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DESIGNING 2D INTERACTIVE MULTIMEDIA ASSETS FOR TEACHING MAN-MADE FEATURES IN ELEMENTARY SCHOOL

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Abstract

Learning the subject of Man-made Features in elementary school often faces challenges, such as the presentation of abstract concepts and the lack of visual representation in conventional media. This research addresses this gap by designing a set of engaging and cheerful 2D assets as a technological learning solution. This study aims to design a 2D illustration asset package capable of visualizing various Man-made Features in an appealing and easily comprehensible manner. Employing a Design-Based Research (DBR) methodology, the process involved three stages: analysis, design, and evaluation. The analysis phase identified students' visual needs and style preferences to establish a robust design concept. This concept was then realized in the design phase through sketching and the creation of a visual style guide, including color palettes and typography. The final stage involved the evaluation of the designed assets. The primary output of this research is a comprehensive illustration set, which includes highly detailed 2D assets, a consistent user interface (UI) with a fresh aesthetic, a logotype, and gamification elements such as puzzles. The significance of these assets lies in their potential to capture the interest and imagination of elementary students, thereby significantly enhancing their understanding of the Man-made Features curriculum.

Keywords: 2D Assets, Interactive Multimedia, Man-made Features, Elementary School, Design-Based Research

INTRODUCTION

In the current digital era, learning is no longer confined to textbooks. Conventional methods often prove insufficient for explaining abstract concepts, particularly in the context of man-made features. Students may struggle to visualize how structures such as bridges, buildings, and roads are constructed. Consequently, their understanding of the significance of these features in daily life remains suboptimal. This highlights the need for a more innovative and interactive approach to enhance the quality of learning (Ilmiani et al. 2020).

Man-made features encompass any landform or structure on the Earth's surface intentionally created by humans to meet various needs. Unlike natural features, which form organically, artificial features such as reservoirs, bridges, industrial zones, and ports are the products of human engineering and technological intervention (Nasruri, Parji, dan Hanif 2021). The presence of these man-made structures and infrastructure offers numerous benefits; they

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aid in urban development, facilitate water resource management, and improve the human quality of life. However, these features can also have significant impacts on the surrounding environment and ecosystems (Indrayati et al. 2022).

The subject of natural and man-made features is taught to elementary school students as part of the Social Studies (Ilmu Pengetahuan Sosial - IPS) curriculum. Social Studies itself is a field that examines the interaction between humans and their environment, including aspects of social life (Siti Nuraini, Aeni, dan Nugraha 2023). However, learning materials, especially for abstract or visual topics like man-made features, are often presented in a generic manner. This can make it difficult for students to build a comprehensive and in-depth understanding. Field observations indicate that the learning materials used are frequently non-interactive, consisting only of static text and images, thus failing to actively engage students' interest. This is significant because elementary-aged students tend to grasp concepts more easily through engaging visual and interactive approaches (Wahyu 2022).

The use of interactive multimedia offers an innovative solution to address these challenges in the digital age. Interactive multimedia integrates various media such as text, sound, images, and video to create a rich and engaging learning experience. For elementary students, this medium is particularly beneficial as it helps simplify abstract or generally difficult-to-understand subject matter (Erfayliana, Kusumawati, dan Juniarta 2022) (Muthahharah et al. 2022). Furthermore, such media can capture students' attention, clarify the presentation of information, and overcome the limitations of space and time in learning. The application of interactive multimedia has been proven to increase interest and effectiveness in the teaching and learning process, especially for science and social studies in elementary school (Azhar Arsyad 2011).

Therefore, this research aims to design a set of 2D interactive multimedia assets focused on the topic of man-made features for elementary schools, which are suitable for use as a supplementary learning medium. The novelty of this research lies in the illustration assets specifically designed for this subject, combining appealing visuals with interactivity that allows students to engage directly with the material. Thus, this study does not merely apply multimedia but creates original illustration assets tailored to the needs of elementary school students.

This design is expected to overcome the problem of the lack of interactive and visual learning media, so that it can significantly improve students' understanding, interest, and learning outcomes. It may also provide recommendations regarding the ideal criteria for illustration design, thereby supporting the creation of optimal 2D interactive multimedia assets for education at the elementary school level (Maesaroh dan Mulyadiprana 2020).

IMPLEMENTATION METHOD

This study employed a Design-Based Research (DBR) approach. The objective was to produce illustrations for the topic of man-made features that are effective, engaging, and relevant for elementary school students, emphasizing the importance of reflective practice in generating effective educational innovations (Terrazas-Arellanes et al. 2017). The process consisted of the following three stages:

1. Analysis
   The initial stage involved the comprehensive conceptualization of the visual design. This began with gathering illustration references from various sources, such as children's books and digital learning media. The purpose of this reference collection was to identify a visual style that is appealing, cheerful, and psychologically appropriate for elementary school students (Huda, Helda, dan Satini 2023). Based on these references, the core illustration concept was established: a simple and colorful visual style. Studies indicate that visual media, like images or illustrations, not only aid in conceptual understanding but also foster a more interactive and engaging learning environment (Nasution et al. 2023). This analysis formed the basis for selecting an appropriate visual concept, such as a semi-realistic cartoon style, which is considered more digestible for children.
2. Design
   Once the visual concept was established, the design stage focused on the detailed creation of each element. In this phase, background illustration assets were developed for the main page, material pages, and a puzzle game page, all depicting various characteristics of man-made features with a clear layout. The illustration process began with sketching, an integral part of the design phase. Sketching serves as the initial process for rapidly and exploratively visualizing creative ideas before proceeding to the more detailed and time-consuming digital stage (Purnama 2024). These illustrations were designed to be easily recognizable and not confusing for students. Additionally, navigation icons were created to guide the learning process. The chosen typography and fonts were selected for readability among children. All these assets were then arranged into a harmonious and structured layout.
3. Evaluation
   After the illustrations and typography were completed, the process continued to the development stage. All 2D graphic assets, including each layer of the background, went through a series of technical validations. The testing process on various resolution configurations aimed to validate the achievement of optimal visual quality standards. Revisions and adjustments to each layer were carried out carefully, referring to the principles of quality and functional suitability to ensure satisfaction with the final result.

RESULTS AND DISCUSSION

The design process for the 2D interactive multimedia assets on man-made features was conducted through several stages guided by the Design-Based Research (DBR) framework. The DBR approach is highly suitable for designing practical, solution-oriented 2D interactive multimedia assets (Rifka Alkhilyatul Ma'rifat, I Made Suraharta 2024). DBR allows researchers to simultaneously design an asset and study its design process within a real-world context—in this case, for the needs of elementary school students. The primary focus of this research is on the initial three stages of this framework: analysis, design, and evaluation.

1. Analysis Phase

   The first activity was a needs analysis, which identified the necessity for visuals that are engaging, simple, and easily understood by students. Concurrently, an analysis of the "Man-made Features" curriculum was performed to identify key objects for visualization. The second activity was a visual reference analysis, involving a visual literature study to find inspiration for an illustration style suitable for children. This process included collecting and analyzing references from various sources such as Pinterest, DeviantArt, children's storybooks, and other digital media.

Figure 1. Reference from Pinterest

Source: Pinterest

   This analysis synthesized several key inspirations: digital landscape illustrations, similar to the works of Studio Ghibli, were adopted to create immersive and calming backgrounds that serve as the main stage for the man-made feature objects. The color palette from retro cartoons served as a reference for building a color scheme that is bright and energetic, yet harmonious when combined with natural colors. Through this synthesis of varied references, a visual direction was established that merges expressive digital painting techniques with charming object design, aiming to produce assets that are not only visually beautiful but also effective in capturing the learning interest of elementary school students.

2. Design Phase

   In this stage, the findings from the analysis were translated into concrete visual concepts and designs. The process focused on creating 2D illustration assets for interactive multimedia. The first step was creating initial sketches to visualize the layout, composition, and main elements of each interface, serving as a framework before the

digitization process.

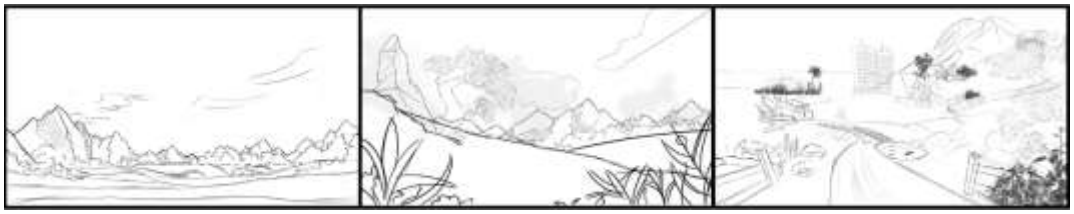

Figure 2. Sketch of Man-made Features Illustration
Source: Author's Documentation

The main concept of this sketch was to create a rich, integrated landscape illustration that displays various examples of man-made features within a single frame. The goal was to provide an engaging first impression and to directly introduce the main theme of the interactive multimedia to the user. This sketch is highly suitable for the main menu due to its informative and representative nature. Each depicted man-made feature could potentially function as an interactive, clickable button that students can use to access specific material menus, thereby creating an immersive user experience.

The second step involved typography design, where the font selection aimed to support readability and create a cheerful, child-friendly atmosphere. The chosen font was "Nice Tango Regular."

Figure 3. Font Selection for the Man-made Features Material
Source: Author's Documentation

This font conveys a cheerful, fun, and energetic feeling, making it highly suitable for capturing children's attention and fostering a playful learning environment.

Figure 4. Logotype for Man-made Features
Source: Author's Documentation

In addition to the base font selection, the visual treatment of the title text, or logotype, was specifically designed to become the primary visual identity of this interactive multimedia. The "Kenampakan Buatan" logotype design shown in the figure is an advanced application of the chosen typographic characteristics.

Figure 5. Button Assets for Man-made Features
Source: Author's Documentation

Consistency in visual style and typography was not limited to the title logo but was also meticulously applied across all User Interface (UI) elements, particularly the interactive buttons. This is crucial for creating an enjoyable experience.

For more general navigation functions (such as Information, Back, Play, Home, Help, Repeat, Profile, Sound, and Exit), square buttons with rounded corners were used. Inside them are universally recognized icons. The use of icons is highly effective for young users who may recognize images faster than text. Using the same font in a creamy white color ensures high readability against the green button background, maintaining consistency and helping users quickly recognize each button's function.

Following the sketching, typography, and color palette design, the next step was finalization. This is the technical process of transforming all rough designs into high-quality, ready-to-use digital visual assets.

Figure 6. Main Page for Man-made Features
Source: Author's Documentation

The application of a green color palette for the grasslands and blue for the sky successfully created a bright, cool, and spacious atmosphere. Detailed shading and highlight techniques on the contours of mountains, clouds, and vegetation provide visual depth and realism, making the scene feel less flat. This is a direct result of the coloring and detailing steps in the finalization stage. The custom-designed "Kenampakan Buatan" logotype is placed in the center as the main focal point. All finalized button elements—both the main "PLAY" button and the navigation icon buttons (Info, Help, Sound, Exit)—are placed in strategic positions.

Figure 7. Choice Page for Man-made Features
Source: Author's Documentation

The consistency achieved during finalization is not only visible on the main page but is also applied throughout the application's entire navigation flow. The following figure shows the design for the Menu Choice Page, which appears after the user presses the "PLAY" button and presents two options: "MATERI" and "GAME."

Figure 8. Material Page for Man-made Features
Source: Author's Documentation

The culmination of the entire design and finalization process is the main Material Page. This page functions as a rich digital illustration asset where all individually produced visual assets of man-made features are integrated into a single, cohesive, and interactive landscape. This is the primary learning arena for students. The illustration uses foreground (fence, flowers, road), mid-ground (the main area with an airport, factory, rice fields), and background (sea, buildings, temple) layers. This layering creates excellent spatial depth and prevents the composition from feeling crowded or chaotic.

This design does not merely place objects but also tells a small narrative. The path seems to invite the player to enter and explore, the plane ready for takeoff provides a sense of dynamism, and the activity in various areas makes this world feel alive.

Figure 9. "Bandara" Material Page for Man-made Features
Source: Author's Documentation

Information is not presented in a standard box but within an interface designed to resemble a wooden information board. This thematic design choice intelligently reinforces the sense of adventure and exploration. To maintain user focus, the material's background is made semi-transparent but remains readable, an effective visual technique to highlight the content in

front without making the user feel lost or disconnected from the main environment. This page displays a new illustration asset created specifically for the "Airport" material, featuring a modern terminal and an airplane in a fresh, detailed, and iconic style.

Figure 10. "Puzzle" Game Page for Man-made Features
Source: Author's Documentation

In addition to pages for material presentation, the visual asset finalization process also included the creation of gamification elements designed to reinforce student understanding through play. The following example is the Puzzle Game Page, one of the available interactive activities.

The illustration that forms the basis of the puzzle game features a beautiful landscape with a unique house as the center of attention. The choice of a house as the main subject invites students to recall and reconstruct one example of the man-made features they have studied. The illustration itself has been finalized with a soft and artistic touch. The use of warm lighting from the right, bright natural colors, and expressive digital brushstrokes gives the man-made feature illustration a very appealing and fresh look for children.

3. Evaluation Phase

Within the Design-Based Research (DBR) framework, the evaluation stage is not a final, separate phase but an integral and iterative process interwoven with the design cycle. The main objective of this stage is to test, validate, and gather feedback on the finalized visual assets. This evaluation serves as the foundation for revision and refinement, ensuring that the final product is truly effective, functional, and engaging for the target users—elementary school students.

The design of the 2D man-made feature assets has undergone a series of technical trials across various settings and resolutions. This process was intended to ensure that every aspect of the design achieved optimal visual quality standards before the final output. Asset consistency was re-checked across all finalized assets (backgrounds, buttons, icons, logotype) to ensure that the visual style, color palette, and rendering quality remained consistent. Revisions and adjustments were meticulously carried out on

each layer of the digital assets to correct minor details, such as lighting, shadows, and placement. This entire process was guided by principles of functional suitability and quality to ensure a technically and aesthetically satisfying final result.

CONCLUSION

Based on the comprehensive design process undertaken, it can be concluded that the design of 2D assets for the "Man-made Features" interactive multimedia for elementary school students has been successfully completed through a systematic Design-Based Research (DBR) method. This process has yielded an integrated and cohesive visual design system, characterized by a cheerful illustration style, a child-friendly color palette, distinct typography, and an intuitive user interface. Through meticulous stages—from needs and reference analysis, initial sketching, and finalization of high-quality digital assets, to the evaluation plan—each element was ensured to be not only aesthetically appealing but also functionally and pedagogically effective. Therefore, this design project has successfully produced a complete, high-quality set of 2D assets. These assets now stand ready as a strong visual foundation to be implemented in the actual development phase of an interactive learning application.

REFERENCES

Azhar Arsyad. 2011. *Media Pembelajaran*. Ed.1. Cet. Jakarta : Rajawali Pers, 2011.

Erfayliana, Yudesta, Oktaria Kusumawati, dan Tonang Juniarta. 2022. "Pengembangan Multimedia Interaktif Berbasis Articulate Storyline Pada Pembelajaran Pendidikan Jasmani, Olahraga, Dan Kesehatan Kelas IV SD/MI." *Terampil Jurnal Pendidikan Dan Pembelajaran Dasar* 9(1):107–18. doi: 10.24042/terampil.v9i1.12167.

Huda, Ega A. H., Trisna Helda, dan Ria Satini. 2023. "Pengaruh Penggunaan Metode Pembelajaran Picture and Picture Terhadap Kemampuan Menulis Teks Eksplanasi Siswa Kelas XI SMAN 2 Lintau Buo." *Alinea Jurnal Bahasa Sastra Dan Pengajarannya* 3(2):344–56. doi: 10.58218/alinea.v3i2.532.

Ilmiani, Aulia Mustika, Ahmadi Ahmadi, Nur Fuadi Rahman, dan Yulia Rahmah. 2020. "Aulia Mustika Ilmiani,Multimedia Interaktif untuk Mengatasi Problematika Pembelajaran Bahasa Arab.Vol. 8, No. 1, June 2020, 17-32." *Al-Ta'rib : Jurnal Ilmiah Program Studi Pendidikan Bahasa Arab IAIN Palangka Raya* 8(1):17–32.

Indrayati, Artin, Mia Setiawati, Muhammad A. Suprayudi, dan Kusriyati Kusriyati. 2022. "PENGARUH PEMBERIAN PAKAN BUATAN PADA UMUR YANG BERBEDA PADA LARVA IKAN BETOK Anabas Testudineus BLOCH." *Buletin Jalanidhitah Sarva Jivitam* 4(2):137. doi: 10.15578/bjsj.v4i2.11370.

Maesaroh, Siti, dan Ahmad Mulyadiprana. 2020. "Rancangan Multimedia Interaktif tentang Pantun untuk Pembelajaran Bahasa Indonesia di Sekolah Dasar." *PEDADIDAKTIKA: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar* 7(3):133–42. doi: 10.17509/pedadidaktika.v7i3.25338.

Muthahharah, Muthahharah, Nadia Ananda, Natasya P. Rantelino, dan Rismayani Rismayani. 2022. "Pengembangan Multimedia Pembelajaran Interaktif Pengenalan Materi

Kepramukaan Untuk Anak Sekolah Dasar." *Techno Com* 21(3):596–612. doi: 10.33633/tc.v21i3.6313.

Nasruri, Hafid D., Parji Parji, dan Muhammad Hanif. 2021. "Identifikasi Kenampakan Alam Dan Buatan Kabupaten Ngawi Sebagai Sumber Belajar IPS Kelas v SD." *Jurnal Pendidikan Indonesia* 2(7):1186–99. doi: 10.36418/japendi.v2i7.237.

Nasution, Eni S., Evitamala Siregar, Yuni Rhamayanti, Fauziah Nasution, dan Tinur Rahmawati. 2023. "Upaya Peningkatan Minat Belajar Peserta Didik Melalui Media Belajar Gambar Pada Sekolah Luar Biasa (SLB) Negeri Padang Sidempuan." *Kalandra Jurnal Pengabdian Kepada Masyarakat* 2(1):7–13. doi: 10.55266/jurnalkalandra.v2i1.235.

Purnama, Drajat Jati. 2024. "Sketsa Ide Dalam Proses Perencanaan Dan Perancangan Desain Interior." *Jurnal Muara Ilmu Sosial, Humaniora, dan Seni* 8(3):584–91. doi: 10.24912/jmishumsen.v8i3.33803.2024.

Rifka Alkhilyatul Ma'rifat, I Made Suraharta, Iryanto Irvan Jaya. 2024. "Design Based Research: Pengembangan Bahan Ajar Etnoandragogi." 2(January):306–12.

Siti Nuraini, Ana, Ani Nur Aeni, dan Dadan Nugraha. 2023. "Chatbot: Materi Kenampakan Alam dan Buatan di Indonesia untuk Siswa Kelas V Sekolah Dasar." *MIMBAR PGSD Undiksha* 11(1):34–40. doi: 10.23887/jjpgsd.v11i1.59153.

Terrazas-Arellanes, Fatima E., Carolyn Knox, Lisa A. Strycker, dan Emily D. Walden. 2017. "Online Learning Tools for Middle School Science." *International Journal of Information and Communication Technology Education* 13(1):27–40. doi: 10.4018/IJICTE.2017010103.

Wahyu, Sawali. 2022. "Penerapan Metode Game Development Life Cycle Pada Pengembangan Aplikasi Game Pembelajaran Budi Pekerti." *Skanika* 5(1):82–91. doi: 10.36080/skanika.v5i1.2904.