	Content eligibility	42	50	
	Total number		41	
	Maximum score		50	Very valid
	Average		82%	
	criteria		Very valid	

Based on Table 3, the results obtained from material expert validation show a percentage of 82% with very valid criteria. So the SETS-based E-book teaching material media to strengthen scientific literacy is appropriate to be used for testing but must be repaired first in accordance with the suggestions given by the validator.

b. Linguist validation

The validation of linguists was carried out by one of the PGSD lecturers at PGRI Madiun University. Linguistics validation was carried out on Monday, June 6, 2022 offline. Media

validation was carried out aiming to determine the level of language validity in SETS-based E-book teaching materials to strengthen scientific literacy in thematic material for class VI, theme 6 sub-themes 1. The researcher prepared a linguist validation sheet to be filled in by the validator. Here are the results of the linguist validators, as shown in Table 4.

Table 4. Validation results by linguists

No.	Aspect	Score obtained	Maximum score	criteria
1.	language	43	50	Very valid
Total number			43	
Maximum score			50	
Average			86%	
criteria			Very valid	

Based on Table 4, the results obtained from the validation of linguists show a percentage of 86% with very valid criteria. So the SETS-based E-book teaching material media to strengthen scientific literacy is appropriate to be used for testing but must be improved first in accordance with the suggestions given by the validator.

c. Media expert validation

Validation of media experts conducted by one of the PGSD lecturers at PGRI Madiun University. Media expert validation was carried out on Tuesday, 7 June 2022 offline. Media validation was carried out aiming to determine the level of media validity of SETS-based E-book teaching materials to strengthen scientific literacy in thematic material for class VI, theme 6 sub-themes 1. Researchers prepared a media expert validation sheet to be filled in by the validator. The following are the results of the media expert validator, as shown in Table 5.

Table 5. Validation results by media experts

No	Aspect	Score obtained	Maximum score	criteria
1	Content eligibility	50	50	Very valid
Total number			50	
Maximum score			50	
Average			100%	
criteria			Very valid	

Based on Table 5 the results obtained from the validation of media experts show a percentage of 100% with very valid criteria. So the SETS-based E-book teaching material media to strengthen scientific literacy is appropriate to be used for testing but must be improved first in accordance with the suggestions given by the validator.

The percentage results obtained from three experts, namely material experts, linguists and media experts. Then calculated to find out the overall percentage. Based on the results of the percentages from the three experts, it can be concluded that the SETS-based E-book teaching material media is feasible to be tested on class VI students of SDN Pilangbango.

d. Student response questionnaire

Response questionnaires were given to 18 grade VI students of SDN Pilangbango to determine the feasibility of SETS-based E-books.After calculating the student response

questionnaire that has been distributed to 18 grade VI students of SDN Pilangbango, an average score of 91.89% is obtained so that it can be said to be very valid.

e. Teacher response questionnaire

The teacher response questionnaire was given to the sixth grade teacher at SDN Pilangbango to determine the feasibility of the SETS-based E-book.After calculating the response questionnaire for the sixth grade teacher at SDN Pilangbango, it was obtained an assessment score of 94% so that it can be said to be very valid. Based on the value of the criteria and assessment obtained validation, response and can be described in the graph, as shown in Figure 1.

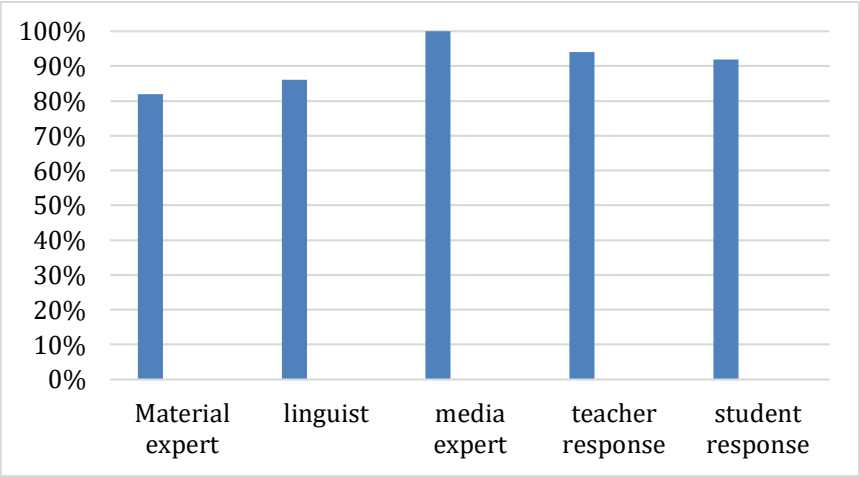

Figure 1. Feasibility Percentage Bar Chart

2. DISCUSSION

This research is a type of research and development of SETS-based E-book teaching materials in Strengthening Science Literacy in Class VI students at SDN Pilangbango which is motivated by the lack of teaching materials used by teachers, because teachers at SDN Pilangbango still use teaching materials in the form of thematic books or books. package so that students feel bored while learning besides that there are still some students who are passive when the teacher explains or gives material during learning. Scientific literacy is considered adequate and important to develop science learning. This agrees with the research conducted by (Prasasti & Listiani, 2019), based on the results of research and hypothesis testing, it can be concluded that the SETS-based Guided Experimental Book can empower elementary school students' scientific literacy.

The researcher decided to develop teaching materials in the form of an E-book based on SETS (Science Environment Technology Society) on thematic material for class VI, theme 6, sub-theme 1. The development of these teaching materials was carried out according to the needs needed by class VI students at SDN Pilangbango. The feasibility of an E-book based on SETS (Science Environment Technology Society) can be seen from the assessments of 3 validators who are experts in their fields, namely material experts, linguists and media experts. In addition, there was also a response questionnaire given to students and teachers as an eligibility for SETS-based E-books (Science Environment Technology Society). The validation results given by material experts are 82%, linguists are 86% and media experts are 100%. While the results of the response to the feasibility of E-book teaching materials given to 18 grade VI students of

SDN Pilangbango got an average result of 91.89% and the results of the response of grade VI teachers at SDN Pilangbango got 94% results.

D. CONCLUSION AND SUGGESTIONS

SETS-based E-book teaching material productsdeveloped using the Borg and Gall development model. At the research and information gathering stage, the planning stage, the initial product development stage, the initial field test stage which was validated by 3 validators consisting of material experts, linguists and media experts besides also getting the results of student and teacher response questionnaires. the last stage is stagePhase I product analysis and revision. The results of the feasibility of the first SETS-based E-book teaching materials are validation by material experts where they get a score of 82% with very valid eligibility criteria, linguist validation gets a score of 86% by getting very valid eligibility criteria, then media expert validation gets a score of 100% with criteria very valid, then the student response questionnaire got 91.89% and also the teacher got a score of 94% so it was declared very valid. So that a teacher can utilize or use SETS (Science Environment Technology Society)-based E-book teaching materials as teaching materials in the learning process and for students to utilize or use SETS (Science Environment Technology Society)-based E-book teaching materials as a learning resource at home or at school to make it easier for students to learn.

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REFERENCES

Basam, F., Rusilowati, A., & Ridlo, S. (2017). Analysis of Science Literacy Learning with Scientific Inquiry Approach in Increasing Science Competence of Students. *Journal of Primary Education*, *6*(3), 174–184.

Dewi, N. K. R., & Agung, A. A. G. (2021). The Feasibility of Social Science Learning E-Book Contains Balinese Local Wisdom for Elementary School. *International Journal of Elementary Education*, *5*(1), 39. https://doi.org/10.23887/ijee.v5i1.32049

Firdausy, B. A., & Prasetyo, Z. K. (2020). Improving scientific literacy through an interactive e-book: A literature review. *Journal of Physics: Conference Series*, *1440*(1). https://doi.org/10.1088/1742-6596/1440/1/012080

Jufrida, J., Basuki, F. R., Kurniawan, W., Pangestu, M. D., & Fitaloka, O. (2019). Scientific literacy and science learning achievement at junior high school. *International Journal of Evaluation and Research in Education*, *8*(4), 630–636. https://doi.org/10.11591/ijere.v8i4.20312

Ni'mah, F. (2019). Research trends of scientific literacy in Indonesia: Where are we? *Jurnal Inovasi Pendidikan IPA*, *5*(1), 23–30. https://doi.org/10.21831/jipi.v5i1.20862

Prasasti, P. A. T., & Listiani, I. (2019). Guided experiments book based on SETS (Science, Environment, Technology, and Society) to empower science literacy for elementary school students. *Journal of Physics: Conference Series*, *1318*(1). https://doi.org/10.1088/1742-6596/1318/1/012018

Raihan, S., Haryono, & Ahmadi, F. (2018). Development of Scientific Learning E-Book Using 3D Pageflip Professional Program. *Innovative Journal Of Curriculum and Educational Technology*, *7*(1), 7–14.

Rasmawan, R. (2020). Development of SETS-Based Teaching Materials in Acid-Base Accompanied by Critical Thinking Exercises and Moral Forming. *EduChemia (Jurnal Kimia Dan Pendidikan)*, *5*(2), 134. https://doi.org/10.30870/educhemia.v5i2.7934

Sa'dun Akbar. (2017). *instrumen perangkat pembelajaran*. PT remaja rosdakarya.

Sugiyono. (2015). *metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta cv.

Winarni, E. W., Hambali, D., & Purwandari, E. P. (2020). Analysis of language and scientific literacy skills for 4th grade elementary school students through discovery learning and ict media. *International Journal of Instruction*, *13*(2), 213–222. https://doi.org/10.29333/iji.2020.13215a