Water Tourism Potential Science E-Book As A Development Product For Elementary School Learning

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Abstract

The ICT development today is spurring elementary school students' learning in classroom, so they have analytical skills, critical thinking, and superior competence. Good learning must be carried out with the learning objectives. Researchers carried out preliminary observations for obtaining the needs of teachers and students in learning science in elementary schools in Blitar. Observation findings state that teachers tend to use conventional teaching materials and students tend to get bored in visualization-based learning, like water cycle material in sciences. Researchers propose research and development for products in form of Science E-Books about the potential for water tourism to spur student achievement in water cycle material. Researchers carry out 7 out of 10 stages of research only because of limited time, manpower, and funds. Design production is validated by material, media, and language experts with respective average scores of 86%, 84%, and 91%, all of which are classified as valid. Then researcher also carried out product readability test on teachers and students with an average score of 96% and 87%, all of which were also valid. Thus, the development of the Science E-Book can be used by teachers to spur student achievement in science learning on the water cycle material.

Key Words: E-Book Development, Elementary Teaching Materials, Water Cycle

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1. INTRODUCTION

The development of the times in the 21st century distracts learning so that students have skills, abilities, and knowledge in the technology, information, and communication (ICT) sector. These aspects can be presented in learning and teaching activities (KBM) in schools. Learning is communication between students, teachers, learning media, and the learning environment. Learning is a process of mentoring teachers for the transfer of knowledge, competence, attitudes, and the creation of student identity (Suardi, 2018). In KBM, there is a process of interaction between teachers and students in order to achieve learning objectives (Rustaman, 2001). The learning process can take place well and smoothly if accompanied by the use of teaching materials. Teaching materials play a crucial role in KBM because they contain material that is aligned for students to learn. Teaching materials are all forms of tools or something used by teachers in KBM to support the learning process (Prastowo, 2015). Teaching materials can be written or unwritten, which should allow students to learn better.

For the implementation of this research, researchers conducted a preliminary study on elementary school students and teachers in Blitar City and Regency. The study targeted SDN Kepanjenlor 3, SDN Bendo 1, and SD Alam Wanatani. The study was carried out by providing questionnaires and observations to determine the needs of teachers and students in learning. The results of student needs questionnaires and teacher needs interviews show that the teaching materials used in KBM tend to be less in accordance with the material, and the indicators of their use are still gray. So far, teachers only use teaching materials in the form of text without videos, whose achievement indicators are not clear, and tend to only use companion books. These findings show that KBM tends to be teacher-centered. In fact, with today's massive digitalization, teaching materials can facilitate the understanding of material for students.

Researchers plan to develop technology-based teaching materials that are aligned with the needs of teachers and students for preliminary studies. Technology-based teaching materials that can be offered can be in the form of Book Creator applications. Book Creator is an instrument for creating digital books that can be supplemented with audiovisuals. This application supports KBM in driving students' competencies for speaking, writing, and reading (Puspitasari, 2020). With this teaching material, teachers can present material that suits the interests of each teacher. For the advantages of this application, researchers plan to combine it with science learning. Thus, the researchers offer research and development for material-based e-books on water tourism potential for elementary schools.

This research has a problem to study, an objective, and benefits presented as follows: First, the problem of this research is, "How is the validity of the Science E-Book on the content of class IV science lessons?" and "How is the readability of teachers and students on the Science E-Book on class IV water cycle material?" Second, the purpose of this research is "knowing the validity of the Science E-Book on the content of class IV science lessons" and "knowing the readability of teachers and students on the Science E-Book on class IV water cycle material." Third, this research is practically useful for schools in adding insight into innovative teaching materials, useful for teachers in

improving the quality of science learning, useful for students in learning supplements, and useful for subsequent researchers in the creation of more refined teaching materials.

2. LITERATURE REVIEW
2.1 Teaching Material

Teaching material is one of the important parts that can support learning. Teaching materials are used by teachers and students during the learning process. Teaching materials are systematically arranged materials or subject matter that teachers and students use in the learning process (Octaviani, 2017). In addition, teaching materials are all forms of materials, both written and unwritten, that are used to assist teachers in carrying out teaching and learning activities (Majid, 2012). Based on these definitions, it can be concluded that teaching materials are all materials that function as learning resources, both written and unwritten, designed by teachers to help students achieve learning objectives.

Teaching materials have a variety of variations that are tailored to their use. There are several types of teaching materials; some are printed and some are not. printed teaching materials that are often found. First, books are written materials in the form of sheets and bounds containing knowledge derived from basic competencies contained in the applicable curriculum for later use by students (Lestari, 2013). Second, handouts are everything that is given to students when participating in learning activities. So, handouts are made with the aim of smoothing and making it easier for students to get information or learning materials as a source of student reference. Third, modules are teaching materials written with the aim that students can learn independently without or with teacher guidance. Modules contain learning performances, competencies to be achieved, content of subject matter, supporting information, work instructions, practice questions, evaluation, and feedback on evaluation results (Prastowo, 2011).

2.2 Book Creator Application

Book Creator application is a science e-book maker application in this study. Book Creator is a simple "tool" for creating attractive books. Why is it said to be attractive? Because usually a book only displays writing and images, but with this tool, we can not only display images and writing but can also insert audio and video (Fitria, 2021). The advantage of this application is that it is easy to use because students can access Book Creator from their devices. In addition, this application is environmentally friendly, which minimizes the use of paper. However, there are drawbacks to this application, including the need for hardware.

2.3 The Matter of Water Cycle

Science learning in Phase B of Grade IV elementary school has water cycle material. The water cycle, also called the hydrological cycle, is the rotation of water, with

water changing into various forms and returning to its original form. In simple terms, the water cycle occurs through the stages of evaporation, or transpiration, condensation, precipitation, and infiltration. First, evaporation is used to indicate the process of evaporation of water coming from seas, rivers, lakes, and other bodies of water, while transpiration is the release of water molecules as a result of plant metabolism. Second, condensation is the process of changing water from gas to liquid, also called condensation, which is the opposite of evaporation. Third, precipitation is a product of condensation that occurs due to cooling and the addition of water vapor so that the water that forms clouds reaches the saturation point. Finally, infiltration is the process of rainwater seeping into the soil.

3. RESEARCH METHOD

Research and development (R&D) procedures are selected for the implementation of this research. R&D is a research method that aims to create products that are tailored to the needs of people and test their effectiveness (Sugiyono, 2019). There are 10 stages in the implementation of R&D, but due to a lack of time, cost, and energy, researchers only apply the 7 stages listed in the following chart.
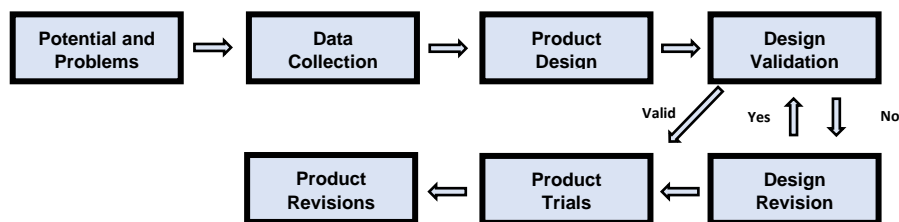
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┌──────────────┐     ┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│ Potential and│ ==> │     Data     │ ==> │   Product    │ ==> │    Design    │
│   Problems   │     │  Collection  │     │    Design    │     │  Validation  │
└──────────────┘     └──────────────┘     └──────────────┘     └──────────────┘
                                       Valid        Yes ⇑ ⇓ No
┌──────────────┐     ┌──────────────┐     ┌──────────────┐
│   Product    │ <== │   Product    │ <== │    Design    │
│  Revisions   │     │    Trials    │     │   Revision   │
└──────────────┘     └──────────────┘     └──────────────┘
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Figure 1. Modification of R&D Stage (Sugiyono, 2019)

First, the potential and problem stages are carried out in the form of interviews with teachers to identify problems related to science learning. Furthermore, researchers made observations on the sites of SDN Bendo 1, SDN Kepanjenlor 3, and SDN Alam Wanatani. The observation aims to identify problems in KBM, especially in the water cycle material. Teacher interviews resulted in teachers not utilizing technology in KBM, and observations showed that students were less enthusiastic about water cycle material due to the lack of teaching materials.

Second, the data collection stage is carried out by researchers to collect documentation. The data collected is based on a needs analysis containing CP, TP, indicators, images, audio, video, water cycle materials, and questions, as well as the results of the analysis of teacher and student needs in the learning process. The learning model that corresponds to this e-book uses a hybrid learning model.

Table 1. Science *E-Book* Product Design

Book Creator *Section*	Information
Display Design	• Book Creator can be accessed via link, QR BarCode and print in the form of a Flash drive.

	• Design Book Creator using the Canva application, then exported to the Book Creator web. • Font size 12 pt. • The selection of cover illustrations is tailored to the theme of the water cycle.
Content Design	• The material used is in accordance with the learning objectives. • The language of delivering material through Book Creator is simplified so that students can easily understand the material. • Examples of the presented benefits correspond to their use in everyday life. • Adding images to support learning. • Illustration as decoration and has meaning.

Third, at the product development stage, researchers begin to design learning material products. The design is carried out to provide an initial overview of the learning materials to be developed, such as flowcharts and storyboards. Product design contains related product specifications to be developed, so in product design there will be an overview of what kind of learning teaching materials to be developed.
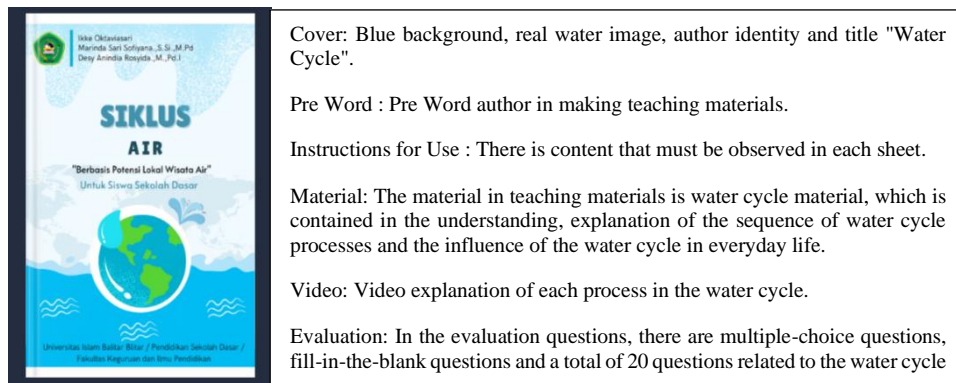

SIKLUS AIR "Berbasis Potensi Lokal Wisata Air" Untuk Siswa Sekolah Dasar	Cover: Blue background, real water image, author identity and title "Water Cycle". Pre Word : Pre Word author in making teaching materials. Instructions for Use : There is content that must be observed in each sheet. Material: The material in teaching materials is water cycle material, which is contained in the understanding, explanation of the sequence of water cycle processes and the influence of the water cycle in everyday life. Video: Video explanation of each process in the water cycle. Evaluation: In the evaluation questions, there are multiple-choice questions, fill-in-the-blank questions and a total of 20 questions related to the water cycle

Figure 2. Product Hypothetical Model

Fourth, the validation stage of teaching material design is carried out in the form of submitting validation to material experts, media experts, and linguists. Validation is carried out to provide value and input on the product design of learning teaching materials. In this case, material experts, media experts, and language experts who conduct validation are also given validation instruments. The following is a validation questionnaire grid of material experts, media experts, and linguists.

Table 2. Material Expert Validation Instrument Hints

No	Aspect	Indicator	
1.	Material Quality	a.	Accuracy of Competency
		b.	Relevance of the material to the purpose
		c.	Completeness of the material
		d.	Material claims
		e.	Difficulty level
		f.	Depth of material
		g.	Relevant to the student's condition
2.	Significance	h.	Membantu dalam pembelajaran

	i.	Mempermudah pemahaman siswa
	j.	Memberikan fokus perhatian

Table 3. Media Expert Validation Instrument Hints

No	Aspect	Indicator	
1.	Cover Design	a.	Suitability of shape, size, layout, fonts, and objects
		b.	Contrast of letters against the background
		c.	Typeface combinations
		d.	Cover appeal
2.	Typography	a.	Compatibility of word bubbles with dialogue
		b.	Font variations
		c.	Accuracy of the station
		d.	Readability
3	Illustration	e.	Illustration suitability
		f.	Highlights
		g.	Clarity

Table 4. Linguist Validation Instrument Hints

No	Aspect	Indicator	
1	Languages in *Science* E-Books	a.	Clarity of Science E-Book usage indicators
		b.	Language suitability to the level of social development of grade IV elementary school students
		c.	Accuracy of the term
		d.	Effects of language usage
		e.	Language support for ease of understanding the flow of material
2.	Language Structure	a.	Conformity with the rules of good and correct Indonesian writing
		b.	Using sentences effectively and efficiently
		c.	The information conveyed is clear
		d.	Communicative language for students
		e.	Language motivates for students

Fifth, at the design revision stage, improvements are carried out by considering the input that has been given by material experts, media experts, and linguists. After the improvement is complete, the learning and teaching materials can enter the next stage.

Sixth, product trials are carried out on a limited number of grade IV students. The students needed in the initial trial of this learning teaching material are 5 teachers and 5 students. Students are given E-Book teaching materials and then they will fill out questionnaires that have been provided to assess and comment on the teaching materials.

Seventh, product revision is carried out by looking at input and suggestions from students. Revisions or improvements are made to improve the teaching materials developed. After the teaching materials have been repaired, the teaching materials will enter the next stage, the readability test. The Readability Test is conducted by researchers to find out how *Science E-Book* can be received by students and teachers for their application. Each sample amounted to 5 teachers and 5 students as respondents to SDN Babadan 1 teachers.

Data analysis in the development of science e-books as teaching materials is based on a Likert scale. The Likert scale is used by researchers to measure the opinions, attitudes, and views of individuals or groups related to social phenomena (Sugiyono, 2019). This instrument is used to measure the results of teacher readability questionnaires with score intervals of 1 to 5.

4.   RESULTS AND DISCUSSION
4.1   Analysis of Potential Problems and Solution Solving

This research produces development products in the field of education in the form of teaching materials for science e-books based on the local potential of water tourism for grade IV elementary school students. The learning teaching materials in the form of science e-books carried out use the R&D model in Sugiyono's writing (2019), which consists of (potential problems, data collection, product design, design validation, design revision, product trials, product revisions, use trials, product revisions, and mass products).

Preliminary data collection was carried out at SDN Bendo 1, SDN Kepanjenlor 3, and SD Alam Wanatani in the form of interviews with teachers who needed analysis to obtain some information. The information is that, first, teachers still lack the teaching materials used for learning to take place. Second, teachers only utilize learning resources from YouTobe's textbooks and videos. Student knowledge and experience are lacking in terms of solving problems around them by considering many aspects, namely technology.

Based on the results of these interviews, researchers can conduct curriculum analysis, analysis of student needs, and learning objective analysis. First, curriculum analysis is carried out on related teaching modules. The results of the analysis are used to determine learning outcomes (CP) and the number of indicators of science subject matter for grade IV students. CP in the form of "Students describe the occurrence of the water cycle and its relation to efforts to maintain water availability" and Learning Indicators in the form of "Students can explain the understanding of the water cycle, students can explain the understanding of the process of the water cycle, students can describe the influence of the water cycle in everyday life."

Second, based on the results of the interviews that have been conducted, it is known that students need interesting teaching materials to make it easier for them to understand the material when learning. Researchers develop science e-book teaching materials that are designed according to the age of elementary school students. teaching materials that are able to increase students' creativity abilities by providing science issues in everyday life so that students are able to solve problems in a scientific way.

Finally, the use of teaching materials is needed by students to increase their enthusiasm for learning. Therefore, teachers are expected to be able to apply learning materials that are interesting and fun and make it easier for students to understand the material learned. Science e-books can be an alternative learning material because they are interesting to use and there are many reading references to find out the actual situations

that occur in the environment around students and understand the sophistication of today's technology.

4.2   Product Design and *Science* E-Book Development

At this stage researchers begin to design how the concept of the product will be made. This product design is adjusted to the problems that have been found and based on data that has been collected in accordance with the analysis of field needs that have been obtained. Science *E-Book* Planning is a step to determine the page or frame, color and placement and placement of text. The following Science *E-Book* planning can be viewed through *the storyboard* can be seen in the Table.

Table 5. Science *E-Book* Product Display Design

Visual	Information
	Display Design: • Book Creator can be accessed via a link or barcode. • Design Book Creator using Canva application, then exported to the Book Creator web. • The selection of cover illustrations is tailored to the theme of the water cycle.

Table 6. Science *E-Book* Content Design

Visual	Information
	Content Design: • The material used is in accordance with the learning objectives. • The language of delivering material through Book Creator is simplified so that students can easily understand the material. • Examples of benefits presented according to their use in everyday life. • Adding images to support learning. • The original image as decoration and has meaning.

4.3   Results of Expert Validity Test

The finished product was then validated to 9 validators consisting of 2 validator lecturers and 1 material expert practitioner, 2 validating lecturers and 1 media expert practitioner, 2 validating lecturers and 1 linguist practitioner. First, researchers carried out material validation tests on 2 qualified lecturers with Master of Education and 1 elementary school teacher. The following are the results of the material validation test.
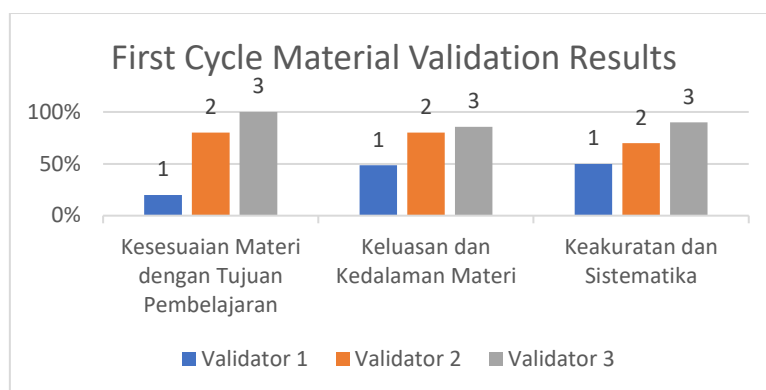
Figure 2. First Cycle Material Expert Validation Results

Based on the evaluation in Figure 2 regarding the accuracy of the material to the learning objectives, the scope and depth of the material, and the accuracy and systematics, it appears that the assessment of the validation of the material reflects this. The first indicator obtained a score of 20% from validator 1, 80% from validator 2, and 100% from validator 3. This factor arises due to learning outcomes (CP), learning objectives (TP), the absence of indicators, and the need to adjust practice questions to the material. On the other hand, the second indicator scored 50% of validator 1, 80% of validator 2, and 85% of validator 3. A low score of 50% is due to a lack of breadth in the material that does not explain the concept in detail. Finally, the third indicator recorded scores of 50% for validator 1, 70% for validator 2, and 90% for validator 3. The presence of indicators below 80% is due to the vagueness of the concept map of the material. Based on the results of this evaluation, researchers revise the product and apply for revalidation to ensure the feasibility of the material in the Science E-Book presented.
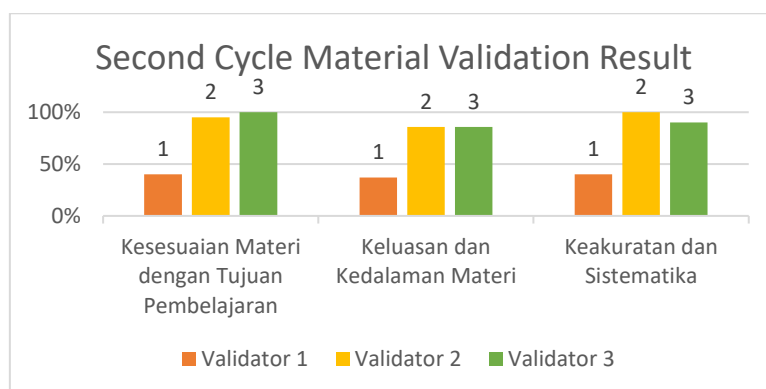

Figure 3. Second Cycle Material Expert Validation Results

Based on the illustration above, the evaluation of the material in the second assessment shows the relationship of the material with learning objectives, the scope and depth of the material, as well as accuracy and systematics. The first indicator scored 40% of validator 1, 95% of validator 2, and 100% of validator 3, due to the recommendation to use the STAD learning model in the absence of CP, TP, and Learning Indicators. Meanwhile, the second indicator obtained a score of 37% from validator 1, 86% from

validator 2, and 86% from validator 3, due to the generality of the material description that has not been in accordance with the desired TP. In the end, the third indicator scored 40% of validator 1, 100% of validator 2, and 90% of validator 3. This score indicates that there are no learning instructions that students have done with the description of the material.
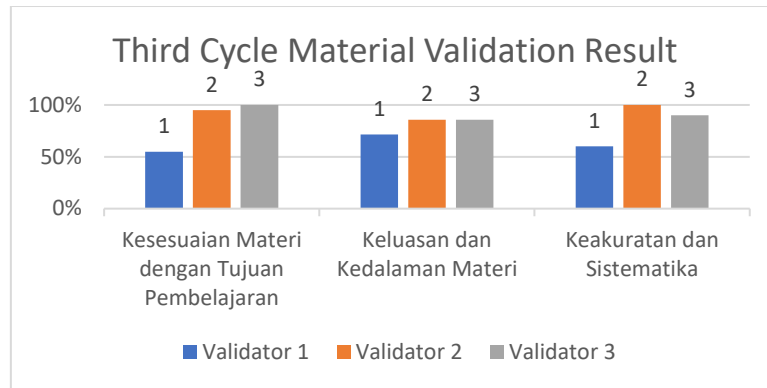

Figure 4. Third Cycle Material Expert Validation Results

Based on the illustration in Figure 4, the evaluation of the material in the third assessment reflects conformity with learning objectives, breadth and depth of material, as well as accuracy and systematics. The first indicator achieved a score of 55% from validator 1, 95% from validator 2, and 100% from validator 3, due to the adoption of the STAD learning model. The second indicator obtained a score of 85% from validator 1, 93% from validator 2, and 93% from validator 3, signaling an average improvement in this indicator because the material has been revised to be more specific according to the desired TP. Finally, the third indicator scored 60% from validator 1, 100% from validator 2, and 90% from validator 3. This 60% score shows that the learning instructions provided still do not fully lead to the main points of KBM implementation.
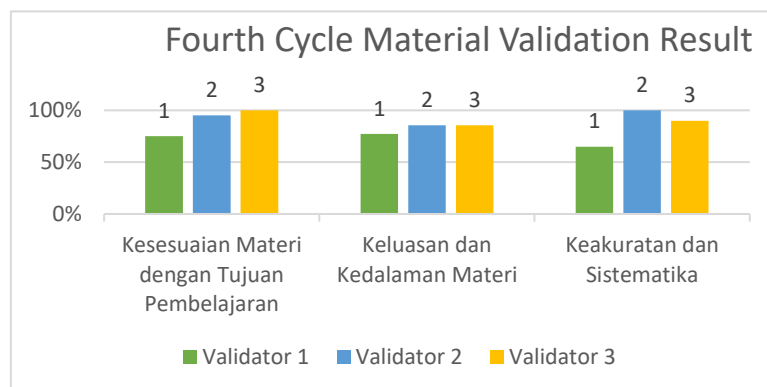

Figure 5. Fourth Cycle Material Expert Validation Results

Based on the figure above, it can be concluded that the most striking indicators are the suitability of the material to the learning objectives as well as accuracy and systematics. These two indicators account for between 80–100% of the second validator

and the third validator, which falls into the "Very Valid" category. This is due to the presentation of material that has accommodated all learning indicators, learning outcomes, and learning objectives in a structured manner. Furthermore, the indicators of breadth and depth of the material obtained a uniform percentage, which is 85.7% of the second validator and the third validator, and can be considered "very valid." This is due to the presentation of the material, starting from the basic introduction of the water cycle to covering more complex matter. Meanwhile, the percentage of results from the first validators for this indicator reached 77.1%, which is still classified as "valid." Less prominent indicators are accuracy and systematics, where the percentage result of the first validator reaches a range of 56–65% and falls within the criteria of "quite valid." Despite this, the average percentage value of the three material experts reached 85.9%, which belongs to the range of 80–100%.

Second, researchers continued the validation testing of media experts. Media experts who provide assessments are 2 lecturers with Master of Education qualifications and 1 elementary school teacher as teaching practitioners. The following are the results of media expert validation:
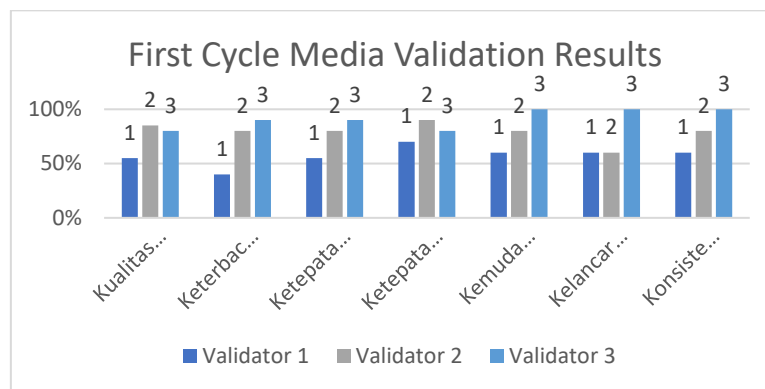

Figure 6. First Cycle Media Validation Results

The results of the initial evaluation of the media were obtained from the data of the three validators against seven indicators in the questionnaire. The seven indicators, sorted based on the assessments of the first, second, and third validators, obtained the following scores: First, the quality of the display design gets scores of 55%, 85%, and 80% due to the unclear potential of local water attractions that have not been explicitly depicted. Second, the readability of the text gets scores of 40%, 80%, and 90% because the text used is not large enough and does not read clearly. Third, the accuracy of using images and videos gets scores of 55%, 80%, and 90% due to the lack of explanation in the image. Fourth, the accuracy of using colors gets scores of 70%, 90%, and 80% because the cover and color themes are less varied to attract students' attention. Fifth, ease of operation scores of 60%, 80%, and 100% because instructions for use have not been included. Sixth, smooth operation gets scores of 60%, 60%, and 100% because the smooth playback of videos depends on the availability of students' internet networks. Seventh, the consistency of presentation pattern design, with each topic getting a score of 60%, 80%, or 100%, because it needs improvement in media presentation patterns to be more

uniform between interfaces. Therefore, in response to input and criticism from validators, researchers revised the science E-Book teaching medium for a second revalidation as a step to improve product quality.
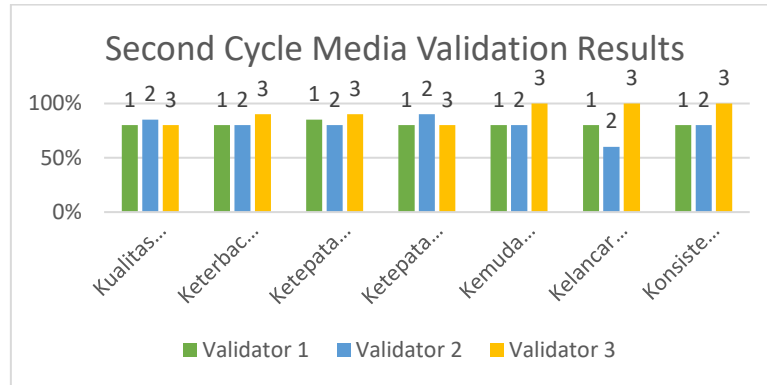

Figure 7. Second Cycle Media Validation Results

Based on the diagram in Figure 7 above, it can be summarized that the percentage results for the seven indicators consistently achieve the same score from the first validator, second validator, and third validator, which is in the range of 80–100%. This indicates that the science e-book-based medium is considered "very valid." The advantages of this medium lie in its practicality, organized appearance, and easy-to-use page navigation buttons. However, on the indicator of smoothness in operation, the percentage result of the second validator is 60%, categorized as "quite valid." This is due to one statement from the second validator, namely the need for student understanding of the use of science e-books based on Book Creator applications on Android devices. The average score of the three experts is 83.5%, which falls in the range of 80–100% and is categorized as "very valid." Therefore, this medium is worth trialing, and revisions can be made to improve its quality.

Third, the last validation test is language validation. This validation targets 2 lecturers with a Master of Education degree and 1 elementary school teacher as an education practitioner. Here are the results of linguist validation testing.
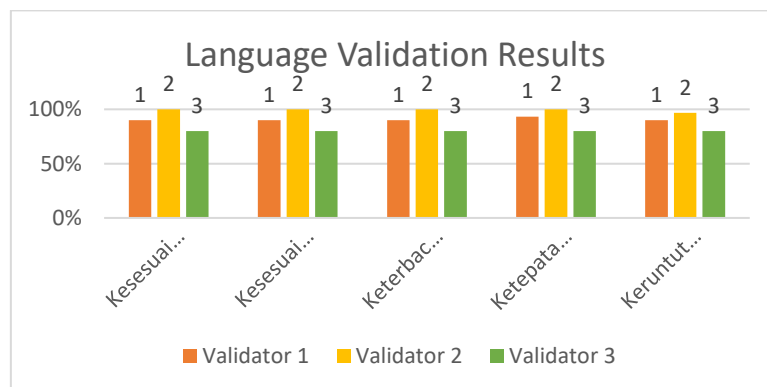

Figure 8. Language Validation Results

Linguists assess this product through three different aspects. Researchers obtained language validation from three validators sequentially, namely validator 1, validator 2, and validator 3. First of all, an assessment of the suitability of the language to the student's level of intellectual development resulted in scores of 90%, 100%, and 80%. This is due to the need to make improvements in spelling writing and the use of capital letters. Second, assessments of language suitability to students' level of social development resulted in scores of 90%, 100%, and 80%, due to unnecessary use of words. Furthermore, the assessment of message readability gets scores of 90%, 100%, and 80% because it needs more attention to the use of punctuation. Fourth, the assessment of the accuracy of language rules resulted in scores of 93%, 100%, and 80% because the language rules used were close to suitability for elementary school children. Fifth, the assessment of coherence and cohesiveness between sentences gets scores of 90%, 97%, and 80%, because paragraph writing in this media is close to perfection. Thus, the average score of the three linguists is 90.6%, which can be categorized as very valid for use in teaching and learning activities (KBM). Linguists provide advice, especially related to effective writing of sentences and paragraphs, and highlight aspects such as the use of punctuation, capital letters, non-capital letters, and spelling that need further attention.

4.4 Product Readability Testing

Teaching materials that have been declared valid are then tested for readability. The subjects of the readability test in this study were 5 students and 5 upper-class teachers, namely grade 4, 5, and 6 SDN Babadan 01. This readability test was conducted to determine the readability of the science e-book that has been developed. After the readability test was carried out, teachers and students filled out a readability questionnaire, which discussed the understanding of teaching materials by teachers and students, language understanding, understanding of the material presented, student interest in teaching materials, and the physical form of teaching materials according to teachers and students. The following are the results of teacher and student readability trials.

Table 7. Teacher Readability Test Results

Question Number	Teacher 1	Teacher 2	Teacher 3	Teacher 4	Teacher 5
1	5	5	5	5	5
2	5	5	5	5	4
3	5	4	5	5	5
4	5	5	4	5	4
5	5	5	5	5	5
6	5	5	5	4	5
7	5	5	5	5	5
8	4	5	4	4	4
9	5	5	5	5	5
10	4	5	5	5	4
11	4	5	5	5	5
12	5	5	5	5	5
13	5	4	4	5	4
14	5	4	5	5	4

15	5	5	5	5	5
16	5	5	5	5	4
17	5	5	5	5	4
18	5	5	5	5	5
19	5	5	5	5	5
20	5	5	5	5	5
Total Score	97	96	97	98	92
Percentage	97%	96%	97%	98%	92%
Mean	96%				

Table 8. Student Readability Test Results

Question Number	Student 1	Student 2	Student 3	Student 4	Student 5
1	4	4	4	4	5
2	5	5	4	4	5
3	5	5	5	5	5
4	3	4	5	5	5
5	4	5	3	3	4
6	5	5	3	3	4
7	4	4	4	4	4
8	5	3	5	3	5
9	4	5	5	4	4
10	5	4	5	5	4
11	5	4	4	4	5
12	4	3	5	4	4
13	5	5	5	5	4
14	5	4	4	4	5
15	5	4	5	5	4
Total Score	68	64	66	62	67
Percentage	90 %	85 %	88 %	82 %	89 %
Mean	87 %				

Based on Table 7, the acquisition of teacher readability questionnaires obtained an average percentage of 96%. The grade is included in the valid category and is appropriate for teachers. Meanwhile, the acquisition of student readability questionnaires from Table 8 is getting an average percentage of 87%. The grade is perfectly valid for students, so the teaching materials of the Science E-Book in terms of readability are claimed valid.
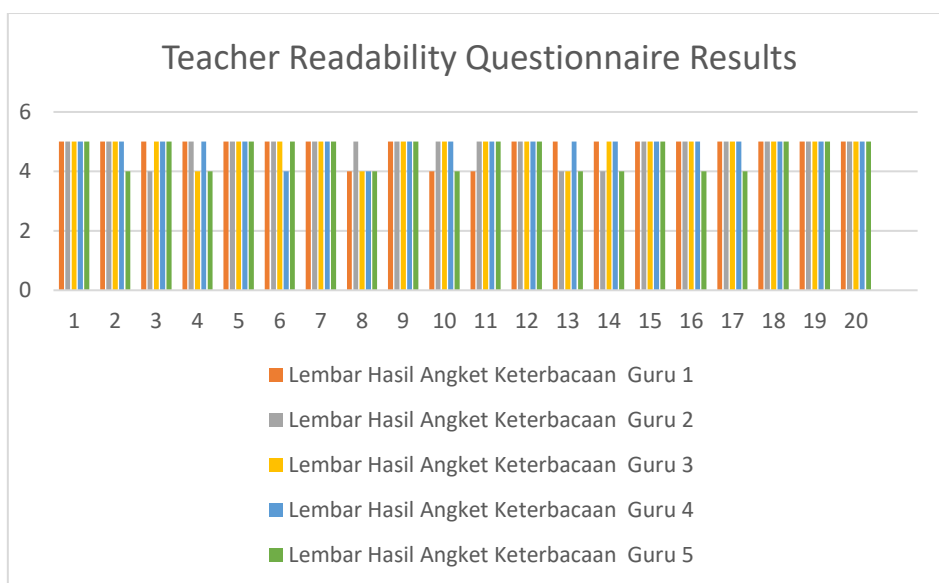
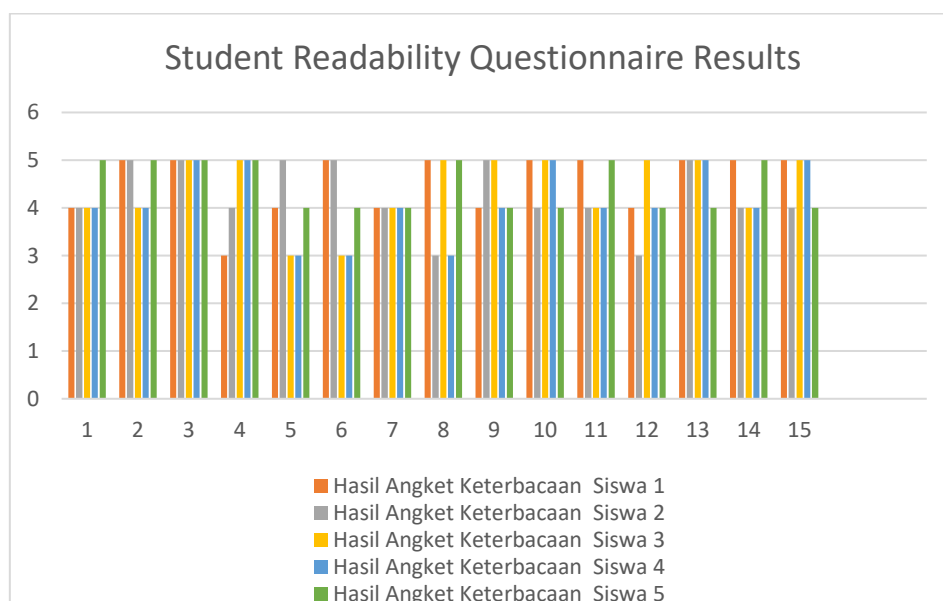**Figure 9.** Teacher Readability Questionnaire Results

Figure 10. Student Readability Test Results Diagram

Based on the two diagrams above, it can be concluded that when conducting a readability test, teachers and students obtained the most prominent indicators. The five teachers and students stated that the indicator was very achievable for teachers and students.

4.5 Product Enhancements

Product improvements are made to improve products based on the shortcomings and weaknesses of the products produced. At this stage, the product has been tested and gained confidence from teachers and students. Furthermore, teaching materials are refined to get teaching materials that are really suitable for elementary school students

and teachers to use in learning. This improvement is based on assessments and suggestions from validators as well as responses from students as assessment subjects.

This product has both advantages and disadvantages. The advantages of developing science e-book products are that the display is presented attractively, the presentation of the material is arranged in a coherent and systematic manner, there are learning videos that can be accessed via links or barcodes, practice questions are presented interestingly, and this teaching material presents illustrations authentically. Meanwhile, the weakness of this product is that the navigation buttons cannot be operated automatically without operation, and this teaching material is only limited to water cycle material.

5. DISCUSSION

The e-Book Science produced through research and development features accessibility through links, barcodes, and the option of hardfile printing. The cover design is tailored to the theme of the water cycle, and the content is organized according to Learning Objectives in a language friendly and easily understood by students. Muchyidin (2017) emphasize that the primary goal of instructional material creation is to assist students in learning concepts in an engaging manner. In the development stages, this product is highly rated as very valid by content, media, and language expert validators. The instructional material of the e-Book Science utilizes multimedia such as videos, animations, sounds, and graphics to create engaging and efficient learning experiences. The e-Book has advantages, including an attractive display, systematic presentation of material, and access to video lessons through links or barcodes. However, there are also drawbacks, such as navigation buttons requiring manual operation and limitations on content only related to the water cycle. Another advantage is the highlighting of the local water tourism potential in Blitar Regency, with video lessons created by the researcher.

The readability test shows highly valid results, with 96% of teachers and 87% of students giving positive ratings to the readability of the e-Book Science. This confirms that the water cycle material in the e-Book is ready to support the learning process of elementary school students. The readability test also reveals positive values after in-depth analysis, with 90% of teachers and 87% of students giving positive ratings. E-Book Science-based learning in the context of the water cycle facilitates group learning, in line with the Student Teams Achievement Division (STAD) learning theory that encourages interaction and mutual assistance among students to achieve full understanding.

6. CONCLUSION

Based on the results of research and product development of Science E-Book teaching materials, it can be concluded that the products developed are Science E-Book teaching materials for skills and knowledge and add insight into science subjects, especially water cycle materials for grade IV elementary school students. Researchers carry out seven stages of research and development on the modified results due to limited energy, funds, and time.

The teaching materials produced have passed validation by material experts, media experts, and linguists and obtained a percentage of material experts with an average of 86%, from media experts by 84%, and from linguists by 91%, which are all classified as very feasible. The readability test of Science E-Book teaching materials is considered very valid, with a percentage of 96% of teachers and 87% of students' readability of these grades being declared very valid.

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BIBLIOGRAPHY

Abdul, M. (2008). Perencanaan pembelajaran mengembangkan standar kompetensi guru. *Jakarta: PT. Rosda Karya*.

Fitria, E. (2021). *Pengembangan buku elektronik materi indahnya kebersamaan dengan menggunakan book creator di kelas iv mi*. IAIN Palangka Raya.

Muchyidin, A. (2017). Pengaruh penggunaan bahan ajar matematika bersuplemen komik terhadap kemandirian belajar siswa. *Eduma: Mathematics Education Learning and Teaching*, *6*(1), 43–51.

Lestari, I. (2013). Pengembangan bahan ajar berbasis kompetensi. *Padang: Akademia Permata*, *1*.

Oktaviani, W., Gunawan, G., & Sutrio, S. (2017). Pengembangan bahan ajar fisika kontekstual untuk meningkatkan penguasaan konsep siswa. *Jurnal Pendidikan Fisika Dan Teknologi*, *3*(1), 1–7.

Prastowo, A. (2015). *Panduan kreatif membuat bahan ajar inovatif menciptakan metode pembelajaran yang menarik dan menyenangkan*.

Puspitasari, R. & W. (2020). Pengembangan Book Creator. Pendidikan.

Rustaman, N., & Rustaman, A. (2001). Keterampilan bertanya dalam Pembelajaran IPA. *Dalam Hand Out Bahan Pelatihan Guru-Guru IPA SLTP Se Kota Bandung Di PPG IPA. Depdiknas*.

Suardi, M. (2018). *Belajar & pembelajaran*. Yogyakarta: Deepublish.

Sugiyono, P. D. (2019). Metode Penelitian Kuantitatif, Kualitatif, dan R&D (Sutopo. *Bandung: CV. Alfabeta*.