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Virtual Reality Design For Introduction To Ternate City Culture

Muhammad Ridha Albaar[1], Hairil Kurniadi Siradjudin[2], Seh Turuy[3], Yasir Muin[4]
Informatics Study Program, Engineering
Khairun University, Indonesia
ridha.albaar@unkhair.ac.id

Abstract

Culture is a priceless heritage that reflects the identity, values, and histo-ry of a community. Ternate City, as one of the historic cities in Eastern Indonesia, boasts an abundant cultural heritage, including customs, traditional arts, and sites dating back to the Ternate Sultanate. One im-portant cultural site is Kalamata Fort, which preserves local historical and cultural values. However, the influence of globalization and the lack of innovative media for promoting culture have led to a low level of public understanding and appreciation of this cultural heritage, espe-cially among the younger generation.This research aims to design a vir-tual reality (VR)-based learning medium that visually and interactively displays the Kalamata Fort tourist attraction as an educational tool for cultural awareness. VR technology was chosen for its ability to provide an engaging, immersive experience, allowing users to explore the fort's environment and understand its historical values. The research method included collecting cultural data through observa-tion, interviews, literature review, and documentation, which was then processed into a 3D model and integrated into the VR platform. The design results indicate that VR can be an effective medium for increas-ing public interest, understanding, and pride in local culture. With this approach, it is hoped that Kalamata Fort will not only be known as a historical site, but also as a technology-based educational facility that strengthens the cultural identity of Ternate City.

Keywords: ***Virtual Reality, Local Culture, Kalamata Fort, Ternate City, Educational Media.***

INTRODUCTION

Ternate City is one of the regions in Indonesia rich in cultural and historical values. As the former center of the Ternate Sultanate, the city is home to a wealth of traditions, arts, customs, and historical sites that reflect its past glory. However, developments and the influence of globalization have led to a decline in interest in local culture, especially among the younger generation. The lack of creative and modern media to promote culture also contributes to low public awareness of the importance of cultural preservation. In this context, this research focuses on the cultural tourist attraction of Kalamata Fort as a representation of Ternate's cultural heritage. Amidst today's technological advances, the use of digital media is a strategic solution for cultural preservation. One potential technology is Virtual Reality (VR), which can present interactive and immersive virtual experiences. This technology not only conveys information visually but also creates a stronger emotional engagement with users. The use of VR to introduce the culture of Ternate City opens up significant opportunities to increase appreciation for

local cultural heritage. With VR, residents and tourists can explore cultural sites, participate in traditional processions, or understand local arts and traditions through engaging and educational approaches. This research aims to design VR-based media that not only visually displays cultural elements but also provides an immersive experience to raise awareness and concern for cultural preservation. Through this approach, it is hoped that Ternate City's culture will become more widely known and become an attraction for the development of cultural tourism.

LITERATURE REVIEW

Research by Radianti et al. (2020) shows that virtual reality has great potential for experiential learning. The use of VR allows students and the general public to learn about culture in immersive ways, such as virtually visiting historical sites or digitally participating in cultural rituals. VR has been shown to increase user engagement, retention, and comprehension of cultural materials. According to Bekele et al. (2021), virtual reality has been used as a medium for cultural heritage preservation, particularly for sites that are vulnerable to damage or difficult to access. This technology helps create digital representations of buildings, artifacts, and cultural activities, so that future generations can still access and study them. This research also emphasizes the importance of local community involvement in the cultural digitization process to maintain authenticity. VR can convey information in an interactive and engaging way. This technology allows users to "visit" historical sites or witness cultural events without having to be physically present.

Ternate City, located in Eastern Indonesia, boasts an extraordinary cultural and historical richness. As the former center of the Ternate Sultanate, the city preserves a diverse cultural heritage, ranging from traditional traditions and performing arts such as music and dance, to historic buildings like Fort Oranje, the Sultanate Palace, and the Sultan Mosque. However, over time, this culture has faced challenges in the form of declining interest among the younger generation in learning about and preserving it.

Lee et al. (2019) conducted a study on the use of VR in introducing Korean culture and found that users showed increased understanding and interest in local culture after interacting with tradition- and history-based VR content.

This research Aditama & Robiin (2024), notes that the public is not yet deeply familiar with Jambi culture, and globalization is accelerating cultural degradation. The use of VR was developed as a solution, aiming to introduce local culture in a more authentic and interactive way.

Suhardi et al. (2022) examined the use of VR for preserving Indonesian cultural heritage and concluded that VR can document endangered cultural elements and present them in an engaging way for the millennial generation.

The use of virtual reality technology to introduce culture has been implemented in various countries and has shown encouraging results. A study by Lee et al. (2019) revealed that the use of VR can increase user interest and understanding of regional culture. Through this technology, users can experience virtual experiences such as attending traditional ceremonies or

exploring historical sites with near-realistic visualizations.

Yuliana et al. (2023) showed that the use of VR in educational settings can create more effective contextual learning, especially in regional history and culture subjects, including the introduction of historical sites such as forts, palaces, and places of worship.

In Indonesia, several studies have also explored the application of VR in the context of cultural introduction. One such study is the work of Putra et al. (2021), who developed a VR application to introduce Balinese culture. The results demonstrated increased user engagement in the process of learning about local culture. These findings reinforce the notion that VR has significant potential as a bridge between modern society and the richness of traditional culture.

Hartono & Nugroho (2022) examined the use of VR in developing digital-based tourist destinations and found that VR can be an innovative and attractive means of cultural promotion for both domestic and foreign tourists. Andini et al. (2023) examined the impact of VR on history education among high school students and found that VR use can improve students' memory, understanding, and interest in local culture.

RESEARCH METHODHS

This research uses a research and development (R&D) approach focused on designing virtual reality media as a means of introducing Ternate City's culture. The research process consists of four main stages. In this research, several stages are used as shown in picture 1 below.

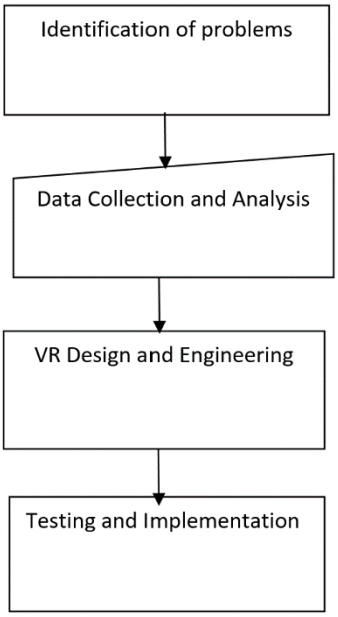

Figure 1. Stages Of Research

The research problem is formulated based on the declining appreciation of the community, particularly the younger generation, for the rich culture of Ternate City. This situation demonstrates the urgent need for interactive and innovative media to introduce and revive interest in this local culture. At this stage, researchers collected data related to the culture of Ternate City, covering aspects of history, traditions, arts, and historical sites. This information was obtained through various methods, including interviews, direct field observations, literature reviews, and documentation to support the analysis.

This stage involves developing initial concepts and developing a virtual reality prototype based on previously acquired cultural data. The design process includes creating 3D visual elements, developing audio narratives to support the user experience, and integrating interactive features to create an immersive and engaging cultural experience.

At this stage, the virtual reality

prototype is tested on target users, such as local residents, students, or tourists, to obtain feedback and evaluation. Based on the feedback received, refinements are made to the developed design. After undergoing revisions, the VR system is then implemented for wider use as a cultural awareness tool.

RESULTS AND DISSCUSSION

This research resulted in a prototype virtual reality (VR) application based on visual data from the Kalamata Fort tourist attraction, which aims to immersively introduce the culture and history of Ternate City. The VR design was developed through a process of transforming field documentation photos into a 3D virtual model that can be interactively explored by users.

Figure 2. 360 Photo of Kalamata Fortress

Photos of Kalamata Fort were collected through direct field observations. Photos were taken from various angles, including the front and rear views of the fort, the wall structure, gates, and cannons, as well as views of the surrounding area, including the sea and mountains. All photos were then selected and processed using photogrammetry, a technique used to generate 3D models from a collection of 2D photographs.

The 3D model generated from the photos was inserted into a Unity-based simulation environment. The result is a visualization of Kalamata Fortress in a virtual format that resembles its original condition, including, the authentic architectural structure of the fortress, detailed textures of the fortress walls and stones, natural lighting and environmental sound effects such as wind and waves.

Figure 3. Photo Integration into VR

To enhance the educational value, audio narration about the history of Kalamata Fortress has been added in two languages (Indonesian and English). Users can approach certain objects (such as cannons) and hear historical explanations, view pop-up info that appears when touching interactive points, and freely navigate the virtual environment using a controller or head tracking.

The prototype was tested on 15 respondents consisting of students, local tourists, and museum visitors. The results showed that the visualization was similar to the original 87%, Easy to use/navigate 80%, Increased cultural knowledge 93%, Want to use again 85%. Some of the feedback given, adding traditional music sounds to make it more interesting, providing an automatic tour option for new users, adding content about the life of the Sultanate of Ternate.

The application of photogrammetry technology in VR design has proven to be able to deliver an accurate and detailed visual representation of Kalamata Fortress. Photos taken directly from the site provide a strong foundation for creating a realistic atmosphere within the virtual world. Compared with manual 3D modeling approaches, using photos as the basis for reconstruction provides a sense of authenticity and increases user confidence in the displayed content. Furthermore, the integration of narrative and interaction strengthens the educational dimension of this application. These findings align with research by Bekele et al. (2021) which states that VR technology based on real visual data is effective in the digital conservation of cultural heritage. The trial results also indicate that this application has potential as an interactive educational medium to introduce local history and culture to the wider community.

CONCLUSION

This research demonstrates that virtual reality (VR) technology design can be an effective medium for introducing and preserving the culture of Ternate City. Through a visual and interactive approach, cultural elements such as historical sites, customs, and local narratives can be presented in an engaging and immersive manner. The implementation of the Kalamata Fort tourist attraction as part of the VR content enhances the user's educational experience in gaining a deeper understanding of local history and culture.

Test results show that VR-based media can increase user interest, understanding, and appreciation of Ternate's cultural heritage, especially the younger generation. Therefore, this VR design serves not only as a learning tool and tourism promotion tool, but also as a strategic innovation in cultural preservation in the digital age.

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