

# Development of Pop-Up Flashcard Media by Strengthening the Curious Character of Class IV Elementary School Students

Putri Assyaffa Nabila, Candra Utama\*, Esti Untari

State University of Malang, Jl. Semarang No. 5 Malang, East Java, Indonesia

\*Author of correspondence, Email: candra.utama.pasca@um.ac.id

## Abstract

This research was conducted because there is a need for learning media to support students memory on the material of flower body parts and their functions. Based on this needs analysis, researchers developed science and technology learning media in elementary schools. The aim of this development research is to create pop-up flashcard media in science subjects that is valid according to validators, practical according to teachers and students, and effectively applied in learning, as well as influencing the curious character of students. Research and Development (R&D) and ADDIE are the types and models of research used. The subjects of this research were 9 class IV students at SDN Polehan 05 and 18 class IVA students at SDN Madyopuro 04 Malang. Based on research results, the pop-up flashcard media was declared valid, practical, effective, and had an effect on students curiosity.

**Keywords:** learning media; pop-up flashcard; curiosity characters

## 1. Introduction

Natural and Social Sciences or IPAS is a science that studies inanimate objects, living creatures, and their relationship with the universe, as well as human interactions with their environment both as individuals and social creatures. In this lesson, quite a few students experienced misconceptions about the material being taught, especially natural knowledge material. Several causes result in misconceptions among students, including the abilities of students, teachers, teaching materials, and many other things (Utama & Kusumaningtyas, 2023). Apart from misconceptions, quite a few students think that natural knowledge material is boring, because there is a lot of material that needs to be memorized (Untari & Sukamti, 2018). These things can be minimized by utilizing media in learning.

Media is a tool that can support teachers in presenting material so that students pay attention to the material presented (Wulandari et al., 2023). Curiosity will grow if students are interested in the material presented, so that students become enthusiastic when teaching and learning activities take place. The learning media referred to in the previous explanation are learning media that are practical, interesting and varied. For example, visual media is developed in such a way, not just images displayed on PowerPoint.

Interviews conducted with fourth grade teachers at SDN Polehan 05 and Madyopuro 04 Malang showed that the media applied in natural and social science subjects, especially in discussions about flowers, often only used student books, PowerPoint and flowers, while students needed something different. more practical, interesting and varied to cultivate their curiosity character. This opinion is supported by Mashfufah, et al. (2024) statements, Teachers must continue to innovate to produce teaching materials and media that are tailored to the needs of their students. Apart from that, the teachers also stated that students prefer when

learning activities are carried out using visual media, because it can make it easier for students to remember the information in the pictures. Levie and Lentz in Kustandi (2020) also stated that visual-based media has a cognitive function, namely images in the media can facilitate students memory and understanding of the information contained in the media.

Through interviews with class IV teachers at SDN Polehan 05 and Madyopuro 04 Malang, it was found that students had a little difficulty in remembering the science subjects in chapter I of plants that are the source of life on earth, especially on the topic of discussing perfect and imperfect flowers. Where in this discussion topic, the material that students often don't remember is the body parts of flowers and their functions, so they have difficulty in the next discussion topic, namely perfect and imperfect flowers. Thus, visual-based learning media is needed to convey learning about flower body parts and their functions. Based on the results of the needs analysis explained in the previous sentence, of the 26 students who filled out the questionnaire, 18 or around 70% of the students agreed that the material on flower body parts and their functions was taught using visual-based learning media which was more practical and interesting, and varied. for students.

The use of visual media can also influence students curious character. This character is an important aspect in learning, because if students do not have this character, then students will become passive and bored with the ongoing learning. This statement is in line with Hidayah, et al. (2019) opinion, that if students have a high curiosity, then teaching and learning activities will be more productive, then with students who often ask questions, learning becomes active and students can also find out things they don't know.

One example of visual-based media is flashcards. Flashcards are categorized as visual media, because they contain pictures and short sentences as explanations. This media has been widely used by teachers, because this flashcard media is easy to make, carry, use and store. Apart from that, by using flashcard media, learning is more fun and can make students remember the material being studied better. The advantages of this media were also mentioned in research by Ika, et al. (2018) said that the advantages of flashcard media are that they are practical, easy to remember and carry, and fun. However, this media also has shortcomings, namely that the media only contains semi-concrete images, is less effective when applied in large groups, and is also less effective for showing complex images.

Flashcard media will be more interesting and innovative if it is developed into pop-up flashcards. The use of pop-ups in this media can add a more real impression, so that students can remember the material longer. This statement is in line with the opinion of Safriani, et al. (2019), who said that learning activities that utilize pop-up media will make the material more memorable and learning will be more meaningful, because the pop-up form gives a real impression, so that students can be actively involved during learning.

Based on the preliminary description regarding the analysis of needs in schools, the researchers developed visual pop-up flashcard based media. The innovation of pop-up flashcard media is that it has a unique appearance, is easy to create, store and use, making it easier for users to utilize this media. Pop-up flashcards can support students to remember material and support teachers in presenting material to students in science learning. Thus, this R&D research has the aim of developing visual media, namely pop-up flashcards which are applied to science subjects regarding flower body parts and their functions. Apart from that, this R&D research also aims to see the validation results, practicality and effectiveness of pop-

up flashcards, as well as their impact on class IV students curiosity about the body parts of flowers and their functions.

## **2. Method**

### **2.1. Type of research**

R&D (Research and Development) or research and development is a type of applied research. The aim of this development research is to create a product based on the results of the field analysis were then revised and carried out trials (Rayanto & Sugianti, 2020). The media produced in this development research are flashcards which are modified into pop-up flashcards. The R&D model used is the ADDIE model. There are five stages in the ADDIE model (Cahyadi, 2019).

1. Analyze: In the analyze stage, analysis is carried out to determine the needs for the learning to be implemented. The analysis was carried out after carrying out school observations, teacher interviews, and distributing questionnaires to students.
2. Design: At this stage, planning is carried out for the learning that will be implemented. The planning carried out is making storyboards, product design, preparing teaching modules and assessment instruments.
3. Development: In the development stage, the product that has been designed or designed and validated by material and media experts is realized.
4. Implementation: At this stage, the product is realized, tested or implemented with students.
5. Evaluate: The final stage, an evaluation is carried out to determine the validation, practicality and effectiveness of the product, as well as its effect on the curious character of students.

### **2.2. Time and place of research**

The experiment was carried out on March 18<sup>th</sup> and 19<sup>th</sup> 2024 in SDN Polehan 05 and Madyopuro 04 Malang.

### 2.3. Subject

The subjects of this development research were class IV students at SD Negeri Polehan 05 and Madyopuro 04 Malang. The trial was carried out twice, namely an experiment with 9 students in class IV of SD Negeri Polehan 05 and testing with 18 students in class IVA of SD Negeri Madyopuro 04 with low, medium and high abilities.

### 2.4. Data collection techniques

Data collection techniques in this development research were carried out using interviews, observation, questionnaires, documentation and tests. Observations were carried out to obtain learning media in the classroom. Interviews with class teachers and distribution of needs questionnaires were carried out to analyze student needs. The questionnaire was completed to assess the validation and practicality of the media, the influence of the media on the character of curiosity. Tests are used to assess students pre-test and post-test to assess media effectiveness. Documentation is carried out to collect documents, such as photos, videos, and others

### 2.5. Data analysis techniques

Data analysis of this development research data uses quantitative and qualitative analysis. The results of the quantitative analysis are in the form of validation data questionnaire analysis, practicality, effectiveness, and curiosity character. Media validation is assessed by material and media experts. The practicality of the media is assessed by students and teachers. Media effectiveness is obtained from students pre-test and post-test scores. The character of curiosity is assessed through a self-assessment and observation questionnaire. The results of the qualitative analysis are in the form of criticism and suggestions from validators, teachers and students.

## 3. Results and Discussion

### 3.1 Result

The pop up flashcard learning media product on the body parts of flowers and their functions was validated by four PGSD lecturers at the State University of Malang. data from media validation results are presented in the table 1 below.

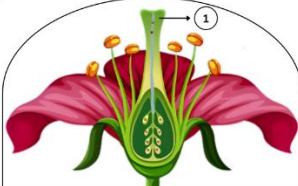
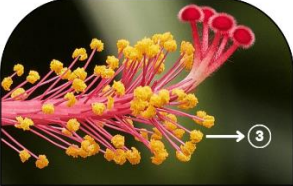






**Table 1. Validity Test Results**

No.	Validators	Results	Test Decision
1.	Media Expert	95,83%	Very valid, so it can be used without revision
2.	Material Expert		
	- Material	87,5%	Very valid, so it can be used without revision
	Validation		
	- Test Validation	90%	Very valid, so it can be used without revision

Based on table 1, for media validation an average value of 95.83% was obtained. The average value is in the range of 85.01-100.00%, so the media is declared very valid, so it can be used without revision. However, there is one aspect that received a score of 87.5%, namely the

media design aspect. Indicators in this aspect are innovative design, proportional image size, easy to use media, varied and practical media. Based on the validation results from material and media experts, several revisions were made, which are explained in table 2.

**Table 2. Product Revisions**

Before Revision	Suggestion	After Revision						
	<p>In the media content, it is better to use real flower images and make the flower images larger and clearer.</p>							
	<p>Guidebooks for teachers and students are separated.</p>							
	<p>The place to store the media is better to make yourself.</p>							
	<p>The front cover of the media is reversed, to make it easier for students when opening the media.</p>							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 2px;">Mengidentifikasi bunga yang termasuk bunga sempurna dan tidak sempurna</td> <td style="width: 40%; padding: 2px;">1. Bunga yang memiliki putik dan benang sari dalam satu tubuh adalah... (Pilihan Ganda Kompleks) (pretest) a. Bunga sepatu b. Bunga melinjo c. Bunga pepaya d. Bunga anggrek</td> <td style="width: 30%; padding: 2px; text-align: center;">C3</td> </tr> </table>	Mengidentifikasi bunga yang termasuk bunga sempurna dan tidak sempurna	1. Bunga yang memiliki putik dan benang sari dalam satu tubuh adalah... (Pilihan Ganda Kompleks) (pretest) a. Bunga sepatu b. Bunga melinjo c. Bunga pepaya d. Bunga anggrek	C3	<p><i>Pre-test</i> and <i>post-test</i> questions are still not in accordance with the KKTP and domain.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 2px;">Menganalisis</td> <td style="width: 40%; padding: 2px;">1. Perhatikan dua pernyataan di bawah ini! Pernyataan I, bunga ini memiliki putik dan benang sari dalam satu tubuh. Pernyataan II, bunga ini hanya memiliki putik atau benang sari dalam satu tubuh. Berdasarkan pernyataan di atas, manakah yang merupakan ciri-ciri dari bunga sepatu... I</td> <td style="width: 30%; padding: 2px; text-align: center;">C4</td> </tr> </table>	Menganalisis	1. Perhatikan dua pernyataan di bawah ini! Pernyataan I, bunga ini memiliki putik dan benang sari dalam satu tubuh. Pernyataan II, bunga ini hanya memiliki putik atau benang sari dalam satu tubuh. Berdasarkan pernyataan di atas, manakah yang merupakan ciri-ciri dari bunga sepatu... I	C4
Mengidentifikasi bunga yang termasuk bunga sempurna dan tidak sempurna	1. Bunga yang memiliki putik dan benang sari dalam satu tubuh adalah... (Pilihan Ganda Kompleks) (pretest) a. Bunga sepatu b. Bunga melinjo c. Bunga pepaya d. Bunga anggrek	C3						
Menganalisis	1. Perhatikan dua pernyataan di bawah ini! Pernyataan I, bunga ini memiliki putik dan benang sari dalam satu tubuh. Pernyataan II, bunga ini hanya memiliki putik atau benang sari dalam satu tubuh. Berdasarkan pernyataan di atas, manakah yang merupakan ciri-ciri dari bunga sepatu... I	C4						

It can be seen that there are several revisions from the media validation results, among which images of the body parts of flowers are recommended to use images of real flowers. It is better to separate media use guidebooks for students and teachers. The media storage area must be homemade, the cover or front cover of the media is reversed, to make it easier for students. Lastly, the pre-test and post-test questions are not in accordance with the domain and KKTP.

Next is the trial stage. At this stage, the pop-up flashcard product was tested on students four times, namely two experiment stages and two testing stages. The experimental phase was carried out in class IV of SDN Polehan 05 Malang. This experimental activity involved 9

students who had low, medium and high abilities. According to Arikunto, 4 to 14 people can be used as sources for experimental subjects (Syafriati & Nelmira, 2023). In the experiment, a practicality test was carried out to identify initial problems when pop-up flashcards were used in class. Practicality test assessments are obtained through class teachers and students. Data on practical test results by students and class teachers can be seen in table 3.

**Table 3. Practicality Test Results**

No.	User	Results	Test Decision
1.	Teacher	97.22%	Very practical, so it can be used without revision
2.	Learners	100%	Very practical, so it can be used without revision

Based on table 3, the results of the practicality questionnaire calculations filled out by class IV teachers at SDN Polehan 05 Malang obtained an average of 97.22%. The average is in the range of 85.01-100%, so the media can be said to be very practical, so it can be used without revision

The testing phase was carried out in class IVA at SDN Madyopuro 04 Malang with 18 students. Effectiveness testing is carried out at the testing stage to obtain improved effectiveness in the trial evaluation. The effectiveness test assessment is obtained through students pre-test and post-test scores.

Next, the pre-test and post-test results are calculated using the JASP Paired Sample T Test statistical application. Before testing the Paired Sample T Test, normality was first tested using Shapiro Wilk. The results of the large-scale effectiveness test are presented in table 4.

**Table 4. Normality Test**

<i>Measure 1</i>	<i>Measure 2</i>	W	P
<i>Pre-test</i>	<i>Post-test</i>	0.904	0.068

Information:

*Measure 1* : Measurement 1

*Measure 2* : Measurement 2

W : W value

p : p/Sig value.

Based on the normality test using Shapiro-Wilk, the result is  $p = 0.068$ , so the pre-test and post-test data are normally distributed, because  $p > 0.05$  or  $p$  is greater than 0.05.

**Table 5. Paired Sample T Test**

<i>Measure 1</i>	<i>Measure 2</i>	t	df	p
<i>Pre-test</i>	<i>Post-test</i>	-7.197	17	< .001

Information:

*Measure 1* : Measurement 1

*Measure 2* : Measurement 2

t : Value of t

df : Degrees of Freedom

p : p/Sig value.

After ensuring that the data is normally distributed, the next step is to look at the p value in the Paired Sample T Test table. Based on table 5, the p value is <.001 or <0.05, the p value states that H0 is rejected and H1 is accepted. This means that the effectiveness test of the testing phase illustrates that there is a difference between the pre-test and post-test before and after the implementation of the pop-up flashcard.

**Table 6. Description**

<i>Measure</i>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>SE</b>	<b>Coefficient of variation</b>
<b>1</b>					
<i>Pre-test</i>	18	54.444	19.089	4.499	0.351
<i>Post-test</i>	18	80.556	9.685	2.283	0.120

Information:

- Measure* : Measurement
- N : Number
- Mean : Average
- SD : *Standard deviation*
- SE : *Standard Error*
- Coefficient of variation: Coefficient of Variation

Based on table 6, the mean of the pre-test and post-test testing phase is 54.444 and 80.556. The mean value describes an increase in value after the implementation of pop-up flashcard media. After the Paired Sample T Test has been carried out, the next step is to look for the N Gain value to determine whether the media is effectively used in learning for class IVA students at SDN Madyopuro 04 regarding the body parts of flowers and their functions. The result of the N Gain calculation for the testing stage was 57.17.

Next is the assessment of the character of curiosity is carried out at two stages and in two ways, namely self-assessment and observation. The results of the curiosity character assessment are presented in the table 7 below.

**Table 7. Self-Assessment of Curiosity Character**

<b>No.</b>	<b>Stage</b>	<b>Results</b>	<b>Test Decision</b>
1.	Test	93.73%	The media has an effect on students curiosity
2.	Testing	87.5%	The media has an effect on students curiosity

Based on table 7, the results of calculating the self-assessment questionnaire for students in the trial and testing stages obtained an average of 91.67% and 88.89%. The average is in the range of 85.01-100%, so that the media can be said to have an influence on the character of students curiosity.

**Table 8. Character Observations Curiosity**

<b>No.</b>	<b>Stage</b>	<b>Results</b>	<b>Test Decision</b>
1.	Test	93,73%	The media has an effect on students curiosity
2.	Testing	87,5%	The media has an effect on students curiosity

Table 8 is the result of the calculation of the observation questionnaire on the character of curiosity of students in the experimental and testing stages which was filled in by observers with an average of 93.73% and 87.5%. The average is in the range of 85.01-100%, so that the media can be said to have an influence on students curious character.

### **3.2 Discussion**

The product realized from this R&D research is pop-up flashcard media by strengthening the curiosity of fourth grade elementary school students. This research went through five stages, namely the analysis, design, development, implementation and evaluation stages. Below are presented the results of the research through 5 stages, namely as follows.

#### **Analysis Stage**

In the first stage, interviews with class teachers and students were carried out, class observations, and students filling out needs questionnaires to find material that was difficult according to the students, the curriculum and the media used, as well as an analysis of the needs of students in the class in science subjects.

The curriculum used in both schools in class IV is the independent curriculum. Based on the results of observations, the learning media commonly used are limited to PowerPoint, student books and flowers. Then from the results of the interview, the class teacher stated that students had difficulty with perfect and imperfect flower material. The results of the needs questionnaire analysis showed that students found it difficult to remember the body parts of flowers and their functions, which had an impact on the next material, namely perfect and imperfect flowers. Apart from that, from short interviews with students, they stated that they liked learning that used visual media that could be used directly.

#### **Design Stage**

This second stage includes selecting and designing media, preparing teaching modules, and assessment instruments. The results of the analysis at the previous stage found a fact, namely that students found it difficult to remember the body parts of flowers and their functions. Apart from that, students prefer learning using visual media that they can use directly. Thus, pop-up flashcard media is a media that is created to meet the needs of students and is applied to the material of flower body parts and their functions.

After analyzing the curriculum and materials, at this stage the teaching modules are prepared. The teaching module will include identity, learning outcomes, KKTP, learning objectives, methods, models, steps and other learning components. The preparation of the assessment instrument includes testing the validity, practicality and effectiveness of pop-up flashcard media, as well as the influence of pop-up flashcards on students curious character.

Then, before the pop-up flashcard is applied to students, validation is carried out by material and media experts. Validation was obtained through 4 PGSD lecturers at the State University of Malang with a division of 2 lecturers as material experts and 2 lecturers as media experts. Media validation is carried out to determine whether the pop-up flashcard created is valid to be applied to students.

Based on table 1, media expert validators provide suggestions and criticism on the second aspect, namely to create more complex pop-up forms in the future, because in pop-up flashcard media the pop-up form is still relatively simple and less varied. This can affect learning, because with more varied forms, students will be more interested in the media. This opinion is supported by Widiasih, et al. (2018) statements, which states that the use of varied media can refer to students enthusiasm.

Then, the value from material expert validation obtained an average value of 87.5%. The average value is in the range of 85.01-100.00%, so the material in the media is categorized as very valid, so it can be used without revision. The calculation result of the validation test after revision is 90%. The average value is in the range of 85.01-100.00%, so the test is categorized as very valid, so it can be used without revision.

In the first aspect of material validation, namely the content of the material received an assessment of 75%, so it was categorized as quite valid and required slight revision. This is because there is material in the pre-test and post-test questions that is not in accordance with the KKTP, so minor revisions are needed. Based on general guidelines for writing questions, one of the correct ways to write questions is that the question items must be in accordance with the indicators or KKTP (Kadir, 2015).

Apart from that, the second aspect of material validation, namely the accuracy of the material, received a score of 87.5%. This is because the images of flower body parts on the media are still in animated form, so they must be changed to real flower images, so that students can get the experience of seeing images of flower body parts clearly. This statement is related to students daily experiences, namely that students can see the body parts of flowers through pop-up flashcards without needing to look for real flowers. This opinion is supported by Sarumaha, et al. (2022) statement, If students have a lot of learning experience, the more they will know.

### **Implementation Stage**

At this stage, products that have been validated and revised according to the suggestions and input of the validators can be applied to students. In addition, at this stage the practicality test, effectiveness test, and curiosity character test are carried out. The test at the implementation stage is presented through the explanation below.

#### **1. Practically test**

Based on table 3, the media can be said to be very practical and it can be used without revision. However, on the indicator of suitability of the media to the characteristics of students, the class teacher gave a score of 3, which means that the pop-up flashcards are quite appropriate to the characteristics of class IV students. This is due to the characteristics of class IV students who tend to focus on media that involves real objects, such as real flowers. However, not all students can find the flowers requested by the teacher, so the use of flower media in this material is considered less effective. Therefore, researchers overcome this by using pop-up flashcard media. This opinion is in line with the Trianingsih (2016) statement, that students at the concrete operational stage (7-11 Years) use real objects to form concepts and solve problems on something that involves real objects.

Then, the results of the practicality questionnaire calculations filled out by 9 class IV students at SDN Polehan 05 Malang got an average of 100%. The average is in the range of 85.01-100%, categorized as very practical, so it can be used without revision. Obtaining 100% results in this practicality test was because 9 experimental students stated that the pop-up flashcards were practical and attractive in terms of use, images, colors and writing. This statement is supported by Johar, et al. (2014) opinion, that the attractiveness of learning media means that the media must be able to attract the attention of students, in terms of appearance, color and content.

Pop-up flashcard media has a practical function, because pop-up flashcards can help students see pictures of the body parts of flowers clearly without having to look for the actual flower. This is because one of the benefits of the practical function of media in learning is that it can minimize limitations (Wulandari et al., 2023). The following is documentation of the implementation of the experiment.



Figure 1. Documentation of the Experimental Phase

## 2. Effectiveness Test

The results of the effectiveness test were obtained through pre-test and post-test scores, the questions used were in the cognitive domains C3 and C4. As is known, the cognitive domain has 6 levels according to Bloom's taxonomy (Utama et al., 2020).

Based on the results of N Gain, which are in the range of 56-75, the interpretation is that the application of media is quite effective in learning for class IVA Madyopuro 04 students regarding the body parts of flowers and their functions. The image below is the percentage of correct numbers on pre-test and post-test questions from 18 students.

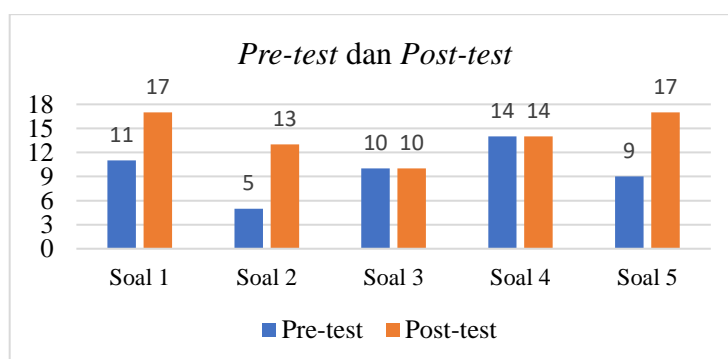


Figure 2 Histogram of Pre-test and Post-test Questions

Based on Figure 2, there was an increase in the number of correct items on the pre-test and post-test questions from 18 students in the testing phase after implementing the pop-up flashcard media. In number 1 it increases to 6 students. Number 2 increases by 8 students. Numbers 3 and 4 do not add up. Number 5 increases by 8 students.

In the pre-test questions, it was found that several students got quite high scores, the researchers concluded that these students had above average abilities. This is also supported by the fact that the researchers took research subjects from students with low, medium and high abilities. Utama, et al. (2014) also believes that students who complete one of the learning objectives in the pre-test questions could be because these students have higher abilities than other students.

In questions number 1, 2, and 5, the number of students who filled in correctly increased significantly, so that pop-up flashcards were effectively applied to the material on flower body parts and their functions, this is proven by the pre-test and post-test scores in Figure 2. Thus, pop up flashcards are effective in the learning process. Media effectiveness is an important aspect of learning, because effective use of media will increase the effectiveness of learning in the classroom. This opinion is in line with the statement of the Ministry of Education and Culture in Magdalena, et al. (2021), that interest and motivation to learn can grow by utilizing media in teaching and learning activities. Apart from interest and motivation, it can foster values and understanding in students.



**Figure 3. Documentation of Testing Phase**

### **3. Curiosity Character Test**

Based on table 7 and 8, in the aspect of self-assessment and observing the character of curiosity, there are aspects that are categorized as quite influential, namely the aspect of conducting exploration with indicators of providing other examples and studying more deeply. This is because students are confused about mentioning other examples, because the teacher has mentioned many examples. Apart from that, students feel that they have had enough of studying at school with teachers and friends, so they don't feel the need to study anymore at home. Because, the general problem when students study at home is that they have difficulty concentrating (Maemunah, 2021).

The learning theory that underlies this research and development is cognitivism learning theory. Cognitivism is a learning theory that prioritizes the process rather than the results of learning. In this learning process, the pop-up flashcards that researchers have developed can support the smooth learning process of students. This opinion is supported by the effectiveness results which show differences in pre-test and post-test scores after the pop-up flashcard was implemented. Apart from learning media, teachers must also prepare good

methods and strategies, in order to facilitate the learning process of students in applying cognitivist learning theory (Hascan & Suyadi, 2021).

### **Evaluation Stage**

Evaluation at the analysis stage is carried out during data collection activities. Data at this stage was obtained through interviews, observations and student needs analysis questionnaires. Based on the results of the analysis, researchers found the need for visual-based media that is more varied and in physical form that can be stored in the classroom and viewed at any time by students.

Evaluation at the design stage was carried out according to criticism and suggestions from supervisors I and II, namely that the campus logo, name of the developer, name of the supervisor should be added, and the product cutting should be tidied up again. Evaluation at the development stage was carried out according to suggestions and criticism from two media and material experts.

Evaluation at the implementation stage is carried out according to criticism and suggestions from the class teacher, as well as impressions and messages from students after carrying out the trial and testing stages. This evaluation aims to find out and improve the quality of pop-up flashcard learning media products.

The following is an explanation of the advantages and disadvantages of pop-up flashcard media. The advantages of pop-up flashcards are:

1. The pop-up form in the media can add a more real impression, so that students can remember the material longer. This advantage is in line with Safriani, et al. (2019) opinion, that learning using pop-ups will make the material more memorable and learning activities become meaningful because pop-up media gives a real impression and students are involved in being active during learning activities.
2. Each student holds one pop-up flashcard and takes turns looking at the other cards, so it will leave a special impression on students and the material will be easy to remember. This advantage is in line with Safri, et al. (2017) opinion, that is, students get their own experience, because students participate in opening, folding, or sliding the pop-up part.
3. On each card in the pop-up flashcard media there is a picture of a flower, the name of the part of the flower, and its function, making it easier for students to study the material..
4. On the back cover of the media, there is a picture of a flower which can be used as a quiz or practice by the teacher, so the teacher does not need to look for other questions.
5. The colors used in media and flower images are varied and not flashy, so they do not interfere with students views. This opinion is in line with Susilana and Cepi's statement, namely that the use of various colors is able to focus students attention for deep learning Sayuti, et al. (2022).
6. The materials and tools used to make pop-up flashcards are easy to obtain, the materials used are photo paper and BC. Both papers are quite thick paper, so the media does not tear or bend easily.

This pop-up flashcard media also has disadvantages, including:

1. There are only semi-concrete images, so they are less effective for showing more complex images.
2. It is quite expensive to make it, if you want to use thick material.
3. It takes quite a long time to prepare the media if used in large groups.

#### 4. Conclusion

Based on the results and discussion in the previous chapter, it can be concluded that,

1. The media and material validation results are categorized as very valid, so they can be used without revision.
2. The results of the practicality test at the experimental stage by the class teacher and class IV students at SDN Polehan 05 Malang were categorized as very practical, so they could be used without revision.
3. The results of the effectiveness test in a large-scale experiment through the pre-test and post-test scores of IVA SDN Madyopuro 04 students categorized the media as quite effective for use in learning.
4. The results of self-assessment and observation of the character of curiosity by observers and students from two schools indicate that the media has an influence on the character of students curiosity.

#### References

- Cahyadi, R. A. H. (2019). Pengembangan Bahan Ajar Berbasis Addie Model. *Halaqa: Islamic Education Journal*, 3(1), 35–42.
- Hascan, M. A., & Suyadi. (2021). Penerapan Teori Belajar Kognitif Pada Mata Pelajaran PAI Tingkat SMP di SIT Bina Insan Batang Kuis. *Edumaspul - Jurnal Pendidikan*, 5(2), 138–146.
- Hidayah, C., Ningrum, C., Fajriyah, K., & Budiman, M. A. (2019). Pembentukan Karakter Rasa Ingin Tahu Melalui Kegiatan Literasi. *Indonesian Values and Character Education Journal*, 2(2), 69–78.
- Ika, R., Maryanto, P., Adhitya, I., & Chrismastianto, W. (2018). Penggunaan Media Flashcard Untuk Meningkatkan Pengenalan Bentuk Huruf Siswa Kelas I pada Mata Pelajaran Bahasa Indonesia di Sekolah Abc Manado. *Jurnal Ilmu Pendidikan*, 16(3), 305–313.
- Johar, A., Risdianto, E., Asriyani, D., & Indriyati, F. (2014). Perancangan dan Implementasi Media Pembelajaran Berbasis Web Pada Bidang Studi Bahasa Inggris di Kelas VII SMP Negeri 1 Kota Bengkulu Dengan Menggunakan PHP dan MYSQL. *Jurnal Rekursif*, 2(1).
- Kadir, A. (2015). Menyusun dan Menganalisis Tes Hasil Belajar. *Jurnal Al-Ta'dib*, 8(2), 70–81.
- Kustandi, Cecep, & Darmawan, Daddy. (2020). *Pengembangan Media Pembelajaran: Konsep & Aplikasi Pengembangan Media Pembelajaran Bagi Pendidik di Sekolah Dan Masyarakat*. Jakarta: Kencana.
- Maemunah, S. E. (2021). Problematika Orang Tua Dalam Mendampingi Anak Belajar Di Rumah Pada Masa Pandemi Covid-19 (Penelitian Studi Kasus Di Desa Tambakbaya, Kecamatan Cibadak, Kabupaten Lebak. *Jurnal Aksioma Al-Asas : Jurnal Pendidikan Islam Anak Usia Dini*, 2(1), 29–40.
- Magdalena, I., Fatakhatu Shodikoh, A., Pebrianti, A. R., Jannah, A. W., & Susilawati, I. (2021). Pentingnya Media Pembelajaran Untuk Meningkatkan Minat Belajar Siswa SDN Meruya Selatan 06 Pagi. *Jurnal Edukasi dan Sains* (Vol. 3, Issue 2).
- Mashfufah, A., Dasna, I. W., & Utama, C. (2024). Community-Based Project Learning: Empowering Students' Self-Regulated Learning and Creativity. *European Journal of Educational Research*, 13(2), 445–456.
- Rayanto, Y. H., & Sugianti. (2020). *Penelitian Pengembangan Model ADDIE Dan R2D2: Teori Dan Praktek*. Pasuruan: Lembaga Academic & Reasearch Institute.

- Safri, M., Sari, A., & Marlina. (2017). Pengembangan Media Belajar Pop-Up Book pada Materi Minyak Bumi. *Jurnal Pendidikan Sains Indonesia*, 05(01), 107–113.
- Safriani, W., Duskri, M., & Maulidi, I. (2019). Analysis of Students' Errors on the Fraction Calculation Operations Problem. *Jurnal Pendidikan Matematika*, 10(2), 307–318.
- Sarumaha, M., Harefa, D., Ziralu, Y. P. B., Fau, A., Venty Fau, Y. T., Bago, A. S., Telambanua, T., Hulu, F., Telaumbanua, K., Lase, I. P. S., Laia, B., Ndraha, L. D. M., & Novialdi, A. (2022). Penggunaan Model Pembelajaran Artikulasi Terhadap Hasil Belajar Siswa Pada Mata Pelajaran IPA Terpadu. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, 8(3), 2045.
- Sayuti, S., Panjaitan, R. G. P., & Wahyuni, E. S. (2022). Buku saku submateri kelainan pada sistem ekskresi kelas XI SMA. *Jurnal Pendidikan Informatika Dan Sains*, 11(2), 113–118.
- Syafriati, & Nelmira, W. (2023). Pengembangan Media Video Pembuatan Belahan Mata Pelajaran Teknologi Menjahit. *Jurnal Pendidikan Tambusai*, 7(1), 335–342.
- Trianingih, R. (2016). Pengantar Praktik Mendidik Anak Usia Sekolah Dasar. *Al Ibtida*, 3(2), 197–211.
- Untari, E., & Sukamti. (2018). Science Learning in Elementary School with Project Based Learning Model. *1st International Conference on Early Childhood and Primary Education*, 244, 42–46.
- Utama, C., Kentjaningsih, S., & Rahayu, Y. S. (2014). Penerapan Media Pembelajaran Biologi SMA dengan Menggunakan Model Direct Instruction Untuk Meningkatkan Hasil Belajar Siswa. *Jurnal Pena Sains*, 1(1), 29–40.
- Utama, C., & Kusumaningtyas, A. W. (2023). Portraits of Science Misconceptions in Plant Adaptation and Breeding Materials in Elementary Schools. *Jurnal Ilmiah Sekolah Dasar*, 7(2), 336–345.
- Utama, C., Sajidan, Nurkamto, J., & Wiranto. (2020). The Instrument Development To Measure Higher-Order Thinking Skills For Pre-Service Biology Teacher. *International Journal of Instruction*, 13(4), 833–848.
- Widiasih, R., Widodo, J., & Kartini, T. (2018). Pengaruh Penggunaan Media Bervariasi dan Motivasi Belajar Terhadap Hasil Belajar Mata Pelajaran Ekonomi Siswa Kelas XI IPS SMA Negeri 2 Jember Tahun Pelajaran 2016/2017. *Jurnal Pendidikan Ekonomi: Jurnal Ilmiah Ilmu Pendidikan, Ilmu Ekonomi Dan Ilmu Sosial*, 11(2), 103.
- Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya Media Pembelajaran dalam Proses Belajar Mengajar. *Journal on Education*, 5(2), 3928–3936.