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ZOOTREK AR : PRESCHOOL EXPEDITION

Sarah Sofeah Zulfikri

Sazanah Md Ali

Selangor Islamic University

sarahfikry02@gmail.com, sazanah@uis.edu.my

1. Product Description

ZooTrek AR: Preschool Expedition is an educational mobile application that integrates augmented reality (AR) technology to enhance preschool learning. The app is designed for children aged 4 to 6, providing an interactive zoo-like experience where they can explore and learn about endangered animals.In addition to the mobile app, the product is accompanied by a specially designed ZooTrek AR Book. By scanning the pages of the book with a smartphone or tablet, children can activate AR features that display 3D animal models, animations, and multimedia content directly on the book's illustrations.

This book-app integration enriches the learning process by blending traditional reading with digital interactivity, making the experience both tangible and immersive.Through the app, children are guided by a virtual AR character who introduces various animals, presents 3D models, and provides engaging facts supported by narration, videos, and images. A built-in quiz module further reinforces learning, offering immediate feedback to sustain motivation.By merging AR technology with preschool education, ZooTrek AR fosters curiosity, engagement, and memorable learning experiences while promoting early awareness of wildlife conservation. Its innovation lies in combining digital interactivity with physical reading material, creating a powerful hybrid learning tool that is both educational and entertaining.

2.Innovation Objectives

1. To develop an innovative AR learning platform

This objective focuses on creating a mobile application that integrates augmented reality (AR) technology into preschool education. The innovation lies in offering interactive 3D animal models, narration, and animations that enhance children's learning experiences beyond traditional methods. By doing so, the platform introduces a novel way of teaching that caters to the digital-native generation, making learning more dynamic, engaging, and effective.

2. To combine education and entertainment through immersive learning

The project aims to merge pedagogical content with entertainment elements in order to sustain children's interest and motivation. This is achieved through the use of playful features such as quizzes, interactive storytelling, and gamified AR experiences. By balancing fun and education, the application ensures that learning is not only enjoyable but also meaningful, thereby addressing the challenge of keeping preschoolers engaged in structured educational activities.

3. To establish curriculum content for future AR-based preschool applications

This objective emphasizes the importance of aligning AR features with preschool curriculum standards. The content within the app introduces fundamental knowledge about animals, environmental awareness, and conservation, ensuring that learning outcomes are developmentally appropriate and educationally relevant. In addition, the framework developed can serve as a reference for educators and developers in designing future AR applications for preschool education, promoting consistency, quality, and scalability in technology-enhanced learning.

3. Problem Statement

1. Limited innovative platforms for preschool education

Current preschool education relies heavily on traditional tools such as flashcards, picture books, and teacher-centered instruction. These methods often lack the level of interactivity required to fully engage young learners, especially children with disabilities who may need more accessible and stimulating approaches. The absence of innovative platforms that integrate technologies such as augmented reality (AR) creates barriers to inclusivity, as these children may struggle to access learning materials that suit their needs. Without adaptive and engaging digital tools, preschool education risks leaving behind learners who could benefit the most from innovative methods.

2. Minimal integration of education and entertainment in preschool learning

While digital educational resources are increasingly available, many fail to strike a balance between fun and pedagogy. Some tools are heavily focused on entertainment with limited educational value, while others provide knowledge in rigid formats that do not sustain children's attention. This lack of integration between learning and play reduces children's motivation, engagement, and retention of knowledge. For preschoolers, whose learning is best supported by exploration and curiosity, there is a need for immersive tools that combine educational objectives with entertainment to create meaningful and enjoyable learning experiences.

3. Lack of structured curriculum-based AR applications for preschoolers

Although AR technology has been successfully applied in higher levels of education, its adoption in preschool settings remains limited and often unstructured. Many existing AR applications for children are designed primarily for general use, with little alignment to preschool curriculum standards. This results in fragmented learning experiences that may be engaging but do not systematically support long-term educational goals. The absence of curriculum-oriented AR applications prevents educators from fully integrating technology into lesson plans, limiting its potential as a sustainable and effective teaching tool in early childhood education.

4. Authenticity / Novelty

The ZooTrek AR: Preschool Expedition application presents a unique and innovative approach to preschool education by integrating augmented reality (AR) technology with curriculum-based learning. Unlike conventional preschool learning tools that rely on static visuals or teacher-centered methods, this product provides an immersive, interactive, and engaging experience where children can explore 3D animal models, listen to narration, and interact with multimedia features in real time.

The novelty of the product lies in its ability to combine education and entertainment seamlessly, transforming traditional learning into a playful exploration that fosters curiosity and motivation. While most AR applications for children focus primarily on entertainment, ZooTrek AR emphasizes curriculum alignment by embedding content related to endangered animals and environmental awareness, ensuring that the learning outcomes extend beyond fun to meaningful knowledge acquisition.

Furthermore, this product introduces a framework for future AR-based preschool applications, serving as both a teaching aid and a prototype model for educational technology innovation. Its originality also stems from addressing gaps in early childhood education by providing exposure to rare and endangered animals that children would not typically encounter, thereby enhancing their learning scope while promoting early awareness of wildlife conservation.

5. Implementation Level

1. Integration into Lesson Planning

The implementation of the ZooTrek AR: Preschool Expedition application begins with its integration into lesson planning, where teachers align the AR content with curriculum topics such as animals, nature, or the environment. Specific sessions are then scheduled so that the app can be used to complement storytelling, picture books, or classroom discussions.

2. Technology Setup and Training

Next is the technology setup and training phase, in which schools prepare the necessary devices, such as tablets or smartphones, with the AR app installed and ensure internet access where required. Teachers are also provided with basic training on how to operate the application, manage AR features, and guide children through interactive activities.

3. Classroom Implementation

The third step involves classroom implementation, where children use the app in small groups or guided sessions to explore 3D animal models, listen to narration, and participate in quizzes. During these sessions, teachers play an active role in facilitating discussions, encouraging interaction, and linking the AR content to real-world knowledge.

4. Evaluation and Feedback

Finally, the process concludes with evaluation and feedback, where teachers observe children's engagement, participation, and learning outcomes. Feedback is collected to refine teaching strategies and to assess the effectiveness of the application in enhancing motivation, curiosity, and knowledge retention among preschool learners.

6. Uses and Applications

The ZooTrek AR: Preschool Expedition application enhances classroom learning by serving as an interactive teaching aid that helps children explore animals and nature through immersive AR experiences. It also supports cognitive and language development by introducing new vocabulary, animal facts, and multimedia content that strengthen early literacy, comprehension, and memory skills.In addition, the application promotes engagement and motivation, as its playful design and game-like features encourage curiosity and sustain children's interest, transforming learning into an enjoyable activity. At the same time, it introduces wildlife conservation awareness by exposing children to knowledge about endangered animals and their habitats, thereby fostering environmental sensitivity and responsibility from an early age.

The product further provides experiential learning opportunities beyond the classroom by enabling "virtual field trips" through AR simulations, allowing children to encounter animals they might not otherwise see due to limitations of cost, distance, or safety. Finally, ZooTrek AR serves as a model for innovative educational tools by demonstrating how AR can be effectively integrated into early childhood education, offering a valuable framework for the future development of similar applications.

7. Innovation Product/Project Impact

The ZooTrek AR: Preschool Expedition represents a significant innovation in early childhood education through its integration of augmented reality (AR) technology with curriculum-based learning. By combining interactive 3D animal models, narration, and multimedia elements, the product creates an immersive environment that transforms conventional, passive teaching methods into dynamic and engaging experiences. This innovation not only enhances children's motivation and curiosity but also strengthens cognitive, linguistic, and observational skills in ways that traditional resources cannot achieve. In terms of impact, the application broadens children's exposure to endangered and exotic animals, fostering early awareness of wildlife conservation while promoting experiential learning beyond the classroom. It also provides teachers with a novel instructional tool that supports curriculum delivery and demonstrates the potential of AR to redefine preschool pedagogy. More broadly, ZooTrek AR contributes to the field of educational technology by serving as a pioneering model for future AR-based learning applications, positioning itself as both an innovative solution and a benchmark for impactful digital learning tools.

8. Achievements

This product was showcased in the Final Year Project Exhibition 2025 at Faculty of Multimedia Creative and Computing, UIS and received a best multimedia creative award sticker from jury.