

# Higher Order Thinking Skills Students Of Water Cycle Materials Through *Flipbook-Based Electronic Textbooks*

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**Abstract.** This study aims to develop a flipbook-based electronic textbook on learning science water cycle material. This type of research uses the *Development Research* method which uses the ADDIE (*Analysis, Design, Development, Implementation, and Evaluation*) development model. This study involved 25 VA class students of SD Alulum Terpadu Medan for the 2021-2022 school year using data analysis techniques carried out by direct observation, interviews, questionnaires, and questionnaires. The results showed that the foldbook-based electronic textbooks developed have met BSNP standards. The results of the standardization of the development of flipbook-based electronic textbooks based on BSNP carried out by textbook feasibility expert validators obtained 90.71% were declared very feasible. As for the feasibility value of the media / design by IT experts, a value of 90% was obtained with very decent criteria, and the N-Gain value was obtained 0.64 with a medium category. So that it can be concluded that *the flipbook-based* electronic textbook is valid and can be used in the learning process.

**Keywords:** Electronic textbook, Flipbook, Higher Order Thinking Skills (HOTS)

## 1. Introduction

Education has an important function for humans to welcome an environment that is constantly undergoing changes. Education is an effort made by humans to categorize their inner abilities towards a better direction. Education has an important role as the process of making the individual into himself [1].

The target of learning in the 21st century is to encourage students to become active learning in order to be able to seek, find, construct, process, use their knowledge so as to create a meaningful learning. The processes of active students in the 21st century have been adapted in the education system in Indonesia through the current 2013 curriculum through a scientific approach. The process of applying science in learning is carried out by involving 5M procedures, such as observing, questioning, trying, reasoning, and communicating. Therefore,

the context of the learning process is directed to encourage students to find out from various sources (observation), be able to formulate problems (questioning) not just solve problems [2].

Natural Sciences (IPA) is one of the eight learning content that needs to be mastered at the elementary school education level. In classes I, II, III, science content is integrated in Indonesian content, while in grades IV, V, VI, science becomes a stand-alone learning content in integrated thematic learning. Science learning is a process and outcome-oriented learning [3]. The science learning process in elementary schools not only focuses on comprehension abilities but also on the development of critical thinking skills [4]. Science learning must be developed to be student-centered, where learners strengthen problem-solving skills and increase curiosity in each learning process [5]. The water cycle material is one of the materials in science learning which contains an explanation of how the process of the water cycle occurs, human activities that can affect the water cycle, and how to save water [6]. This material is very important to be taught in elementary schools with the aim that students know and understand how to behave towards nature and to have a caring attitude towards nature [7].

One of the learning resources that can be used in the science learning process that is in accordance with the demands of the industrial revolution era 4.0 is electronic books which are often referred to as *e-books*. Electronic textbooks have become popular because they combine conventional teacher teaching materials into electoral teaching materials that can be accessed anytime and anywhere. The practicality of electronic textbooks is also recognized by many parties because they contain animations that are presented multimedia by combining text, audio and visual [8].

Based on the results of interviews and observations with class V teachers of SD Swasta Al-Ulum Terpadu Medan, it shows that the results of learning science are still below the KKM set by the school, namely 78. This is due to several factors both from the teacher and from the students themselves. Most students have difficulty in understanding a material, especially in science learning. Their memory cannot last long because when the learning process students only rely on explanations from teachers with conventional learning methods. Another problem is that the learning resources used are less varied, only utilizing existing images, the learning model that is often used is the discussion method, while other learning methods have been carried out, but to carry out the method requires energy and a long enough time so that the learning process is not carried out optimally. In addition, the books used by students currently still use the package books given by the Ministry of Education and Culture revised in 2018 and a companion book entitled "I'm Ready" published by the publisher Pustaka Mulia which contains several thematic subjects along with a collection of questions, and the two books used are still in the form of printed books, so that the source of student information is still limited, The textbook references used are found to be a lot of incomplete discussion of material and a fairly wide scope of material, then the presentation of images is less supportive such as unclear meaning of the image, so the meaning or intention of the image is not understood by students so that students must think abstractly to understand the material, especially in science learning class V semester 2, one of which is on theme 8 "Our Friends Environment" water cycle material. Whereas in 2013 learning. Based on observations of the teaching and learning process and student learning outcomes are classified as low. This is also supported by data on science learning outcomes on the UTS scores of VA class students at Al-Ulum Integrated Private Elementary School Medan totaling 25 students with a KKM of 78, where there are still many average student completion scores below KKM in the VA class of students who have not reached KKM as many as 19 people and students who have reached KKM as many as 6

people or around 76% of students who are not completed on the UTS exam.

Therefore, to support the science learning process, it is necessary to develop *flipbook-based electronic textbooks* which are the development of e-books as an alternative in making it easier for students during the science learning process which is expected to improve high-level thinking learning outcomes, especially water cycle materials.

As stated by Sitepu [9] that a set of materials that have been adapted to the curriculum that has been set in writing or unwritten and described in sequence can be referred to as textbooks that are used as manual guidelines for teachers in carrying out learning and also as the main reference for students to learn. So based on this description, it can be said that the existence of textbooks plays a very big role in the success of the learning process.

Agreeing with this according to Sukerni [10] the benefits that can be obtained by developing a companion textbook are that the material and discussion are obtained that are broader and more detailed both in more knowledge and information, the variety of science is also more numerous and diverse for students to learn. Therefore, this reason makes the development of textbooks important to do as a way to improve the quality of learning. Along with the development of technology, a book is not only in print, or sheets of paper, but can also consist of various types such as Prastowo's opinion [11] when viewed from its nature textbooks are divided into four types, namely print media-based textbooks, technology-based textbooks, textbooks with special steps, and interactive textbooks.

Based on the description above, it is considered necessary to develop *flipbook-based electronic textbooks* with the aim of producing flipbook-based electronic textbooks that are feasible according to textbook feasibility experts and media / design according to BSNP criteria.

## 2. Research Method

This research uses research and development methods (*Research and Development*). The development model used in this study is ADDIE which has five steps or stages that include aspects of *analysis, design, development, implementation, and evaluation*, at the implementation stage using a *Pre-Experimental Design* research design in the form of *One Group Pretest-Posttest* i.e. with only one class as an experimental class (with treatment) [12]. The data analysis technique used in this study is the analysis of data on the validity of textbooks and the media / design of flipbook-based electronic textbooks in science learning.

**Table 1.** Expert Validation Assessment Score

Score	Criterion
4	Excellent
3	Good
2	Not Good Enough
1	Very Bad

Then the resulting score is analyzed using the percentage of the score by using the formula:

$$\text{Score (\%)} = \frac{\text{jumlahskorperkategori}}{\text{jumlahskormaksimal}} \times 100\%$$

The calculation of the validation result data using the formula above will produce a number in the form of percent, then changed to a classification in the form of a percentage, the next step is to determine the level of feasibility of the textbook based on the results of the research that has been carried out Then categorized with qualitative sentences as listed in Table 2.

**Table 2.** Percentage of Textbook Validity Rate

Percent Interval	Value	Criterion
85,01%-100%		Excellent, or can be used without revision
70,01%-85,00%		Either, or usable but needs a minor revision
50,01%-70,00%		Not good, it is recommended not to be used because it needs a major revision
01,00%-50,00%		Not good, valid, or should not be used

### 3. Result and Discussion

#### A. Result

This development research uses the ADDIE (*Analysis, Design, Development, Implementation, and Evaluation*) development model.

##### *Analysis*

The results obtained in the early stages of the analysis are that the textbooks used in the learning process are still in the form of printed books published by the Ministry of Education and Culture and contain several subject content that is incorporated into thematic learning so that the material on science learning is still minimal, learning outcomes, especially in science learning are still relatively low, this is seen based on the results of UTS scores in science learning where the predetermined KKM value is 78 and the results obtained that only 6 students were completed in the process activities.

##### *Design*

The design of electronic textbooks is based on the 2013 curriculum syllabus and book analysis. The advantages of each book are taken for use in the design and development of textbooks. Textbooks developed with several references from the internet and several textbooks that contain material on the water cycle in science learning. The book developed has an appeal to read, the material discussed is easy to understand and clear, there are project tasks, in each chapter there are practice questions, there are final evaluation questions, and glossaries so that students are actively involved in the learning process and the language used is communicative. Electronic textbook creation developed using the *flipbook* application is one of the *flipbook* applications that is easy to use and can be accessed online, namely *Heyzine Flipbooks*.



**Figure 1.** Electronic Textbook Cover Design

At the design stage, electronic textbooks combine learning media with learning resource materials about the water cycle in science learning. In electronic books, there are materials, material summaries, practice questions, and there are learning videos packaged in electronic books (*e-books*) using the *Heyzine Flipbooks application*. The use of *flipbook maker-based electronic textbooks (e-books)* can facilitate students in the learning process both at school and at home.

### **Development**

In the development stage, it aims to determine the quality assessment of the products that have been developed, the results of validation of the feasibility of textbooks and the validation of media / design of flipbook-based electronic textbooks in accordance with the modified National Standards Board for Education (BSNP).

The results of the validation of lecturers and teachers who are experts in the feasibility of *flipbook-based* electronic textbooks on water cycle material in class V science learning can be seen in Table 3.

**Table 3.** Assessment of the Feasibility of Flipbook-Based Electronic Textbooks water cycle material in science learning class V elementary school

No.	Component	Total Items	Average Percentage	Category
1	Eligibility of Contents	26	91,11	Excellent
2	Language Eligibility	20	90,00	Excellent
3	Feasibility of Presentation	9	90,28	Excellent
4	Chart Eligibility	15	91,25	Excellent
Total Average Percentage			90,66	
Category			<b>Excellent</b>	

Based on the results of the percentage of eligibility of electronic textbooks of 90.66%, it can be concluded that *flipbook-based* electronic textbooks are categorized very well. For the results of the media assessment / flipbook-based electronic textbook design carried out by expert lecturers, the results in Table 4 were obtained.

**Table 4.** Media Feasibility Assessment / Flipbook-Based Electronic Textbook Design water cycle material in science learning Class V elementary school

No.	Component	Total Items	Average Percentage	Category
1	Cover Design	2	93,75	Excellent
2	Content Design	4	87,50	Excellent
3	Highlights of the Look	4	84,38	Excellent
4	Content Feed Suitability	2	87,50	Excellent
5	Ease of Use	3	100,00	Excellent
Total Average Percentage			90,63	
Category			<b>Excellent</b>	

Based on the results of the calculation of the percentage of feasibility of *media / design of flipbook-based* electronic textbooks of 90.63%, it can be concluded that the media / design of flipbook-based electronic textbooks is categorized very well.

### **Implementation**

At this stage, the developed electronic textbooks have been validated and improved according to the suggestions of the validators, so that the developed electronic textbooks have been feasible to be applied in the learning process of science water cycle materials. This research was carried out on April 18, 2022. The samples in this study were va class students of Al-Ulum Integrated Private Elementary School Medan.

### **Evaluation**

At this stage after implementing the application of the flipbook-based electronic textbook that has been developed, to measure students' high-level thinking ability through *the flipbook-based* electronic textbook that has been developed can calculated through N-Gain. After being given *pretests* and *posttest*, it is known the gain results obtained from each participant

**Table 5.** Results of Calculating N-Gain Value to Improve Student Learning Outcomes

Number of Learners	Average Value		N-Gain	Classification
	<i>Pretest</i>	<i>Posttes</i>		
25	61,9	87,8	0,64	<b>Keep</b>

Based on Table 5 shows that the average N-Gain of learners is 0.64 in the Medium N-Gain criterion. So with the application of flipbook-based electronic *textbooks* can affect students' higher-order thinking ability

## **B. Discussion**

The results of this study are related to the development of *flipbook-based* electronic textbooks to improve the learning outcomes of higher-order thinking in learning science water cycle materials. Books are an indispensable learning resource during the learning process, books have been systematically arranged in order to help students understand the material and achieve learning objectives [13]. In today's digital era, books can be presented in physical form or presented in a simpler and more interesting embodiment, namely in the form of electronic books (*e-books*) or non-physical books. Electronic books can be compiled with

multi-media applications because they can combine various media in the form of text, images, graphics, music, animation, video, and interaction into a digital *file*, and can be used as a message to users of the book [14]. *Flipbook* is often known as a professional PDF, *flipbook software* can turn PDF into HTML5 or *flash* with 3D animation that can be used on various devices such as computers / android. The manufacture of electronic textbooks must be in accordance with the assessment of the National Standardization Board for Education (BSNP) as textbooks that are worthy of use in the learning process. Based on the results of the validation calculations of media experts 90.63% and design 90.66%, it can be concluded that the media / design of flipbook-based electronic textbooks is categorized very well. The results of this study are in accordance with the results of Hayati's research [15] the results of this study show that based on the results of validation by media experts, it is obtained results of 91.46% and from meter experts by 94.17%, it can be concluded that electronic textbooks are able to display interactive simulations by combining reading text, images, audio, video, and animation, so that the learning process can take place interestingly and fun.

The creation of a *flipbook-based* textbook used in this study was made using the *Microsoft word* application, after it was typed, the raw file of the textbook was converted into PDF form. After the textbook file becomes a PDF, the file is uploaded to the *hayzine flipbook* website and then the researcher can edit the flipbook-based electronic textbook that is already based *online*. Electronic textbooks are edited to make it look more interactive and can make it easier for students to use and learn the subject matter in the book. The creation of this flipbook-based electronic textbook can actually use *the 3D Page Flip Pro*, *Kvisoft Flipbook Maker* and *Flipbook Maker Pro* applications. However, considering that the application is a paid application, but the output produced is not much different from making electronic textbooks through the *hayzine flipbook* website, therefore, researchers choose to make flipbook-based electronic textbooks using the website. One of the advantages in the use of flipbook-based electronic textbooks is the ease of making them that are felt by researchers and then in their operation which is felt by students, so that according to researchers learning by using electronic textbooks is better and can improve student learning outcomes [16].

## 4 Conclusion

The results of the validation of the development of *flipbook-based* electronic textbooks in improving high-level thinking on water cycle materials get the results of the validation of the feasibility of flipbook maker-based electronic *textbooks* the development results have been valid (very feasible) to be used according to the BSNP (National Standards Agency for Education) which has been modified with a value of 90.66% for the feasibility of flipbook-based electronic textbooks and flipbook-based electronic textbook media/design of 90.63% (very feasible). So textbooks can be used in the learning process to help students' higher-order thinking abilities on water cycle materials.

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