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ENHANCING MUSEUM EXPERIENCES WITH AUGMENTED REALITY: DIGITAL CONTENT DEVELOPMENT AT UNIVERSITAS PENDIDIKAN INDONESIA'S NATIONAL EDUCATION MUSEUM

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Abstract

This research aims to develop Augmented Reality (AR)-based digital content at the Diknas Museum, the national education museum of Universitas Pendidikan Indonesia (UPI), focusing on the legacy of Dominique Willem Berretty, the founder of the iconic ISOLA building at UPI. The digital content, named "AR Baretty Voice," utilizes a heuristic approach to retrieve and present reliable historical sources. The research team obtained direct information from the Berretty family in Leiden via the Zoom platform. The development process comprises two main stages. The pre-production phase involves gathering information and creating a storymatic to shape the digital narrative. The production phase includes processes such as image input equipment, creating a virtual object database, interacting with virtual objects, and real-time interaction technology. The resulting digital content features visualizations of Berretty in significant life scenes, highlighting the ISOLA UPI building as the place where he found success and experienced solitude. The AR-based digital content at the Diknas UPI Museum enhances the museum's offerings, transforming static exhibits into dynamic, interactive experiences that enrich visitors' understanding and engagement.

Keywords: Baretty, ISOLA UPI, M'Isolo E Vivo, Museum content digitalization.

1. Introduction

In line with technological advancements and the intention of bringing museums into a more contemporary context, digital platforms have emerged as a means of museum development. Digital museums are closely associated with digital technology [1] and educational digital archives [2]. The evolution of digital museums can significantly contribute to cultural diversity, particularly concerning content, benefits, dissemination processes, and user behaviour in utilizing digital museums [3]. Digital museums, also referred to as digital heritage, have become a vital component within the context of cultural heritage and are integrated into the creative economy. The theoretical foundation employed in digital museums is sociotechnical, representing a model of interaction among individuals, information, and technology aimed at enhancing visitors' active understanding (self-directing, self-selecting) through three main stages of learning: discover, develop, and construct [4]. Within the realm of digital museums, there are three values that need to be considered: functional value, emotional value, and social value. It is essential to align the digital collection process with evolving lifestyles [5]. The development of digital museums must also consider various aspects, including identification digital systems, the quality of digital exhibits, social interaction, and engagement interaction [6].

Digital museum platforms enable the development of diverse digital technologies and media, leading to the identification of museums within this context as digital heritage and new media in museums [7]. The development of digital museums also requires consideration of existing objects and visitors' experiences in accessing information (experience-based interactive) [8]. Collections in digital museums can be presented in various formats, including physical objects (object-centred), artifacts presented through imaginative forms that evoke emotions (narrative-cantered), and digital information (information-centred) [9]. Digital information within digital archives provides a platform that enables visitors to explore information using "new ways," making the search process more flexible and dynamic [10]. One key principle in the development of digital museums is the provision of a mobile guide model for museum visitors, assisting them in selecting information that interests them. Digital museums must also consider exhibition design and gallery layout as they influence how visitors access specific information, ensuring user-friendliness and entertainment value, particularly for the younger generation (digital natives) [11].

Various technology platforms can be developed within digital museums, including Augmented Reality (AR), which can aid in the reconstruction of specific artifacts using 3D technology [12]. Other technologies that can be developed include panoramic photography, videography, and 3D animation [13]. Digital museums can also create interactive games, such as video games, which serve educational and memorable purposes. Games as teaching tools hold the potential to impart knowledge (entertainment games). Learning that utilizes games as tools to stimulate learners is known as "tangential learning" [14]. This research aims to develop digital content based on Augmented Reality at the Diknas UPI Museum, focusing on the history of Baretty, the founder of Villa Isola at UPI. The digital content developed, referred to as "AR Baretty Voice," is expected to become an engaging history learning medium, particularly for the younger generation of Indonesia.

2. Methods

This research is intended to design digital media based on Augmented Reality (AR) with the main focus on highlighting the history of the founder of the ISOLA building at the Indonesian Education University, a phenomenal and protected structure that has become an icon in the city of Bandung. The design process of AR-based digital media is carried out in the production stage.

The production stage of "AR Baretty Voice" involves several detailed steps to ensure a comprehensive approach to creating the AR content. Figure 1 illustrates these steps, which include image input equipment, a virtual object database, interaction with virtual objects, and real-time interaction technology.

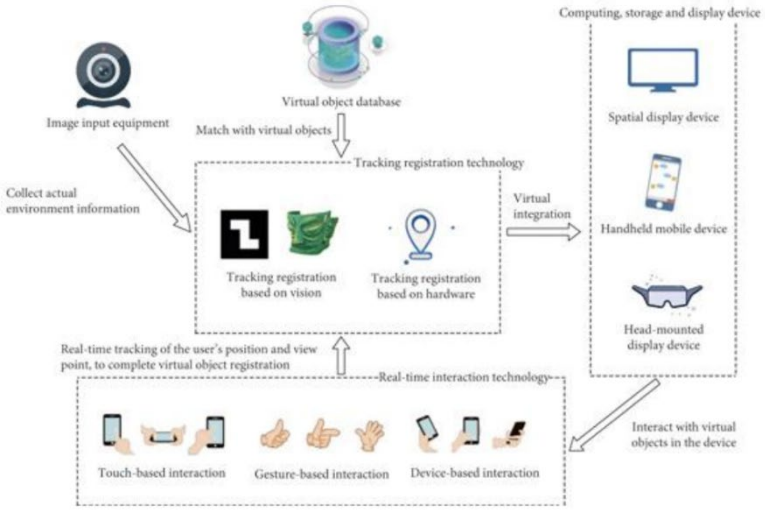

Fig. 1. Production stage "AR Baretty Voice".

The production process begins with the exploration and collection of digitalization objects. This involves gathering assets and creating mock-ups to visualize the final AR experience. Following this, the production of assets and layouts is carried out, which includes designing 2D/3D background environments and modelling props with appropriate texturing to enhance the visual appeal.

Compositing and visual effects (VFX) are integrated next, involving match move tracking, matte painting, lighting setup, and rendering to create a cohesive and visually engaging AR experience. Motion graphics and kinetic typography animations are developed to add dynamic elements to the content. This phase also includes creating transitions, lower thirds, and upper thirds to ensure a polished presentation.

Video editing is a crucial part of the process, where archive footage is re-edited and retrofitted, followed by ingestion, logging, and offline editing. This stage includes multiple revision sessions to refine the content. Audio and music production involves mixing, scoring, and adding sound effects (SFX) and voice-overs to enhance the auditory experience.

The finalization process includes digital grading and colour processing to ensure visual consistency across different platforms. The content is then mastered and packaged for multiplatform delivery. Platform authoring development encompasses theme configuration, programming, coding, and responsive multi-platform executable packaging, followed by beta testing to ensure functionality.

The user integration deployment phase includes generating QR codes, setting up hyperlinks, printing QR code triggers, and the installation and deployment of the final AR content. This comprehensive production process ensures the successful development of "AR Baretty Voice" as an engaging and interactive digital medium that effectively conveys the historical significance of the ISOLA building and its founder, Dominique Willem Berretty.

3. Results and Discussion

The pre-production stage of "AR Baretty Voice" involves a documentary study concerning the family of William Dominique Berretty, the initial owner of Villa Isola, which now serves as the office of the Rector and other leaders of UPI. Previous research efforts have resulted in videography capturing the perspective of the Berretty family on the founder of Villa Isola, displayed as part of a collaboration with Leiden University. To enhance its appeal and make it more engaging, the next stage involves creating dynamic digital collections in the form of AR, recounting the story of Dominique Willem Berretty. This narrative encompasses his role as the founder of Villa Isola, his founding of the Anneta News Agency (now Antara), and his romantic stories as a person of Indo-Javanese-Italian-French descent. This approach aims to attract visitors, with the number of visitors normalizing over the past three months, averaging around 5,000 per month. Accessing information dynamically will offer visitors a wide range of experiences [15], serving as a personal collection tool, allowing visitors to explore what interests them independently [16]. In this context, the digital museum transitions from a technocentric to a humancentric concept [17].

The story of Dominique Willem Berretty has been documented in his biography by Coen Van't Veer, a lecturer at Leiden University. The author of this book has expressed a willingness to contribute to this research by providing a letter of consent via email. Together with other historians from Leiden University, they will visit Villa Isola. Another preliminary research effort is the book titled "Villa Isola yang Bertahan Bersama Waktu" (Villa Isola that Survives Time) by Kurnia: Het Gebouw Dat de Tijd Doorstat in 2022, which delves into the metamorphosis of Villa Isola, from its first ownership by Berretty to its current status as the Rectorate Building. This preliminary study, along with videography of testimonials regarding Berretty's character, has resulted in an initial draft tracing his life.

The production stage conducted thus far has yielded digital content comprising visualizations of various events related to Berretty. The digital content referred to in this research is termed "storymatic." The initial interface of "AR Baretty Voice - Storymatic" depicts Berretty in three aspects: business, romance, and ISOLA (the current ISOLA UPI building). The portrayal of the narrative in the form of a storymatic serves as crucial initial content. The concept of a digital/mobile guide can expedite visitor access to information by up to 60%, potentially attracting more visitors [18]. Mobile applications are designed to enable visitors to navigate and

take digital tours through their smartphones within the museum, and museums can also develop audio tour guides to enhance the museum experience.

Further storymatic visualizations include an airplane accident involving Berretty. This visualization depicts a KLM airplane departing from Schiphol Airport in the Netherlands bound for Batavia, which crashed near Rutbah Wells, close to Baghdad. The crash resulted in the tragic loss of all crew members and passengers, including Dominique Willem Berretty, a prominent figure in the Dutch East Indies media. Another remarkable storymatic element highlights that before the accident, Berretty wrote the words "M'Isolo E Vivo," meaning "I am alone and surviving." These words are still inscribed in one of the corners of the ISOLA UPI building. This story highlights Berretty's hardworking, determined, and intelligent nature, but also suggests an unfulfilled human aspect of his life. Digital collections must be managed to achieve their educational and pedagogical objectives [19], especially for digital natives who require specific news navigation patterns [20, 21]. The utilization of digital technology in museums can be particularly appealing to younger generations, and museums should strive to engage a diverse audience [22].

Overall, the storymatic visualization, which is the main raw material for "AR Baretty Voice," can be seen in Fig. 2. Teaching history to the younger generation necessitates skills in developing digital media with visualizations and materials that accurately depict past events. Important considerations include museum infrastructure [23, 24], hospitality, mobilities aspects [25], potential technological aspects, and limitations in technology [26]. Human resources need adequate preparation, digital skills, digital literacy [27], and technical expertise [28]. The DIKNAS UPI Museum has the potential to become a museum that embraces the values of edutourism.

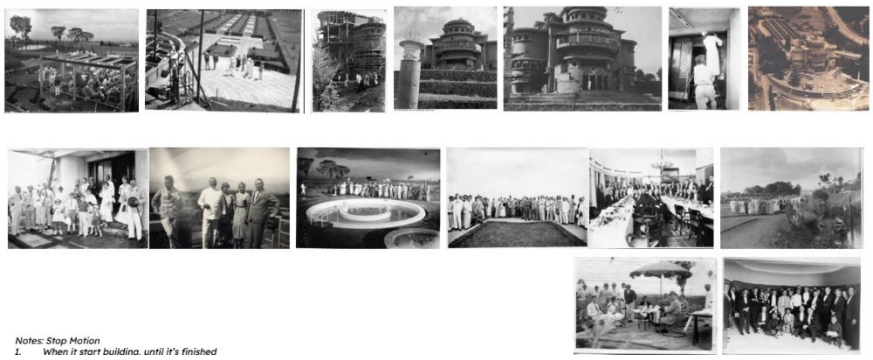

Fig. 2. Storymatic visualization "AR Baretty Voice".

Figure 2 illustrates that teaching history to the younger generation, especially, necessitates skills in developing digital media with visualizations and basic materials that depict an accurate representation of past events.

4. Conclusion

The research on the development of digital content at the Diknas UPI Museum represents a pivotal effort in transforming the museum's traditional image. Historically, the museum has been perceived as rigid, with less engaging and static

historical content. The introduction of digital content not only modernizes the museum but also revolutionizes the way history is presented, making it more captivating and enjoyable for visitors. This transformation is particularly significant for the younger generation. By leveraging modern technology, such as Augmented Reality (AR), the museum creates interactive and immersive experiences that make learning about history both engaging and memorable. This approach helps bridge the gap between the past and the present, allowing young visitors to see the relevance of historical events in today's world. Furthermore, the development of digital content aligns with the broader trend of integrating digital technology into educational environments. This strategic move not only enhances the museum's appeal but also positions it as a leader in innovative educational methods. By providing dynamic and interactive historical content, the museum fulfils its educational mission more effectively, encouraging visitors to explore and understand history independently. In conclusion, the digital content development at the Diknas UPI Museum is a critical initiative that enriches the museum's offerings, making history accessible and engaging. This effort ensures that the museum remains relevant in a digital age, particularly for younger audiences who are accustomed to interactive and multimedia-rich environments. Ultimately, this project underscores the importance of evolving museum practices to meet the educational needs of future generations while preserving the integrity and significance of historical narratives.

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