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DEVELOPMENT OF POP-UP BOOK MEDIA BASED ON CONTEXTUAL CONTENT OF SCIENCE LEARNING MATERIAL ON ANIMAL LIFE CYCLE IN ELEMENTARY SCHOOL

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ABSTRACT

This study focuses on the development and feasibility testing of contextual-based visual pop-up book media for teaching science, specifically the animal life cycle material, in grade IV at SDN Dukuh 08 Pagi. The pop-up book media is designed to address the lack of student understanding of the material delivered through conventional teaching methods. The research method used is Research and Development (RnD) with the 4D development model (Define, Design, Develop, Disseminate). Validation results from media experts show a feasibility percentage of 99%, and validation from subject matter experts shows a percentage of 98%. The implementation of this media in both small and large groups indicates that the pop-up book is highly suitable for use in teaching, with positive responses from students. This media is expected to enhance student creativity and motivation, as well as contribute to the development of more engaging and effective learning media.

KEYWORDS *Media, Pop-Up Book, Science, Research and Development (RnD), 4D Model.*

INTRODUCTION

Education plays a fundamental role in measuring the progress of a nation because it is the initial foundation for students to advance to the next level Salsabila & Ninawati, 2022. According to (Ramadhani & Ninawati, 2022), the role of education through the teaching and learning process aims to create and enhance the potential within individuals with the hope of producing creative and innovative human resources. In preparing students to adapt to an increasingly advanced era, education equips them with knowledge related to creativity, intelligence, and morality. Educators are capable of delivering lesson materials so that students can understand the content, creating a conducive, enjoyable learning atmosphere that aligns with

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desired outcomes (Ramadhina & Pranata, 2022). Therefore, a teacher is required to create a good, enjoyable, and engaging learning environment. The quality of students is influenced by the quality of teachers in imparting knowledge that makes students active in learning (Herawati, 2022). Learning is a conscious activity conducted by teachers and students in a learning environment (Fadillah & Ninawati, 2020).

The teaching and learning process is a mechanism carried out by schools in carrying out the function of educational facilities Mutanaffisah et al., (2021). In developing the teaching and learning process, teachers are required to be able to develop their skills in making or using media Rohani et al., (2020). So students do not only learn by listening to the teacher lecturing, but students can see directly the objects or objects they are studying, thus making students more active in the learning process. Then reinforcement from (Humaira & Ninawati, 2023), in using this media not only tools and materials are needed, but can be directly demonstrated directly or can be in the form of experiences that students experience directly.

The ability of students to understand a concept is greatly influenced by the teacher's ability, including in preparing various learning media (Kustandi et al., 2021). Learning media according to (Pranata & Yulianti, 2021) is a means for teachers to facilitate the delivery and distribution of messages from sources in a structured and planned manner, so as to create a conducive learning environment, and message recipients can experience an effective and efficient learning process. The functions of learning media include creating learning that is initially abstract to concrete, arousing learning motivation and focusing attention, providing clarity of a concept or material, and providing learning stimulation McKown in Miftah (2013).

According to Trianto (in Nawawi et al., 2022) Natural Science (IPA) as a systematic collection of theories, its application is limited to natural symptoms, and develops through scientific methods such as observation and experimentation, in studying science there are events that exist in nature, including biotic and abiotic material. Meanwhile, according to Lestari (in Panggabean et al., 2021) science subjects equip students with knowledge, ideas, and concepts about the natural environment, which are obtained from experience through a series of scientific processes, including investigation, preparation and ideation. According to Winingsih Tri, (2022), one of the important science materials at the elementary school level is the life cycle of animals (metamorphosis), which includes an understanding of the process of perfect and imperfect metamorphosis. By learning this material, students can understand the process of metamorphosis and increase direct experience so that students understand the surrounding natural environment (Jannah Nur, 2019).

Contextual-based media is a solution as a support in the learning process in elementary schools, with contextual media or real media students can directly connect the learning process with everyday life that students often see in the surrounding environment (Herowati & Azizah, 2022)..

Based on the problems at SDN Dukuh 08 Pagi, several problems were found such as learning activities that too often use textbooks and learning videos, lack of availability of learning media, and learning activities that are only teacher-centered. This results in students' lack of understanding of the material provided and the difficulty of students expressing their creativity. This problem occurs in animal life

cycle material in science lessons in grade IV elementary school. This research develops learning media in the form of Pop-Up Book for animal life cycle material. According to Rahayu (2020), this media can be an alternative learning media development in creating an innovative learning atmosphere. Pop-Up Book according to Dzuanda (in Nengsi, 2019), is a book with parts that can move or have 3-dimensional elements that provide a more interesting visualization of the story. Meanwhile, according to (Setiyanigrum, 2020), pop-up book is a type of media in three-dimensional form that can provide an interesting effect, because each page opened will give the impression that the material contained in the media is adjusted to the material to be taught. Based on the various descriptions above, the researcher concludes that pop-up book media is a practical, easy-to-carry, two- and three-dimensional display that can increase students' enthusiasm for learning.

Some previous studies that have examined the development of pop-up book media such as: (1) Jannah Nur, (2019) namely the development of pop-up book media in science subjects on animal life cycle material to increase the understanding of grade IV students of MI Wahid Hasyim III Dau Malang which is categorized as effective and valid for students. (2) Catur Prasetiyo et al., (2021), namely the development of pop-up book science learning media on animal life cycle material for grade V MI / SD, with feasible criteria and can be used as one of the science learning media at school. (3) Melindra (2023), namely the development of pop-up book media in learning Indonesian language for grade II students of SDN 01 Sukamelang Indramayu with very valid criteria.

The novelty of this research is different from previous research, namely developing pop-up book media, a contextual media that uses 260 Gr art carton base material which has a thick enough diameter to provide more durability, the adhesive used is an-imal glue to be one of the strong adhesives, as well as the addition of thick hard cov-er binding to increase durability so that it is not easily damaged. In addition, the illustrations in this pop-up book media are made more colorful to give the impression of attracting students' attention. Then this pop-up book media of animal life cycle is opened vertically or upwards, creating a more realistic visual experience. Pop-Up Book media is used in science subjects mate-ri life cycle of animals in class IV elementary school.

Based on the background of the problems that have been described, the researchers are interested in conducting research on “Development of Pop-Up Book Media Based on Contextual Content of Science Learning Material on Animal Life Cycle In Elementary School”. This research focuses on the development and feasibility test of contextual-based pop-up book visual media for science learning content on animal life cycle materials in elementary schools, as well as assessing student responses to the use of these media. The problems formulated include how the development, feasibility, and student response to this pop-up book media.

RESEARCH METHOD

This study was conducted at SDN Dukuh 08 Pagi, East Jakarta in May 2024. It involved 32 fourth-grade students from SDN Dukuh 08 Pagi as the sample. This research applied the Research and Development (RnD) method to develop this media. In this study, the researcher chose to use the 4D model, which includes the

stages of defining, designing, developing, and disseminating. The defining stage involves needs analysis, student analysis, concept analysis, and task analysis. The designing stage includes test standardization, media selection, format selection, and initial design. The development stage includes expert assessment and development testing. The dissemination stage aims to promote the product for acceptance by users.

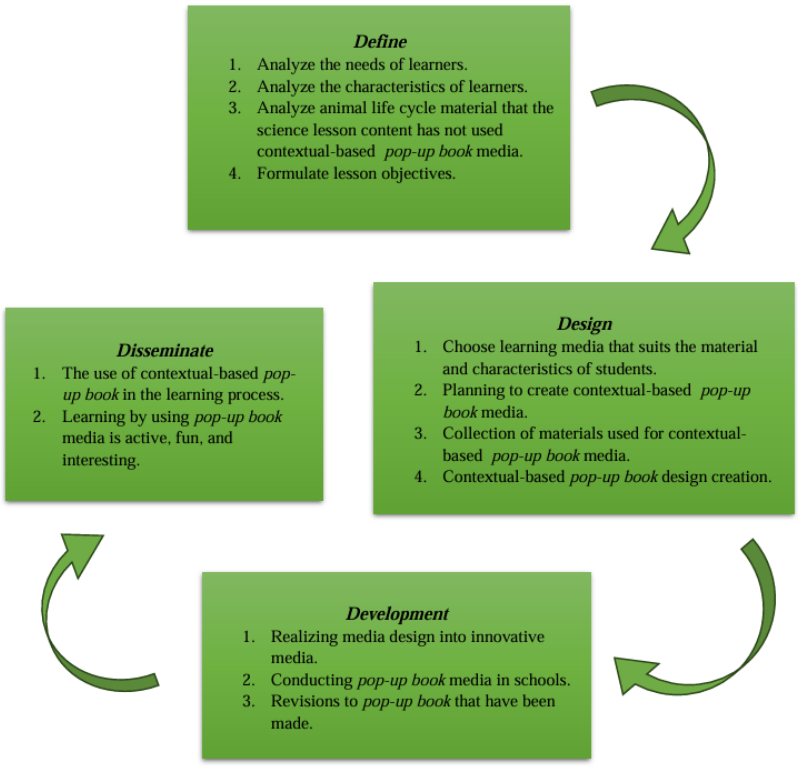

Figure 1. 4D Model Design

In this study, validation was conducted by media experts and subject matter experts, followed by revisions based on their feedback. The implementation of the pop-up book media will be tested on fourth-grade students at SDN Dukuh 08 Pagi. The instruments used include questionnaires for media experts, subject matter experts, and students. Media experts in this study are media expert lecturers. Subject matter experts are the homeroom teachers of SDN Dukuh 08 Pagi. The sample in this study consisted of 32 fourth-grade students from SDN Dukuh 08 Pagi. This research was conducted in large and small groups. The large group consisted of 32 students, while the small group consisted of 7 students.

In assessing this questionnaire, the Likert Scale was used. The data collection process used descriptive data from questionnaires. Descriptive data were obtained from responses and suggestions from the experts and fourth-grade student respondents.

After the media assessment process by subject matter experts, media experts, and respondents, an analysis was conducted to measure media validation using the descriptive percentage technique with the formula:

$$P = \frac{f}{n} x\ 100\ \%$$

Information :

f = Frequency that is being searched percentage
n = Number of students
P = Percentage figure

The data obtained from the validation results are calculated using the Likert Scale, the following score assessment is used:

Table 1. Percentage Range and Media Eligibility Criteria

Percentage Range	Criteria
76% - 100%	Very Feasible
51% - 75%	Feasible
26% - 50%	Less Feasible
0% - 25%	Not Feasible

Table 1 describes the media eligibility criteria from the percentage of results obtained from the data analysis process.

Table 2. Questionnaire Assessment Criteria

Criteria	Score
Strongly Agree	5
Agree	4
Adequate	3
Disagree	2
Strongly Disagree	1

Table 2 explains the assessment criteria for each presented question.

RESULT AND DISCUSSION

The results of the research and development of a contextual visual pop-up book for the science lesson on the life cycle of animals for fourth-grade students align with the Four D model (Define, Design, Development, Disseminate). Research and Development (R&D) is a method used to validate and develop products. Define, the initial stage, involves analyzing why the development of a pop-up book on the animal life cycle is needed at SDN Dukuh 08 Pagi. The analysis identified a need for more concrete learning activities due to students' overreliance on video lessons, leading to a sense of familiarity and boredom.

Design, the second stage, involves planning after analyzing the issues in the fourth grade at SDN Dukuh 08 Pagi. In this study, the researcher searched for appropriate learning media and found that a pop-up book with creative design would capture students' attention. Development, the third stage, involves the development of the results. The images below depict the developed pop-up book on the animal life cycle:

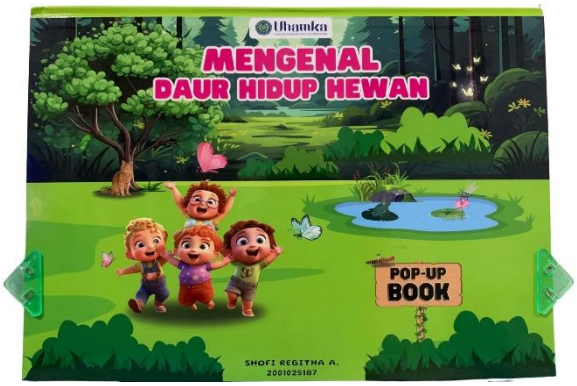

Figure 1. Cover *Pop-Up Book*

Figure 2. Without Metamorphosis

Figure 3. Complete Metamorphosis

Figure 4. Complete Metamorphosis

Figure 5. Incomplete Metamorphosis

The next stage is dissemination or implementation, which involves implementing the product for the research subjects to assess its feasibility. Product validation is conducted by media experts, subject matter experts, and research conducted with a small group of 7 students and a large group of fourth-grade students from SDN Dukuh 08 Pagi.

Table 3. Media Expert

Assessment Aspect	Percentage		Category
	Media Expert 1	Media Expert 2	
Physical Appearance	97%	97%	Very Feasible
Use of Text	100%	100%	Very Feasible
Use of Colour	100%	100%	Very Feasible
Average	**99%**		**Very Feasible**

Based on the table above, the average validation results obtained from media experts for the aspects of Physical Appearance, Use of Text, and Use of Color received a percentage of 99%, leading to the conclusion that the validation by media experts falls under the category of "very feasible.".

Table 3. Material Expert

Assessment Aspect	Percentage Per Aspect	Category
Media Content Suitability	96%	Very Feasible
Language and Writing	100%	Very Feasible

Based on the table above, the validation results from subject matter experts cover two aspects: Media Content Suitability with a percentage of 96% and Language and Writing with a percentage of 100%. Thus, the validation results for the pop-up book on the animal life cycle by subject matter experts fall under the "very feasible" category. Combining the validation results from both media and subject matter experts, it can be concluded that the pop-up book on the animal life cycle is "very feasible" for use in the learning process.

Research was conducted with both small and large groups at SDN Dukuh 08 Pagi. The small group consisted of 7 student respondents, while the large group

consisted of 32 student respondents. The purpose of this research was to determine the feasibility of the developed media in the form of a pop-up book on the animal life cycle. The instrument used included 10 questionnaires covering media usage and student responses to the media.

Table 4. Small Groups

Assessment Aspect	Percentage Per Aspect	Category
Media Usage	98%	Very Feasible
Student Response	97%	Very Feasible

The table above is the result of responses from a small group of 7 students with results of 98% for aspects of media use, and for aspects of student responses get results of 97%.

Table 5. Large Groups

Assessment Aspect	Percentage Per Aspect	Category
Media Usage	98%	Very Feasible
Student Response	98%	Very Feasible

While in the table above is the result of the response of a large group of students totaling 32 students, for aspects of media use get a percentage of 98%. And for the aspect of student response to the media got a percentage of 98%.

Based on the overall results of student responses from small groups and large groups, it can be concluded that the *pop-up book* media of animal life cycles can be categorized as "very feasible" to be used for the continuity of the learning process, because this media is real that provides experience to students directly by seeing.

CONCLUSION

Based on the results of the research that has been described, the development of contextual-based pop-up book media for science learning content on animal life cycle material in elementary schools produces a final product in the form of learning media consisting of sheets of paper that are arranged, making students curious. This research has been carried out in small groups with 7 students and large groups with 32 students in class IV SDN Dukuh 08 Pagi and has been validated by media experts and material experts. The final result of this research is that the pop-up book media is declared very feasible to use in the learning process. The results of media expert validation get a percentage of 99% with a very valid category, then there is validation by material experts who get a percentage of 98% with a very valid category. Furthermore, the results of responses through student questionnaires in small groups with 7 student respondents get a percentage of 98% with a very feasible category. Furthermore, research to large groups with 32 respondents in class IV SDN Dukuh 08 Pagi got a percentage of 98% with a very feasible category. Based on the results of validation by media experts and material experts as well as research conducted in small and large groups, it can be concluded that this pop-up

book media is very feasible to use as a learning medium for animal life cycle material in science lessons in grade IV SD.

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