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The Development of an Illustrated Storybook about the Rain Cycle Using Digital Painting to Enhance Student's Learning Interest

Syaipul Ramdhan[1], Siti Maisaroh[2] & Ahmad Saeful[3]

[1,2,3] Institut Teknologi dan Bisnis Bina Sarana Global, Tangerang, Indonesia, 15113
E-mail: [1]syaipulramdhan@global.ac.id, [2]maekayla27@gmail.com, [3]ahmadsaeful48@gmail.com

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ABSTRACT

While a wide variety of learning media exists today, each with its own strengths, this abundance can also be overwhelming for students, making it difficult to choose materials that are both effective and easy to understand. Currently, the learning media at SDN Curug 1 are often considered monotonous, relying heavily on text and featuring illustrations that do not adequately support the educational process. This research aims to transform the learning experience from tedious to engaging by developing an illustrated storybook about the rain cycle using digital painting techniques. The methodology employed includes observation, interviews, and a literature review, informed by expert sources and the specific conditions at SDN Curug 1. The primary outcome of this study is an illustrated storybook about the rain cycle. This book serves as a new educational tool for students at SDN Curug 1, designed to deepen their understanding of the subject matter and spark their interest in learning.

1. Introduction

In the educational context, conventional learning media are often perceived as monotonous and ineffective in supporting the learning process. Consequently, students face challenges in achieving optimal comprehension of the subject matter. At SDN Curug 1, students struggle to visualize the hydrological cycle process due to a lack of clear and engaging visuals in the current learning materials.

Therefore, this study addresses the problem of how students' understanding of the hydrological cycle can be enhanced through the use of an illustrated storybook created with digital painting. Furthermore, this research aims to create an illustrated storybook using digital painting techniques that can capture students' interest. The learning method using this storybook is expected to provide a more engaging and interactive learning experience.

Initially, paper originated from the papyrus plant in Egypt before the Common Era, where it was used for writing and documentation. In China, paper was made from silk threads and bamboo, leading to significant differences between Egyptian and Chinese paper and resulting in various types. The practice of binding collected papers into a book began as paper became more widespread, especially in Europe [1].

Picture books aim to show the reader what the world implied by the words looks like, thereby creating a powerful atmosphere for this kind of interaction [2].

The benefits of storytelling include developing speaking skills, expanding vocabulary, building the courage to speak in front of a class, and expressing emotions from the narrative. Storytelling can also foster effective communication between teachers and students [3].

Illustration is a picture or a collection of pictures that tells a story non-verbally, often used to represent real or fictional situations and to convey feelings or impressions about a particular object [4]. It serves as a medium to visually simplify the explanation of an activity [5].

Design is a creative activity that involves creating something new and useful that did not exist before[6]. Therefore, as a tool for creating greater student interaction compared to typical learning media, design is necessary to enhance its impact. With good design, teachers can build a more effective and efficient learning atmosphere. However, not all learning media succeed in fostering this interaction with students [7].

For digital painting, Procreate is one of the most advanced painting tools designed for mobile devices. Created to work in harmony with the iPad Pro and Apple Pencil, Procreate provides the feeling of real-world drawing with the power of digital art [8].

Simply put, illustration is a key indicator that a book can be classified as a picture book. Over time, experts have come to view the textual and visual elements in a picture book as interdependent components that work together to construct a story or

meaning [9]. The first picture books by domestic illustrators in Indonesia were published in the 1950s. Works published before this period are more often categorized as 'illustrated books' because the portion of text far exceeded the illustrations [9].

Digital painting is a modern innovation derived from manual painting. While people previously painted only on physical canvases, technological advancements have made it possible to perform this and other activities through digital media [10]. Art initially imagined on canvas has now shifted towards digital images or paintings, and works created through digital media are not inferior in quality and appeal compared to those painted manually. Digital painting offers many unique capabilities, such as photo editing power, digital brushes, and virtual canvases [10].

The rain cycle, influenced by water, is one of the most vital elements on Earth. Water is required by all living things, including humans, plants, and animals; without it, life would not exist. The science that studies water is hydrology [11]. The rain cycle is "the unending circulation of water from the atmosphere to the earth and back to the atmosphere through condensation, precipitation, evaporation, and transpiration."[11]. Based on this, it can be concluded that the rain cycle will continue as long as surface water is available.

Digital painting is closely related to the brush, which literally means a paintbrush. In the context of digital media, a brush is a tool used for painting or drawing on a digital layer [12].

To create an appealing impression in digital painting illustrations, perspective refers to the way we see or view an object. Each perspective is divided into several components, such as the Vanishing Point, the Picture Plane, and the Horizon Line. Perspective functions as a part of how we paint or draw to make it look more dynamic and lively [13]. In practice, perspective is divided into three types: one-point perspective, two-point perspective, and three-point perspective. Each of these three types represents the object being viewed [13].

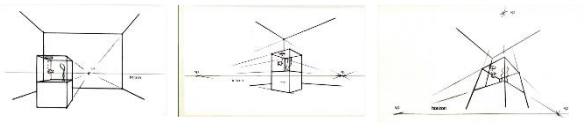


Figure 1. Various perspectives

If an illustrator can effectively manipulate or work well with color, they can produce an illustration that is visually pleasing and capable of conveying an impression and message [13].

Colors can be divided into three types: primary colors, secondary colors, and tertiary colors. Primary colors are the main colors, such as red, yellow, and blue. Secondary colors are the result of mixing primary colors; for example, red mixed with yellow becomes orange, red mixed with blue becomes purple, and yellow mixed with blue becomes green. Meanwhile, tertiary colors are the result of combining or mixing secondary colors [13].

Color is further divided into several key properties, such as Hue, which refers to the color itself, like red, yellow, or green. Saturation refers to the intensity or purity of the existing color, examples being pink, dark red, pale green, and so on. Value, on the other hand, is the lightness or darkness of a color produced; the lower the value, the darker it is, and the higher the value, the lighter it is [15].

The current study is informed by previous research findings that are relevant to this work. This includes the study by Yusup Ibrahim, M [14]., which used an infographic book as a learning medium to understand environmental conservation. Related research on the use of illustrated storybooks as a learning medium was also conducted by Rosvita, O [15]. and Shinta Kusnawati, who used a diorama learning medium regarding the hydrological cycle [16]. Reis F. explained in their research how easily children understood difficult material using illustrated storybooks [17]. Furthermore, Rizki Susilowati A. demonstrated in their research process that illustrated storybooks are effective in solving problems related to improving critical thinking skills [18].

Therefore, the objective of this research is to facilitate students' understanding of the hydrological cycle through the use of an illustrated storybook featuring digital painting illustrations. Furthermore, creating this storybook is also intended to serve as a learning medium for 5th-grade students. The use of an illustrated storybook with a digital painting illustration technique is expected to benefit students by increasing their comprehension of the hydrological cycle and providing a more engaging and interactive learning experience.

2. Method

2.1. Data Collection Methods

Data collection in this research utilizes several methods, such as observation, literature review, and survey, as supporting aspects for the process and final results of the study. These methods are (1) Observation: Analyzing the existing problem by observing the resources and all information related to the learning of the rain cycle at SDN Curug 1, (2) Literature Review: Gathering complementary data from previous books, journals, and theses, as well as scientific writings related to the topic of the illustrated storybook with a digital painting illustration technique, (3) Survey: After the illustrated storybook, which serves as a learning medium for 5th-grade students at SDN Curug 1, is completed and published, all feedback, both direct and indirect, will be summarized. This will help determine the benefits, impact, and results achieved. This step is also carried out as material for evaluation.

2.2. Development Method

In the design process, the author uses the ADDIE Model (Analyze, Design, Develop, Implement, Evaluate), which is an approach used in instructional design to produce intentional learning episodes. This method consists of five interrelated and sequential phases:

Analyze Phase: This phase involves identifying potential causes of instructional method differences and validating those gaps. Instructional goals are determined, the target audience is identified, necessary resources are specified, and a project management plan is compiled.

Design Phase: An initial design is created to address the existing problem, which is then implemented into a sketch or thumbnailing to facilitate the subsequent process.

Development Phase: The process where the design results are directly implemented into the media to be used. Content is produced, supporting media is selected or developed, guidance for teachers and students is compiled, formative revisions are conducted, and pilot testing is performed.

Implementation Phase: The learning environment is designed, and students are engaged. Teacher and student preparation are carried out, and implementation strategies are formulated.

Evaluation Phase: The quality of the product and the creation process are evaluated before and after implementation. Evaluation criteria are determined, evaluation tools are selected or created, and the evaluation is conducted. The results of this evaluation are used to compile an Evaluation Plan.

The ADDIE Model provides a systematic and structured framework for designing and developing learning materials.

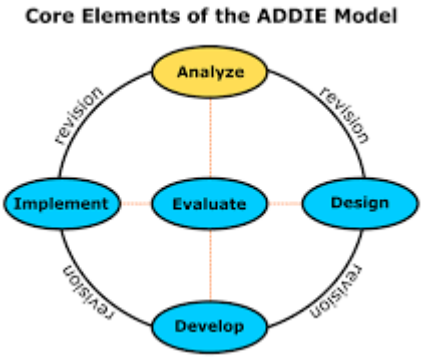


Figure 2. ADDIE model's flow

3. Result and Discussion

3.1. Thumbnailing

The process of thumbnailing is useful for establishing the composition or perspective during the illustration creation process. This process serves as one of the keys to making the illustration visually clear.



Figure 3. Thumbnailing

3.2. Brush Setting

This involves finding, collecting, and arranging assets for the painting process, as painting is closely related to the brush, which is the primary tool in digital painting. This section outlines the collection of brushes to be used in creating the illustrated storybook:

1. Solid Brush A brush with a texture that is not too prominent. This type of brush is used in the color blocking process, which is useful for applying base colors to the illustration.
2. Textured Brush Used to provide texture to the illustration being created. The textured brush produces a more realistic image and gives the impression of a traditional painting.
3. Pattern Brush Shaped like a realistic pattern, such as grass, rain, flowers, and many others.

3.3. Character Creation

This character serves as a supporting image/illustration for the story. Since the story is told using a narrative approach, two sibling characters who form the core of the story were created: Vini as the older sister and Ako as the younger brother.



Figure 4. Vini & Ako Characters

3.4. Painting

The painting process will explain the method of creating illustrations using the digital painting technique through the Procreate application.

Procreate is used because the application is well-suited for creating illustrations or digital paintings. Besides being easy and lightweight to use, Procreate has numerous features, which makes it possible to produce compelling illustration results.



Figure 5. Painting Results

3.5. Layout

In the book printing process, layout is necessary to ensure the printed book meets expectations. This process goes through several stages, such as selecting a font, determining the text (placement/content), and page setting (or page arrangement).

Setting the typography by selecting a font that is suitable for the images or illustrations. The author chose the font "Sensei Medium", which has a fun characteristic and is appropriate for the psychology of children who prefer things that are cute, engaging, and easy to read.

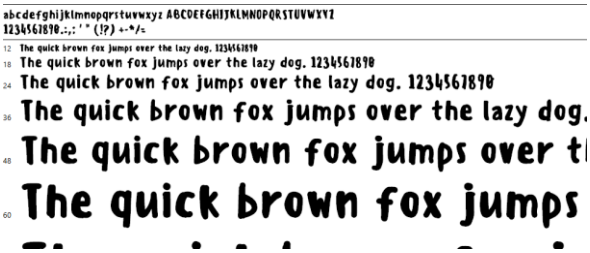


Figure 6. Font Sensei Medium

The title used for the book is "Why Is It Raining?" (*"Kok Hujan Sih?"*), accompanied by an illustration of the characters looking sadly up at the sky. The book cover page also includes information regarding the type of book and the author's name.



Figure 7. Book Cover

On page 24, a QR Code is provided, containing a link to the folder for downloading the eBook of this book.



Figure 8. QR Code

3.6. Post-Production

Post-production is the process of selecting the paper that will be used when printing the illustrated storybook. Three types of paper were sorted for potential use in the illustrated storybook:

100 gsm HVS Paper: A suitable paper for printing any type of document.

150 gsm Art Paper: A paper commonly used for printing posters and magazine covers.

200 gsm Ivory Paper: This paper is typically used for printing product packaging, featuring a glossier exterior side but a rougher interior side.

In conclusion, for the post-production process, the author chose 150 gsm Art Paper due to its more suitable characteristics and typical use compared to the other paper types.

3.7. Testing

From the trial conducted, the author created a comparison for each question asked using a pie chart, which has been summarized into tables for every question. The following presents the results of the questionnaire.

Table 1. User Acceptance Test (UAT)

No.	*Questions*	*Answer*			*Percentage*		
		A	*B*	*C*	*A*	*B*	*C*
1	How is the design of this book?	24	4	0	86%	14%	0%
2	Is the information in this book easy to understand?	25	3	0	89%	11%	0%
3	Do you think the characters/pictures in this book are interesting?	25	3	0	89%	11%	0%

4	Are you interested in reading this book?	24	4	0	86%	14%	0%
5	What part did you like about this book?	23	5	0	82%	18%	0%

By displaying the percentages of several questions, a pie chart is created as follows:

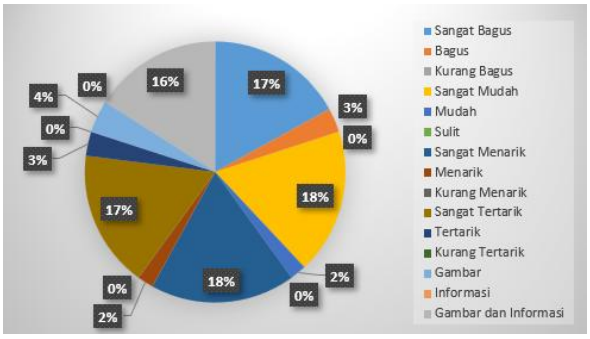


Figure 9. Pie Chart of User Acceptance Test

Therefore, this study concluded by accumulating the pie chart, classifying each answer from A as "Strongly Liked," answer B as "Liked," and answer C as "Disliked Less."

The graph below represents the accumulated percentages of responses from the questionnaire. From the graph, it can be concluded that 86% (24 people) really liked all aspects of the picture book, 14% (4 people) quite liked all aspects of the picture book, and 0% (0 people) did not like all aspects of the picture book. Based on these data, the author concludes that the book is very good and can attract reading interest.

4. Conclusion

Based on the research findings, it can be concluded that the current method of teaching the rain cycle is conventional, relying solely on direct face-to-face instruction between teacher and student without the aid of other learning media. To increase children's interest in reading and learning, the introduction of a creative and engaging medium that incorporates visual elements and is accessible to them is necessary, with the book serving as an effective informational medium for this purpose. Specifically, an illustrated book with compelling visuals is an appropriate medium for delivering lessons on the rain cycle. For the next research, it is recommended that the information presented in the book be improved by sourcing data not just from school textbooks and the internet, but also by involving an environmental expert to ensure greater accuracy. Furthermore, it is suggested that the illustrated storybook be adapted into other forms, such as an animation, to further increase children's interest in understanding the rain cycle.

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