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Utilization of interactive e-flipbook media oriented toward contextual approaches to learning in elementary schools

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ABSTRACT

An educator is required to continue to make updates in the learning process carried out, especially in learning media innovations that can support face-to-face and online learning. This study aims to determine the results of the feasibility analysis of interactive e-flipbook media oriented toward contextual approaches to science learning in elementary schools. This research uses a research and development approach, especially the design of the ADDIE. The subjects of the study were grade V students of an Elementary School in Surakarta. Data collection techniques include questionnaires and interviews. Data analysis is done using descriptive analysis. The results showed that the results of media expert validation obtained an average score of 4.38 in the very good category, and material expert validation obtained an average score of 4.59 in the very good category. Then the results of student responses to interactive e-flipbook products at the time of the initial trial, which included a one-to-one trial, obtained an average score of 3.54 included in the very good criteria; a small group trial obtained an average score of 3.37 included in the good criteria; and a field trial obtained an average score of 3.21 included in the good criteria. In addition, the results of the t-test at the field trial stage show that the value of probability or sig. (2-tailed) which is 0.000 < 0.05 and the coefficient = 4.688 greater than the coefficient value t_{tab} = 2.018 then H_0 is rejected meaning that there is an average difference in students' critical thinking ability scores between the experimental class and the control class at the field trial stage. The average post-test score in the experimental class was 83.45 and the average post-test score in the control class was 75.68. The average difference is 7.773. Thus, interactive e-flipbook media oriented towards contextual approaches is said to be feasible and can be used in science learning in elementary schools.

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INTRODUCTION

Education at the primary level is a critical foundation in the formation of the intellectual and social development of students. Education is a conscious and planned effort to create an

environment and learning process in which students actively develop their potential to have religious and spiritual strength, self-control, personality, intelligence, noble character, and skills needed for individuals, society, nation, and state (Undang Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional, 2003; Kemdikbud, 2013). In this digital era, integrating technology into teaching in elementary schools is becoming increasingly important to facilitate more interactive and contextual learning, including the need for technology integration in science learning in elementary schools (Khair et al., 2023; Sumardi et al., 2020). The use of technology in science learning will make it easier for educators to convey messages to learners so that learning objectives can be carried out according to plan.

Science subjects are one of the subjects in the primary school curriculum. Science as a product (factual, conceptual, procedural, and metacognitive knowledge) and science as a process (scientific work) are two interrelated components in the science curriculum (Aprilia, 2021; Wisudawati & Sulistyowati, 2022). The results of observations and interviews conducted with grade V teachers in the three elementary schools showed that students' thinking skills in science learning at Cemara Dua State Elementary School, Mangkubumen Kidul State Elementary School No. 16, and Mangkubumen Lor State Elementary School No. 15 were still low; only 2-4 students (10% of the number of students in each class) were able to express their opinions, ask, or conclude and solve a problem posed by the teacher. As for student learning outcomes, it shows that the average score of students' science tests in semester 1 has met the minimum completeness criteria, almost 85% above 75. This shows that students' learning outcomes in science subjects are good, but their critical thinking skills are still low. Several factors contribute to these students' critical thinking skills, and it is necessary to investigate those factors. Indicators of students' critical thinking skills can be influenced by several things, such as the use of learning models based on student centers, supporting infrastructure, and varied, innovative, and contextual-based digital learning media (concrete) (Aprilia, 2021; Latifah et al., 2023).

The presence of learning media is very important in the learning process because it can help learners understand unclear material. Learning media can be used to describe what teachers cannot say in certain words or sentences. With learning media, the abstractness of the material can even be concretized (Aprilia et al., 2023; Smaldino et al., 2012). As a result, students more easily understand the material than without the help of learning media. Therefore, it is an alternative medium that helps students think critically. One promising medium to achieve this goal is the interactive e-flipbook, a form of electronic book that offers a dynamic and engaging reading experience.

The advantages of e-flipbooks are that they can display text, images, animations, and videos equipped with tools and connections that allow students to interact, navigate, and communicate. Students not only see but also hear, observe, and perform interactively with various e-flipbook features (Aprilia et al., 2017; Azizah et al., 2022). Moreover, in this study, interactive e-flipbook media was integrated with a contextual approach that connects material concepts with concrete examples in the student environment. This makes learning more meaningful and fosters students' curiosity, thus impacting their critical thinking skills while learning science. In line with this research, Oktarina et al., (2021) stated that multimedia-based e-flipbooks make learning materials very easy for students to understand and can increase student interest, motivation, and learning activities.

The development of contextual-based interactive e-flipbook media plays an important role in innovation in learning media in elementary schools. The majority of the use of learning media today tends to be one-way between teachers and students. The absence of interactive-based digital learning media (two-way) between teachers and students or students with other students makes this product development research important to continue and know the level of feasibility when used by students or teachers in the learning process. Therefore, this study aims to determine the results of the feasibility analysis of interactive e-flipbook media oriented toward contextual approaches to science learning in elementary schools. This research contributes to improving the quality of elementary school science subjects through the use of e-flipbook media with a contextual approach.

METHOD

This research uses a research and development approach, especially the design of the ADDIE development model. This research procedure contains research stages that refer to the steps of the ADDIE development model, starting from analysis, design, development, implementation, and evaluation, as developed (Branch, 2009). In this study, the research procedure was simplified to the stage of developing interactive e-flipbook media, which was carried out through expert validation and media feasibility tests involving elementary school students. The subjects of the study were grade V students of elementary schools in Surakarta, namely Cemara Dua State Elementary School and Mangkubumen Kidul State Elementary School No. 16.

The selection of research subjects is done by considering the ease of access and experience of researchers related to the problems in this study. Media feasibility test subjects were carried out using purposive sampling techniques, namely sampling techniques by determining certain criteria (Sugiyono, 2014). The criteria are schools that already have adequate facilities for using this interactive e-flipbook product. In detail, the technique of taking research subjects in each trial according to Suparman (2012) can be seen in Table 1.

Table 1. Sampling Techniques

No.	Stages	Number of Students
1	One-To-One Trial	3
2	Small Group Trial	8-10
3	Field Trial	20-35

The subjects of the one-to-one trial as many as three students with different abilities (tall, medium, and less), were conducted at SDN Cemara Dua in the VB class to provide an assessment of the feasibility of the interactive e-flipbook media. Meanwhile, the subjects of the small group trial were 10 students of the VB class as an experimental class, and 10 students of the VC class as a control class, which was carried out at SDN Cemara Dua Surakarta. The experimental design used a post-test-only control group. The data obtained is a reference for revision to correct the shortcomings that exist in the interactive e-flipbook media so that it is feasible to be tested in the field trial. Then, the field trial involved 22 students of the VA class as an experimental class and 22 students of the VB class as a control class which was carried out at SDN Mangkubumen Kidul No. 16. At this stage, the media was applied in the learning process, namely the experimental class (using interactive e-flipbook media) and the control class (using science printed book media). After the field trial, revisions were made to reduce the level of weakness of the interactive e-flipbook media product to produce a final product that is worth using.

This interactive e-flipbook product validation is carried out by involving material experts and media experts. The data from the results of this study is a response from material experts and learning media experts to the quality of interactive e-flipbook media products developed in terms of aspects of communication, technical design, material, language, and display format. Data in general comments or suggestions as well as the results of researchers' observations during trials are analyzed in a qualitative descriptive manner and will be concluded for input in revising or improving the learning media products developed. Quantitative analysis with percentage and categorization techniques is used for data in the form of response scores from material experts and learning media experts. The validation instrument of media experts and material experts uses the Likert scale, which is 5 scales (very good, good, enough, less, very less).

The product feasibility test instrument for users of this interactive e-flipbook uses 4 scales, namely strongly agree, agree, disagree, and strongly disagree. The instruments used are interview guidesheets and questionnaires. Interview guidelines are used to find out how students respond and respond openly about the product being tested. The questionnaire instrument was prepared with the intention of evaluating the quality of interactive e-flipbook media developed from aspects of critical thinking skills, material content, and product design display.

Data analysis uses descriptive statistics, where criteria or categories of interactive multimedia product assessment results and LMS-integrated online quiz-based gamification, both in the validation of media experts, material experts, and product trials, are said to be feasible if they

have at least a good category. As for the guidelines for converting quantitative data, the resulting score into qualitative data, according to Rofiq et al., (2019), is described in the following Table 2.

Table 2. Guidelines for Converting Product Feasibility Value into Qualitative Data

No.	Qualitative Data (Category)	Quantitative Data (Scale 5)	Quantitative Data (Scale 4)
1	Very Good	X > 4.20	X > 3.94
2	Good	3.40 < X ≤ 4.20	2.98 < X ≤ 3.94
3	Good Enough	2.60 < X ≤ 3.40	2.02< X ≤ 2.98
4	Less	1.80 < X ≤ 2.60	1.01 < X ≤ 2.02
5	Very Less	X ≤ 1.80	X ≤ 1.01

Descriptive data analysis is used for expert due diligence and one-to-one trial stage. While the small group trial and field trial stages were carried out, a comparison analysis of post-test values between the experimental class and the control class was carried out to determine the level of difference through the calculation of hypothesis tests using independent sample t-tests with the help of the SPSS program. Hypothesis testing can be done after the data is known to be normally distributed and homogeneous, so it is necessary to calculate the normality test and homogeneity test first.

RESULTS AND DISCUSSION

Results

The process of designing interactive e-flipbook media is oriented towards a contextual approach; in this case, display design needs a design sketch to illustrate media making. The sketch is formed into a flow chart. A flow chart is a flowchart of an interactive e-flipbook medium to be developed. Flow charts start from the front cover, copyright page, flipbook usage instructions, preface, teaching program analysis, book usage instructions, table of contents, chapter 1 style, chapter 2 simple plane, science dictionary or glossary, answer key, notes, and up to the back cover.

This interactive e-flipbook media discusses two chapters of material, namely simple styles and planes. Each chapter contains text, images, videos, activities or exercises, and quizzes that are oriented towards a contextual approach and trigger students to express their opinions both orally and in writing. The sections contained in each chapter include chapter titles, decrees, basic competency, learning objectives, national character values, contextual-based perceptions, concept maps, keywords, material accompanied by concrete images, let's find out (practicum), let's see (video), let's argue (exercise), do you know? (important information), let's do (activities), national character (motivation), let's play while learning (quizzes), character info (figures who invented the material discussed in each chapter), summary, and evaluation practice questions. Here is the designed flow chart, which can be seen in Figure 1.

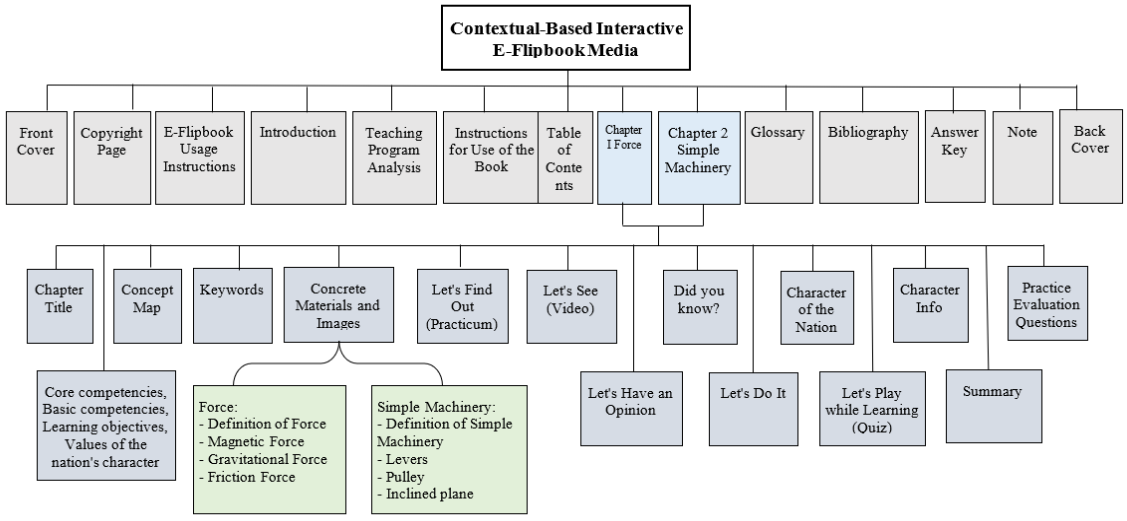

Figure 1. Interactive E-Flipbook Media Flow Chart

At the development stage, researchers carry out several steps, including the media production stage, the media and material expert validation stage, and the product trial stage.

a. Interactive E-Flipbook Media Production Stage

The media production stage is carried out based on the flow chart that has been made before. In making interactive e-flipbook media, researchers use Kvisoft Flipbook Maker Pro 4 software. The output produced by interactive e-flipbook media in format (.swf) that can be opened on all PCs or laptops starting from Windows XP OS, Windows 7 OS, Windows 8 OS, and Windows 10 OS has minimum specifications for Intel Pentium III and has been installed with Adobe Flash Player or GOM Player so that it can produce image display (visual) and sound (audio). In Kvisoft Flipbook Maker Pro 4 software, PDF format books that have been imported into the Kvisoft Flipbook Maker software must go through the editing stage, starting from template selection, background settings, background, navigation button selection, language, and inserting learning videos, images, or .swf into the flipbook. After completing the editing process and having been saved, the next step is that the flipbook product is published according to the desired format Figure 2.

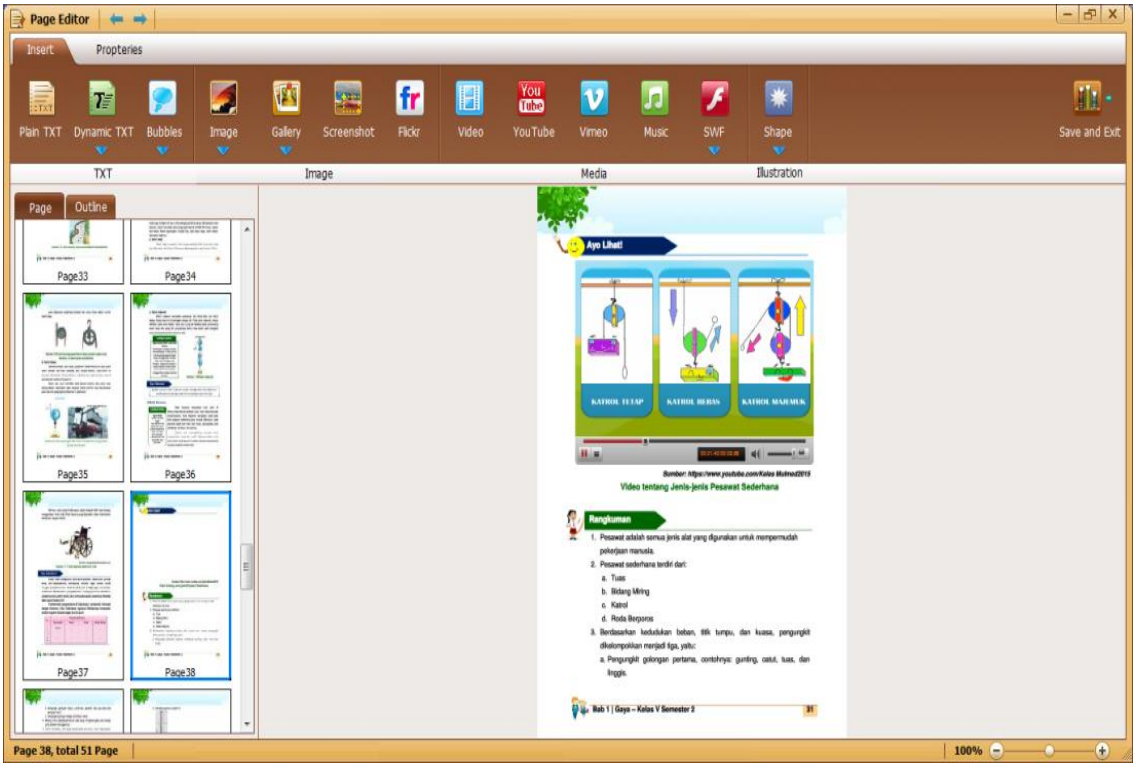

Figure 2. Display of E-flipbook Editing Process in Kvisoft Flipbook Maker Software

The interactive e-flipbook product display results from the production stage through the Kvisoft flipbook maker pro 4 software are a) front cover display: the front cover display contains the author's name, book title, science subjects, class and school level (V elementary school semester 2), the curriculum used Education Unit Level Curriculum and the author's institution; b) front page display and copyright: the front page display contains the title of the book and the material discussed, the author, and the author's institution, while the copyright page contains the author's name, cover design, editor, expert consultation 1 and 2, validator, and book identity such as year published, number of pages, print to- and size of the book; c) Display instructions for use of e-flipbooks and preface: The display instructions for use of e-flipbooks contains an explanation of each navigation button contained in the flipbook. The preface of the book is gratitude, thanks, and a brief description of the description of the book; d) Teaching program analysis display and book use instructions: The teaching program analysis display contains a description of the material outline along with the allocation of teaching time. The instructions for use of the book contain instructions for activities contained in each

chapter; e) Table of contents display: contains a list of parts of the book from the front page to the back page accompanied by the page number of the book; f) Display chapter 1 style: this display includes book titles, competency standards, basic competencies, learning objectives, character values, concept maps, keywords, materials (understanding and types of styles), concrete images, activities (let's find out, let's see (learning videos), let's argue, let's do it), character info, quizzes, summaries, and evaluation exercises; g) Display chapter 2 simple planes: this display contains book titles, competency standards, basic competencies, learning objectives, character values, concept maps, keywords, materials (understanding and types of simple planes), images, videos, activities (let's find out, let's see, let's argue, let's do it), character info, quizzes, summaries, and evaluation exercises; h) display of science dictionary: also referred to as a book glossary containing a list of terms in the material/chapter accompanied by their meanings; i) bibliography display: the bibliography contains a list of citation or reference sources used by the author in compiling the book; j) Note display: is a blank page provided by the author so that the reader can write important notes or a summary of material from the material that has been read. In writing or drawing, the reader can use the draw navigation button contained in the flipbook; k) Back cover display: the back cover contains a brief description of the contents of the book and the identity of the author's institution.

b. Product Validation Stage

The expert validation stage is carried out before product trials. In this study, validation of interactive e-flipbook media products was carried out with 3 media experts and 3 material experts. The purpose of product validation is to validate or assess whether the design of interactive e-flipbook media and the material presented in the flipbook is feasible to test or not.

1. Media Expert Validation and Revision

Media expert validation was carried out by 3 lecturers of Sebelas Maret University Surakarta who are experts in the field of learning media in the PTIK Study Program, Visual Communication Design Study Program, and Educational Technology Study Program. There are five aspects assessed by validators in testing the feasibility of interactive e-flipbook media; namely navigation aspects, convenience aspects, audio aspects, writing or text aspects, and display aspects. The assessment results used are on a scale of 5 to 1, where a score of 5 is for very good, a score of 4 is for good, a score of 3 is for sufficient, a score of 2 is for less, and a score of 1 is for very little. The results of the assessment of the three media experts can be seen in the following Table 3.

Table 3. Media Expert Assessment Results

No.	Media Expert	Aspects	Average Score	Criterion	Average Aspect
1	Media Expert 1	Navigation	4.33	Very Good	Navigation
		Ease	4.20	Good	4.22
		Audio	4.00	Good	(Very Good)
		Writing/Text	4.50	Very Good	Ease
		Display	3.56	Good	4.60
2	Media Expert 2	Navigation	4.00	Good	(Very Good)
		Ease	4.60	Very Good	Audio
		Audio	4.50	Very Good	4.17
		Writing/Text	4.50	Very Good	(Good)
		Display	4.44	Very Good	Writing/Text
3	Media Expert 3	Navigation	4.33	Very Good	4.61
		Ease	5.00	Very Good	(Very Good)
		Audio	4.00	Good	Display
		Writing/Text	4.83	Very Good	4.30
		Display	4.89	Very Good	(Very Good)
Average Media Expert Rating			**4.38**	**Very Good**	

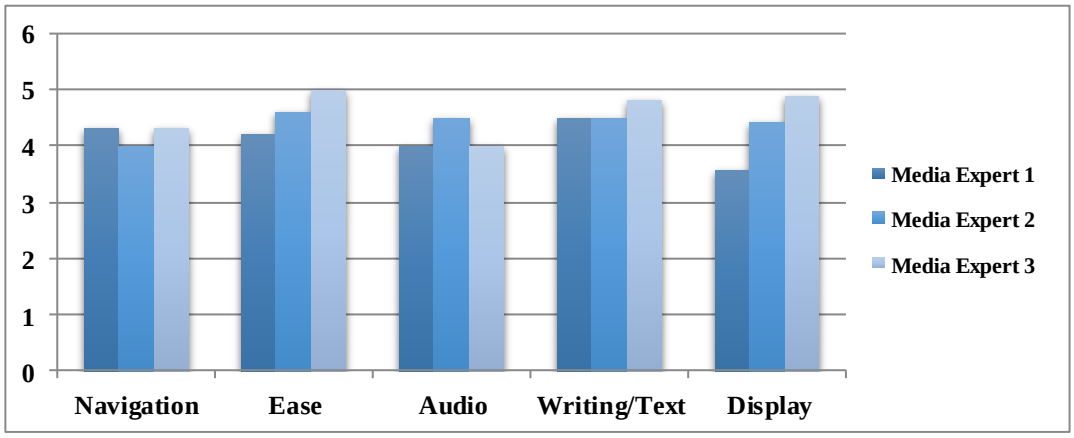

Figure 3. Media Expert Validation Assessment Results Diagram

Based on Table 3 and Figure 3, which show that the results of the media expert validation assessment on the navigation aspect obtained an average score of 4.22 with very good criteria, the ease aspect averaged a score of 4.60 with very good criteria, the average score for the audio aspect was 4.17 with good criteria, the writing or text aspect obtained an average score of 4.61 with very good criteria, and the average viewing aspect score of 4.30 with excellent criteria. Thus, it can be concluded that the interactive e-flipbook media oriented towards a contextual approach in science learning in Class V elementary school can be said to be very good with an average score of 4.38 that the interactive e-flipbook media oriented to a contextual approach is declared suitable for use in the science learning process. The inputs and revisions given by the three media experts are as follows: a) Media expert 1: the navigation buttons need to be given explanatory information to make it easier for students to operate; the display on the flipbook is attempted to be more fullscreen; b) Media expert 2: the background used as an e-flipbook template needs to be revised according to the material to be delivered; c) Media expert 3: the volume of the e-flipbook background should be reduced; the display on the e-flipbook is attempted to be more fullscreen, in the notes section it is necessary to add a description of the use of draw navigation buttons. This is in agreement with Sumarmi & Mutia (2021) research, which explains that the use of background must be made fully screened to be clearer and by the characteristics of elementary school students. Furthermore, researchers revised the interactive e-flipbook media according to input from the three media experts. The interactive e-flipbook media display after revision is as follows.

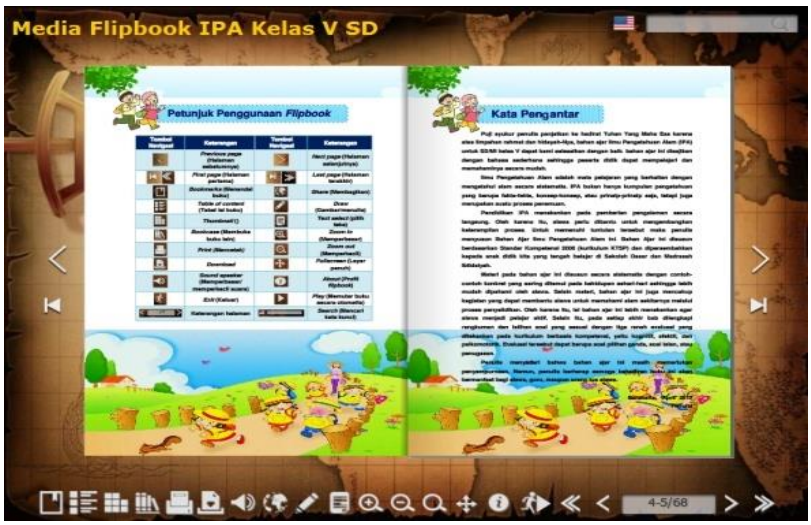

Figure 4. Post Revision View (Navigation Button Caption)

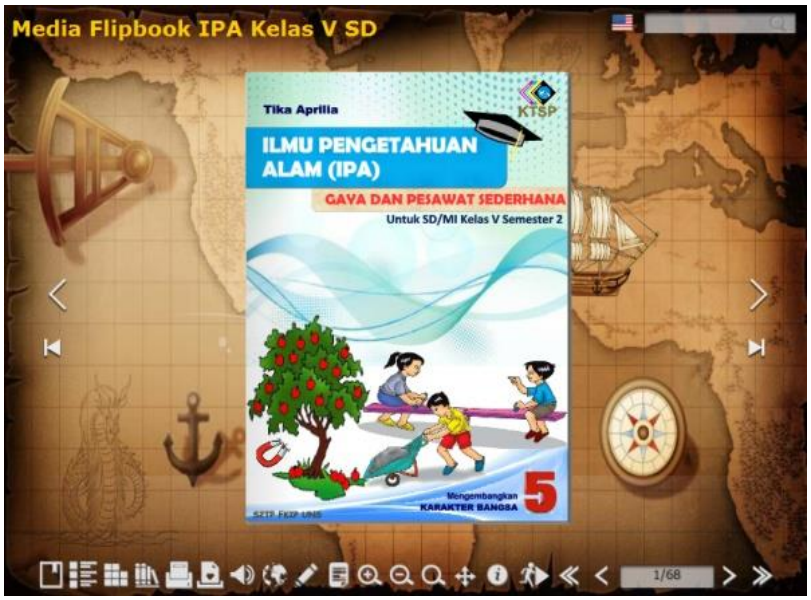

Figure 5. Background Display

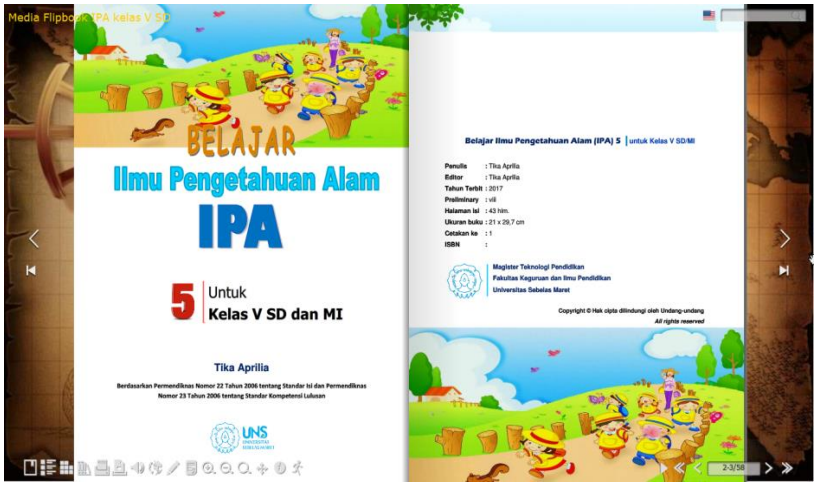

Figure 6. Display (Full Screen)

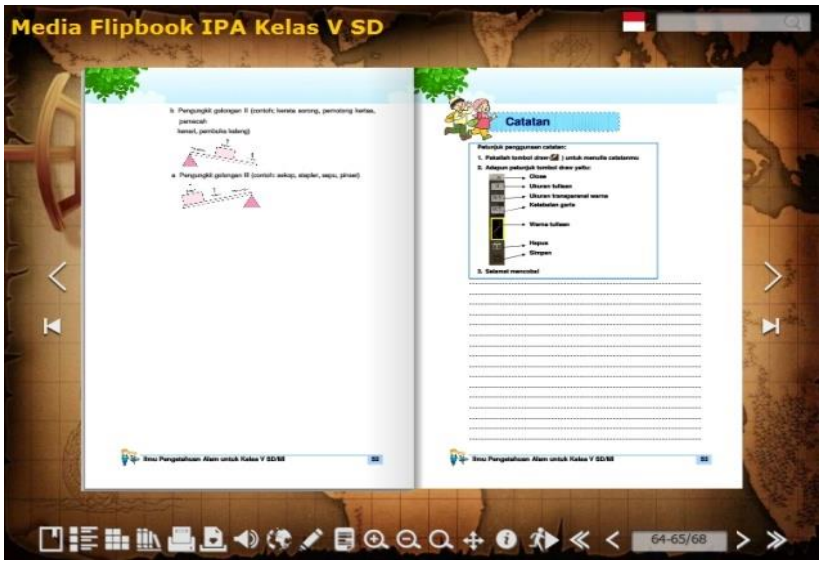

Figure 7. Display of the Book Notes Section

2. Material Expert Validation and Revision

Material expert validation was carried out by 1 lecturer of the Primary Teacher Education Study Program, Sebelas Maret University, Surakarta, who is an expert in the field of elementary science, and 2 practitioners, namely class V teachers of SDN Mangkubumen Lor No. 15. There are 2 aspects assessed by validators to test the feasibility of the material presented on the interactive e-flipbook media, namely the learning aspect and the material aspect. The rating scale used is a scale of 5 to 1, where a score of 5 is for very good, a score of 4 is for good, a score of 3 is for sufficient, a score of 2 is for less, and a score of 1 is for very little. The results of the assessment by the three material experts can be described in Table 4.

Table 4. Material Expert Assessment Results

No.	Material Expert	Aspects	Average Score	Criterion	Average Aspect
1	Material Expert 1	Learning	4.25	Very Good	Learning 4.54 (Very Good)
		Material	4.54	Very Good	
2	Material Expert 2	Learning	4.75	Very Good	
		Material	4.69	Very Good	Material 4.64 (Very Good)
3	Material Expert 3	Learning	4.63	Very Good	
		Material	4.69	Very Good	
Average Material Expert Assessment			**4.59**	**Very Good**	

Based on Table 4, which shows the data obtained from the results of material expert assessment of the material presented on the interactive e-flipbook media, In the acquisition of these data included in the learning aspect, the average score obtained was 4.54 with very good criteria, while in the material aspect, the average score was 4.64 with very good criteria. Thus, it can be concluded that the material presented on the interactive e-flipbook media oriented towards a contextual approach to learning science in grade V elementary school is very good, with an average score of 4.59, so that the interactive e-flipbook media oriented towards a contextual approach is declared suitable for use in the science learning process of grade V elementary school. The inputs and revisions given by the three material experts are as follows: a) material expert 1: in the "let's find out" activity in each chapter, it is necessary to add parametric measurements so that students' critical thinking skills are more visible; b) material expert 2: on the front cover, it is necessary to add the specifications of the material discussed, "force and simple machinery"; c) material expert 3: no input and suitable for use in science learning in grade V elementary school. The following is a display of interactive e-flipbook media results that have been revised by researchers based on input from material experts.

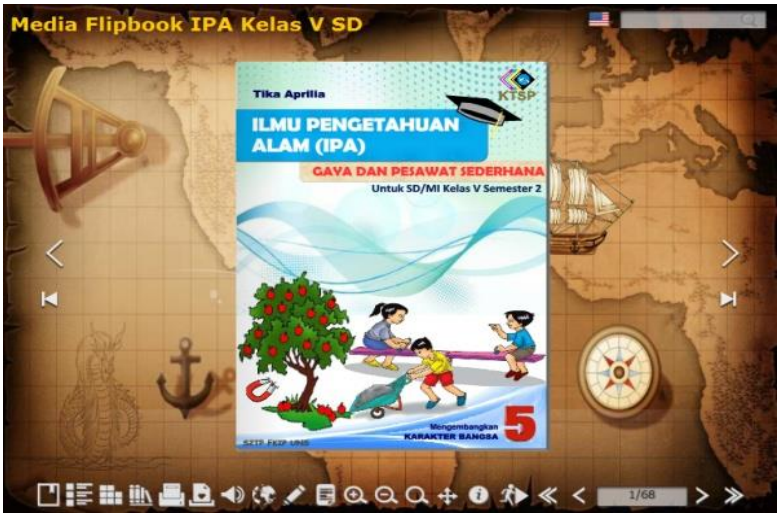

Figure 8. Front Cover Display

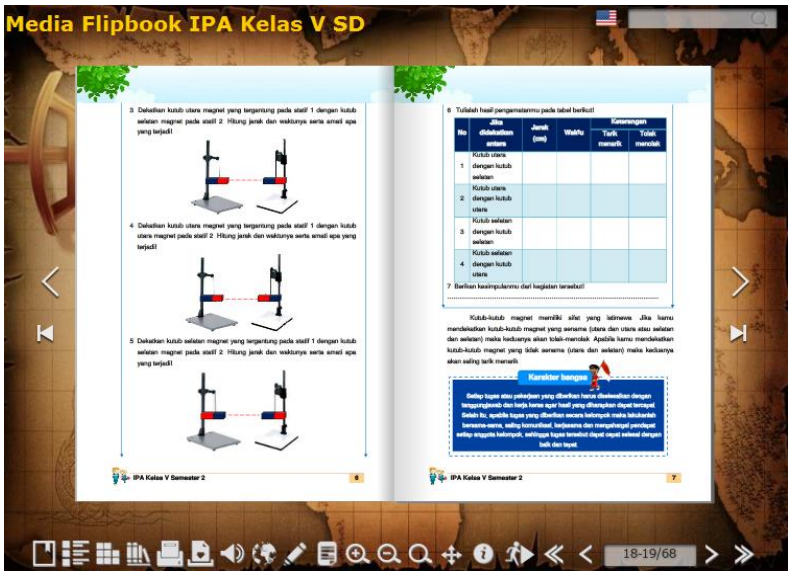

Figure 9. Display of "Let's Find Out" Activities

c. Validation by Students through Product Trials

The interactive e-flipbook media is ready to be tested in the science learning process of grade V elementary school after a revision of the interactive e-flipbook media product based on input from media expert validators and material experts. The product trial phase carried out in this study consisted of three trials, namely one-to-one trials, small group trials, and field trials (Branch, 2009).

1. One-to-One Trial

In one-to-one trial was conducted with three students individually. The three students come from students who have different levels of ability (Suparman, 2012). Each student faces one computer on which interactive e-flipbook media oriented to contextual approaches has been installed. Students begin to read and observe interactive e-flipbook media oriented to contextual approaches that are displayed on each computer. Upon completion, students are given a questionnaire with responses to the developed interactive e-flipbook media product. The results of the trial, in the form of a media feasibility questionnaire, were then analyzed to determine student assessment scores on aspects of motivation, attractiveness, ease, and usefulness of interactive e-flipbook media before being tested for the next stage. The results of the student assessment questionnaire on the feasibility of interactive e-flipbook media oriented to the contextual approach of the one-to-one trial stage can be seen in Table 5.

Table 5. Results of Student Assessment of Interactive E-flipbook Media in One-to-One Trial Stage

No.	Ability Level	Motivational Aspects	Attractiveness Aspect	Convenience Aspect	Expediency Aspect
1	Low	2.86	3.50	3.67	3.67
2	Middle	2.57	3.83	3.67	3.33
3	High	3.43	4.00	4.00	4.00
Average		**2.95**	**3.78**	**3.78**	**3.67**
Criterion		**Good**	**Very Good**	**Very Good**	**Very Good**
Average Total		**3.54**		**Very Good**	

Based on Table 5, shows that students' assessment of interactive e-flipbook media oriented to a contextual approach on the motivation aspect averaged a score of 2.95 with good criteria, the media attractiveness aspect obtained an average score of 3.78 with very good criteria, then the ease aspect averaged a score of 3.78 with very good criteria and the last for the expediency aspect of media obtained an average score of 3.67 with very good

criteria. The average total score of student assessment of interactive e-flipbook media at the one-to-one trial stage is 3.54 with very good criteria. This shows that the interactive e-flipbook media developed is very good and feasible to use.

The results of the student assessment of the feasibility of interactive e-flipbook media, researchers also conducted open interviews with three students who were research samples at the one-to-one trial stage. The average student said that the interactive e-flipbook media product developed for science learning in grade V elementary school was good and interesting; it's just that there was one student who gave advice not to use music background sounds because sometimes when playing videos, students become less concentrated on the content of the material in the learning video. Therefore, based on student input, researchers finally eliminated the music background in the interactive e-flipbook media so that students were easier to understand and not disturbed when viewing and observing learning videos displayed in the interactive e-flipbook media (Putra et al., 2023; Setiyani et al., 2022). Based on the results of the assessment and student input on the feasibility of interactive e-flipbook media products, it can be concluded that interactive e-flipbook media oriented towards a contextual approach to science learning in grade V elementary school is suitable for use in the next stage of trials.

2. Small Group Trial

In the small group trial stage, the number of samples used was 10 VB class students as an experimental class and 10 VC class students of SDN Cemara Dua Surakarta. This trial was carried out with an experimental class using interactive e-flipbook media oriented towards a contextual approach to science learning, while the control class only used science package book media (printed books). The experimental design used was a posttest-only control group design.

In the experimental class, before using interactive e-flipbook media, researchers must first install the GOM Player application on each computer used by 10 students so that interactive e-flipbook media can be operated. This is because the average computer in the school does not have an Adobe Flash Player application or a GOM Player application. After completing the learning process, both experimental and control classes were given post-test question items to determine students' critical thinking skills (Gall et al., 2003; Gall et al., 2014). The number of post-test questions tested was 15 multiple-choice questions and 5 description questions for basic competencies 5.1 (force) and 15 multiple-choice questions and 5 description questions for basic competencies 5.2 (simple machinery).

Learning was carried out in as many as two meetings for each basic competency. The results of post-test scores are the average results of students' scores on both basic competencies tested. Then compare the post-test values between the experimental class and the control class to determine the level of difference through the calculation of the hypothesis test using an independent sample t-test with the help of the SPSS program (Santoso, 2014). Hypothesis testing can be done after the data is known to be normally distributed and homogeneous, so it is necessary to calculate the normality test and homogeneity test first. The results of the calculation of the normality test and homogeneity test using the SPSS program can be seen in Tables 6 and 7.

Table 6. Normality Test Results at the Small Group Trial Stage

No.	Group		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
1	Value	Eksperiment	.223	10	.172	.951	10	.681
		Control	.224	10	.168	.904	10	.242

a. Lilliefors Significance Correction

Based on Table 6 of the Normality Test Calculation Data, which states that the sig value of 0.681 > 0.05 for the experimental class value data and the sig value of 0.242 > 0.05 for the control class value data, it can be said that the experimental class and control class value data are normally distributed data.

Table 7. Homogeneity Test Results at the Small Group Trial Stage

No.	Levene Statistic	df1	df2	Sig.
1	.740	1	18	.401

Based on Table 7 of the homogeneity test calculation data above, a sig value of 0.401 > 0.05 is obtained so that the data value of the experimental class and the control class of the small group trial stage can be said to be homogeneous. Based on the state of the data that is said to be normally distributed and homogeneous, the post-test value data of the experimental class and the control class at the small group trial stage can be carried out for the next calculation, namely the hypothesis test or t-test. The results of the t-test using the Independent Sample T-Test can be seen in Table 8.

Table 8. Results of Hypothesis Test in Small Group Trial Stage

No.	Value	Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
1	Equal Variances Assumed	.740	.401	2.831	18	.011	5.900	2.084	1.522	10.278
	Equal Variances not Assumed			2.831	17.442	.011	5.900	2.084	1.511	10.289

Based on Table 8 shows that the value of probability or sig. (2-tailed) which is 0.011 < 0.05 which means that H_0 is rejected (there is a difference in the average score of students' critical thinking skills between the experimental class and the control class). The average post-test score in the experimental class was 81.50 and the average post-test score in the control class was 75.10. The average difference is 5.90. In addition, judging from the assessment criterion coefficient which is greater than the value of coefficient t_{tab} then H_0 is rejected. The results obtained are t_{hit} = 2.831 consulted at t_{tab} = 2.101 (significance level 5% and df = 18) so it can be said that $t_{hit} > t_{tab}$ or 2.831 > 2.101 which means there is a difference in the average value of students' critical thinking skills between the experimental class and the control class at the small group trial stage. In the small group trial stage of the experimental class, students were given an assessment questionnaire on the feasibility of the interactive e-flipbook media product developed. The media feasibility questionnaire was then analyzed to determine the average score of student responses on aspects of motivation, attractiveness, ease, and usefulness of interactive e-flipbook media before being tested to the last stage.

The results of students' assessments of interactive e-flipbook media oriented towards contextual approaches at the small group trial stage showed that the motivation aspect of the average score obtained was 3.13 with good criteria, the media attractiveness aspect of the average score obtained was 3.43 with very good criteria, then the ease aspect of the average score was 3.50 with very good criteria, and the last aspect of media expediency obtained an average score of 3.42 with very good criteria. The average total score of student assessments of the feasibility of interactive e-flipbook media at the small group trial stage is 3.37 with good criteria. This shows that the interactive e-flipbook media developed is suitable for use in the science learning process.

Researchers also conducted open interviews with 3 students who were randomly selected from the number of students who were the research sample at the small group trial stage. The average student said that the interactive e-flipbook media product developed for science learning in grade V elementary school was very good, there were learning videos, it became easier to understand the material, and it was very interesting (Aprilia et al., 2017). However, there is one student who gives input to add quizzes or games to each

chapter of flipbook material. Therefore, based on student input, researchers finally added quizzes to each chapter, namely the "Let's play while learning" activity, into the interactive e-flipbook media, so that students are more enthusiastic, interested, and not bored to read and understand the material presented in the interactive e-flipbook media oriented to the contextual approach developed (Amin et al., 2020; Haryanto et al., 2020). Based on the results of the hypothesis test of differences in students' critical thinking ability scores, as well as the results of students' assessments and input on the feasibility of media products, it can be concluded that interactive e-flipbook media oriented towards contextual approaches for science learning in grade V elementary school is feasible to be used in the next stage of trials.

3. Field Trial

The field trial was conducted with a sample of 22 students of the VA class as an experimental class (using interactive e-flipbook media oriented towards a contextual approach in science learning) and 22 students of the VB class of SDN Mangkubumen Kidul No. 16 Surakarta as a control class (using science package book media (printed books). After the learning process, students were given post-test question items to determine students' critical thinking skills after using the interactive e-flipbook media both in experimental and control classes (Gall et al., 2003). The number of post-test questions tested was 15 multiple-choice questions and 5 description questions for basic competencies 5.1 (force) and 15 multiple-choice questions and 5 description questions for basic competencies 5.2 (simple machinery).

Learning was carried out in as many as two meetings for each basic competency. The results of post-test scores are the average results of students' scores on both basic competencies tested. Then a comparison of post-test values between the experimental class and the control class was carried out to determine the level of difference through the calculation of the hypothesis test using an independent sample t-test with the help of the SPSS program (Pituch & Stevens, 2015). Hypothesis testing can be done after the data is known to be normally distributed and homogeneous, so it is necessary to calculate the normality test and homogeneity test first. The results of the calculation of the normality test and homogeneity test using the SPSS program can be seen in Table 9 and 10.

Table 9. Normality Test Results at the Field Trial Stage

No.	Group		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
1	Value	Eksperiment	.169	22	.102	.916	22	.064
		Control	.219	22	.007	.914	22	.057

a. Lilliefors Significance Correction

Based on Table 9 of normality test calculation data states that the sig value of 0.064 > 0.05 for experimental class value data and a sig value of 0.057 > 0.05 for control class value data, it can be said that the experimental class value data and the control class of the trial stage are normally distributed data.

Table 10. Homogeneity Test Results at the Field Trial Stage

No.	Levene Statistic	df1	df2	Sig.
1	.152	1	42	.698

Based on Table 10 of the homogeneity test calculation data above, a sig value of 0.698 > 0.05 is obtained so that the data values of the experimental and control classes of the field trial stage can be homogeneous. Based on the state of the data that is said to be normally distributed and homogeneous, the post-test value data of the experimental class and control class at the field trial stage can be used for the next calculation, namely the hypothesis test or t-test. T-test results using the Independent Sample T-Test are shown in Table 11.

Table 11. Results of Hypothesis Test at Field Trial Stage

No.	Value	Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
1	Equal Variances Assumed	.152	.698	4.688	42	.000	7.773	1.658	4.426	11.119
	Equal Variances not Assumed			4.688	41.402	.000	7.773	1.658	4.425	11.120

Table 11 shows that the value of probability or sig. (2-tailed) which is 0.000 < 0.05 which means H_0 is rejected (there is a difference in the average score of students' critical thinking skills between the experimental class and the control class at the field trial stage). The average post-test score in the experimental class was 83.45 and the average post-test score in the control class was 75.68. The average difference is 7.773. In addition, judging from the assessment criterion coefficient which is greater than the value of the coefficient table, then H_0 is rejected. The results obtained are t_{hit} = 2.831 consulted at t_{tab} = 2.018 (significance level 5% and df = 42), so it can be said that $t_{hit} > t_{tab}$ or 4.688 > 2.018, which means that there is a difference in the average value of students' critical thinking skills between the experimental class and the control class at the field trial stage.

In the experimental class of the field trial stage, in addition to being given post-test questions, students were also given an assessment questionnaire on the feasibility of the interactive e-flipbook media product developed. The media feasibility questionnaire was then analyzed to determine the average student assessment score on aspects of motivation, attractiveness, ease, and usefulness of interactive e-flipbook media (Sugianto et al., 2013). The results of the student assessment questionnaire on the feasibility of interactive e-flipbook media oriented toward contextual approaches at the field trial stage can be seen in Table 12.

Table 12. Results of the Student Assessment of Media Feasibility E-flipbook in Field Trial Stage

No.	Aspect	Average	Criterion
1	Motivational Aspects	3.09	Good
2	Attractiveness Aspect	3.24	Good
3	Convenience Aspect	3.26	Good
4	Expediency Aspect	3.24	Good
Average Total		**3.21**	**Good**

Based on Table 12, shows that the results of student assessment of interactive e-flipbook media oriented to a contextual approach on the motivational aspect of the average score obtained 3.09 with good criteria, the media attractiveness aspect of the average score obtained was 3.24 with good criteria, then the ease aspect of the average score was 3.26 with good criteria, and the last for the expediency aspect of media obtained an average score of 3.24 with very good criteria. The average score of the total student assessment of the feasibility of interactive e-flipbook media at the field trial stage was 3.21 with good criteria. This shows that the interactive e-flipbook media developed is good and feasible to be used in the science learning process in grade V elementary school.

The results of the student assessment of the feasibility of interactive e-flipbook media were randomly selected by three students from the number of students who became research samples at the field trial stage. The average student said that the interactive e-flipbook media product developed was good and colorful; many activities trained students to express their opinions and work together; there were quizzes and learning videos so that learning became clearer in understanding the material; and it was very interesting and not

boring (Mutiara & Emilia, 2022; Prasetyono & Sigitta, 2020). Thus, the interactive e-flipbook media oriented to the contextual approach developed is good and feasible to use in elementary science learning.

Based on the data on the feasibility results of interactive e-flipbook media products oriented towards contextual approaches, it can be concluded that interactive e-flipbook media oriented towards a contextual approach is feasible to be used for the science learning process in grade V elementary school with very good criteria. The average result data for the feasibility assessment score of interactive e-flipbook media products oriented towards a contextual approach can be seen in Table 13.

Table 13. Product Feasibility Results in Interactive E-Flipbook Media-Oriented Contextual Approach

No.	Respondents	Score	Criterion	Conclusion
1	Media Expert	4.38	Very Good	
2	Material Expert	4.59	Very Good	
3	Student:			
	One-To-One Trial	3.54	Very Good	FEASIBLE
	Small Group Trial	3.37	Good	
	Field Trial	3.21	Good	
Average		**3.82**	**Very good**	

The feasibility results of continually based interactive e-flipbook media products in science subjects show that the results of media expert assessments can be declared feasible with very good criteria, while material expert assessments can also be said to be feasible to use with very good criteria. Then the results of student assessments in one-to-one trials also show that they are feasible and very good to be used in learning, as well as that small group trials obtain good and feasible criteria for use, and the results of the last assessment in the field trial also show that the media is good and suitable for use. Thus, the results of media feasibility assessments ranging from media experts and material experts to assessments by students at each stage of the trial, show that interactive e-flipbook media oriented towards a contextual approach is feasible to be used for class V elementary science subjects on force and simple machinery.

Discussion

The use of interactive e-flipbook media oriented to contextual approaches in elementary school learning, especially on style materials and simple planes, shows significant results in improving science learning in grade V. This is proven from the development stage to the test of the effectiveness of interactive e-flipbook media, showing that it is feasible and can be used in supporting the science learning process in elementary schools. The initial stage starts with the validation of material and media experts and then continues with feasibility tests and media effectiveness tests in learning. Based on the validation of media experts, the navigation aspect obtained an average score of 4.22 with very good criteria, the ease aspect averaged a score of 4.60 with very good criteria, the average score for the audio aspect was 4.17 with good criteria, the writing or text aspect obtained an average score of 4.61 with very good criteria, and the display aspect averaged a score of 4.30 with very good criteria, so overall in the aspect of media elements, it met the eligibility criteria with an average score of 4.38. There are several inputs from media experts in the development of interactive e-flipbook media, namely that the background and background aspects used must be by student characteristics. In addition, there is a need for explanatory information on every navigation button used. This is by research that states that the development of learning media needs to be adjusted to the learning styles of students. However, the influence of student behavior on digital-based learning is not only influenced by internal factors of students; but also there is the influence of teachers and parents in facilitating the learning process (Smaldino et al., 2018; Hirata & Ozawa, 2023). In addition to media validation, in this initial stage, validation is also carried out related to materials, namely style materials and simple planes in science learning in elementary schools. The results in the learning aspect averaged a score of 4.54

with very good criteria, while in the material aspect, the average score was 4.64 with very good criteria. Thus, it can be concluded that the material presented on the interactive e-flipbook media oriented towards a contextual approach to learning science in Class V elementary school is very good, with an average score of 4.59. The presentation of science material that tends to be disliked by students must be presented as interesting and practical as possible so that the learning process fosters student interest in science. This is in agreement with research conducted by Yoon-Sung Choi (2023), namely that students with a higher level of interest in science tend to participate more in science activities, become more independent, and re-engage in science activities.

In the early stages, interactive e-flipbook media oriented to contextual approaches have been feasible to use in the later stages. Furthermore, the stage in the development of this media is the trial stage in classroom learning, which is carried out in three stages: a one-to-one trial, a small group trial, and a field trial (Branch, 2009). The results in the one-to-one trial stage obtained a score of 3.54 with very good criteria. There are several inputs in this stage, namely that the influence of using music background in media must be given an on and off button, so as not to interfere with students' concentration and enthusiasm when playing videos in this interactive e-flipbook media. In addition, student learning style factors are also a consideration for the on-off background button. In the opinion of Korber & Shepherd (2019), the interest and enthusiasm of students who participate in activities on e-flipbooks can provide positive feedback on learning and certainly have an impact on student cognitive outcomes. This is because the e-flipbook contains text, video, audio, and animation, which are combined according to the learning needs of students (Andini et al., 2018; Ningsih et al., 2022; Putra et al., 2023). Digital interactive e-flipbook media has several advantages, one of which is that it can present learning materials in the form of words, sentences, and images that can be equipped with colors so that they attract more students' attention (Amin et al., 2020; Mutiara & Emilia, 2022; Sudiarti et al., 2023). In addition, e-flipbooks will make students engage in searching for information and assessing reference sources that are advantageous as material for solving problems.

The development of interactive e-flipbooks in this study used the Kvisoft Flipbook Maker application. This is because the Kvisoft flipbook maker application makes it easy to create assessment and evaluation features, resulting in interactive digital textbooks equipped with multimedia elements such as video, images, sound, and text (Divayana et al., 2019; Erna et al., 2021; Haryanto et al., 2019; Sumarmi et al., 2021). This application can also be used on Windows 10 PCs or laptops and above so that when applied in the classroom, learning can be done in groups or individually. The next stage of the trial is the small group trial. At this stage, the average motivation aspect score obtained was 3.13 with good criteria; the media attractiveness aspect obtained an average score of 3.43 with very good criteria; then the ease aspect averaged 3.50 with very good criteria; and the media expediency aspect obtained an average score of 3.42 with very good criteria so that the average total score of student assessment of the feasibility of interactive e-flipbook media at the small group trial stage was 3.37 with good criteria. There is some input from students at this stage, namely adding quizzes or games to each chapter. Therefore, this study is not just about developing media but also testing student learning outcomes through evaluations and assessments in the e-flipbook in the form of questions or quizzes per chapter. The results of this evaluation were carried out in the third trial stage, namely the field trial stage.

The field trial stage was divided into two groups, namely the experimental group (learning using interactive e-flipbook media) and the control group (learning using printed books) with a quasi-experimental design. The average post-test score in the experimental class was 83.45, and the average post-test score in the control class was 75.68. The average difference was 7.77. In addition, judging from the assessment criteria of that = 2.831 coefficient greater than that = 2.018 coefficient value (significance level 5% and df = 42), H0 is rejected, so it can be said that this> tab or 4.688 > 2.018, which means that there is a difference in the average value of students' critical thinking skills between the experimental class and the control class at the field trial stage. These results agree with research conducted by Prasetyono & Sigitta (2020) and Erna et al., (2021) that e-flipbook media can guide learning activities, save time, optimize teaching aids, help students be actively involved in learning, improve students' ability to solve problems and improve critical thinking skills. The

influence of contextual-based material is also an effect of increasing students' critical thinking skills. With this contextual approach, students can directly imagine real examples in everyday life so that learning becomes more meaningful (Gastama et al., 2023; Koch & Bock, 2023; Lestari et al., 2023). The average score of the total student assessment of the feasibility of interactive e-flipbook media at the field trial stage was 3.21 with good criteria. The interactive e-flipbook media product developed must be interesting, and colorful; many activities train students to express their opinions and cooperate and are not boring (Firdaus et al., 2023; Prasetyono & Sigitta, 2020; Samarraie et al., 2020). But it would be even better if this media could also be integrated into digital learning platforms that can be accessed online and offline easily for elementary school students, such as Moodle, Google Classroom, or Edmodo (Ahmed & Indurkhya, 2020; Alim et al., 2019; Tinmaz & Lee, 2020). Therefore, this e-flipbook product has a novelty in its use that can be integrated into the LMS as above. In addition, this e-flipbook can be used offline without being connected to the internet network, so students can use it anytime. Content in e-flipbooks is presented in several variations to accommodate various student learning styles, such as video, voice, text, and quiz features.

Thus, it can be concluded that contextually based e-flipbook media can be declared worthy of use, with a total average of 3.82 in the excellent category. This is reinforced by the results of research conducted by Chen et al., (2021) and Saraswati & Linda (2019) who found that teaching using electronic book media such as e-flipbooks that emphasize interactive features is better than conventional teaching. Therefore, the use of e-flipbooks needs the support of adequate facilities and infrastructure for their operation in learning. This interactive e-flipbook can also be used by teachers both online and offline, according to the needs of each class. It is hoped that all parties, including the education office, schools, teachers, and students, will be able to work together in implementing interactive e-flipbook media oriented towards this contextual approach that is feasible to use.

The contribution of this research to the learning process in elementary schools can be described theoretically, practically, and methodologically. Theoretically, product development in this study, can facilitate student needs and be the main learning resource for students who can train and improve students' interaction and critical thinking skills to achieve planned learning goals. In practical terms, this research has succeeded in proving feasible to be used in supporting the implementation of the science learning process on the subject of simple styles and planes. Then, methodologically, this research was carried out using a development research design by paying attention to the feasibility testing procedures of media products that exist by existing their studies so that they can be a reference as well as a source of learning for future researchers.

CONCLUSION

The interactive e-flipbook media development procedure oriented towards a contextual approach is carried out using the ADDIE development model design. The steps taken by researchers start with analysis, product design, product development, implementation, and evaluation of the final product. However, this feasibility analysis is focused on the analysis, design, and product development stages only. At the analysis stage, there are several activities carried out, including curriculum analysis, literature analysis, and analysis of student and teacher needs. Furthermore, carrying out the product design stage starts with setting competency standards and basic competencies, selecting and collecting e-flipbook materials or content, and finally making flowcharts. The product development stage is carried out at this stage the interactive e-flipbook media production stage, media and material expert validation, and student validation through product trials (one-to-one trial, small group trial, and field trial). The results of the media expert validation assessment averaged a score of 4.38 with very good criteria, material expert validation obtained an average score of 4.59 with very good criteria, student validation ranging from one to one trial obtained an average of 3.54 included in the very good criteria, small group trial obtained an average score of 3.37 included in the good criteria, and the field trial stage obtained an average score of 3.21 included in the good category. Thus, it can be concluded that the interactive e-flipbook media oriented towards a contextual approach has met the requirements with very good

criteria and is worthy of being used as a science learning media for grade V elementary school. Through the use of interactive e-flipbook media, teachers can collaborate with various innovative learning models according to the characteristics of students and the learning objectives to be achieved. Suggestions for further research are expected in the development of digital media, especially in the form of e-books or e-flipbooks, that can be improved so that they can be used on any device, including PCs, laptops, and mobile phones based on Android or iOS.

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