

## DEVELOPMENT OF POP-UP BOOK MEDIA IN SCIENCE LEARNING FOR ELEMENTARY SCHOOL

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Submitted: 04/02/2024

Revised: 16/02/2024

Accepted: 19/01/2025

Published: 24/01/2025

### Abstract

This research aims to develop learning media in the form of Pop-Up Book media during offline learning activities. This research is development research and uses the ADDIE model, namely analysis, design, development, implementation, and evaluation. The data sources used in this research are teachers, students, validators, media experts, material experts and language experts. Data collection was carried out through interviews with class IV teachers at SDN 005 Desa Baru, class IV students and needs analysis. The population in this study included teachers and students of class IV SDN 005 Desa Baru. The researcher's sampling technique used a simple random sampling technique. The sample in this study was one teacher and three class IV students. The qualitative data analysis technique was carried out using the needs analysis method in the form of interviews. Meanwhile, for quantitative data analysis using descriptive statistical methods using validation sheets. Data collection techniques used interviews and validation sheets. Based on the research results of material experts with a total of 83%, media experts with a total of 87.26% and language experts with a total of 93.87% and the overall results obtained were 88.03%. It can be concluded that pop-up book media with various styles of material is very valid to be used as learning media material in elementary schools.

### Keywords

Development, Media, Pop-Up Book.



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## INTRODUCTION

Learning is a procedure for changing behavior due to knowledge (Pane & Darwis Dasopang, 2017). Seeking knowledge is defined as a way of transitioning actions as a result of individual relationships through place (Siti Ma'rifah Setiawati, S.P, 2018). Learning is a transition mechanism for an individual's actions from the thinking process and obtaining conclusions from his thoughts to respond to that thinking (Tute et al., 2020). Learning is a conscious effort carried out by humans to form changes in behavior, knowledge, awareness, and skills, as well as the exchange of other parts as a result of interactions with their environment (Aminoto & Pathoni, 2014). So, it can be concluded that learning will be said to be successful if the implementation of learning takes place well and provides changes during the teaching and learning process in the classroom. The learning process will go well if learning conditions are conducive. Learning is an important process that occurs in the life of educational institutions. A conducive learning process will lead to change, improvement and optimizing learning outcomes.

According to Melmambessy Moses, education is defined as a systematic transfer of knowledge from one person to another that is in line with standards that have been applied by experts (Adi La, 2022). Education is a bond of humanization stemming from the humanistic (Armedyatama, 2021). Education is an investment in the future (Muhlishottin, 2020). Education is not only meant to form people who are capable of thinking and are experts in carrying out instructions given by teachers, although, from the educational environment, students are also expected to become members of society who have morals and thus form people who always think positively and have morals (Febrianti & Dewi, 2021).

Learning media is a message-channeling technology that can be used for learning purposes (Ahmad Zaki, 2020). Learning media is an essential element of learning or physical facilities that contain instructional objects that can encourage students to explore knowledge (Safri et al., 2017). Learning media is interpreted as an object that functions and can be used to explain the message of learning. So, it can be concluded that learning media can be said to be a tool that has the aim of explaining a number of information related to it to make interaction between teachers and students more effective (Astuti et al., 2017). The position of learning media in the field of teaching is one way to consider learning activities. Thus, the essential use of learning media is as an instrument that helps in teaching, namely supporting the use of teaching techniques used by educators.

Learning media is an educational vehicle that can be used to support learning activities and also advance student learning motivation, as well as anything that is used, both objects and the environment scattered around students that students can use during learning activities (Moto, 2019). The most essential purpose of learning media is to solve learning problems or provide a learning process (Swastyastu, 2020). Media can develop students' positive attitudes towards the material and remind students of learning (Firmadani, 2020). So, one of the efforts that can be made by educators to provide learning that should become more useful is by determining learning media in teaching and learning activities because students at the elementary school level are between the ages of seven and twelve years in terms of intellectual progress contained in a concrete operational structure, because their logical thinking is based on physical manipulation of a goal.

Teaching aids or learning media are useful for explaining the material presented by the teacher and what is felt by the students. The diversity of media each has its own uniqueness. Therefore, you need to determine them carefully and precisely so that they can be applied effectively (Abdul, 2018). The application of media means that the material taught can be arranged well in advance. However, the evidence is that when teaching, teachers do not pay attention to learning media when teaching. Learning media is often neglected due to limited time, costs, energy, and so on. Finally, due to the low application of learning media, the learning process becomes monotonous and not conducive. Learning is not conducive because students do not understand the learning material. Therefore, in the 2013 curriculum, the elementary school level has implemented an integrative thematic style where the learning tools used when studying must have visual messages in the form of images/text with attractive coloring. These efforts need to be carried out so that learning runs well and is not boring. The quality of the learning process is closely driven by the learning media used.

Based on interviews conducted by researchers with class IV homeroom teachers at State Elementary Schools 005 Desa Baru, where the use of learning media is still less realized. Theoretically, elementary school students think concretely, but teachers often teach lessons using abstract thinking using words that make it difficult for students to understand things directed by the teacher. One of the materials that were considered difficult for fourth-grade students to understand at SDN 005 Desa Baru was in theme 7, subtheme 1, in study 1, which contained Indonesian language subjects as well as science, containing material from various styles that were considered quite difficult in science subjects. Through test 3.3, find out the types of force: muscle

force, electricity, magnetism, gravity, and friction, and basic test 4.3 explains their use in everyday life by exemplifying these forces. This is shown by the overall score of 31% of the teaching impact of class IV students at SDN 005 Desa Baru, where the KKM, which has been determined by educators, is still not achieved, namely 60. Of the 32 students in class IV, only 22 students (69%) had achieved the KKM score, while 10 students (31%) did not reach the KKM. This is due to the fact that, when learning material in various styles, the teacher only focuses on the learning process activities in the teacher's books and student books that have been provided without developing learning media that can support the implementation of the learning process. Because educators do not use attractive learning media when implementing learning, the learning process in class feels stiff, and students are not enthusiastic when learning.

A pop-up book is a change in the structure of a book that can present the capacity and content/meaning of the book through a 3D design displayed through combinations, folds, scrolls, or sections (Umam et al., 2019). Pop-up book media is a tool that is 3D and interactive (Barsihanor et al., 2020). This media has advantages, including it has dimensions, so the image appears to appear, then it can be moved and shifted so that it gives a clear indication of the content provided (Sinta, 2021). In its use, there are advantages, namely that during teaching, you can get participation in the use of this media so that when it is implemented, it can add insight into students' (Cahyani & Sari, 2020). The advantage of pop-up media itself is that it is simple to apply and attractive because it is presented in full three-dimensional images, but the weakness of pop-up media itself is that the production time tends to be quite long because it requires extra precision (Atikasari & Dessty, 2022). One of the media that can be used in the process of learning about various styles is this media. This media is a type of learning that places sides that can move and contains 3D elements. The pop-up book structure presents various kinds of sketches and varied writing so that it makes it easier for children to learn because it is tangible. That is, it can be touched and seen from various sides, attracting students' interest and arousing enthusiasm for learning. Different from most ordinary books, pop-up books have their own uniqueness, namely providing explanations along with sketches, schemes, and attractive effects such as the use of interesting and varied colors. Apart from being attractive, pop-up books have unique characteristics that make it possible to obtain information more easily.

Force is defined as a push and pull that is sent to an object in which the object experiences a change in position or position (moves) and also changes (Hardiansyah, 2021). A force is a push or pull on an object that is obtained from the interaction between the object and other objects (Zulham & Sulisworo, 2017). Force is defined as a pull or push that has a direction, a force that is capable of producing change, and a force that can be measured and has a direction (Malifut, 2021). Based on the explanation above, it can be concluded that force is a push or pull given to an object that is capable of causing the object to experience changes in position, motion, or shape. There are divisions such as friction, muscle, electricity, magnetism, and gravity.

Previous research related to the use of this media for students during teaching. In Elisa, the research results show that this media has succeeded in raising the level of science teaching for class III A students at Mutiara Singaraja Elementary School (Masturah et al., 2018). In line with Malfia, the research results stated that the implementation of teaching using this media was successful in achieving the provisions made. Data analysis shows that student study from an average of 68.3 in cycle I experienced an increase of 86.1 in cycle II. The increase applies to the level of student completion, where in cycle I, it was 50% to 88.9% in cycle II. This condition indicates a good response from students regarding the pop-up book media application (Arip & Aswat, 2021). Rafika's research results show that media validation results achieved 87%, which displays a very valid level, and material validation results achieved results of 86.6%, which displays a very valid level. Furthermore, the results of the questionnaire submitted to educators achieved a score of 96.6%, and students received a result of 90.8%, which shows a very practical level (Firman & Julianto, 2021). In line with Ovi's research, the results of the research show that the validation obtained by expert validators and media, as well as interviews with educators regarding science media in explaining animal life cycles, is classified as "good" and suitable for use (Nur & Sujarwo, 2022). So, the development of this media for teaching science in fourth-grade elementary schools can be used by teachers, educators, and students. In Nourma, the results of the research show that the number of appropriate media qualities is 87%, which is classified as valid and can be used, and the percentage of product-appropriate quality by media experts is 83.07%, which is already a valid level but there are things that need to be developed. The application of the media to small community testing showed a total score of 98.3%, the usage test questionnaire showed an average of 95.02, and the learning observation questionnaire had a score of 86.6% (Oktaviarini, 2018). Based on several previous studies, there are several differences, such as the material covered, data collection techniques, percentage level of

media validity, class level, and subjects taken in research.

The aim of this research is to develop pop-up book media in order to understand the development of appropriate/valid learning media that can be used in the teaching and learning process of teaching and learning with various types at SDN 005 Desa Baru. It is hoped that the application of this media will increase students' interest and enthusiasm when receiving material information provided by educators. Using attractive learning media will certainly increase the efficiency of the learning process itself.

## METHOD

In this study, RND was used with the ADDIE model. This method has a number of stages that match its name, namely: 1) analysis, 2) design, 3) development, 4) implementation, and 5) evaluation (Tri et al., 2018). The RnD method is a research method used to obtain the desired media and test its effectiveness.

In developing this product, structured and orderly procedures are needed which are expected to be carried out correctly. Adopting steps from the ADDIE model. Of the five stages in the ADDIE model, researchers only carry out product development up to the third stage, namely the development stage (*development*). Before carrying out product development, researchers conducted a principal analysis of learning for fourth-grade elementary school students. Developing learning media requires design, such as determining material that is in accordance with KI, KD, and learning objectives and then determining each part that will be used in developing this learning media. After the design phase, the next phase is the development phase, using steps such as determining the materials to be used; the pop-up book takes the form of 3 dimensions. Once the product is ready, a validation test will be carried out on the product which will be carried out by experts. This is intended to assess the suitability of the product being developed and whether it is suitable or not when used during learning.

The location during which the research was carried out was the State Elementary School 005 Desa Baru, which is located in Baru village, Siak Hulu District, Kampar Regency. The data in this research is formed from 2 types of data, namely primary and secondary data. Primary data was carried out by direct interviews with class IV teachers at State Elementary School 005 Desa Baru. Meanwhile, secondary data is obtained from library materials, for example, books, theses, and journals.

The data collection technique used in this research used interviews conducted with class IV teachers and three class IV students where interviews were carried out in order to obtain an analysis of the needs required by educators and class IV students. The population in this study included teachers and fourth-grade students. Meanwhile, the researcher's sampling technique used a simple random sampling technique. The sample in this study included one teacher and three class IV students.

The source of research data is the results of interviews with class IV teachers at State Elementary School 005 Desa Baru. Researchers tested the feasibility of the product using validation from material experts, media experts, and language experts. After obtaining the research data, the researcher then carried out an analysis of the data obtained. Data analysis was carried out qualitatively and quantitatively. Qualitative data was obtained from comments and directions from validators, material experts, media experts, and language experts. Furthermore, quantitative data is seen from the score results in the validation sheet, which are assessed by material expert validators, media experts, and language experts. Media validity analysis using a formula:

$$Va1 = \frac{TSe}{TSh} \times 100\%$$

$$Va2 = \frac{TSe}{TSh} \times 100\%$$

$$Va3 = \frac{TSe}{TSh} \times 100\%$$

Based on the calculation results above, the researcher then carried out the combined validity of the analysis results using the following formula (Akbar, 2013):

$$V = \frac{Va1+Va2+Va3}{3}$$

Information :

V : Validation ( combined )

Va1 : First Expert Validation

Va2 : Second Expert Validation

Va3 : Third Expert Validation

TSh : The maximum desired total score

TSe : Total empirical score (validation results from validators)

In order to determine whether a learning media is appropriate or not, you can use validity standards such as the following :

**Table 1.** Product Validity Criteria

No	Validation Criteria	Level of Validity
1.	85,01% - 100,00%	Very valid.
2.	70,01% - 85,00%	Quite valid.
3.	50,01% - 70,00%	Less valid.
4.	01,00% - 50,00%	Invalid.

Source: (Akbar, 2013)

## FINDINGS AND DISCUSSION

### Findings

Research and development (RnD) produced a product in the form of pop-up book media intended for fourth-grade elementary school students. This product was created with the intention that it could be used as a learning tool for teachers in various styles of material. The presentation of results and developments carried out follow the stages contained in the ADDIE model. In this research, researchers determined product development to the level of development.

The analysis stage involves identifying the needs of teachers and students and the learning process. In identifying teacher needs, researchers conducted interviews with teachers so that they found that when the use of learning media had not been carried out optimally, especially in materials of various styles. Then, identifying student needs, researchers conducted interviews with students who found that students found it difficult to use various styles of material where there was a lack of interesting learning media, while students wanted to get an alternative to books, namely learning media that was interesting, unique and not just text. Based on these conditions, researchers want to develop a product, namely learning media, that is interesting, simple, and not only focused on reading texts but can be an educational media for students.

Design stage, in this step, design and create pop-up book media with various styles of material. The steps for making it are (1) making a sketch which aims to make it easier to make and design the images contained in each page of the pop-up book; (2) placement of image and text objects according to previously designed sketches, such as strategic image positions on pop-up book pages; (3) providing text and supporting material information, making the text colors varied and attractive; (4) provision of supporting accessories.



Figure 1. Muscle Force

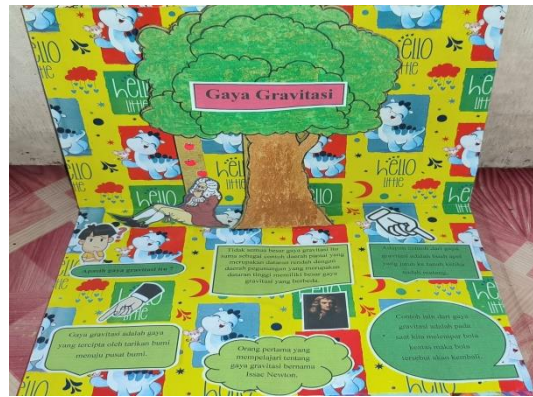


Figure 2. Gravitational Force



Figure 3. Magnetic Force



Figure 4. Friction Force

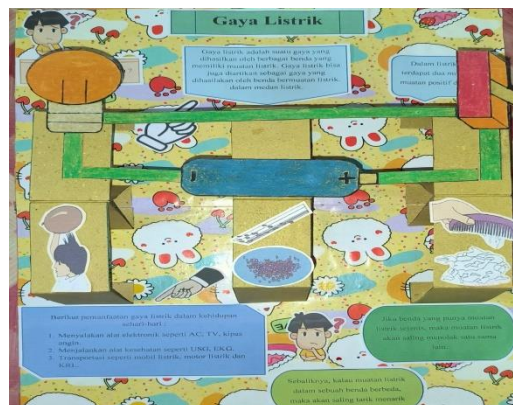


Figure 5. Electric force

The development stage begins with validation from experts. The researcher carried out media validation with two validators, namely Mr. Benni Handayani, M.I.Kom (lecturer at Fikom UIR Pekanbaru) and Mr. Muhammad Ridho, S.Pd., M.Pd (teacher at State Elementary School 005 Desa Baru), media experts who gave an assessment of the pop-up book media. The results of the media expert validator assessment can be seen in the following table:

**Table 2.** Media Validation Results

Validator	Percentage	Category
Benni Handayani, M.I.Kom	81,81%	Valid
Muhammad Ridho, S.Pd., M.Pd	92,72%	Valid
Amount	87,26%	Valid

Source: Results by Researchers

In Table 2, the results of the media expert validation assessment are displayed with a result of 87.26%, which is classified as "feasible" on November 11, 2022. The researcher conducted a product assessment on the expert Mr. Benni Handayani, M.I.Kom, who received the category "worthy of being tested along with revisions according to suggestions." Where to get directions and comments? Even though this is still a sample/prototype, you must still use quality and sturdy materials. On November 3, 2022, researchers conducted a product assessment with expert Mr. Muhammad Ridho, S.Pd., M.Pd, in the category "valid for testing non-revision."

The researcher validated the material with two expert validators, namely Mr. Eddy Noviana, S.Pd., M.Pd (lecturer at FKIP UNRI Pekanbaru) and Mrs. Elza Yunita, S.Pd (teacher at State Elementary School 005 Desa Baru) the material validator provided an assessment to the media pop up book. The results obtained by media expert validators can be seen in the table below:

**Table 3.** Material Validation Results

Validator	Percentage	Category
Eddy Noviana, S.Pd., M.Pd	72%	Valid
Elza Yunita, S.Pd	94%	Valid
Amount	83%	Valid

Source: Results by researchers

Table 3 shows the results of the material expert validation assessment with results worth 83%, which are included in the "feasible" category. On November 9, 2022, the researcher conducted a media assessment on expert Mr. Eddy Noviana, S.Pd., M.Pd, who received the category "worthy of being tried out together with revise according to suggestions," which gets direction and input on where the media can be used in trials. On November 3, 2022, researchers conducted a product assessment with expert Mrs. Elza Yunita, S.Pd, receiving the category "fit for non-revision testing."

The researcher carried out language validation with two validators, namely Mr. Latif, S.Pd., M.Pd (lecturer at UIR Pekanbaru FKIP) and Mrs. S.Pd (Teacher at State Elementary School 112 Pekanbaru), the language validator provided an assessment on the pop-up book media. Regarding the results of the media expert validator assessment, you can see the table below:

**Table 4.** Language Validation Results

Validator	Percentage	Category
Latif, S.Pd., M.Pd	93,84%	Valid
Marrita, S.Pd	93,84%	Valid
Amount	93,84%	Valid

Source: Results by researchers

Table 4 displays the results of the language validator validation assessment with a result of 93.84%, which is included in the "feasible" level. On November 14, 2022, the researcher conducted a media assessment on expert Mr. Latif, S.Pd., M.Pd, obtaining the category "worthy of being tested." without revision." On November 2, 2022, researchers conducted a media assessment on expert Mrs. Marrita, S.Pd, obtaining the category "fit for non-revision testing."

After explaining the validity test from the six validators, the results obtained by the researcher can be seen in Table 5 below:

**Table 5.** Final Validity Test Results

Assessment Aspects	Validity Percentage
Media format	87,26%
Material format	83%
Language format	93,84%
Amount	88,03%

Source: Results by researchers

Table 5 is the final result consisting of six validators, namely two media experts, two material experts and two language experts. It can be seen that the percentage score results in the media assessment were 87.26%, the material assessment was 83%, and the language assessment was 93.84%, so the final result was 88.03% so that the validated media was very valid and could be tried out during the learning process.

## Discussion

This research is classified as development-type research. Research and development methods are research methods used to develop certain products and test their usefulness (Purnama, 2016). In this research, the media developed was pop-up book media with material in various styles. The type of research used by researchers is development research based on the ADDIE model. Where one of the advantages at this stage is working systematically (Adesfiana et al., 2022). (Aini et al., 2023) The ADDIE model is defined as a learning model that provides facilities for students where, during learning activities, it is focused on students using five structured steps.

In the analysis step, the researcher carried out an analysis with the aim of finding out the needs of teachers and students and becoming a reference when developing pop-up book media for various styles of material. Analysis was also carried out to understand the aspects that need to be developed when providing media that is comparable to the needs of students and teachers so that interactions are not rigid. The fake relationship between teachers and students results in students being less motivated to learn (Oktiani, 2017).

Design stage: this stage plans and creates pop-up book media with materials in various styles. Previously, at the analysis stage, a number of data had been obtained where the product design was based on the needs of teachers and students for learning media which could support learning efforts in various styles of material. There are stages which include 1) making sketches. In this stage a sketch is designed, which aims to create and design images on each page in the pop-up book; 2) object placement, objects here include images and text contained on each page of the pop-up book where the location of each object is positioned strategically and as well as possible; 3) providing supporting text and information, in terms of support such as inventors and examples of styles in everyday life; 4) supporting accessories, providing supporting accessories is intended to make the contents of the pop-up book more interesting.

Products in the form of pop-up book media with various styles of material have been developed and validated. With validation activities, researchers can assess whether there were any errors or deficiencies during the media development stage as well as directions for improvement from the validator, which can be used to create better learning media. Media is used as a learning forum (Anshori, 2018). A pop-up book is defined as a book that contains 3-dimensional components and can move when the page is opened (Rahmawati, 2014). Pop-up books have an entertainment component plus illustration images that can be shaped, moved, and display a pop-up effect on the book page when opened (Alviolita & Huda, 2019). Apart from the advantages of pop-up media, it has disadvantages: 1. The manufacturing time tends to be longer because it requires higher precision so that mechanics can operate smoothly for a long time; 2) This book is more expensive due to the use of higher quality materials when making it (Hasanudin, Cahyo, Novi Mayasari, Kundharu Saddhono, 2021). The validity of the pop-up book media developed is based on the scale results submitted by validators, media experts, material experts, and language experts.

According (Meidyanti et al., 2018), it requires validation from a number of experts in order to obtain assessments, criticism, and direction on the media being developed, namely in terms of content/material, media, and language. Based on the research above, the researcher created a validation instrument in the form of a learning media validation sheet, which contains the three things above. Each assessment point is matched to the researcher's needs. Next, validation will be carried out with six validators, namely Benni Handayani, M.I.Kom (Validator 1 media expert), Muhammad Ridho, S.Pd., M.Pd (Validator 2 media experts), Eddy Noviana, S.Pd., M.Pd (Validator 1 material expert), Elza Yunita, S.Pd (Validator 2 material experts), Latif, S.Pd., M.Pd (Validator 1 linguist), Marrita, S.Pd (Validator 2 linguist) then obtained the average results from the experts, namely 1) Media expert, pop-up book media design, material in various styles, achieved an overall score of 87.26 % with eligible category. 2) Material expert, the contents of the pop-up book media material, material in various styles, received an overall score of 83% in the decent category. 3) Linguist, linguistic aspects of pop-up book media, material in various styles, received an overall average score of 93.84%. After accumulating the overall results of the pop-up book media, various styles of material obtained an overall score for the six expert validators of 88.03% in the very valid category. The validation results for all sections obtained from all validators are shown in Table 6 below:

**Table 6.** All Aspects of Media, Material, and Language

Assessment Aspects	Percentage	Category
Media	87,26%	Very Valid
Material	83%	Quite Valid
Language	93,84%	Very Valid
Results	88,03%	Very valid

Source: Results by researchers

In accordance with the explanation above, it can be concluded that the product developed by the researcher is pop-up book media with material in various styles. The average validity value obtained was 88.03%. So, the pop-up book media with material on various styles that have been developed is in a very valid category and can be used as one of the interesting learning media during the learning process, namely in science lessons material on various styles. This is in line with research (Setiyanigrum, 2020). Pop-up book media is a book that has a 3D aspect when the page is opened; the inner segment can display movement and also displays increasingly interesting visualizations to increase student's awareness of the material. In line with the research conducted by Erika, she concluded that the quality of the media developed was in the appropriate category or

could be used by fourth-grade elementary school students (Sinta, 2021). In Syalsyabila, the research results show that pop-up book learning media in animal growth material is categorized as very valid, very practical, and very effective (Dukungan et al., 2022). In the research carried out by Elva, based on the assessment of the score regarding the suitability of this media, it has been validated by experts with a score of 92%, material experts 85%, and the response from educators was 78% so that the development of this observation media is included in the type of metamorphosis developed by this researcher, it is included in the appropriateness level. Becomes a teaching medium given to fourth-grade elementary school students (Barus, 2022). This research develops and produces learning products in the form of pop-up book media with various styles of material in class IV State Elementary School 005 Desa Baru to overcome problems experienced by students and teachers. At the beginning of the research, the researcher conducted interviews with teachers and class IV students In order to find out the anxiety experienced by teachers and students during learning activities where it is found that one of the materials is considered difficult, namely material of various styles, for this reason, the researcher then wants to develop learning media which aims to help educators and students during material learning activities. Various styles can work with good quality. Learning activities are considered meaningful if, during these learning activities, students are able to achieve the desired learning objectives (Afrianti & Musril, 2021). By applying the ADDIE model, this RnD research begins with the step of analyzing existing problems, then designing a product in such a way as to become a learning medium, and then developing media according to the planned design, namely in the form of pop-up book media with various styles of material. After passing validation tests with two material experts, two language experts, and two media experts, the results were obtained which showed that the product developed by the researcher received a final score of 88.03%, the criterion level was feasible and very valid when applied to learning by following directions and input, presented by each expert.

The implication of this research is the development of teaching media with various types in theme 7, subthemes 1 for learning media to make it easier for teachers and students during the learning process. The limitations of this research itself include the development step to test the validity of the media developed through assessment/evaluation by experts. It is hoped that future researchers can present more teaching media in the form of complex pop-up books on material in various styles in elementary schools.

## CONCLUSION

Pop-up book media with various styles of material received very good ratings based on expert assessments. It can be concluded that this media has a variety of styles that have been developed that are suitable for use when processing teaching. Pop-up book media with various styles of material can make it easier for educators to provide information to students and can make students enthusiastic during the learning process. Not only that, pop-up book media with various styles of material can also foster students' positive attitudes towards learning media.

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