

Wild Wonder Animals Explorers

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The Wild Wonders: Animal Explorers project is an interactive Augmented Reality (AR) storybook designed to educate and engage children aged between 4 to 8 years on the subject of wildlife and environmental conservation. The storybook is enriched with 3D animal models, animations, and immersive auditory elements, offering a captivating learning experience that encourages curiosity about nature. Developed using Unity, Blender, and Adobe Illustrator, the project merges narrative storytelling with interactive AR content to introduce children to the concepts of biodiversity, ecosystems, and the importance of conservation. By integrating storytelling with AR, this project not only enhances traditional learning but also aligns with educational goals related to STEM (Science, Technology, Engineering, and Mathematics) and environmental awareness. The research methodology adopts the ADDIE model, guiding the project through structured phases of analysis, design, development, implementation, and evaluation. The goal of this study is to create an impactful learning tool that fosters environmental consciousness in young learners while promoting active engagement through technology.

Keywords: *Augmented Reality, Storybook, Wildlife Education, Children, Environmental Conservation*

I. INTRODUCTION

In today's technology-driven society, children are increasingly exposed to digital media from an early age, making it essential to leverage innovative platforms for educational purposes. The Wild Wonders: Animal Explorers is a project that addresses this need by developing an AR-enhanced storybook that introduces children to wildlife, ecosystems, and conservation in a playful and interactive manner. Traditional methods of teaching about biodiversity and environmental science often rely on static images and text, which may not effectively engage or educate young learners. By combining the immersive capabilities of AR with vibrant storytelling, this project seeks to transform the way children learn about the natural world. The application aims to deliver educational content in a fun and memorable way, nurturing a lifelong appreciation for animals and their environments.

A. Objective

- To create an AR-based storybook that enhances learning through interactivity
- To design a user-friendly interface suitable for children aged 4–8
- To evaluate the impact of AR learning tools on children's engagement and understanding

II. LITERATURE REVIEW

A. A Case Study 1: Wildlife AR – 3D Animal Tracker



Figure 1: Wildlife AR – 3D Animal Tracker

The Wildlife AR application provides a platform where users can explore life-size 3D animals placed into their physical environments through AR technology. Although it offers educational information on animal habitats and behaviors, the app's interactivity is limited primarily to viewing, without integrated narratives or learning paths, which are essential in early childhood education. The Wild Wonders project builds upon this by adding storytelling, structured quizzes, and contextual animal interactions to enrich the learning experience.

B. Case Study 2: Animal 3D AR



Figure 2: Animal 3D AR

Animal 3D AR enables users to project animated animals into real-world settings using mobile devices. While it delivers a visually impressive experience, its lack of educational depth and absence of structured learning objectives reduces its suitability for long-term educational use. In contrast, *Wild Wonders* integrates detailed animal facts, conservation messages, and narrative progression to ensure both entertainment and knowledge acquisition.

C. Case Study 3: Seek by iNaturalists



Figure 3: Seek by iNaturalists

Seek by iNaturalist encourages users to explore biodiversity in their environment by identifying species through image recognition and AR overlays. Though it supports discovery-based learning and promotes outdoor engagement, its interface and content are better suited for older children or adult learners. *Wild Wonders* tailors its design to the cognitive and literacy levels of younger children, using storytelling and guided AR interactions to explain complex ecological relationships in simple, understandable ways.

III. METHODOLOGY

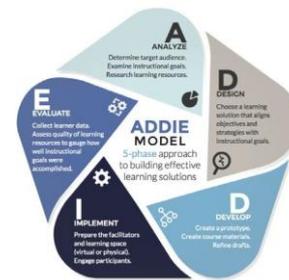


Figure 4: ADDIE Model

This project utilized the ADDIE instructional design model, which includes five critical phases—Analysis, Design, Development, Implementation, and Evaluation—to ensure that the educational objectives are effectively translated into an interactive digital product.

A. Analysis Phase

In the initial phase, a comprehensive needs assessment was conducted to identify the learning preferences and developmental requirements of the target audience—children aged 4 to 8. The analysis also examined existing gaps in wildlife education tools for young learners and how AR could bridge those gaps. The findings suggested that interactive media, particularly those that support visual and tactile learning, significantly improve retention and engagement in young children.

B. Design Phase

Based on the analysis, a detailed design framework was created, which included storyline development, character design, AR feature integration, and educational objectives. The design phase focused on aligning each story segment with specific learning outcomes. Interactive quizzes, animated scenes, and sound effects were strategically planned to enhance the user's cognitive and emotional connection with the content. The user interface was designed to be intuitive and child-friendly, incorporating bright colors, large buttons, and voice-guided instructions.

C. Development Phase

In the development phase, all visual, interactive, and functional components were built and assembled using Unity and Blender. This included the creation of 3D animal models, environments, animations, sound design, and quiz logic. The AR experiences were programmed using marker-based tracking to allow pages of the physical book to trigger digital

interactions. All content was tested for age appropriateness, clarity, and engagement.

D. Implementation Phase

The prototype was implemented on mobile platforms and tested with actual users, including children, parents, and educators. The testing focused on observing user interaction, identifying technical or usability issues, and gathering feedback related to content engagement and educational value. A structured questionnaire was used to collect quantitative and qualitative data.

E. Evaluation Phase

The final phase involved analyzing the user feedback to assess whether the learning objectives were met. Most users reported increased understanding of animal roles in ecosystems and showed improved engagement compared to traditional learning tools. The evaluation helped refine the application interface, pacing of animations, and the difficulty level of quiz questions. These refinements were essential to optimize both user experience and educational effectiveness.

IV. PROTOTYPE DEVELOPMENT

A. Software Requirements

Software	Functionality & Purposes
Adobe Illustrator	Used for designing storybook pages, character art, environmental backgrounds, and UI
Blender	Utilized to create, rig, and animate 3D animal models and environmental assets
Unity with Vuforia SDK	Served as the main development platform for building the AR application
Canva	Assisted in layout planning, visual mockups, and presentation material creation

B. Prototype Design



Figure 5: Prototype Design

The prototype consisted of a printed storybook and a mobile AR application. Each page of the storybook contained a marker that, when scanned, activated a 3D animation or interactive scene. The AR app featured:

- A page with story selection
- Interactive animal behaviors in 3D
- Short narrations and animal sound effects
- Embedded quizzes and mini-games related to environmental conservation

Story elements were carefully aligned with ecological facts to ensure that children not only enjoyed the story but also absorbed meaningful lessons about biodiversity and sustainability.

V. TESTING AND RESULT

A. Survey Result

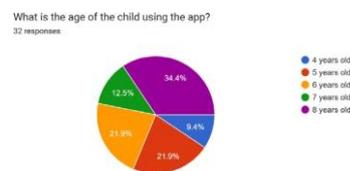


Figure 6: Survey Result

A total of 32 respondents participated in the survey. The children involved ranged from 4 to 8 years old, with the following age distribution:

- **8 years old:** 11 respondents
- **6 years old:** 7 respondents
- **5 years old:** 7 respondents
- **7 years old:** 5 respondents

- **4 years old:** 3 respondents

This distribution reflects strong representation across the entire target age range, with the majority falling at the upper end (8 years old), suggesting that older children may be more inclined or capable of independently interacting with AR features.

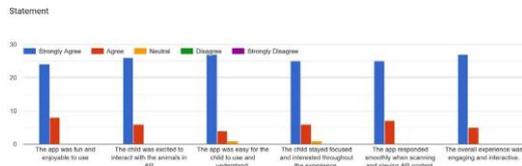


Figure 7: Survey Result

- 94% of parents agreed or strongly agreed that the app was fun and enjoyable.
- 91% reported that their children were excited to interact with the AR animal characters.
- 100% agreed that their child was able to stay focused and engaged throughout the session.

These results show that the storybook successfully captured children’s attention, an essential factor in early childhood learning. The use of 3D animations, voice narration, and bright visuals helped create an immersive experience that encouraged active participation. Engagement in learning, especially for children, is not only about attention—it’s about emotional connection. When children enjoy the process of learning, they are more likely to retain information. The results here confirm that *The Wild Wonders: Animal Explorers* achieved that balance between education and entertainment, often referred to as “edutainment.”

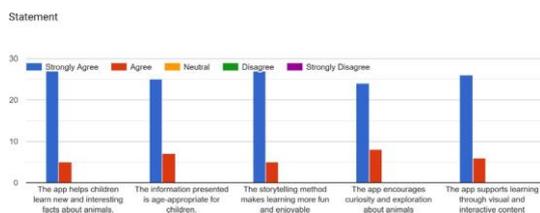


Figure 8: Survey Result

- 100% of parents agreed that the app helped children understand the importance of protecting animals and nature.
- 100% believed the app encouraged respect for animals and their natural habitats.

- 100% agreed the storyline helped children connect animals to their real-world environments.
- 94% reported that their children showed increased interest in learning more about animals and conservation.

This overwhelming support from respondents strongly validates the app’s educational effectiveness. By embedding key messages about animal behavior and environmental conservation in the narrative, the app encourages critical thinking and empathy in young learners. When children begin to care about what they’re learning, especially in the context of animals and nature, it creates a foundation for lifelong environmental awareness and responsible behavior.

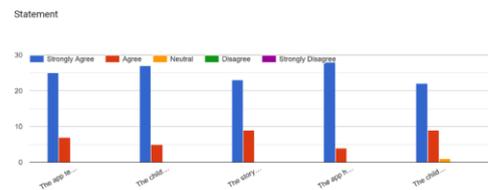


Figure 9: Usability and Design Evaluation Survey Result

- 97% said the app was easy to use and intuitive for their child.
- 94% found the app’s visuals attractive and well-designed.
- 97% felt the buttons and layout were accessible for children.
- 97% agreed the AR animations worked smoothly with minimal errors.
- 94% confirmed that the overall design was suitable for children aged 4–8.

These results are important because they demonstrate that the app meets the cognitive and motor skill abilities of its target users. Children in this age group often have limited reading skills and short attention spans, which means that every visual and interactive element must be intentional and accessible. The strong positive feedback indicates that design decisions—like bright colors, large buttons, clear icons, and intuitive scanning—contributed to a high-quality user experience.

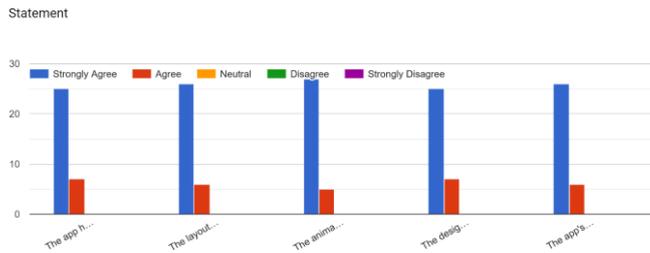


Figure 10: Survey Result

100% of respondents agreed that games, quizzes, and animations improved learning and enjoyment. The inclusion of a mini-game and quizzes was not only engaging but also instrumental in reinforcing learning outcomes. Children were able to apply what they had learned about animals through play-based assessments and interactive scenarios, which further supports knowledge retention.

B. Observations

During interactive sessions, children were observed to express excitement, ask questions about animals, and revisit specific scenes repeatedly. Parents appreciated the inclusion of educational content wrapped in a fun and creative format. Some parents recommended adding multilingual options and additional stories to broaden the appeal and accessibility.

VI. CONCLUSION

The Wild Wonders: Animal Explorers project successfully demonstrates how Augmented Reality can transform early childhood education by providing an engaging and interactive platform for learning about animals and the environment. The use of the ADDIE model ensured a structured and iterative development process, which contributed to the application's educational effectiveness and user engagement. The storybook and application combination offers a new paradigm in wildlife education by bridging storytelling and digital interaction. This project not only supports the development of cognitive and environmental awareness in young children but also serves as a reference for future educational AR tools.

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