

Development Of Digital Book Learning Media On The Subject Geography Environmental Material Geosphere: Atmospheric Dynamics

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Abstract

Research into the development of digital book learning media is essential because it can increase learning effectiveness, accommodate diverse learning styles, facilitate understanding of concepts, encourage student involvement, and facilitate learning evaluation. Developing learning media in digital books aims to produce products and analyze the feasibility of developing digital book learning media for students. This Research is a type of development research using the ADDIE development model, which consists of 5 stages: Analysis, Design, Development, Implementation, and Evaluation. The results obtained from the Research show that the assessment obtained from material experts was 93.33%, which was included in the Very Appropriate criteria, the media expert's assessment was 85%, which was included in the Very Appropriate criteria, the assessment from subject teachers reached 94.07%, which was including the Very Eligible criteria, and for student assessment on the limited test, 84.7% was obtained including the Very Eligible criteria. The general test results obtained were 88.6% with very feasible criteria. Based on the validation and trials results, digital book media is suitable to be a digital book media in geography subjects with atmospheric dynamics material.

Keywords: Learning Media; Digital Books; Atmospheric Dynamics

1. INTRODUCTION

Learning media is a learning component that can encourage students' interest in learning. Students can develop and exercise their potential by providing a learning environment that suits their level of development and way of thinking. Media, also known as a medium, functions as a channel of information between the source of information (teacher) and the recipient (students). The learning and teaching process (PBM) is where the media functions. Learning Media has an essential function in the learning process, and students need an environment that encourages them to develop their inner potential (Pratama, 2022). The internal potential for learning awareness is developed, and knowledge can be assimilated well (Rofi'ah, 2021). Learning media that uses pictures, graphs, diagrams, or videos means students can more easily understand abstract or complex concepts. Visual-based media can be an effective strategy for improving the quality of learning at various levels of education (Karo-Karo & Rohani, 2018).

Appropriate learning resources that can support students' understanding of the learning process are significant for teachers to optimize the learning process (Mahendri et al., 2022). The learning resources commonly used in high schools are integrated printed books related to subjects for one semester. A type of digital book has recently emerged with a focus on interactivity and integration of media content. Digital learning resources can be defined as anything stored in digital form that educators and students can use to help the learning process (Susanto & Akmal, 2019). Digital books are flexible digital learning resources that help students carry out learning activities. Digital books can be accessed conventionally and independently for use in the learning process. The characteristics of digital books are more engaging, inspiring, exciting, and interactive (Yuniastuti et al., 2021). Development of multimedia learning by providing various media types in one learning tool. Digital technology is considered to increase student retention and persistence in learning. Learning media can provide rich content. Digital technology is considered more suitable for modern learning models (Mawarni & Muhtadi, 2017).

Digital books are integrated media because they combine text material with various media types, such as video, audio, and multimedia. These characteristics are by geography's needs regarding

atmospheric dynamics. Digital learning means providing integrated learning resources to integrate theory and practice (Amalia, 2020). The development of digital books is nothing new. The open ebook format began to be developed in 1990, allowing software developers and creators to use a format that can be read by various devices and using various digital book reader software. Digital books also consist of digital content (publications) and a combination of software and hardware used to produce digital book products containing multimedia content (Istiqlal, 2018). The development of digital books cannot be separated from the concept of developing learning modules and multimedia; both combine digital books into integrated modules that combine collaborative multimedia content to become a learning medium (Bakoban et al., 2022).

The choice of learning media must be adjusted to the teaching method used and the characteristics of the students. Using appropriate learning media can increase the overall effectiveness of teaching and learning (Suryana, 2020). Learning media can replace the role of the teacher, as well as the reasons why media are used and what media can do. Learning media must have at least three essential characteristics: fixative, manipulative, and distributive (Reza, 2021). Learning media is everything in the learning process, both physical and technical, that can help teachers convey lesson material to students and help achieve learning goals. Learning media is a tool in the teaching and learning process to stimulate the thoughts, feelings, attention, and abilities or skills of learners so that they can encourage the learning process.

Geography is one of the subjects that examines the biosphere in a complex manner, as well as the science of mapping and geographic information systems. In the research, material related to the Geosphere Environment: Atmospheric dynamics is material for class X high school level in the Merdeka Belajar curriculum. This material is considered suitable for research on the development of learning media. The researcher considers this material appropriate for the learning media that the researcher will develop. Based on this information, the researchers found several obstacles, namely that studying geography at SMA Negeri 1 Gorontalo Utara tends to be quite popular with students. However, the limited learning media in the form of the availability of LCDs for learning is still lacking, while the use of computer laboratories which cannot be accessed freely makes students focus on printed books are used as a reference in the learning process, this makes students less interested so they don't pay too much attention to the material provided, besides that students are still less focused on understanding the learning concepts carried out by subject teachers, so subject teachers make LKPD complement the media learning.

2.METHOD

The type of research carried out is development research, using the ADDIE method as a reference for making the learning media in question. The ADDIE development model has five stages in the development process: Analysis, Design, Development, Implementation, and Evaluation. The following are the stages of the ADDIE development model (Setiawan et al., 2021). The data collection techniques used were observation, documentation, and questionnaires. This research uses four data collection instruments and two interview instruments at the analysis stage.

The validation instruments were for material experts, media experts, subject teacher experts, and product trial instruments in digital book learning media for Class X students at SMA Negeri 1 Gorontalo Utara. The questionnaire used in this instrument was structured as open questions to obtain information on the needs for developing digital book learning media. The data analysis technique is carried out by assessing validation sheets for the use of this media filled in by validators and analyzing student responses, with an assessment consisting of 5 assessment scores as shown in Table 1 below:

Table 1. Score Assessment

Score	Alternative Answer
5	Very Good/Very Decent
4	Good/Decent
3	Good enough/Decent enough
2	Not Good/Not Worth It
1	Very Poor/ Not Eligible

To calculate the eligibility percentage, using the following formula:

$$\text{Eligibility Score} = \frac{\text{obtained score}}{\text{maximum score}} \times 100\%$$

Table 2 shows the percentage value of the feasibility of using learning media according to category (Arikunto,2021).

Table 2. Eligibility Qualification Values

No.	Percentage (%)	Qualification
1.	80-100	Very decent
2.	66-79	Decent
3.	56-65	Decent enough
4.	46-55	Not suitable
5.	0-45	Not eligible

The student response scores were obtained from the assessment questionnaire to see the qualification scores in making conclusions regarding the learning media being developed, namely digital books on Geosphere Environment: Atmospheric Dynamics in class X SMA Negeri 1 Gorontalo Utara. Calculate each student's response using the following formula (Saski & Sudarwanto, 2021).

$$\text{Percentage} = \frac{\text{number of student responses}}{\text{number of students}} \times 100\%$$

3. RESULT AND DISCUSSION

1) Analysis

Based on the observations that have been made, the problem identified is that students' interest in learning has decreased due to the lack of learning media and learning resources. Generally, the media used by students is printed power points, due to limited facilities and infrastructure in schools. Learning resources are obtained from textbooks that are distributed during the learning process so that some students are still unable to master the material in depth due to limited learning time. analysis related to the curriculum applied in the teaching and learning process at SMA Negeri 1 Gorontalo Utara has used the Merdeka curriculum, in implementing the Merdeka curriculum it gives more freedom to schools, teachers and students to determine learning materials, teaching methods and evaluate learning outcomes in accordance with local and global needs.

Student analysis was carried out by interviewing students and subject teachers. The results of the analysis show that from the results of interviews with students, researchers know that students tend to experience boredom and saturation when studying geography because some material is difficult for students to digest, including geosphere environmental material: dynamics of the lithosphere, and geographical research material. Apart from that, students find it difficult to understand the material due to limited media and learning resources so that students cannot understand the material in depth.

2) Planning

Designing digital book media is designed to make it easier for students to understand learning material, especially atmospheric dynamics material. The material created is adapted to the curriculum that applies at SMA Negeri 1 Gorontalo Utara.

a. Title

The title contained in the digital book must be interesting in accordance with the material that will be described in the digital book, namely Atmospheric Dynamics. Interesting titles can foster students' interest in reading.

b. Learning Objective Flow

The development of digital books contains learning objectives that must be achieved

by students during the learning process. The flow of learning objectives is adjusted to the curriculum that applies at SMA Negeri 1 Gorontalo Utara.

c. Contents of the material

The material presented includes atmospheric material and is equipped with contextual examples related to everyday life. The material is compiled from various sources, both articles and books, which have been collected by researchers.

d. *Digital E-book*

Digital E-book means that the media developed is digital which is accessed using devices such as laptops or smartphones where learning videos are available in the digital book which makes the student's learning process more interesting. Digital book media is created through the Book Creator website, which is a website that can be used to design a digital book with features such as being able to add learning videos that can be accessed by students in the book media that has been created. The availability of learning videos that are loaded can help students understand the material on atmospheric dynamics and can attract students' interest in studying digital books

3) Development

The digital book media display makes it easy for students to access learning media during the learning process. The digital book media creation process results are described below, along with validation results from material experts, media experts, and geography teachers.

a. Validation and Revision Results by Material Experts

Validation is carried out by filling out a validation sheet, which includes a scale of 1-5 regarding the appropriateness of the material content and the language used in digital books. Also, several suggestions and input were provided to improve the quality of the media. Table 3 below shows the results of valid material experts' dating the suitability of digital books by mat 3 Material Expert Validation.

Table 3. Material Expert Validation

No	Feasibility Aspect	Expert	
		Score Obtained	Maximum Score
1.	Material Contents	43	45
2.	Language	27	30
	Total	70	75
	Feasibility Value (%)	93,33	
	Category	Very Decent	

Based on Table 4.2, material experts' digital book validation assessment is included in the "Very Eligible" category with a feasibility value percentage of 93.33% in the qualification range of 80-100%.

b. Validation and Revision Results by Media Experts

The validation process is carried out by filling in a validation sheet containing 1-5 scales related to aspects of media suitability. Media experts also provide suggestions and input, which can later help improve media quality. Based on Table 4 regarding the media expert's assessment of digital book media, it is classified in the "Very Appropriate" category with a percentage achieved of 85%, so if you look at the qualifications, the range is 80-100%. As a result of validation by media experts, digital books were created based on the appropriateness of presentation. The appropriateness of the media has been tested according to the suggestions and input provided. Table 4 below shows the results of media experts validating the suitability of digital books.

Table 4. Media Expert Validation

No	Feasibility Aspect	Expert	
		Score Obtained	Maximum Score
1.	Presentation	21	25
2.	Media	30	35
Total		51	60
Feasibility Value (%)		85	
Criteria		Very Decent	

c. Validation and Revision Results

The validation process is carried out regarding aspects of appropriateness of material content, language appropriateness of presentation, and media appropriateness of digital book media using a scale of 1-5 in the validation sheet. Apart from providing a feasibility assessment, the geography subject teacher also provided several inputs and suggestions for materials to improve the quality of digital book media to make it even better. The following is a recapitulation obtained from the validation results of digital books by subject teachers in Table 5.

Table 5. Subject Teacher Validation

No	Feasibility Aspect	Expert	
		Score Obtained	Maximum Score
1.	Contents of Material	44	45
2.	Language	30	30
3.	Presentation	21	25
4.	Media	32	35
Total		127	135
Feasibility Value (%)		94,07	
Category		Very Decent	

Table 5 shows the results of geography subject teacher assessments for digital book media, which are classified in the "Very Appropriate" category, with a feasibility score of 94.07%, in the 80-100% range. The results of validation by this subject teacher show that the digital book has been developed in accordance with aspects of the appropriateness of presentation and appropriateness of the media so that it is suitable for testing and by the revisions and input provided.

Table 6 shows that the average score of the three validators is 90.8%, which is within the qualification range of 80-100% and in the "Very Eligible" category. Table 6 also presents the results of assessing the feasibility of digital books from each validator.

Table 6. Results of Validator Expert

Assessment Of Media Suitability			Avarage	Category
Validator I	Validator II	Validator III		
93,33	85	94,07	90,8	Very Decent

4) Implementation

The digital book design will be used in the ongoing learning process after development. The validator has deemed that the digital book can be used and feasible so that the digital book can be tested on students who are the subjects of the trial. The trial process is carried out by testing the product on students. Carrying out product trials aims to identify students' responses to digital book media. The trial was carried out on April 23 and May 27, 2024. The limited trial subjects were students in class X-1 of North Gorontalo 1 Public High School. The results of student assessments in the overall limited test of digital books are presented in Table 7.

Table 7. Limited Test Student Responses

No	Feasibility Aspect	Product Trial	
		Score Obtained	Maximum Score
1.	Appropriateness of Material Content	644	750
2.	Language Eligibility	421	500
3.	Feasibility of Presentation	421	500
4.	Media Eligibility	632	750
Total		2118	2500
Feasibility Value (%)		84,7	
Criteria		Very Decent	

The table above displays the results of assessing the suitability of digital books as a whole in terms of material content, language, presentation, and media. The score obtained reached 84.7%, which is in the range of 80-100%, which includes the "Very Decent" criteria.

5) Evaluation

The digital book learning media developed and validated by material experts, media experts, and subject teachers is then tested on students. Then, the product revision stage is carried out based on the suggestions and input received from the student questionnaire assessment. The product revision stage aims to evaluate the product to achieve final learning media results suitable for use. Digital book learning media can be accessed by students anywhere and at any time as long as they have an internet network, making it easier to study materials presented in the form of digital books, which contain learning videos and enrichment questions that can sharpen students' knowledge.

After conducting a limited test on 25 students in class X-1 and revising the product again according to several student inputs, a general test was conducted in five classes. The number of students who were respondents was around 133 students. Consisting of 5 classes, namely X-2, X-3, X-4, X-5, and X-6. Based on the data obtained from the distributed questionnaire, it can be seen that the average response from students regarding digital book media is 88.6%, which is included in the "Very Appropriate" category. Based on data from the questionnaire related to questions to see student responses from 133 respondents at SMA Negeri 1 Gorontalo Utara, the data results are presented in Table 8 below:

Table 8. General Test Student Responses

No	Feasibility Aspect	Product Trial	
		Score Obtained	Score Obtained
1.	Appropriateness of Material Content	3.563	3.990
2.	Language Eligibility	2.308	2.660
3.	Feasibility of Presentation	2.383	2.660
4.	Media Eligibility	3.528	3.990
Total		11.782	13.300
Feasibility Value (%)		88,7	
Criteria		Very Decent	

The analysis stage began by observing SMA Negeri 1 Gorontalo Utara to identify problems in the geography learning process. Based on the observations made by collecting information using the interview method with subject teachers and students, the researcher concluded that it is essential to have learning media that can increase students' interest in learning and motivation. The following stage is to design the learning media product that will be developed, namely digital book media. Digital books created through the book creator website are designed with material appropriate to learning outcomes

and designed learning videos that can help students understand the material.

Digital books were developed with validation from material experts, media experts, and subject teachers to evaluate their suitability. After that, the book was tested on a limited basis and in general with students. The trial activities were carried out twice, involving 25 students in class X-1 for limited testing and 133 students in classes X-2, X-3, and X-4; the final stage is the researcher's overall evaluation of the digital book. The main objective of developing digital books is to assess their suitability as learning media.

Based on the results of this research, the development of learning media in the form of digital books has a significant impact on increasing students' interest and understanding of subject matter, especially in geography subjects. Previously, research by Sella Mawarni and Ali Muhtadi highlighted the importance of validation from material experts and media experts in measuring the suitability of a learning media (Mawarni & Muhtadi, 2017). These findings prove relevant in this research, where validation by material and media experts is critical in ensuring the quality and effectiveness of digital books as learning media. In addition, research conducted by Nopi Yanti and Dina Ampera emphasized the importance of the limited trial and general trial stages in evaluating the effectiveness of learning media (Yanti & Ampera, 2021). This is reinforced by the findings in this research, where limited trials and general trials provide in-depth insight into the feasibility and response of students to digital books as a learning medium.

In the context of Geography learning, digital-based learning media such as digital books provide easy access and a more exciting learning experience for students. This aligns with learning theories, where engaging media can increase students' motivation and involvement in learning (Slavin, 2015). By presenting learning material interactively and contextually, digital books can help students understand complex concepts better. In this case, digital books can also effectively encourage independent learning and more profound mastery of the material.

This research also highlights the importance of digital books' compatibility with the applicable curriculum, in this case, the Merdeka Belajar Curriculum. This is in accordance with the concept of learning media development, which emphasizes the need for compatibility between material content and local and global learning needs (Mardiana & Harti, 2022). By integrating relevant learning concepts with the applicable curriculum, digital books can be an effective tool in supporting the achievement of learning goals and preparing students to face future challenges.

Thus, developing digital books as learning media in Geography learning has great potential to improve the quality of learning and students' understanding of the subject matter. By paying attention to the principles of developing effective learning media and integrating the results of previous research, digital books can be one solution to overcoming challenges in learning in this digital era.

4. CONCLUSION

The research results show that developing learning media in digital books with material on atmospheric dynamics at SMA Negeri 1 Gorontalo Utara has proven to be very effective in increasing students' interest and understanding of learning. Through the analysis, planning, development, implementation, and evaluation stages, digital books developed through the Book Creator website received a "Very Decent" assessment from material experts, media experts, and subject teachers and positive responses from students both in limited trials and general. The high suitability score, namely an average of 90.8%, shows that this digital book not only meets quality standards in terms of material content, language, presentation, and media but is also able to overcome the problem of limited existing learning facilities so that it can be relied on as an effective and efficient learning medium in the digital era.

REFERENCE

- Amalia, F. (2020). Pengembangan Buku Digital Interaktif Pada Mata Pelajaran Penerapan Rangkaian Elektronika Di SMKN 1 Jabon. *Jurnal Pendidikan Teknik Elektro*, 09(01).
- Arikunto, S. (2021). *Dasar-dasar Evaluasi Pendidikan*. Jakarta: Bumi Aksara.
- Bakoban, F. I., Syahputra, E., & Khairani, N. (2022). Pengembangan Media Pembelajaran Buku Digital dengan Menggunakan Pendekatan Matematika Realistik untuk Meningkatkan Kemampuan Pemecahan Masalah Siswa di SMPN 13 Medan. *Jurnal Cendekia: Jurnal Pendidikan*

- Matematika*, 6(3), 2962–2971. <https://doi.org/10.31004/cendekia.v6i3.1645>
- Istiqlal, A. (2018). Manfaat Media Pembelajaran Dalam Proses. *Jurnal Kepemimpinan Dan Pengurusan Sekolah*, 3(2).
- Karo-Karo, I. R., & Rohani, R. (2018). Manfaat Media Dalam Pembelajaran. *AXIOM: Jurnal Pendidikan Dan Matematika*, 7(1). <https://doi.org/10.30821/axiom.v7i1.1778>
- Mahendri, R. P., Amanda, M., & Latifah, U. (2022). Pengembangan E-Modul Interaktif Berbasis Flipbook sebagai Media Pembelajaran Distance Learning. *J-HyTEL: Journal of Hypermedia & Technology-Enhanced Learning*, 1(1), 1–14. <https://doi.org/10.58536/j-hytel.v1i1.18>
- Mawarni, S., & Muhtadi, A. (2017). Pengembangan digital book interaktif mata kuliah pengembangan multimedia pembelajaran interaktif untuk mahasiswa teknologi pendidikan. *Jurnal Inovasi Teknologi Pendidikan*, 4(1), 84. <https://doi.org/10.21831/jitp.v4i1.10114>
- Mardiana, R., & Harti, H. (2022). Pengembangan E-Modul Berbasis Flipbook untuk Meningkatkan Pemahaman Siswa SMK pada Materi Hubungan dengan Pelanggan. *Edukatif: Jurnal Ilmu Pendidikan*, 4(4). <https://doi.org/10.31004/edukatif.v4i4.2946>
- Mawarni, S., & Muhtadi, A. (2017). Pengembangan digital book interaktif mata kuliah pengembangan multimedia pembelajaran interaktif untuk mahasiswa teknologi pendidikan. *Jurnal Inovasi Teknologi Pendidikan*, 4(1). <https://doi.org/10.21831/jitp.v4i1.10114>
- Reza, M. (2021). *Ciri-ciri Media Pembelajaran Menurut Gerlach dan Ely*. 23 Februasri 2021.
- Rofi'ah, R. (2021). Meningkatkan Motivasi Belajar Pendidikan Sejarah Kebudayaan Islam Melalui Metode Pembelajaran Mind Mapping. *Attadrib: Jurnal Pendidikan Guru Madrasah Ibtidaiyah*, 3(2), 33–40. <https://doi.org/10.54069/attadrib.v3i2.109>
- Pratama, M. I. L. (2022). Pengembangan Media Pembelajaran Interaktif Sebagai Sarana Edukasi Kesiap-Siagaan Bencana Tsunami Pada Anak. *Jurnal Ilmiah Profesi Pendidikan*, 7(3b). <https://doi.org/10.29303/jipp.v7i3b.782>
- Slavin, R. E. (2015). Cooperative Learning Teori, Riset dan Praktik. In *Nusa Media*.
- Saski, N. H., & Sudarwanto, T. (2021). Kelayakan Media Pembelajaran Market Learning Berbasis Digital Pada Mata Kuliah Strategi Pemasaran. *Jurnal Pendidikan Tata Niaga (JPTN)*, 9(1).
- Setiawan, H. R., Rakhmadi, A. J., & Raisal, A. Y. (2021). Pengembangan Media Ajar Lubang Hitam Menggunakan Model Pengembangan ADDIE. *Jurnal Kumparan Fisika*, 4(2). <https://doi.org/10.33369/jkf.4.2.112-119>
- Suryana, S. (2020). Permasalahan Mutu Pendidikan Dalam Perspektif Pembangunan Pendidikan. *Edukasi*, 14(1). <https://doi.org/10.15294/edukasi.v14i1.971>
- Susanto, H., & Akmal, H. (2019). Media Pembelajaran Sejarah Era Teknologi Informasi: Konsep Dasar, Prinsip Aplikatif, dan Perancangannya. In *Program Studi Pendidikan Sejarah Fakultas Keguruan dan Ilmu Pendidikan Universitas Lambung Mangkurat*.
- Yanti, N., & Ampera, D. (2021). Pengembangan Media Pembelajaran E-Book (Buku Digital) Pada Mata Pelajaran Dasar Desain Siswa Kelas X Smk Negeri 1 Stabat. *Pesona*, 1(1). <https://doi.org/10.24114/pesona.v1i1.24210>
- Yuniastuti, Miftakhuddin, & Khoiron, M. (2021). Media Pembelajaran Untuk Generasi Milenial Tinjauan Teoritis dan Pedoman Praktis. In *Scopindo Media Pustaka*.