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The Effectiveness of Development Digital Picture Story Books to Improve Science Learning Outcomes on 5th Grade Elementary School Students

Riski Nurseptyani[1,2], Sigit Saptono[2], Budiyono[2]

[1]SD Negeri 3 Kracak, Banyumas City, Indonesia
[2]Master Program, of Primary Education Universitas Negeri Semarang, Semarang City, Indonesia

Corresponding Author: Riski Nurseptyani

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ABSTRACT

Elementary school students need direct experience and learning objects that can drive the pace of their cognitive development. This study aimed to determine the effectiveness of the development of digital picture storybooks integrated with videos and worksheets on the learning outcomes of elementary school students. The development model used in this research is ADDIE (Analyze, Design, Development, Implementation, and Evaluate). This study involved fifth-grade students at SDN 3 Krack as research subjects. Based on the results of the material valiator and media validation test, scores of 84.44% and 80% were obtained in the appropriate category. The product was tested on a small scale and obtained an average pre-test science learning result of 50.66 and a post-test of 72.33 with an n-gain of 0.43 in the medium category, and the results of the t-test obtained count 20.05 ≥ t-table 2.306. In the large-scale trial, the average pre-test in science learning outcomes was 60.5 and 76.33 in the post-test with an n-gain of 0.40 in the medium category, and the t-test obtained tcount 31.25 ≥ ttable 2.069. The researcher concluded that the developed digital picture storybooks were effective in improving the science learning outcomes of elementary school students.

Keywords: digital picture story books, science learning outcomes

INTRODUCTION

Science learning is one of the learning activities that focus on providing direct learning experiences and developing process skills and students' scientific attitudes. Therefore, teachers need to involve students mentally and physically in science learning activities so that students get real learning experiences. In addition, for science learning to be carried out optimally and in demand by students, the activities carried out in learning must be fun and challenging and make use of learning media tools that are adjusted to the level of development of elementary school level students. (Wulandari et al., 2017). This is important so that the material conveyed in learning is not just memorizing the concepts but also the concepts that students can understand. Learning activities that are fun and challenging and involve the real actions of students are also very appropriate to the developmental stages of elementary school students, in which students who are in elementary school are at the stage of concrete operational development. At the concrete operational stage, elementary school students need learning experiences and tools or objects as real learning materials to boost the pace of their cognitive development.

In science learning process of elementary schools, students often find materials that are quite difficult for students, one of which is the material about the digestive system. The digestive system material discusses the way the human digestive organs process

food that enters the body through the digestive tract. This material is considered difficult because it is abstract, cannot be sensed directly, and many new terms are found for students. Difficulty understanding the material experienced by these students influences the low acquisition of their learning outcomes. The Assessment can take the Assessment of learning outcomes from self-assessment, peer-to-peer Assessment, authentic Assessment, Daily Deuteronomy, Mid Semester Examination, Final Semester Examination, portfolio assessment, projects, products, competency tests, Education Unit Examination, as well as the National Examination (Magdalena et al., 2020). Learning outcomes can be used as a reference for teachers to observe changes in student behavior, whether they are in accordance with the learning objectives and basic competencies of the material that the teacher has taught or not. (Mustika et al., 2021).

The difficulties of students in understanding the material and the low learning outcomes are a challenge for teachers to be able to create learning that is fun, challenging, and involves students directly so that they can easily understand the material that the teacher conveys that it affects increasing their learning outcomes. One strategy that teachers can do is to present learning media because in learning activities, the media can carry information from sources, namely teachers to recipients or students. (Rosyana et al., 2021). Picture story book media is one of the media that can be utilized in the learning process in elementary schools. A picture story book is a book that contains pictures accompanied by writing to help explain the meaning of the story (Adipta et al., 2016). Picture storybooks are suitable for use in teaching and learning activities in elementary schools because elementary school students are at an age stage that tends to prefer reading in the form of stories and is equipped with pictures (Sayer et al., 2018). Picture story books were also chosen because they can stimulate the thinking and imagination of students by bringing out the characters in the story. In addition, the pictures and writing that appear in picture story books can attract the attention of students, so that curiosity will grow in students about what is the content of the stories they read. (Supartini & Ambara, 2022).

Previous research conducted by Chun-Chun Wei and Min-Yuan Mi showed that electronic picture books (eBooks) have advantages such as miniature physics, abundant data storage space, multimedia animations, and interactive fun, enabling the presentation of text content through multisensory stimulation. These advantages have a positive impact on increasing the attention, interest, and understanding of readers. These features allow the development of new genres in reading. By using electronic picture books, pleasant abstract feelings, clarity, imagination, anticipation, consistency, concentration, comfort, and multifunctionality, students can grow optimally. (Wei & Ma, 2020).

The research conducted by Lubis and Dasopang (2020) is also in line with the findings of the researchers, where previous research was conducted on elementary school students who are often called the e-generation, internet generation, digital generation, or better known as generation Z. validation tests by media validators, material validators, and language validators and tested on teachers and students, the results of the study show learning media in the form of picture story books with Augmented Reality features have been declared practical and feasible to use in teaching and learning process and can accommodate students in learning. (Lubis & Dasopang, 2020).

Based on the problems described, this study developed a media as a digital picture storybook. Digital picture storybooks were chosen because of the current rapid development of technology which has a great impact on the development of education in Indonesia (Irmade & Jumanto, 2022). These technological developments make educators more innovative and

creative in creating or compiling learning media. Moreover, today's students are very literate in technology, so bringing learning media that is integrated with technology in teaching and learning activities is one of the right choices because it is close to the daily lives of students so that it can stimulate students' enthusiasm, motivation, and interest in learning. In this study, the picture storybooks developed were directly integrated with videos and worksheets. The development of this product is expected to be able to optimize student learning outcomes in science subjects, in particular.

MATERIALS & METHODS

The development method or Research and Development (R&D) was used in this study, to develop a product to test the effectiveness of using the developed product.. (Fransisca & Putri, 2019). The ADDIE development model (Analyze, Design, Development, Implementation, and Evaluate) was chosen by researchers to develop research products. This research was conducted at SD Negeri 3 Krack, Banyumas Regency, with 9 students as research subjects in a small-scale trial, and 24 as research subjects in a large-scale trial. Data collection techniques in the form of questionnaires to determine the feasibility of products developed based on the results of validation by material and media validators, as well as test techniques through pre-test and researchers selected post-test to collect research data. The feasibility test results data obtained is then analyzed to determine the feasibility level of the product. While the pre-test and post-test results obtained were then processed using descriptive statistical tests to see the number, class average, minimum value, and maximum value. In addition, the results of the pre-test and post-test were also analyzed using the t-test and n-gain test to see the level of effectiveness of product development in increasing learning outcomes.

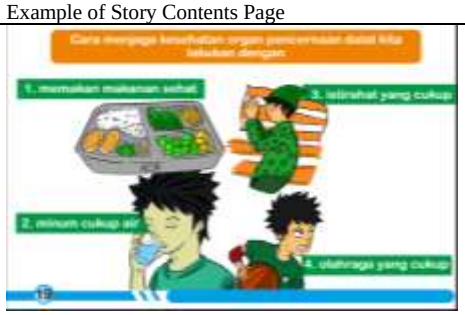
RESULT & DISCUSSION

Before developing the product, the researcher first analyzed what teachers and students needed in science learning, especially digestive system material, through a teacher and student needs questionnaire. Based on the results of the questionnaire recapitulation of the needs of teachers and students, both strongly agree with the plan to develop digital picture story books, because currently there are not many digital picture storybook media that contain learning materials. The development of digital picture story books is based on suggestions and input from teachers and students, namely that digital picture story books should be made attractive with a complete mix of colors, rectangular in shape with more than 20 pages, and use varied language that doesn't have to be standard.

After analyzing the needs of teachers and students, an initial design or prototype of digital picture storybook media was prepared with several sections including: (1) front cover, (2) preface, (3) KD Indicators, (4) material map, (5) content story, (6) bibliography and (7) author biodata. Then the design was developed into a digital picture storybook product. An overview of digital picture storybook media is shown in Table 1.

Table 1. Digital Picture Storybook Products

No	Figure	
1.		
	Front cover	Foreword Page

2.	 KD and Indicator Pages	 Material Map Page
3.	 Example of Story Contents Page	 Example of Story Contents Page
4.	 Example of Story Contents Page	 Example of Story Contents Page
5.	 Example of Story Contents Page	 Example of Story Contents Page
6.	 Example of Story Contents Page	 Example of Story Contents Page
7.	 Bibliography Page	 Author Biodata Page

Products that have been developed are then validated through material validation tests and media validation by material validators and media validators. The results of the material feasibility test are in table 2.

Table 2. Material Validation Test Results

No	Indicator	Assessment Aspect	Score
1.	The Quality of content and purpose	The material is in accordance with KD	4
		Material according to the indicator	4
2.	The visual media	Products can clarify learning material	5
3.	Material accuracy	The accuracy of concepts and definitions in digital picture storybook media on digestive system material	4
		The accuracy of reference literature on digital picture storybook media on digestive system material	4
		Appropriateness of pictures and illustrations on digital picture story book media	4
4.	Encourage curiosity	The suitability of the material presented in digital picture storybook media with the level of development of students	4
5.	Display	Confusion of material concepts in digital pictorial story media	4
6.	Presentation support	Evaluation questions according to the material being taught	5
Total Score			38
Percentage			84,44

While the results of the media validation test are in table 3.

Table 3. Media Validation Test Results

No	Assessment Aspect	Statement	Score
1.	Be concise and direct	1. A digital picture story book of digestive system material has a storyline that is concise, clear, and not long-winded.	4
2.	Contains serialized concepts	2. The digital picture story book of digestive system material has an interconnected storyline.	5
3.	The written concept can be understood	3. A digital picture story book of digestive system material has an easy-to-understand storyline.	5
4.	Illustrations/images that complement the text.	4. Illustrations/pictures in the media of digital picture story books on digestive system material improve the delivery of messages.	4
		5. Illustrations/pictures on digital picture story book media are in accordance with the material.	5
		6. The illustrations/images used in digital picture story books are interesting.	4
5.	Visual design	7. Selection of the right font type so that it is easy to read clearly.	4
		8. The font color is in harmony with the background.	3
		9. Use the right font size so that it can be read clearly.	4
		10. The combination of text, color, and images can improve message delivery.	3
		11. The layout of the text and images / illustrations are appropriate.	4
		12. The selection of colors in digital picture story books is appropriate, so as to produce attractive media.	3
		13. Selection of the background color according to the material in the digital picture story book media.	3
6.	User Interface	14. Digital picture storybook media is easy to use.	5
		15. Digital picture book media is in accordance with the development of elementary school children	4
Total Score			**60**
Percentage			**80**

Based on tables 2 and 3, the percentage results of the validation test by the material validator were 84.44 and the percentage of the validation test results by the media validator was 80, the two scores obtained were included in the proper category with some input and suggestions from the material validator and media validator. After passing the validity test stage and improving the product according to input and suggestions from the material and media validator, the product was tested on a small scale with 9 students as research subjects.

In small-scale trials, students carry out the teaching and learning process according to the syllabus and lesson plans that have been prepared. The learning includes preliminary activities, core activities, and closing

activities. Before entering the lesson, students are first given multiple choice pretest questions and descriptions totaling 20 with a time allocation of 20 minutes. In the main activity, students and their groups consisting of 3 students each use cellphones and laptops that have been provided to access digital picture story books. Previously the teacher gave an overview of the material to be discussed. Then students are allowed to read intensively digital picture stories and fill in the worksheet and videos that are available as links in digital picture storybooks. After that, students retell what they have read. Furthermore, the teacher gives reinforcement to the students' exposure. After finishing learning, students worked on multiple choice posttest questions and descriptions, totaling 20 with a time allocation of 20 minutes. A comparison of students' pretest and posttest learning outcomes in small-scale trials can be seen in Figure 1.

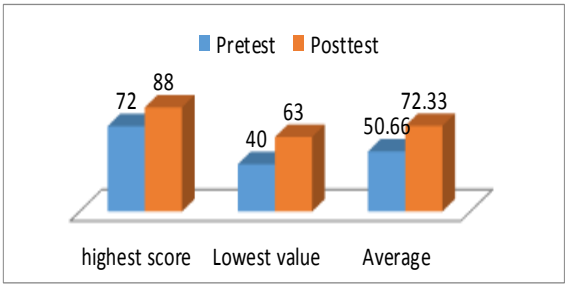


Figure 1. Comparison of pretest and posttest learning outcomes

Figure 1 shows the results of the pre-test and post-test of the small-scale test experienced an increase in the average pre-test and post-test results. The mean of the small-scale learning outcomes of the Post test = 72.33 is greater than the average of the small-scale learning outcomes of the Pre-test = 50.66. From this mean, a moderate N-gain criterion is obtained with a value of 0.43. In addition, learning outcomes were also tested using the t test using SPSS, and the t-count was 20.05 ≥ t-table 2.306. This shows that learning outcomes after using digital picture story media experience better changes than before using the media.

After passing small-scale trials, the product was again tested on a large-scale with 24 students as test subjects. The learning stages carried out in large-scale trials are the same as those in small-scale trials. The results obtained in the large-scale trial are presented in Figure 2 below.

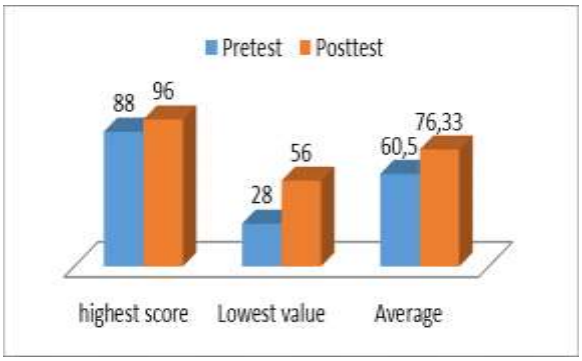


Figure 2. Large Scale Trial Results

Figure 2 shows an increase in the pre-test and post-test results on a large-scale test. The mean of the large-scale learning outcomes of the post-test = 76.33 is greater than the average of the large-scale learning outcomes of the pre-test = 60.5. The N-gain medium criterion is obtained from this average with a score of 0.40. Besides that, learning outcomes were also tested by using the t test using SPSS, and the tcount was 31.25 ≥ t table 2.069. Based on the results of small-scale and large-scale trials, it can be concluded that digital picture story book media is effectively used in the science learning process in class V SDN 3 Kracak. This effectiveness is also supported by the positive responses of students as stated in the student questionnaire in table 4.

Table 4. Recapitulation of Student Response Questionnaire Results

No	Aspects in question	Students	Percentage (%)
1.	The overall display of digital picture storybook media attracts students' learning interest.	24	100
2.	The learning process using digital picture storybook media is more fun	24	100
3.	All components of the digital picture story book media are clearly visible	24	100
4.	The shape and size of the letters in digital picture storybook media are easy to read	24	100
5.	Digital picture storybook media is easy to use	24	100
6.	Digital picture book media can be studied independently or in groups	24	100
7.	Digital picture story book media adds enthusiasm to learning	24	100
8.	Digital picture story book media adds interest in reading	24	100
9.	The material presented is accompanied by appropriate pictures	24	100
10.	The material in the media is easy to understand	24	100
11.	The material in the media is complete and clear	24	100
12.	Digital picture storybook media can add insight about the digestive system	24	100
13.	Pictures and illustrations in digital picture storybook media are interesting	24	100
14.	The images contained in the digital picture story book media are clearly visible	24	100
15.	The language used in explaining the material is easy to understand	24	100
Average			**100**
Criteria			**Excelent**

Table 4 shows the positive response of all students to all statement items, and a percentage of 100% is obtained, including in the very feasible category, because the character of elementary school students who like to play, like teaching materials that are full of visualizations, and like to be directly involved in the learning process, then learning using pictures is appropriate for use in learning at the elementary school level (Rusmono & Alghazali, 2019). Besides that, picture books have many elements, designs, and formats that can stimulate the senses of students, and can be used as reading material that can help students to be more effective in learning. (Wei & Ma, 2020). On the other hand, pictures in storybooks have contributed to the language, creativity, intellectual and artistic development of students (Ozsezer & Canbazoglu, 2018).

Reading illustrated stories is an interesting activity for students and very effective for understanding the material, especially when added with elements of technology, both of which help students develop their knowledge (Kalogiannakis et al., 2018). The effectiveness of using picture storybook media has also been proven by previous research, where previous research showed that there was a significant difference between the class mean, n-gain, and the t count of the learning outcomes in the experimental class with picture story media compared to the class mean, n -gain, and t arithmetic control class that does not use picture story media. On the other hand, in the experimental class, students were also more enthusiastic and active in learning with picture story media compared to students in the control class who did not use picture story media in learning. (Masruro & Gunansyah, 2018).

CONCLUSION

The digital picture storybook media developed was deemed feasible by the material and media validators with percentages of 84.44% and 80%. The results of the small-scale product trials obtained an average pre-test in science learning outcomes of 50.66 and a post-test of 72.33 with an n-gain of 0.43 in the medium category, and the results of the t-test obtained t-count 20.05 ≥ t-table 2.306. Furthermore, in the large-scale trial, the average pre-test in science learning outcomes was 60.5 and 76.33 in the post-test with an n-gain of 0.40 in the medium category, and in the t-test obtained tcount 31.25 ≥ ttable 2.069. Based on the research results, digital picture story book media is effective for use in science learning activities.

Declaration by Authors

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