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# Exploration of Singosari Museum

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## Abstract

This study, conducted by the Makar Team, students of Visual Communication Design (DKV) at STIKI Malang, aimed to develop an Augmented Reality (AR) application to assist visitors in exploring the historical context of the Singosari Museum in Malang. Utilizing the design thinking methodology, the research comprised five stages: empathize, define, ideate, prototype, and test. Direct observation was conducted during the empathize stage to understand visitor needs. Problems were formulated in the define stage, followed by ideation (ideate) and prototype development (prototype). The prototype was tested (test) to gather feedback. The results showed that the AR application significantly enhanced historical understanding and provided innovative interaction with historical information

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## 1. Introduction

AR fosters interactive experiences, enabling visitors to engage with exhibits in novel ways, such as viewing 3D artifact models, enhancing comprehension and information retention (Yudis et al., 2024). The "Talkative Museum" prototype exemplifies this by promoting collaborative interaction among families, enriching learning experiences through dialogue and exploration (Tokuno et al., 2024).

### Psychological Benefits

AR transforms museum spaces into restorative environments, offering psychological benefits such as stress reduction and attention recovery (Yin, 2024). Empirical studies indicate that AR experiences significantly improve visitors' psychological well-being, making museums not just centers for learning but also for healing (Yin, 2024).

### Practical Applications

Museums such as the Megalodon Museum utilize markerless AR to present fossils in an engaging format, overcoming the limitations of traditional displays (Yudis et al., 2024). The Dirgantara Mandala Museum in Yogyakarta employs marker-based AR to provide historical context, enhancing visitors' understanding of aviation history (Prihantoro & Aji, 2024).

While AR offers numerous benefits, it is important to consider potential challenges, such as the need for technological infrastructure and staff training to effectively implement this innovation. Balancing technology with traditional museum experiences remains crucial to maximizing AR's benefits.

## **Singosari Museum**

Located in Klampok Village, Singosari District, Malang Regency, East Java, the Singosari Museum was inaugurated on May 20, 2015. It serves as an educational platform for history and culture, specifically focusing on the Singosari Kingdom or Tumapel. Managed by the Cultural and Tourism Office of Malang Regency, the museum plays a vital role in the preservation and education of regional history.

The museum houses a variety of collections, including historical artifacts such as keris, statues, and relics from the Tumapel Kingdom and other kingdoms. These collections consist not only of original artifacts but also replicas that illustrate the cultural and historical richness of East Java. The museum features four exhibition rooms showcasing various themes, including temple models and Malangan masks representing traditional characters.

As an educational tourism destination, the Singosari Museum is frequently visited by students and scholars eager to learn about history. The museum also hosts cultural events such as wayang performances and traditional dances to attract visitors. According to Yossi Indra Herdyanto, a cultural expert at the Singosari Museum, the museum aims to increase public awareness of local culture by inviting more general visitors.

Despite its relatively limited collection compared to other museums, efforts to enhance its appeal are ongoing. Plans include extending operational hours and promoting local art exhibitions and cultural heritage education to attract more visitors. With easy accessibility and free admission, the Singosari Museum strives to be a welcoming destination for all to learn about the region's history and culture.

The media used by the Singosari Museum includes various forms of cultural expression and educational outreach, reflecting its role as a key institution in preserving and promoting heritage.

### **Traditional Media and Cultural Practices**

**Grebeg Singosari:** This tradition involves musical performances using Gamelan Selonding, integrating local culture and community participation (Kartawan, 2023).

**Cultural Significance:** These rituals serve as a means to strengthen community identity and cultural continuity, essential for educational purposes (Brata et al., 2022).

**Modern Media Integration**

## **Integration of Modern Media**

**New Media Systems:** The museum adapts to contemporary needs by integrating online and offline interaction systems, enhancing visitor engagement through technology (Hongwen, 2017).

**Social Media Marketing:** Efforts to increase visitor numbers through social media have been noted, indicating a shift towards digital outreach to attract a broader audience (Cornellia & Hermawan, 2020).

While traditional museum practices are crucial for cultural preservation, the integration of modern media strategies is essential for reaching new audiences and ensuring relevance in a rapidly changing digital landscape.

## **Lo Kreatif**

To foster creativity and innovation among students, the Indonesian Private Universities Association (APTISI) Region VII of East Java organized the 2024 Lo Kreatif National Creativity Competition. Themed "Realizing Creative Innovations for Independent Learning," this competition covers various categories:

1. Business Ideas
2. Poster Design
3. Short Video
4. Photography
5. Tiktok
6. Talent Show
7. UI/UX Design
8. Comics
9. E-Sport (Mobile Legends Bang Bang)
10. Challenge of Champions
11. AR/VR

This study explores the use of AR technology in education and cultural preservation. By selecting Singosari Museum as the research site, the study highlights its significant yet underappreciated historical wealth. The researchers aim to contribute to developing educational AR applications that attract public attention.

## **1.1 Literature Review**

According to Davis (1989), user acceptance of technology is influenced by its perceived ease of use and usefulness. Similar studies on the use of AR in museums suggest that this technology can enhance user engagement (Turban et al., 2005). Furthermore, research by Yudha et al. (2022) highlights the importance of technological innovation in cultural preservation to expand the accessibility of historical information.

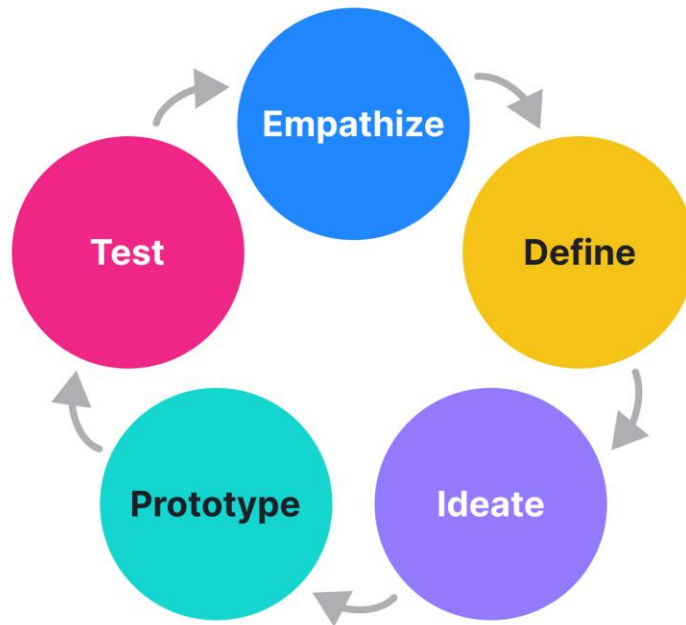
AR can be utilized to visualize historical relics and provide visitors with an interactive learning experience (Efendi, 2018). However, there is still limited research leveraging AR in museums with a focus on practical approaches. Therefore, this study aims to fill this gap by designing an AR application tailored for the Singosari Museum.

## **2. Research Methods**

The research method employed in this study is qualitative with an observational approach. In this process, the Makar Team applied the design thinking method to ensure that the solutions generated were relevant and user-centered.

The research subject is an AR application with the theme of the Singasari Museum. The development of the AR application followed the design thinking method, which consists of five stages: Empathize, Define, Ideate, Prototype, and Test.

The design thinking methodology is a solution-oriented approach used to address various problems. This method is effective in solving diverse issues and focuses on understanding the human needs involved in these problems (Satria, 2023).



*Fig. 1 The design thinking methodology*

There are five key elements in the design thinking method (Sari et al., 2022):

**Empathize:** The first step of design thinking involves understanding the problem empathetically before solving it. This stage entails engaging with users or customers to understand their needs and desires. In this context, empathize refers to understanding the challenges faced by the Singasari Museum. Observations were conducted ethically, respecting human dignity, privacy, confidentiality, justice, inclusivity, and considering potential benefits and harms (Hassanah, 2016).

**Define:** In this stage, all information gathered during the empathize stage is analyzed and synthesized to identify the core problem clearly. For the Singasari Museum, this step involves defining issues related to visual communication media to effectively convey the museum's historical messages to its audience. The aim is to help the target audience better understand the history of the Singasari Kingdom.

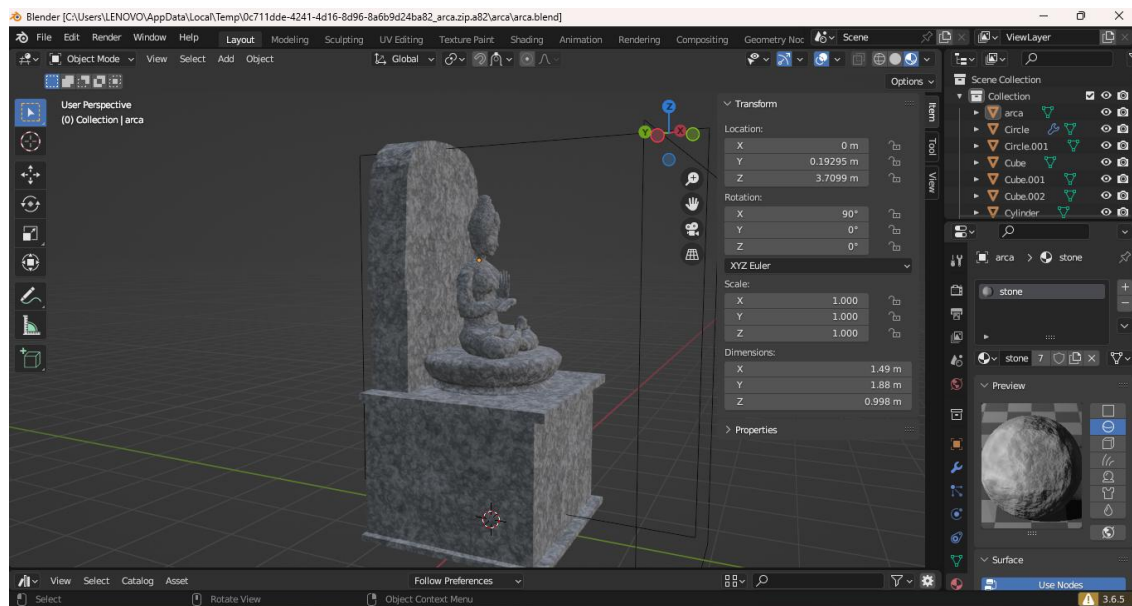
**Ideate:** This phase focuses on generating creative ideas to solve the identified problems. Brainstorming is used to produce and refine solutions. In this context, ideation involves developing creative solutions for the challenges defined in the previous stage, using methods like brainstorming to explore and organize potential ideas (Monica, 2017).

**Prototype:** In this stage, an initial version of the AR application is created with core features to test solutions and gather feedback for improvement. The prototype highlights the history and culture of the Singasari Kingdom, offering interactive exploration for museum visitors. Features include AR markers like QR codes or special images, digital content such as 3D models of artifacts, animations, and interactive storytelling elements. Visitors can scan the markers to explore 3D artifacts, follow animations, or complete challenges like quizzes. This mechanism enhances engagement and provides an educational yet entertaining experience. The visual style of the prototype adopts a digital watercolor approach, combining artistic elegance with modern technology.

**Test:** In the testing phase, the AR application undergoes beta testing with real users to collect feedback and make necessary improvements. Beta testing ensures that the product aligns with its intended objectives and addresses user needs effectively (Abadi, 2018; Dirgantara, 2018). For this project, the testing involves university students as the primary target audience to evaluate their experience of viewing 2D or 3D virtual objects projected into the real world. Feedback will help refine the application for a better final version.

Through this innovative and interactive technological approach, the Singasari Museum aims to become a compelling historical education center for diverse audiences.

### 3. Result and Discussion



*Fig. 2 Developed AR application*

The developed AR application successfully provides additional information in the form of 3D animations and explanations for several key artifacts in the Singosari Museum.

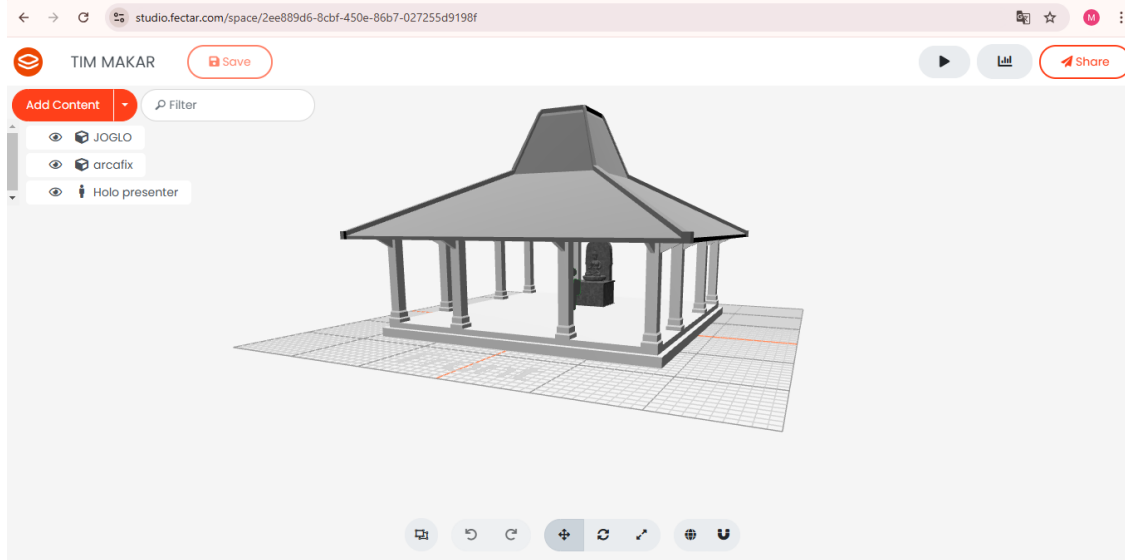


Fig. 3 Developed AR application

Field-based approaches, involving the exploration of artifacts and historical relics in the museum, offered profound insights into the needs for effective information delivery. The Makar Team meticulously documented each artifact to ensure that the content presented in the application aligns with accurate historical context. These explorations enabled the AR application to become an interactive medium that is both relevant to the museum's character and responsive to visitors' needs.

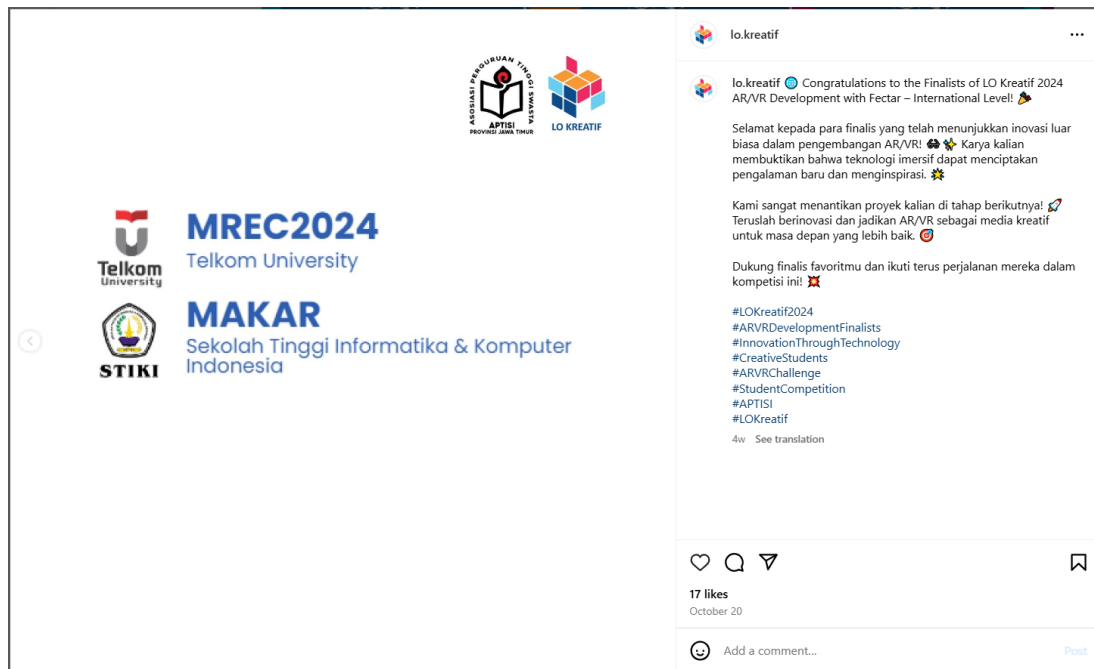


Fig. 3 Pengumuman finalist Lo Kreatif

#### 4. Conclusions

AR technology presents significant opportunities to enrich museum visitor experiences by offering interactive ways to explore local history. This research highlights that field-based approaches yield solutions aligned with user needs. Further development is recommended to include more artifacts and expand application functionalities.

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