

E-Book Design Analysis: The Effectiveness of Interactive Media in Understanding Characters and Ethnoscience Concepts

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Abstract: This study aims to develop a context-based interactive e-book that integrates West Javanese folktales with ethnoscience concepts to improve second-grade students' understanding of natural phenomena. Using the ADDIE development model—Analysis, Design, Development, Implementation, and Evaluation—data were obtained through expert validation, individual and small group trials, and effectiveness assessment using pre-test and post-test instruments. Validation was conducted by experts in the fields of media, language, and ethnoscience, and involved 29 second-grade students. The results showed excellent feasibility, with expert assessments exceeding 90% in all categories. A t-test analysis showed a significant increase in student learning outcomes after using the e-book ($\text{sig. } 0.000 < 0.05$), indicating the e-book's effectiveness in improving students' conceptual understanding of environmental change through cultural narratives. The integration of West Javanese folktales with ethnoscience is a new approach rarely explored in educational research. The use of context-based e-books not only facilitates meaningful learning but also encourages character values such as responsibility and concern for the environment. Therefore, the developed e-book is validated as a practical and effective book for science education in elementary schools, with potential recommendations for implementation in other educational contexts.

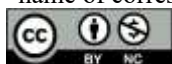
Keywords: e-book, folklore, ethnoscience, science, students

INTRODUCTION

Learning is a necessity for everyone because it has the ability to change one's perspective and increase their social awareness (Kholifah & I Made Tegeh, 2024). Education plays a crucial role in shaping individuals into knowledgeable, creative, responsible individuals capable of making a real contribution to society. Through education, individuals can develop their potential, understand moral values, and acquire skills to equip them for social life (Husnaini et al., 2024). Character formation is very necessary in the learning process with the aim of realizing the goals of education in Indonesia (Putri et al., 2023). Learning has specific goals that are achieved by utilizing the environment as a tool and learning support for students (Resti et al., 2024). Appropriate learning resources are needed to enhance basic knowledge and engage students. These resources also help teachers visualize and understand content more easily. Science and technology are two things that are very difficult to separate because science arises as a result of activities to meet human needs, both physical and spiritual. Usually, the results of scientific thinking are realized in technology (Habsy et al., 2024).

With the advancement of the digital era, traditional learning methods are increasingly being shifted toward more participatory and technology-enabled approaches. Interactive educational media has become a new innovation, expected to improve student engagement in the learning process and spark greater interest in learning. Interactive learning media has become an innovative approach to creating more engaging learning. Interactive multimedia can increase student engagement with learning materials while strengthening teachers' digital competencies (Raudah et al., 2024). The use of appropriate learning media can help students understand complex material and increase their interest in learning. Therefore, it is important for teachers to continuously explore innovative methods that can make the learning process more enjoyable and effective. Interactive learning media not only helps students understand concepts but also increases their participation and motivation in learning (Rangkuti et al., 2024). The importance of digital learning media in education can be seen from its significant

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potential to enrich students' learning experiences. In this context, the effectiveness of digitally-based interactive learning media refers not only to the extent to which it enhances students' understanding of the material, but also to its ability to improve students' practical skills. By using digital learning media, students can learn more independently and interactively, which in turn can increase their motivation and interest in the learning material (Safitri et al., 2025).

The low scientific literacy of Indonesian students is closely related to their lack of understanding of science material. Therefore, innovation is needed in science learning to facilitate student comprehension. According to (Pratama & Jumadi, 2023) currently, science learning is more often conducted through reading and memorizing material. Science itself is not a learning process that emphasizes memorization. Learning science with an ethnoscience approach that connects learning to a community's culture will increase students' awareness of that community's culture (Syafira et al., 2024). Therefore, the implementation of science learning must be carried out contextually and scientifically to develop the ability to think, work, and act scientifically and provide students with direct and meaningful experiences.

In today's technological era, children are more accustomed to foreign cultures and less aware of their own local wisdom and culture, which has resulted in a decline in students' nationalism. Another frequently encountered problem is the diminishing understanding of cultural traditions among students, which are increasingly being forgotten due to changes in their cultural values. Although they possess local cultures that deserve to be explored, preserved, and upheld, students are at risk of losing touch with them, as local culture represents the identity of a community (Dhoka et al., 2024). Ethnoscience is the knowledge possessed by a nation, or more precisely, a particular ethnic group or social group. In the context of education, ethnoscience is a strategy for creating learning environments and designing learning experiences that integrate culture into the learning process (Lidi et al., 2022). Learning using an ethnoscience approach involves combining environmental learning materials with local culture. This integration is expected to enable students to directly experience learning connected to their surroundings (Oktaviana et al., 2024). Indonesia boasts diverse cultures and traditions in each region. This important point is not only about the diversity that Indonesia can be proud of, but also about how it can support learning activities in each region.

LITERATURE REVIEW

in a study conducted by (Putri et al., 2023) with the title "Development of Science E-Modules on the Topics of Vibrations, Waves and Sound Based on Ethnoscience to Improve the Character of Kayuh Baimbai." The problems faced are the lack of integration of science learning with the cultural identity of the Banjarmasin community, as well as the limitations of learning modules that are appropriate to the pandemic conditions and technological developments. The purpose of this study is to describe the validity, practicality, effectiveness of the e-module, and the achievement of the character of kayuh baimbai in students. The results of the study indicate that the developed e-module has good validity, the practicality category is very practical, the effectiveness is categorized as effective, and the achievement of the character of kayuh baimbai is in the good category, so the e-module is suitable for use in learning.

Furthermore, in the research conducted by (Sunedi & Syaflin, 2024). with the title "Development of Ethno-STEM Based Teaching E-Modules in the Independent Curriculum in Elementary Schools." The problem faced is the lack of adequate teaching modules for teachers, which results in a suboptimal learning process and low student motivation and understanding. The purpose of this study is to produce a valid and practical teaching e-module, by presenting flat shape material using Palembang local wisdom. The results of the study showed that the developed e-module received a valid assessment from experts with a percentage of 79.47% for material experts, 84.21% for media experts, and 82.63% for language experts. One-on-one trials showed a result of 95.04%, which means that the e-module is very practical and can be applied in mathematics learning in grade IV in the Independent curriculum.

Next, in the research conducted by (Wangi & Lestari, 2020) this research is entitled "Ethnoscience-Based Thematic Learning in Improving Cultural and Civic Literacy of Elementary School Students." The problem faced is the lack of teaching modules that integrate local culture in the learning process, which results in low cultural and civic literacy of students. The purpose of this research is to develop valid and effective ethnoscience-based thematic learning in improving this literacy. The results of the study show that the product developed has a validity score above 80 from expert assessment, and its implementation is able to improve cultural and civic literacy with an N-gain of 0.49, which is classified as moderate. This shows that learning that integrates local culture, such as wooden batik, is effective in improving students' understanding of their culture and citizenship. For convenience, it will be summarized in the following table.

Tabel 1 Literatur Review

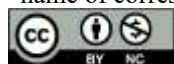
1.	Writer	Melda, Rizka Putri, Suryajaya, Arif Sholahuddin
	Year	JOURnal of Banua Science Education 2023
	Method	Educational Design Research (EDR) with Tessmer's formative evaluation model.
	Result	The results of the study indicate that the developed science e-module has excellent validity based on expert assessment, and is considered very practical based on student response questionnaires and the implementation of the lesson plan, which showed excellent results. The effectiveness of the e-module is also proven by the gain score which indicates an effective category, where the average achievement of the baimai pedal character increased during the learning process. Overall, this e-module is suitable for use in school learning.
	Relevance	This research, along with related journals, focuses on the development of an e-book that integrates traditional West Javanese fairy tales and ethnoscience concepts, in line with previous research that emphasizes the importance of science learning with local culture. The use of the ADDIE model in the development of the e-book demonstrates its suitability with methods that have been proven effective in educational contexts, and research results indicate that this e-book is effective in improving students' understanding of natural phenomena.
2.	Writer	Sunedi, Sylvia Lara Syaflin
	Year	Jurnal Pendidikan Matematika dan IPA 2024
	Method	Development (R&D) with the ADDIE model
	Result	This study shows that the developed Ethno STEM-based teaching e-module has good validity, with validator assessments for the material aspect reaching 79.47%, media 84.21%, and language 82.63%, all in the valid category. One-to-one trials showed the e-module's practicality with a score of 95.04%, indicating that the e-module is very practical to use. In addition, the average student score after using the e-module was 91.04, indicating a significant increase in understanding.
	Relevance	Development of an Ethno-STEM-based e-learning module that integrates local wisdom and culture into learning. This research aligns with concepts raised in journals regarding the importance of integrating ethnoscience and local culture in education, particularly in the context of mathematics and science learning. The use of the ADDIE model in developing the e-learning module demonstrates a methodology consistent with research approaches in other journals, and the high validation and practicality results of the e-learning module demonstrate the effectiveness of using interactive media in improving student understanding, similar to findings in related journals.
3.	Writer	Asrizal, Fleony Dea Amanda, Endang Aldila, Jufiani Ulfa
	Year	Jurnal Ilmiah Pendidikan MIPA 2023
	Method	meta-analysis method to assess the influence of STEM-based e-books on students' scientific literacy.
	Result	The analysis results show that STEM-based e-books have a significant impact on students' scientific literacy. The average effect size of e-book use is 1.55, which is in the very high category. The results of the hypothesis test indicate that e-book use is effective at the elementary education level, but has no significant effect at the higher education level.
	Relevance	on efforts to integrate local culture and ethnoscience into the learning process, as well as the use of interactive media to enhance student understanding. Both emphasize the importance of local context in education, which can strengthen students' understanding of natural phenomena and character values. Furthermore, the use of the ADDIE model in e-book development reflects a methodology similar to the approach taken in other research on the development of STEM- or ethnoscience-based modules.

The use of the ADDIE model in this study is highly relevant, as it provides a systematic and structured framework for designing, developing, and disseminating learning media. By following the ADDIE steps, researchers can ensure that every aspect of the developed e-book is aligned with student needs, effective in the learning context, and able to address challenges faced in today's education.

METHOD

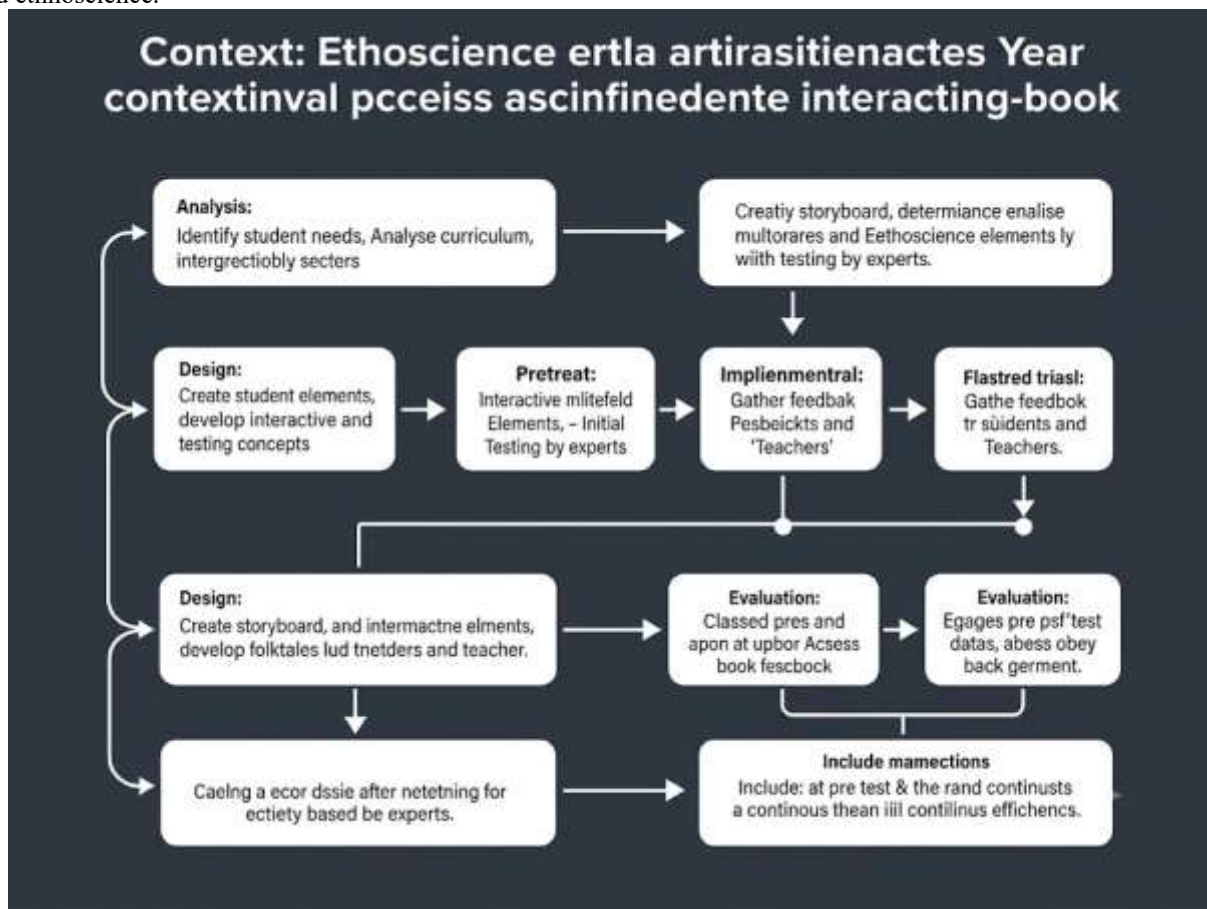
The ADDIE model has become one of the most widely used frameworks in process development. Since its introduction, this model has proven effective in various educational contexts, from elementary to higher education. According to (Sultan Syarif Kasim & Kunci, 2024), the application of the ADDIE model in early childhood

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education has shown significant improvements in children's language skills. This demonstrates that this model is not only relevant but also applicable in various educational settings. This research is a research and development (R&D) that aims to develop learning media in the form of an interactive e-book based on West Javanese folk tales integrated with character values and ethnoscience concepts. The following is a picture of the development of ebooks and ethnoscience.



Gambar 1 ebook development and ethnoscience

The development model used refers to the ADDIE model which consists of five stages: analysis, design, development, implementation, and evaluation. The research subjects were 29 second-grade students of Abdurrahman bin Auf Islamic School Curug Elementary School, Bogor City, with product validation carried out by three experts, namely a media expert, a language and character expert, and an ethnoscience expert. The research stages include analysis of natural event material relevant to folk tales (Sangkuriang, Situ Bagendit, and Telaga Warna), design of visual and interactive elements of the e-book, and preparation of character assessment instruments and conceptual understanding. Validation of the content and appearance of the e-book was carried out by media experts, language experts, and ethnoscience experts to ensure the suitability of the content, the feasibility of the design, and the accuracy of the integration of local cultural values. Data were collected through pretests and posttests, observations, interviews, and student questionnaires, as well as character assessments that included indicators of discipline, responsibility, environmental awareness, and curiosity.

For the expert profile for testing media experts named Suwarjono, his educational background is Bachelor of Information Systems STMIK SWADHARMA Jakarta 2005 and continued his Masters at STMIK ERESHA South Tangerang and now teaches at Muhammadiyah University Bogor Raya, then for language expert Yuli Adiningsih, his educational background is Bachelor of Indonesian Language and Literature Education at the Indonesian Education University and continued his Masters in Indonesian Language and Literature Education at the Indonesian Education University, then ethnoscience and material expert Lucky Dewanti S.Pd, M.Pd, M.Si.

Experiments were used to determine the extent to which the produced goods could meet the research participants' aims and objectives. The subjects involved in this study were three experts and 29 second-grade elementary school students at Muhammadiyah Cileungsi Elementary School, Bogor Regency. The data types used

in this study were quantitative, qualitative, and inferential statistics (t-test). The methods used to obtain data were questionnaires and tests.

Tabel 2 Media Expert Instrument

No	Aspect	Indicator	Item Number	Many Items
(1)	(2)	(3)	(4)	(5)
1	Visual Display	1. Visual quality (clear and attractive images/animations)	1	3
		2. Suitability of color and design to the age of the students	2	
		3. Clarity of illustrations in explaining natural events	3	
2	Narration and Audio	1. Suitability of the narrative to the video content	4	3
		2. Clarity of the narrator's voice and pronunciation appropriate to the child's age	5	
		3. Background music supports the mood of the video without distracting from the narrative.	6	
3	Interactivity	1. There are parts that trigger students' curiosity (questions/suggestions for action)	7	2
		2. Videos can encourage students to actively discuss after watching.	8	
4	Technical and Format	1. The video runs smoothly without any technical glitches (freezing, audio dropping out, etc.)	9	2
		2. Video formats compatible with devices used in schools	10	
Many Items				10

Tabel 3 Language Expert Instrument

No	Aspect	Indicator	Item Number	Many Items
(1)	(2)	(3)	(4)	(5)
1	Language Clarity	1. Sentences are easy for students to understand	1	3
		2. The sentence structure is clear	2	
		3. Communicative and straightforward narrative	3	
2	Politeness	1. Polite language according to norms	4	2
		2. Does not contain harsh/biased words	5	
3	Age Appropriateness	1. Vocabulary according to student age	6	2
		2. Style of language supports character formation	7	
4	Language Consistency	1. Terms are used consistently	8	2
		2. The language style does not change	9	
Many Items				9

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Tabel 4 Ethnoscience Expert Instrument

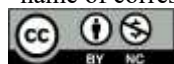
No (1)	Aspect (2)	Indicator (3)	Item Number (4)	Many Items (5)
1	Local Culture	1. Stories that are in accordance with local culture (e.g. local folk tales)	1	3
		2. Cultural elements are depicted accurately and fairly	2	
		3. Local wisdom values are displayed consistently	3	
2	The Concept of Ethnoscience	1. Natural events are associated with culture and science	4	4
		2. The scientific concepts presented are correct and not deviant.	5	
		3. There is an integration between cultural explanations and natural events.	6	
		4. Cultivating understanding of the relationship between humans, nature, and culture	7	
3	The Value of Character Education	1. Character values (responsibility, environmental care, etc.) are clearly conveyed	8	3
		2. Character values according to the cultural context and age of students	9	
		3. Moral messages support learning activities	10	
Many Items				10

Tabel 5 Individual and Small Group Test Instruments

No (1)	Aspect (2)	Indicator (3)	Item Number (4)	Many Items (5)
1	Appearance	1. The attractiveness of the interactive e-book display (images, colors, animations)	1	2
		2. Readability of text/narrative in e-books	2	
2	Material	1. Clarity of the content of natural events related to folk tales	3	4
		2. Clarity of learning objectives and their relationship to character values	4	
		3. Suitability of image and video illustrations with the material	5	
		4. Teaching materials motivate and make students interested in learning	6	
3	Evaluation	1. The instructions for the practice questions are clear and easy to understand.	7	4
		2. The number of questions is balanced with the material being taught.	8	
		3. The practice questions are based on the content of the story and natural events	9	
		4. The language of the questions is easy for 2nd grade elementary school students to understand.	10	
Many Items				10

This study uses the ADDIE model to develop learning media in the form of an interactive e-book based on traditional West Javanese fairy tales, involving 29 second-grade students of SDIT Abdurrahman Bin Arif, Curug, Bogor City. The normality test was conducted using Shapiro-Wilk to determine the distribution of pre-test and post-test data, with the null hypothesis (H_0) stating that the data is normally distributed; the results show a p-value = 0.123 ($p > 0.05$), so H_0 is accepted. Furthermore, the homogeneity test was conducted with Levene's Test to

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assess the similarity of variances between groups, with the same null hypothesis; the results show a p-value = 0.258 ($p > 0.05$), which means that the variances between groups are considered homogeneous. Data were collected through pre-test and post-test, observation, interviews, student questionnaires, and character assessments. Data analysis was conducted descriptively qualitatively and quantitatively, with paired t-samples used to determine significant improvements in student understanding after using the interactive e-book.. Qualitative descriptive analysis was used to analyze data by systematically organizing it in the form of sentences/words. Meanwhile, quantitative descriptive data analysis was used to process the data obtained through the questionnaire into descriptive percentages (Sofwatillah et al., 2024).

RESULT

The development of an interactive e-book in this study uses the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation. In the analysis stage, the researcher conducted a study to identify classroom learning needs, including analyzing the media and methods used, student characteristics, and the availability of school facilities and infrastructure. To make it easier to understand, here is a bar graph showing the comparison of the average pre-test and post-test scores.

Comparison of Average Pre-test and Post-test Scores



Gambar 2 comparison of average pre-test and post-test

The results of the needs analysis showed that many students experienced difficulties in understanding the science material on the theme "Environmental Change and Nature Conservation" due to the lack of interesting learning media and the minimal connection of the material to their contextual experiences. Based on the data, only 32% of students stated that they often used learning media in class. In terms of learning styles, most students tended to be visual (45%), followed by auditory (31%) and kinesthetic (29%). In the analysis material, the researcher integrated the concepts of environmental change due to human behavior, nature conservation, and environmental responsibility into West Javanese folktales, namely Sangkuriang, Situ Bagendit, and Telaga Warna. In the story of Sangkuriang, changes in natural forms due to human activity can be linked to the importance of maintaining environmental balance. The story of Situ Bagendit depicts the impact of greed and indifference on the surrounding community and environment which causes the area to become flooded. Meanwhile, Telaga Warna conveys a message about the importance of maintaining harmony and preserving nature. These stories are processed into an e-book as an interactive medium that not only conveys moral messages but also contains contextual scientific knowledge. In terms of the school environment, facilities such as Chromebooks, projectors, and Wi-Fi access are available, and 23 of the 29 students already have personal mobile devices, thus supporting the implementation of e-book-based learning. Therefore, the results of this analysis serve as an important foundation in designing e-books that are contextual, engaging, based on local culture, and appropriate to the needs and learning styles of students.

Tabel 6. Analysis of Material and Learning Objectives

No	Mata Pelajaran	Matreri	Topik	Tujuan Pembelajaran
1	IPA	1. Peristiwa Alam Berbasis Etnosains	1. Situ Bagendit	1. Students can understand the causes of changes in the earth due to natural factors 2. Students can find the relationship between natural events and natural disasters

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		3. Students are able to explain the impact of natural disasters on human life.
2. Sangkuriang	1. Students can understand the relationship between folklore and natural events	
	2. Students can identify elements of natural phenomena in folk tales.	
	3. Students are able to explain the impact of natural events in stories on people's lives.	
3. Telaga Warna	1. Students can understand the existence of environmental problems in folk tales.	
	2. Students can predict the causes of environmental problems based on stories.	
	3. Students are able to explain the impact of environmental damage on social and economic conditions.	

Design is the second stage, and the goal of this step is to design the product.

It is needed as a reference in the design of the learning material to be developed, namely the e-book.

The development of this e-book naturally refers to the curriculum of the learning materials and how to design an e-book well. The activities carried out in this contextual e-book design stage include: first, gathering reference materials, content, and supporting materials to complete the e-book's learning content. Second, compiling the materials, learning videos, and practice questions to be included in the e-book. Third, designing the e-book in the form of a storyboard and flowchart. Fourth, developing assessment instruments for the developed product.

Development is the third stage. The goal of this stage is to produce an e-book product with a contextual approach based on the flowchart and storyboard that have been created. Second, the assessment is conducted by professionals consisting of media, language, and ethnoscience experts. After the expert assessment, the next stage is to revise the product based on the recommendations and feedback from the expert assessment before it is piloted with students.

The product trial involved nine students in small groups and three students in individual trials. Students were selected based on their ability levels: high, medium, and low. After product evaluation, each subject's score was converted to a 5-point scale. The results of the feasibility test are presented in Table 6.

Tabel 7. E-book Development Feasibility Test Percentage

No	Test Subjects	Presentation (%)	Information
1.	Media Expert Test	97%	Very good
2.	Linguist Test	95%	Very good
3.	Ethnoscience Expert Test	91,86%	Very good
4.	Individual Trial	93%	Very good
5.	Small Group Trials	91,44%	Very good

The results of the contextual approach to e-book development for fifth-grade science subjects consist of several sub-items, including the e-book cover design, e-book material design, and e-book video design. The results of the contextual approach to e-book product development are presented in the following figure.



Gambar 3 E-book Product Results Situ Bagendit

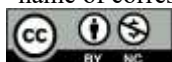


Gambar 4 E-book Product Results Sangkuriang

The fourth stage in the ADDIE development model is implementation, which involves implementing learning activities using the e-book after it has been deemed feasible and practical for use. Implementation took place in the fifth grade, the target class for the study, involving all 29 students. The learning activities lasted for one month (approximately four weeks), encompassing several face-to-face class meetings according to the science lesson schedule. At the beginning of the meeting, all students were given a pre-test to determine their initial understanding of the material. Subsequently, learning was conducted using the e-book using a contextual approach, designed to increase student engagement and understanding by integrating folklore into the material on natural phenomena. At the end of the learning month, students were given a post-test consisting of 20 multiple-choice questions to measure learning outcomes after using the e-book.

Pre-test and post-test data were analyzed using a paired sample t-test to determine whether there was a significant improvement after product use. Prior to the t-test, prerequisite tests were conducted, namely normality and homogeneity tests using the Shapiro-Wilk formula. The analysis results are presented in Table 9 and indicate a significant difference between pre- and post-implementation scores, indicating that the use of contextual e-books is effective in improving student learning outcomes. The fifth stage is evaluation. Evaluation aims to assess the quality and effectiveness of the developed product. Assessment is conducted through effectiveness testing, validation by content experts, instructional design experts, and media experts, as well as through individual trials and small group trials representing students with high, medium, and low abilities. Furthermore, the evaluation also involves gathering feedback from teachers and students throughout the learning process. The feedback obtained is used to revise and refine the product to better suit the needs of students and the learning environment. Thus, the e-book product developed not only fulfills the validity and practicality aspects, but is also able to increase the effectiveness of science learning, especially on natural phenomena material integrated with local wisdom.

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Tabel 8. Prerequisite Test

Paired Samples Test										
Paired Differences										
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)	Inter Pres Tati On
					Lower	Upper				
Pair 1	Pretest									Significant increase in score (p < 0.05)
	dan	-46,89655	8,38938	1,55787	-50,08770	-43,70540	-30,103	28	0,000	
	Posttest									

Effect size is a crucial statistical measure that quantifies the strength or magnitude of the relationship between variables or the difference between groups, providing context to the significance of results. While statistical tests like the t-test indicate whether a difference is significant, effect size measures, such as Cohen's d and Eta Squared, reveal how substantial that difference is. This is important because it allows researchers to assess not only the existence of a significant difference but also its practical implications. By considering effect size, findings can be compared across studies and interpreted in real-world contexts, thus enhancing the overall understanding of the research outcomes.

The results of the quantitative analysis were obtained from pre-test and post-test data conducted on 29 second-grade students of SDIT Abdurrahman Bin Arif. The paired sample t-test showed a significant increase in student learning outcomes after using e-books. The significance value obtained was 0.000, which means $p < 0.05$. This indicates that the use of contextual e-books is effective in improving students' understanding of natural phenomena. This data can also be presented in tabular form for easier interpretation. Qualitative findings were drawn from observations and interviews with students regarding their experiences using e-books. Students reported that interactive features, such as animations and sounds, made the material more engaging and helped them better understand science concepts. Many students felt that e-books made learning more enjoyable and increased their motivation to learn. Some students also stated that integrating folktales with science materials helped them relate learning to everyday experiences.

DISCUSSIONS

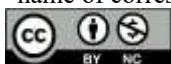
The final product of this development is a contextual e-book specifically designed for second-grade science learning at SDIT Abdurrahman Bin Arif, Curug, Bogor City. The primary goal of this e-book is to facilitate students' understanding of the science material, particularly the theme "My Beloved Earth, My Poor Earth," by linking learning to real-life contexts and local culture, such as through West Javanese folklore. The development of this e-book follows the ADDIE model, which includes analysis, design, development, implementation, and evaluation. Throughout the process, the e-book underwent testing, expert assessment, and product revisions based on teacher and student feedback. Based on the feasibility test results, the e-book was declared to have excellent qualifications. Validation was carried out by learning content experts, learning design experts, and media experts, as well as through individual and small group trials. The entire testing process demonstrated that this e-book is suitable, engaging, and practical for implementation in second-grade learning activities. It was also proven to increase student motivation, understanding of the material, and interaction during the learning process.

The use of folktales in science learning serves as a bridge between scientific concepts and students' everyday experiences, enhancing understanding and retention of information. Stories rich in cultural and moral values can increase students' interest and motivation, sparking active engagement in the learning process. Furthermore, folktales encourage the development of critical thinking and analytical skills through problem-solving situations containing scientific elements. The emotional aspects of the stories also strengthen students' memory, while story-based learning encourages group discussions that reinforce social learning. Finally, the integration of character values into the stories enriches the learning experience by teaching desirable attitudes and behaviors, such as environmental responsibility.

This study has several limitations that should be considered. First, the small sample size, involving only 29 students from a single school, limits the generalizability of the findings to a broader population. This may affect external validity, as the results may not reflect the experiences of students in other schools with different contexts. Second, the focus on a single school may reduce variation in student characteristics and learning environments, which may impact the study's results. Third, potential bias from teachers involved in the study should also be considered, as their perspectives and expectations may influence the implementation of e-books and student assessments.

In a study by (Ayu et al., 2024), which examined the integration of local culture in science learning across various countries, this study demonstrated that the use of a culture-based approach can improve students'

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motivation and understanding of scientific concepts. These findings align with our findings, which show that integrating ethnopedagogy into science learning has a positive impact on students' understanding of local wisdom and scientific concepts. They noted that successful cultural integration relies heavily on adequate training for educators and support from the existing curriculum.

Based on the findings of a review by experts, including subject matter experts, instructional design experts, and learning media experts, the results were consistently rated as very good. The experts conducted an in-depth evaluation of the e-book's content, design, and interactivity. Not only does it broaden the scope of learning, but it also creates an environment where students can learn at their own pace and learning style (Sonia & Yuliani, 2023).

Based on the results of individual and small group trials, the e-book was found to have excellent credentials. In the individual trials, students individually accessed and used the e-book, and they responded positively to its ease of use and understanding of the material. Students found the contextual explanations and engaging visuals helpful. Meanwhile, in the small group trials, student interaction while using the e-book also yielded positive results. They were more active in discussions and sharing their understanding, indicating that the e-book can encourage collaboration and collaborative learning (Muhammad Arsy Ash Shiddiqy, Alficandra, La Ode Syarfan, 2023). Overall, both individual and small group trials showed that this e-book was of good quality and well-received by students. This aligns with the opinion that using e-books in the learning process can facilitate and accommodate student learning (Yusnita Fitrianna et al., 2021).

The effectiveness of developing e-book teaching materials using a contextual approach was implemented by providing multiple-choice questions to 29 second-grade students at SDIT Abdurrahman Bin Arif Curug, Bogor City, through a test. The pre-test was conducted before students learned using the e-book using a contextual approach, while the post-test was conducted after students learned using the e-book using a contextual approach (Rusdiana & Wulandari, 2022).

Quantitative data from pre- and post-e-book tests showed a significant increase in scores, while qualitative data from observations and interviews indicated increased student motivation and engagement in the learning process. The results of the hypothesis test revealed a significant difference between before and after using e-books in the second-grade science subject of SDIT Abdurrahman Bin Arif Curug, Bogor City. Based on this, it can be concluded that the use of e-books with a contextual approach in the fifth-grade science subject of SDIT Abdurrahman Bin Arif Curug, Bogor City is effective in improving student learning outcomes SDIT Abdurrahman Bin Arif Curug, Bogor City.

The context-based interactive e-book development model using the ADDIE approach can be replicated across various subjects and regions with some adjustments. It is important to integrate local cultural elements relevant to the subject, such as using folklore for history lessons. A thorough analysis of student needs is necessary to understand their characteristics and learning styles, as well as ensuring the availability of adequate technological infrastructure, such as internet access and necessary devices. Teacher training is also crucial for effective e-book implementation. Furthermore, the model should undergo a feasibility test before full implementation, gathering feedback from students and teachers to refine the product. By considering these factors, the model has great potential for adaptation and application across various educational contexts while maintaining cultural relevance and local experiences.

The research results show that e-books significantly increase students' reading interest through interactive features such as animation and sound, which make reading material more engaging (A. A. Prasetyo et al., 2024). Furthermore, the results of this study align with research related to the development of e-modules in science subjects. This research indicates that e-modules with a contextual approach in science subjects are highly feasible and engaging to use. The use of e-books can help students understand the material during the learning process, thereby achieving learning objectives (Futri et al., 2025). In this study, the use of learning media, such as digital books or e-books, is considered to increase students' learning motivation (D. Prasetyo & Zulherman, 2023).

CONCLUSION

Based on the research results, assessments by content, design, and media experts, individual tests, and small group tests on the developed e-book indicated excellent performance in all aspects. Effectiveness testing using a t-test demonstrated a significant difference in learning outcomes before and after using the contextual e-book. These findings indicate that the e-book is effective in improving the learning outcomes of second-grade students at SDIT Abdurrahman Bin Arif in the science subject. The development of this contextual-based e-book has also been proven to create more meaningful learning activities by encouraging active student engagement throughout the learning process and connecting the material to students' real-life experiences and local culture and demonstrates that the ADDIE approach, a context-based interactive e-book development model, can be replicated across various subjects and regions, provided appropriate adjustments are made. This implementation model not only enhances student understanding through the integration of local cultural elements but also increases engagement and motivation to learn. Practical implications for teachers include improving their ability to use technology to create more engaging learning experiences. Schools can benefit from a more relevant learning

environment, which positively impacts student academic outcomes. For policymakers, the successful implementation of this model can serve as a basis for encouraging investment in technology-based education and curriculum development that integrates local cultural values. Thus, this model has great potential for effective adaptation across various educational contexts, while maintaining cultural relevance and local experiences, ultimately supporting the preservation of cultural identity and improving the quality of education.

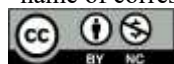
However, this study has limitations, including a small sample size and focus on a single location, which may limit the generalizability of the results to broader contexts. Furthermore, limited teacher training and technological infrastructure in some regions may also impact the implementation of e-books. Therefore, further research with more comprehensive and diverse designs is needed to address these limitations and explore the potential of this model in broader educational contexts. Thus, this model has great potential to be effectively adapted across various educational contexts, while maintaining cultural relevance and local experiences, ultimately supporting the preservation of cultural identity and improving the quality of education.

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