

Character Design For An Educational Book On Harmony In Ecosystems

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ABSTRAK

Ekosistem merupakan bagian yang dekat dengan kehidupan manusia, namun ketidakseimbangan ekosistem saat ini menjadi permasalahan global yang semakin mendesak akibat aktivitas manusia yang tidak berkelanjutan dan perubahan iklim. Pembelajaran ekosistem pada kelas 5 SD berperan penting dalam membangun pemahaman siswa mengenai hubungan antara makhluk hidup dan lingkungannya. Namun, keterbatasan media pembelajaran yang menarik masih menjadi kendala dalam penyampaian materi tersebut. Perancangan ini bertujuan untuk merancang buku ilustrasi interaktif bertema ekosistem dengan pendekatan desain karakter sebagai media pembelajaran alternatif. Metode yang digunakan meliputi observasi dan kuesioner terhadap siswa kelas 5 SD Yamassa Surabaya. Hasil penelitian menunjukkan bahwa 58,9% siswa masih memiliki pemahaman yang rendah terhadap materi ekosistem, sementara 91% siswa menunjukkan ketertarikan terhadap media pembelajaran interaktif. Selain itu, siswa cenderung menyukai ilustrasi bergaya ceria dengan warna-warna cerah. Berdasarkan temuan tersebut, dirancang karakter utama berupa anak perempuan berusia 10–11 tahun yang berperan sebagai narator untuk membantu penyampaian konsep ekosistem secara sederhana dan menarik. Maka, dengan terciptanya karakter ini akan membantu komunikasi dengan pembaca dan berpotensi meningkatkan minat belajar dan pemahaman siswa terhadap materi ekosistem pada jenjang sekolah dasar.

Kata Kunci: desain karakter, buku pembelajaran, ekosistem, siswa SD, media interaktif

ABSTRACT

Ecosystems are closely connected to human life; however, ecosystem imbalance has become an increasingly urgent global issue due to unsustainable human activities and climate change. Ecosystem learning in Grade 5 elementary schools plays a crucial role in developing students' understanding of the relationships between living organisms and their environment. Nevertheless, the lack of engaging learning media remains a challenge in effectively delivering this material. This study aims to design an interactive illustrated book on ecosystems using a character design approach as an alternative learning medium. The research methods include observation and questionnaires administered to Grade 5 students at Yamassa Elementary School, Surabaya. The findings reveal that 58.9% of students have a low level of understanding of ecosystem concepts, while 91% show interest in interactive learning media. Students also tend to prefer cheerful illustration styles with bright colors. Based on these results, a main character in the form of a 10–11-year-old girl was designed to act as a narrator to support the simple and engaging delivery of ecosystem concepts. The designed character is expected to enhance communication with readers and improve students' learning interest and understanding of ecosystem material at the elementary school level.

Keywords: character design, learning books, ecosystem, elementary school students, interactive media

INTRODUCTION

Learning about ecosystems is one of the essential subjects in the Grade 5 elementary school curriculum. This material not only introduces students to basic ecosystem concepts but also teaches the importance of reciprocal relationships between living organisms and their environment, as well as their impact on ecological balance. Such understanding is expected to foster early awareness of environmental protection and sustainability.

Learning styles have a significant impact on education, particularly in relation to how instructional materials (curriculum), teaching methods, and assessment are implemented as benchmarks for achieving learning objectives (Putri et al., 2020). However, the delivery of ecosystem material still faces several challenges. One of the main issues is the lack of learning media that can effectively attract students' interest and attention. Many available textbooks present information primarily in lengthy textual formats accompanied by illustrations that are often less aligned with children's characteristics and curiosity. The interactive nature of illustrated digital books allows students to recall, access definitions, and obtain information related to unfamiliar words, thereby expanding their numerical and vocabulary knowledge (Nasir et al., 2023). Therefore, innovation in the form of more interactive learning media is needed—not only to present material in an engaging way but also to actively involve students in the learning process. Such media can bridge students' learning needs while supporting the implementation of the Kurikulum Merdeka, which emphasizes meaningful, contextual, and enjoyable learning experiences.

Based on observations and questionnaires conducted at Yamassa Elementary School in Surabaya, it was found that Grade 5 students' understanding of ecosystem concepts remains relatively low. In addition, most students expressed interest in interactive book media, as such media had never been used previously in classroom learning. Of the 56 respondents, 35 students stated that they had never read or directly encountered interactive books. Some were only familiar with interactive books through bookstores or the internet but had never used them as part of learning activities. These findings indicate a significant opportunity to introduce attractively designed interactive learning books to enhance students' understanding of ecosystem material.

Questionnaire results revealed that 34 out of 56 students (58.9%) demonstrated insufficient understanding of ecosystem material within the current curriculum. Students reported difficulties in comprehending the material due to several factors. In addition to the complexity of ecosystem concepts, the learning media used at Yamassa Elementary School has undergone minimal innovation. Conventional lecture-based teaching methods, where students primarily listen to teachers explaining material at the front of the classroom, often lead to boredom and occasionally result in an uncondusive classroom atmosphere, especially given the increasingly active nature of students. In such methods, teachers frequently position students as passive objects rather than active subjects, limiting opportunities for students' development. This type of education also provides limited space for students to develop holistically, creatively, objectively, and logically (Herayana et al., 2020). Therefore, new learning media are urgently needed to help students absorb material more effectively.

One possible solution is the introduction of learning media that are more engaging and relevant to elementary school students. Learning media for children require appealing visual elements. The presence of characters enables interaction with readers through dialogue, the presentation of unique facts, or interaction with other illustrations that support the book's narrative (Kattreen, 2025). Character design holds high urgency as a medium for effectively conveying environmental messages. Creatively designed characters can attract students' attention, build emotional connections, and communicate environmental conservation values in a more accessible manner. Character design is a process of representing human emotions

or traits with specific objectives (Novica & Hidayat, 2018). In educational media, characters do not function merely as visual elements but play a crucial role in supporting the learning process. Well-designed characters can capture students' attention, establish emotional engagement, and simplify complex concepts through storytelling and interaction. Characters representing living organisms can help students understand the functions and roles of ecosystem components in an enjoyable and meaningful way. Furthermore, interactive and ecosystem-relevant character designs can enhance student engagement in the learning process.

Currently, ecosystem imbalance has become a critical global issue requiring serious attention. One of the main causes of this disruption is unsustainable human activities, such as deforestation, large-scale land development, and the exploitation of natural resources without consideration of long-term environmental impacts. Climate change further exacerbates these conditions, resulting in rising temperatures, extreme weather patterns, and disrupted natural cycles that affect various species. Wildlife, including insects, mammals, and birds, has experienced significant population declines due to habitat destruction, increased hunting, and pollution. According to the Living Planet Report (LPR) released by WWF, there has been a 73% decline in the average monitored global wildlife population over the past 50 years, from 1970 to 2020 (WWF, 2024). The urgency of understanding global ecosystem issues must be instilled from an early age; however, at the local level, such as at Yamassa Elementary School, learning media remain limited and have not optimally integrated environmental and biodiversity issues into the learning process.

This condition clearly indicates that ecosystem balance is increasingly under threat. The decline in wildlife populations not only reflects biodiversity loss but also signals disruptions to essential ecosystem functions. For example, the reduction of pollinator species affects plant regeneration, while the loss of top predators such as tigers, lions, and eagles can lead to uncontrolled prey population growth. Such imbalances ultimately disrupt food chains and may cause broader ecosystem damage. If left unaddressed, these conditions will have severe consequences not only for nature but also for human survival, which depends on healthy and sustainable ecosystems. Therefore, more serious collective efforts are required in environmental conservation and ecosystem restoration as concrete steps to address this crisis.

Visual characters can be designed to represent key elements of ecosystems, such as animals, plants, and humans, each of which plays an important role in maintaining balance. These characters can be used to illustrate complex ecosystem concepts. Through expressive designs, characters can function as visual communication tools that connect learning messages with students' imagination, enabling them not only to read but also to become emotionally engaged in the learning process. However, character design should not rely solely on aesthetics but also on the character's ability to support effective message delivery. Therefore, designing characters for educational books requires a systematic approach that considers visual elements such as anatomical form, facial expressions, color, and relevance to the learning theme. Through this approach, characters can become learning media that are not only visually appealing but also effective in enhancing students' understanding of the material.

DESIGN METHOD

In designing effective and engaging learning media for Grade 5 elementary school students, both qualitative and quantitative approaches were employed through in-depth analysis, including SWOT analysis, consumer journey mapping, and consumer insight analysis. The data were obtained from interviews, observations, and questionnaires conducted at Yamassa Elementary School, Surabaya. Students' interest in interactive media was identified as a key strength that could be leveraged in media development, while their limited prior experience with interactive books presented a challenge that needed to be addressed through a simple and accessible design approach.

Through the consumer journey analysis, it was found that students' engagement with interactive books begins with visual attraction and gradually leads to the formation of a stronger conceptual understanding. Field insights revealed that expressive character visualizations and an enjoyable delivery style were able to enhance students' focus and learning absorption of ecosystem material. These analyses serve as an essential foundation for designing learning media that are not only educational but also aligned with the needs, interests, and characteristics of elementary school students.

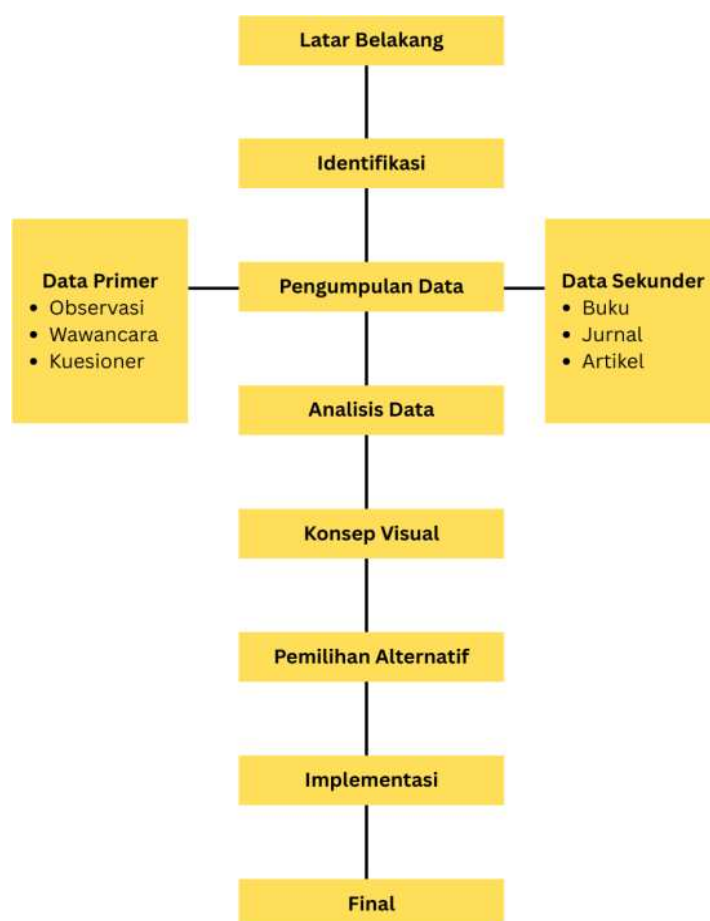


Figure 1. Design Process Flow.

RESULT AND DISCUSSION

Based on observations conducted at Yamassa Elementary School in Surabaya, it was found that Grade 5 students tend to prefer cheerful illustration styles with the use of bright colors. These visual preferences contribute to increased reading interest and facilitate students' understanding of learning materials presented visually. This finding serves as the

foundation for designing the interactive illustrated book themed Harmony in Ecosystems, particularly in determining the appropriate visual approach and character design style that align with students' characteristics.

In line with these observations, the main character in the interactive illustrated book was designed as a girl aged approximately 10–11 years, representing cheerful, energetic traits and a high level of curiosity. This character functions as a narrator who guides readers through the storyline while gradually and communicatively delivering ecosystem concepts in a clear and accessible manner, thereby enabling a more engaging and effective learning process.

Questionnaire results indicate that 34 out of 56 students (58.9%) still demonstrate a low level of understanding of ecosystem material. This condition is influenced by the complexity of the subject matter and the limited renewal of learning media used at Yamassa Elementary School. Conversely, 91% of Grade 5 students expressed interest in interactive learning media, although most had never used interactive books as part of classroom instruction. Meanwhile, only 9% of students believed that conventional textbooks sufficiently supported the learning process. These findings highlight a significant need for the development of alternative learning media that are more innovative and aligned with students' preferences.

Based on these conditions, the SWOT analysis indicates that the ecosystem-themed interactive illustrated book has strengths in its attractive character design, use of bright-colored illustrations, and ability to simplify complex ecosystem material through visual and narrative approaches, thereby potentially increasing Grade 5 students' learning interest and comprehension. However, this medium also has limitations, including relatively high production costs and the risk of physical damage due to its printed format. On the other hand, the growing demand for innovative learning media and students' high interest in interactive materials present opportunities for the development of this book, particularly in line with the implementation of the Kurikulum Merdeka, which emphasizes creative and visually based learning. The challenges faced include the rapid development of digital interactive learning media and school budget constraints, which may affect the large-scale implementation of interactive illustrated books.

Furthermore, the character design exploration process did not focus solely on visual aspects but also considered the narrative function and emotional appeal of the character. Based on an interview with children's book illustrator Fiqri G. Ramadhan, it was emphasized that character uniqueness is a fundamental aspect of design, enabling characters to possess a strong identity and be easily recognizable. In addition, the character's backstory and ability to visually express emotions play an important role in building emotional connections with child readers. Therefore, the character design process was conducted through observations of children's behavior, the collection of visual references, and an in-depth understanding of the target audience's characteristics in accordance with the intended book level.

A. Visual Concept



Figure 2. Illustration Style

According to Kartaatmadja (2015), character illustration is an art form that focuses on a character with the purpose of defining not only its visual appearance but also its behavior and mannerisms. The illustration style used in the character design for this interactive book employs simple visual forms that are easily recognizable by children. The illustrations tend to have a strong storytelling aspect, as they are often used to depict or reinforce narratives, ideas, or specific stories (Wallace, 2020). One distinctive feature emphasized in the design is the proportionally larger head compared to the body, a common approach in children's books to highlight facial expressions and emotions. The character is also designed with expressive facial features and dynamic gestures, allowing readers to perceive the character not merely as a static image but as an active participant in the storyline. This approach aims to create an emotional connection between readers and the character while facilitating children's understanding of the conveyed messages.

In terms of coloring, the illustrations are created using digital painting techniques, with the selection of textured brushes to produce a more dynamic and lively visual impression. The color palette predominantly consists of bright and warm colors, representing a sense of exploration, cheerfulness, and warmth embodied by the main character. This visual style not only enhances aesthetic appeal but also reinforces the theme of enjoyable learning and a spirit of adventure in understanding ecosystems.



Figure 3. Reference Character Exploration

The main character design is inspired by the character Ara from the film *Keluarga Cemara*, portrayed by Widuri Puteri. Ara is the second child of Abah and Emak and is characterized by a strong-willed yet courageous personality. As a reference for the character design in the interactive illustrated book themed *Harmony in Ecosystems*, this personality is considered highly relevant, as it reflects the qualities needed to explore and understand the relationships among living organisms within an ecosystem. Her empathy and curiosity can be translated into a character who actively observes the environment, asks questions, and encourages readers to care about their surroundings. This approach positions the character not merely as a visual figure, but as an inspirational guide who is able to lead by example and support a learning process that is both enjoyable and meaningful.



Figure 4. Color Palette

In the design of an interactive book, the visual concept plays a crucial role in effectively conveying the story, theme, and messages to readers. This interactive book

design employs bitmap-based illustrations with a simple and cheerful style to help children remain focused on the learning material. The use of bright colors and textured brush strokes adds a more vivid and dynamic impression to the illustrations. Based on observations conducted at Yamassa Elementary School in Surabaya, it was found that children are more attracted to illustrations that are simple yet rich in color; therefore, this aspect became a primary consideration in determining the book's visual style. In addition, the illustration style applied in this book was compared with several reference books to ensure its suitability for the target audience's preferences while also providing a unique visual approach in the overall design.

Aluna, the main character, is depicted in a cheerful and colorful visual style to capture children's attention. She has shoulder-length, slightly messy hair that reflects her active and adventurous nature. The character's appearance consistently conveys enthusiasm, with large eyes that express a strong sense of curiosity. Skin tone and hair color are designed to represent diversity, making the character easily relatable to children from various backgrounds. This visual representation is intended to reflect a spirit of exploration and warmth, which serves as the main appeal of the character in this interactive book.

B. Character Background

The character designed in this project is an 11-year-old girl, equivalent to a Grade 5 elementary school student, known for her active and cheerful personality, named Aluna. Aluna is portrayed as an intelligent, resilient, and empathetic child. Despite growing up in a modest family environment, she demonstrates a strong enthusiasm for learning, a high level of curiosity, and genuine care for the people around her. The character also exhibits independence and strong adaptability, serving as an inspiration for children of her age.

C. Alternative Design Process

1) Sketch

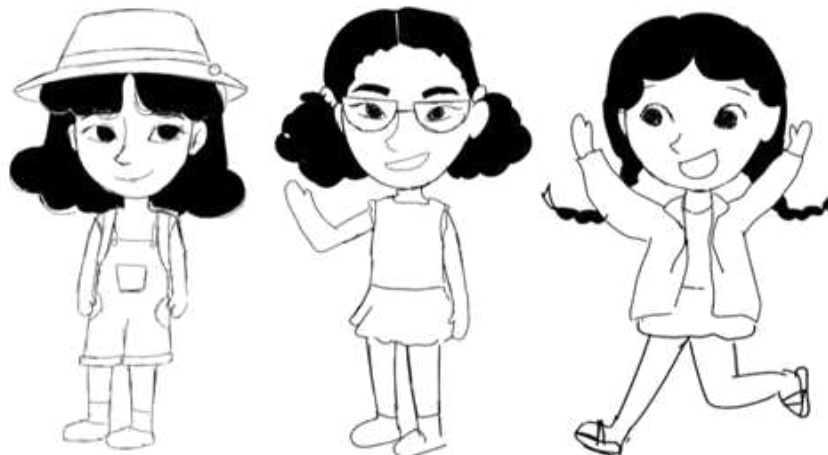


Figure 5. Character Sketch

The initial step in digital illustration practice is the development of the image concept and the creation of preliminary sketches (I Made Marthana Yusa, 2024). At this stage, idea exploration and visual form development are carried out in the character design process to ensure that the composition and visual elements align with the intended concept and the character's background.

2) Coloring

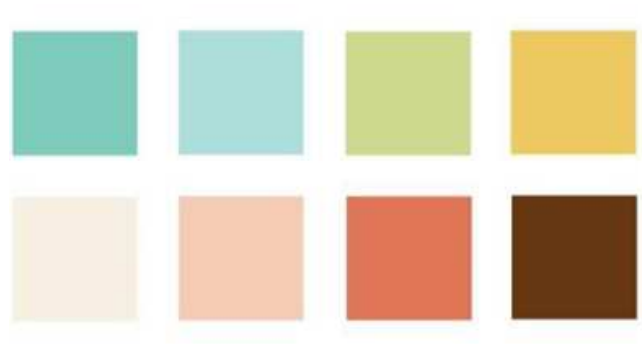


Figure 6. Color palette

Color selection in character design plays a crucial role in shaping visual impressions and the emotional responses of readers, particularly in educational books for elementary school-aged children. According to Zharandont (2015), colors do not possess inherent traits; rather, they create perceived characteristics in the human mind and indirectly influence human emotions. Kholid et al. (2021) explain that colors have distinct personalities and their own visual language, which can help define both main and supporting characters within a story. Bright colors such as yellow, green, blue, and orange are commonly chosen because they create a cheerful, friendly, and energetic atmosphere. These colors have also been proven to attract children's attention and help maintain their focus throughout the learning process. With appropriate color selection, character design becomes not only an aesthetic element but also an effective communication tool for conveying educational messages in an engaging and meaningful way.



Figure 7. Base Color

3) Alternative Character



Figure 8. Alternative Character

After the base coloring stage using primary colors, the selected character alternative proceeds to the final coloring process, which includes the addition of textures, shadows, and highlights to the character illustration.

Pilih karakter yang kalian suka!

56 responses

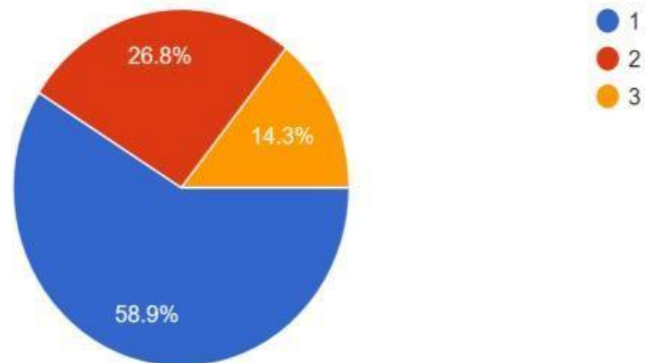


Figure 9. Questionnaire Results

Based on the questionnaire results, Alternative 1 was selected as the final design for the character Aluna. This alternative features attributes such as a hat and a backpack, which represent Aluna's character and reflect the adventure theme of the interactive illustrated book.

4) Final



Figure 10. Character Expressions



Figure 11. Front – Side – Back Views of the Character.

In the interactive illustrated book *Harmony in Ecosystems*, which is designed as a learning medium for Grade 5 elementary school students, the character used is based on Alternative 1. The visual design of Aluna aligns with the initial concept of this project, portraying an 11-year-old girl with an active and cheerful personality, a strong sense of curiosity, and a high level of environmental awareness and care for her surroundings.

CONCLUSION

Character design plays a significant role in enhancing students' interest and understanding of learning materials. Well-designed characters, particularly those featuring cheerful, expressive, and colorful illustration styles, can help create enjoyable and engaging learning experiences. In this interactive book, the selection of a main character with strong curiosity and a spirit of exploration, represented by a cheerful and empathetic young girl, effectively supports the learning process and brings ecosystem concepts closer to students.

Furthermore, based on data analysis obtained from interviews, observations, and questionnaires, it can be concluded that this interactive book has strong potential to facilitate the understanding of complex material through a visual and interactive approach. By

considering students' preferences and audience characteristics, this book is expected to serve as an effective and enjoyable learning medium while also fostering environmental awareness among younger generations.

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