



A digital pop-up book for fifth-grade social studies: Design and development study

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ABSTRACT

Pop-up book digital media is a type of digital media that incorporates three-dimensional (3D) effects, helping learners enhance their overall understanding. The purpose of the study was to describe the development process, validity, and applicability of Pop-up book digital media. Using Research and development with the ADDIE model. The research subjects were fifth-grade students of elementary school students. The data collection technique used a questionnaire. Data analysis techniques using quantitative descriptive methods. The results of the research on the development of Digital Pop-up Book media on social studies for fifth grade students were carried out using the ADDIE model which includes Analyze (problem and needs analysis), Design (design of making Digital Pop-up Book media), Development (media validation and material validation), Implementation (small group and large group trials), Evaluation (revision of the Pop-up book digital media cover). The score of media validation results obtained a percentage of 94.16% with the category "very valid". Material expert validation obtained a percentage of 92.5% in the "very valid" category. The applicability of Pop-up book digital media in small groups has a percentage of 85.76% and the results of large group trials obtained a percentage of 88.8% so as to obtain a "very good" category. Pop-up book digital media proved to be very valid and very good to help stimulate students in the learning process.



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INTRODUCTION

Education is an effort aimed at creating a learning environment that helps students actively develop their potential (Kwon, 2025). Its goal is for students to gain spiritual and religious skills, self-control, intellectual abilities, and a positive moral attitude (Yusron, et al., 2020; Wenas & Verana, 2024). The world's educational system needs to evolve, such as updating increasingly digital learning tools by using technology to facilitate achieving learning goals. In the 21st century, education is shifting from traditional media to digital media and adapting to modern trends (Aisyah & Dahnial, 2024). Consequently, 21st-century learning requires technology as a key tool to enhance learning capabilities (Iroriteraye & Nwabuaku, 2024). Education in the digital age is rapidly advancing with technology, not only used by adults but also implemented for elementary school children, where digital technology serves as a learning aid (Ahmad et al., 2023; Tallat et

al., 2023). Teachers must be capable of mastering various types and features of digital learning media and have the skills to operate technology such as computers (Moto, 2019; Akem, et al., 2025).

The results of pre-observation found that students looked less enthusiastic in learning where learning media were still conventional, such as guidebooks containing pictures of dances, traditional houses, and other historical relics. Teachers have a tendency to use printed guidebooks in presenting material. There is no use of technology in the learning media that is currently used. Innovations in digital learning media are still not optimally utilized. On the other hand, visual limitations and the presentation of the material affect students' understanding of the material studied. Students tend not to be enthusiastic about following the entire learning process and face difficulties in understanding the subject matter, which can be seen from their ability to answer oral questions given by teachers regarding the material just explained. This condition shows the difference between the ability to use digital media and its application in schools, which can affect the success rate of social studies learning. The use of facilities such as LCD projectors, computers, and Wi-Fi has not been used to its fullest. This underlies the need to develop learning media that is able to utilize technology by providing visuals and presenting interesting material using existing facilities in social studies learning.

Learning media is used to accelerate learning and help students understand lessons in the classroom (Indriyani, 2019; Kassa, 2024). A digital Pop-up book is a learning tool that uses digital technology to convert a printed guidebook into a digital version (Hoel & Jernes, 2024). This tool can be used for a variety of subject matter and adapted to the material being taught. This type of digital book has enforceable image visualization, allowing for the creation of many interesting and movable images (Yang et al, 2021). This media displays two- or three-dimensional images that can move when opened and are equipped with sound (Dandung et al., 2023; Maulifia et al., 2024). A complete voice tool can help students listen to the material. The comfort and concentration of students in learning can be influenced by the use of audio on digital Pop-up book media (Jana, 2023; Day et al., 2025). Based on various theories collected, digital Pop-up book media has great potential in supporting learning through the presentation of attractive 2D/3D visuals, interactive movements, and the completeness of audio features that can increase students' attention and understanding. This media serves as a tool that enriches the learning experience and provides an alternative to delivering material that is more immersive than traditional print media.

The use of digital Pop-up book media in elementary education can help the learning process, especially in the field of science, because of its ability to arouse students' imagination and make learning more interesting and meaningful (Darmawan et.al, 2024). Using digital Pop-up books can help teachers in learning science science because 3D features and attractive images make students more interested in paying attention to and understanding the material presented (Teplá et.al, 2022; Zhang, 2025). This digital Pop-up book media is made with the help of *PowerPoint*. *PowerPoint* is one of the *Windows media* that is quite interesting which can be turned into interactive media

that helps the teaching and learning process (Sarwono, 2022; Haramba, et al., 2024). Many of the animation features that this computer program has can help in creating creative learning media (Kleftodimos, 2024; Rashid, 2024). This research highlights the novelty in the development process, namely using PowerPoint as the main tool for making *digital Pop-up books*. PowerPoint has been known as a presentation medium, but this study shows that the program can be maximized into an interactive media with animation features that are economically and technically more accessible to teachers without the need for professional design applications (Osman et.al, 2021). This provides added value because it addresses the limitations of previous practices that tend to use specialized applications or advanced software that are not always available in schools.

Teachers can use *PowerPoint* to deliver learning materials in a more organized and engaging way in addition to being able to effectively grab students' attention (Kohnke & Moorhouse, 2022; Islami, et al., 2024). The purpose of this research is to develop a digital Pop-up book media for "Budaya Daerahku" that meets the level of validity and applicability in social studies subjects. This media is equipped with visuals of Indonesian regional culture with explanations equipped with audio, and quizzes.

METHOD

This study uses *Research and Development* (R&D) as a research method with the ADDIE (*Analyze, Design, Development, Implement and Evaluate*) research model developed by Reiser and Mollenda (Branch, 2009). The data collection technique uses questionnaires. The questionnaire used was in the form of a validation questionnaire and student response. Media expert validation instruments, materials, and student response assessments are presented in the following table.

Table 1. Media Expert Rating Indicators

No.	Indicator
1	Suitability of color composition, images, and writing Suitability of the media color composition with the characteristics of the relevant audience Suitability of media images with relevant audience characteristics Suitability of the composition of media writing with the characteristics of the relevant audience The accuracy of the media it allows mastery of the material Suitability of media plans with the material
2	Color composition attracts students to use media Precision of color use in media Accuracy of the use of background colors in media Accuracy of the color of the writing on the media Color compatibility with the character of the student
3	Illustrations of images on interesting media for students Selection of images that are appropriate and interesting to the material being discussed
4	The media has an interesting flow in terms of media items The media has an interesting material presentation flow The media has quizzes that match the material

No.	Indicator
5	Illustrations of images on interesting media for students Selection of images that are appropriate and interesting to the material being discussed

Table 2. Material Expert Assessment Indicators

No.	Indicator
1	Media compatibility with the theme Suitability of the material with learning outcomes Suitability of the material with the flow of learning objectives Suitability of the material with learning objectives Media compatibility with the material
2	Media suitability with the level of achievement of material understanding Media fit with level of understanding
3	Media compatibility with the theme The depth of the material presented Ease of use of media Continuity of media with material

RESULTS

The product produced is in the form of a digital Pop-up book of *Budaya Daerahku*. This media is in the form of a digital book containing visuals of Indonesia's various cultural and intangible heritage in 3D form, which is equipped with a brief written explanation, detailed audio explanation. This media has been developed using the ADDIE (*Analyze, Design, Development, Implement, and Evaluate*) stages.

1. Analyze

Digital Pop-up book learning media in my regional cultural material class V begins with the stages of analyzing problems and needs in learning activities. The problem lies in the lack of variety of learning media. Providing clear visuals of cultural diversity is limited by the small amount of displayed content and the reliance on lecture methods, which restricts students' understanding of cultural diversity. Students often show less enthusiasm for learning about Indonesian cultural diversity because they lack access to clear visuals and easily understandable materials. Educational media should combine visuals and content using technology as an innovative learning tool. This need has led to the development of printed guidebooks into 3D digital books, called digital Pop-up books, focusing on regional cultural materials.

2. Design

The design includes the planning of the digital Pop-up book "*Budaya Daerahku*" involves a detailed process to develop a good and structured product. This media is created using *PowerPoint*. Every variety of cultural objects and intangibles in the material is equipped with audio. The audio

explains in detail the explanation of the various cultures shown. The Pop-up digital book "*Budaya Daerahku*" contains a cover, identity, instructions for use, materials and quizzes. Figure 1 presents a digital *Pop-up book* cover created in advance using the *Canva app*. The cover design is *exported* to JPG and then *imported* into *PowerPoint*.



Figure 1. Digital *Pop-up book* cover

Figure 2 presents the material in the digital Pop-up book of my regional culture, namely tangible and intangible cultural heritage. Cultural heritage consists of traditional houses, traditional clothing, typical foods, traditional weapons, traditional musical instruments and architecture. Intangible cultural heritage consists of traditional dances, traditional ceremonies, crafts, regional songs, regional languages and arts.



Figure 2. Cultural variety materials

3. Design

The digital Pop-up book has been designed at the design stage followed by media validation. Media validation is carried out by media experts and material experts. Table 4 presents the validation of media experts.

Table 4. Obtaining Media Expert Validation

Indicators	Score	
	Validator 1	Validator 2
Composition of colors, images, and text		
Suitability of the media color composition with the characteristics of the relevant audience	4	5
Suitability of media images with relevant audience characteristics	5	5
Suitability of the composition of media writing with the characteristics of the relevant audience	4	5
Accuracy of media to enable mastery of material	5	5
Appropriateness of media design to content	5	5
The color composition attracts students to use the media		
Accuracy of color usage in media	4	5
Accuracy of the use of background colors in media	5	4
Accuracy of the color of the writing on the media	5	5
Color matching with the student's character	5	5
Illustrations in the media are attractive to students		
Suitability of media images with relevant audience characteristics	4	4
Selecting images that are appropriate and interesting for the material being discussed	4	5
The media has an interesting flow in terms of media items		
The media has an interesting way of presenting material	5	4
The media has quizzes that match the material	4	5
Total Score	55	58
Maximum Total	60	
Average Validator Score	56,5	
Percentage	94,16	

has been carried out by two media experts, digital Pop-up book media in validator I obtained a score of 55, and validator II obtained a score of 55 58. The average score obtained from the two validators was 56.5 so the percentage was 94.16%. Based on a percentage of 94.16%, digital *Pop-up book media* is included in the "very valid" category. The acquisition of material experts is presented in Table 5.

Table 5. Obtaining Material Expert Validation

Indikators	Score
Media suitability for the theme	
Alignment of materials with learning outcomes	5
Alignment of materials with learning objectives	5
Alignment of materials with learning objectives	5

Indikators	Score
Alignment of media with materials	4
Media suitability based on level of material comprehension	5
Media suitability for the theme	5
Depth of material presented	4
Ease of use of media	5
Continuity of media with material	4
Number of Validator Scores	37
Maximum Total Number	40
Percentage	92,5%

Table 5 describes the material validation that has been carried out by material experts, obtaining a score of 37. So it obtained a percentage of 92.5%. Based on a percentage of 92.5%, digital *Pop-up book* media materials are included in the "very valid" category. After the digital *Pop-up book* media has been declared very valid by media experts and material experts, the media is tested to small groups and large groups.

4. Implement

The implementation stage, which includes small group and large group trials is used to obtain the practicality of the media. After the digital *Pop-up book* media has been declared very valid by media experts and material experts, the media is tested to small groups and large groups. The trial was carried out with 10 students became a small group and the VA class with a total of 21 students became a large group. Small group trials were tested first for 2 meetings. The recap of the data of the small group trial is presented in Table 6.

Table 6. Small Group Trial Data Recap

No.	Name	Question Score													Average	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1	AMW	3	3	3	4	4	4	5	5	5	3	3	3	4	4	3,78
2	ASP	5	5	5	2	2	3	4	4	4	5	3	4	3	3	3,71
3	AKW	5	5	5	4	5	5	5	5	5	5	4	5	5	5	4,85
4	AS	4	5	4	4	3	4	4	4	4	4	5	4	5	4	4,14
5	AAZ	5	5	5	5	5	4	5	5	5	5	4	5	5	5	4,85
6	BAA	5	4	4	5	4	5	4	5	4	3	5	4	5	5	4,42
7	KALN	5	4	4	4	4	4	5	2	5	5	4	4	5	4	4,21
8	KMF	4	3	4	4	3	3	4	3	5	4	3	4	4	3	3,64
9	KYP	5	5	5	4	5	4	4	4	5	5	5	5	5	5	4,71
10	LLM	4	5	5	5	4	5	5	5	4	4	5	5	4	4	4,57
														Total Score	42,88	
														Maximum Total	50	
														Presentase	85,76	

Table 6 presents a recap of trial data that has been carried out in small groups, obtaining a score of 42.88. So it obtained a percentage of 85.76%. Based on a percentage of 85.76%, digital *Pop-up book* media is included in the "very good" category. A large group trial can be carried out if the small group trial is categorized as very good. Large group trials were first tested for 2

meetings. The recap of the large group trial data is presented in Table 7.

Table 7. Recap of Large Group Trial Data

No.	Name	Question score													Average	
		1	2	3	4	5	6	7	8	9	10	11	12	13		
1	SMF	5	5	5	5	5	5	4	4	4	4	4	5	5	4	4,57
2	RAGP	4	4	4	4	4	5	4	4	4	4	4	4	4	4	4,07
3	RNP	5	5	5	5	4	4	4	4	4	4	5	5	4	4	4,42
4	MK	5	3	4	4	5	4	4	4	4	4	5	5	5	4	4,28
5	MAP	4	4	5	4	5	5	4	4	5	5	4	4	5	4	4,42
6	SRJ	4	4	5	5	5	4	4	5	5	5	4	5	4	5	4,57
7	SAR	4	4	4	4	4	4	5	5	4	4	4	5	5	5	4,35
8	VEA	4	4	5	4	3	5	4	5	5	4	4	5	5	4	4,35
9	NHA	4	4	4	4	4	4	4	4	4	4	5	4	5	5	4,21
10	ZNAA	5	5	5	5	5	5	5	5	4	4	5	4	5	5	4,78
11	VKJ	5	4	4	5	5	5	5	4	3	4	4	4	5	4	4,48
12	MSM	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5,00
13	MAAN	5	4	5	5	4	5	4	4	5	5	4	5	4	4	4,50
14	MZI	4	4	5	4	3	5	5	5	4	4	4	4	5	4	4,28
15	MFAA	5	4	5	4	4	4	5	5	4	5	5	4	4	5	4,50
16	RNF	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5,00
17	MKR	5	5	5	5	5	5	5	4	5	5	5	5	5	5	4,92
18	SPA	1	2	4	3	2	4	2	3	5	4	1	2	3	1	2,64
19	VHW	4	4	4	4	4	5	4	4	4	4	4	4	4	4	4,07
20	MAI	5	4	5	5	5	5	5	5	5	5	5	5	4	5	4,85
21	NAH	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5,00
Total Score															93,26	
Maximum Total															105	
Presentase															88,8%	

Table 7 presents a recap of trial data that has been carried out in a large group, obtaining a score of 93.26. So it obtained a percentage of 88.8%. Based on a percentage of 88.8%, digital *Pop-up book* media is included in the "very good" category.

DISCUSSION

The development of digital pop up book media began from pre-observation conducted by researchers. The use of printed handbooks, which do not have clear visuals, and the delivery of uninteresting material causes students to not understand what is being conveyed. Some material is too abstract to accept cannot be explained by ordinary explanations alone, without the use of auxiliary media (Alif et al., 2023). Participants tend to be less interested in learning about the diversity of Indonesian culture because of the less appropriate media. No learning models and media are used, so students are not interested in participating in ongoing learning (Diyantari & Wiyasa, 2020). The problems found and the lack of use of technology encourage the need to develop digital media that can convey material with clear and attractive visuals (Godsk & Møller, 2025; Zou et al, 2025). Media that can attract students' enthusiasm for learning will foster motivation to learn (Barton et.al, 2021; Li & Chiang, 2022). This is

corroborated by [Gagne \(1970\)](#), media is a variety of environmental elements that can motivate learning ([Pagarra, et al., 2022](#)).

The guidebook for “*Budaya Daerahku*” materials in printed form was developed into a digital pop up book. This medium offers images with three-dimensional (3D) effects, which help learners understand objects and improve their understanding of the material ([Mansour et.al, 2025](#)). This digital pop up book media of “*Budaya Daerahku*” was made using *PowerPoint* with audio. A digital pop up book is a digitally designed book that has the ability to display images in three dimensions and has audio ([Dandung et al., 2023](#)). *PowerPoint*-assisted digital pop up books are one of the supporting media in teaching and learning activities that contain my regional cultural materials which include regional cultural heritage, regional languages, regional songs, and how to preserve regional culture. The creation of this media pays attention to the visual images of various cultures, along with their size and color combinations. Images obtained from Google, Pinterest, Freepik and Canva that are tailored to my local cultural material. The addition of this image is to support the media and materials taken to make a digital pop up book media. The images that appear in the digital pop up book give a 3D effect when changing the slides, the images move and create a very amazing impression, this digital pop-up book media is made using the *PowerPoint* application and the morph transition effect. In addition to images, the selection of background colors on each different page aims to make it more attractive ([Guo et.al, 2024](#)). The color in the text is also very important in the creation of this media ([Buljat et.al, 2024](#)). This aims to make students more interested in reading and more interested in the media. The selection of colors and font sizes is adjusted to the background so that the text in this medium can be read clearly. Using colored letters can be an alternative way to increase students' sense of courage and cooperation so that it ultimately helps create a more effective learning process ([Azis, 2021; Oliver, et al., 2025](#)). This digital pop up book media uses bright colors as the basic color that is adjusted to the character of the students. Color can affect students' understanding of material and emotions and help improve memory retention ([Na'im & Rofi'ah, 2024](#)).

The use of this media is very practical so that it can be used individually or in groups. The advantages of digital pop up book media can increase students' enthusiasm for learning through bright and attractive color compositions with the addition of audio so that it is easy for students to understand. Each material slide on the digital pop up book media is given a 3D illustration image along with explanatory audio. Audio in the form of voice-over given to each image in the slide can be listened to repeatedly. This aims to provide a new experience that allows all students to participate in learning. This addition makes digital pop up book media into audiovisual media. Students will find it easier to understand the material if it is accompanied by audiovisuals, so that they can see directly during the learning process ([Fridayanti et al., 2022](#)).

The acquisition of the percentage of media experts of 94.16% with a very valid category

shows the aspect of suitability of color composition, images and writing as a whole close to the maximum score. The composition of media colors, media images and media writing compositions is in accordance with the characteristics of class V students. Certain colors can affect how well a person can focus and concentrate, both in a good and bad way (Lourenzo et. al, 2024). Red, pink, yellow, brown, and orange colors are usually preferred by students (Syahbani, 2021). Lighter colors can attract the attention of elementary school students because they usually prefer bright and bright colors, which correspond to their active and cheerful personalities (Herdianti & Oktavia, 2021).

The images presented in the digital pop up book of my regional culture have clear visuals, good coloring and resemble the real object so that students are more interested and happy to learn the material taught by the teacher (Kaminski & Sloutsky, 2020). The use of images is as original as it is to provide a realistic picture of the forms of various cultures. Images must be lively, realistic, with the right coloring, and appropriate for the age of the students (Mirnawati, 2020). Each image is given an effect to create an effect that appears when the book sheet is opened. Enforceable image visualization allows the creation of various beautiful and movable image objects and creates extraordinary impressions, which can be used in various areas of learning and can be adapted to the material being taught (Febriyanti & Sulistyawati, 2024). Not only colors and images, the style of writing in the media also affects the visual appeal of learners (Stokes & Hearst, 2024). Font styles that match the media can also increase visual appeal, good layout such as spacing and clear text layouts so that they can improve students' reading comprehension and comfort (Sutawijaya, 2024). The positive response to the application of the media was shown by the acquisition of the small group test of 85.76% and the large group of 88.8% who received the very good category. Learning media in the form of digital pop up books can be a very interesting solution to be applied to students in the teaching and learning process, especially in dealing with generations of students in the current digital era (Yahzunka & Astuti, 2022). There is a difference between before and after the use of learning media in the form of digital pop up books seen in small group trials and large group trials. Students were less enthusiastic before using digital pop up book media but they looked happy after using digital pop up book learning media.

CONCLUSION

The digital pop-up book learning media was successfully developed using the ADDIE model and demonstrated a high level of feasibility and effectiveness. The media validity reached 94.16%, while the material validity achieved 92.5%, both categorized as *very valid*. Furthermore, the implementation results showed positive responses, with a score of 85.76% in the small group trial and 88.8% in the large group trial, indicating a *very good* category. These findings confirm that the digital pop-up book is highly suitable for use in social studies learning, particularly for regional culture materials in elementary schools. Based on these results, it is recommended that teachers

integrate digital pop-up book media into social studies instruction to enhance student engagement, cultural understanding, and learning motivation. Schools and curriculum developers are also encouraged to adopt and further develop similar interactive digital media aligned with local cultural contexts to support meaningful and contextualized learning experiences. In addition, future research may explore the integration of digital pop-up books with other emerging technologies, such as augmented reality or learning analytics, as well as examine their long-term impact on students' cultural literacy and higher-order thinking skills. In terms of future educational impact, the use of digital pop-up book media has the potential to support digital transformation in elementary education by fostering interactive, student-centered, and culturally responsive learning. This innovation contributes to the preservation and appreciation of local culture while simultaneously strengthening digital literacy skills among students. Therefore, digital pop-up book media can play a strategic role in improving the quality and relevance of social studies education in the digital era.

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