

DIGITAL HERITAGE PORTAL BASED ON PROGRESSIVE WEB APP: EFFORTS FOR THE DEVELOPMENT OF CULTURAL HERITAGE AND TOURISM IN LAMPUNG

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ARTICLE INFO

History of the article:

Received August 15, 2023

Revised September 27, 2023

Accepted Oct 27, 2023

Keywords:

Culture
Digital Heritage
Lampung
PWA
Tourism

ABSTRACT

According to Undang-undang No. 11 Th. 2010 regarding Cultural Heritage, preservation involves dynamic efforts to safeguard the existence and values of Cultural Heritage through protection, development, and utilization. Despite rapid technological progress, there is currently no dedicated digital platform designed to promote and preserve cultural heritage in Lampung Province. The diverse cultural legacies could be better harnessed and developed, as they hold significant potential for attracting tourists to the region. This research aims to design a Progressive Web App-based Digital Heritage Portal to foster cultural heritage and tourism in Lampung Province. Digital Heritage employs technology to understand and conserve cultural legacies. As an innovative approach, the information system is crafted using Progressive Web App technology for easy user access online or offline, without requiring prior app installation. The system is anticipated to aid in the promotion, preservation, and advancement of cultural heritage and tourism in Lampung. The research follows the Waterfall method with these stages: 1) Problem analysis, (2) Data collection, (3) System requirement analysis, (4) Coding, (5) Deployment, and (6) System testing. The research yields an application design functioning as an informative platform for historical and cultural heritage tourism in Lampung Province. The application operates smoothly across platforms and offline. Test results affirm proper menu functionality aligned with stipulated system requirements.

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INTRODUCTION

The manifold array of historical heritage, culture, and traditions constitutes Indonesia's precious wealth. This is prominently displayed through the abundant historical remnants, cultural values, and traditions dispersed across the Indonesian expanse, and this holds even for the Lampung Province. Positioned at the utmost southern edge of Sumatra Island, the Lampung Province is demarcated by a demographical dichotomy of immigrant settlers and indigenous natives. The Lampung society is broadly bifurcated into two distinct customary systems or societal clusters: saibatin (coastal or shoreline) and pepadun (inland or hinterland).[1]. The Lampung Province boasts a cultural richness that is no less diverse than other provinces in Indonesia. Due to its location in the southernmost

region of Sumatra, Lampung serves as the sole gateway to the island of Sumatra. [2] As a result, Lampung has become a destination frequently visited by newcomers from various ethnic backgrounds.

In line with the progress of time, technology, and information, the cultural heritage embodied in physical artifacts is increasingly under threat of deterioration and neglect. Simultaneously, intangible cultural legacies and traditional languages are being disrupted by the forces of modernization, putting them at risk of fading away. As stipulated by the provisions of Law No. 11 of 2010 concerning Cultural Heritage, preservation takes on a dynamic dimension, actively aimed at upholding the existence of historical remnants alongside the values they encapsulate. This objective is pursued through a

series of protective, augmentative, and purpose-driven steps, all designed to ensure the sustained continuity and deepened appreciation of the inherent values within these Cultural Heritage sites. Broadly speaking, preservation refers to a set of actions taken to safeguard, shield, and nurture entities of paramount significance across economic, political, social, and cultural spectrums, with the ultimate goal of preventing their loss. As per Article 53 of the aforementioned Law, the preservation of historical legacy should ideally commence with documentation before engaging in activities that could alter its authenticity. Up until now, a considerable portion of the millennial generation and the Lampung community remains largely unaware of the multitude of historical artifacts and cultural heritage sites possessed by the Lampung Province. [3].

In the current era of technological advancement, particularly in the realm of digital photography, the concept of utilizing digitization arises as a means to preserve cultural heritage. This encompasses historical buildings, sites of historical significance, and locations with historical value, such as cultural heritage sites in the Lampung Province. The goal is to avert the risk of extinction. The government has undertaken various efforts to safeguard Indonesia's cultural richness, including in the Lampung Province. One of these efforts is through the Government Program outlined in Law No. 5 of 2017 concerning Cultural Advancement, which emphasizes the preservation and development of Indonesian culture. [4]. The cultural diversity, local wisdom, historical edifices, sites of historical significance, and historical landmarks can serve as unique attractions drawing tourists to the Lampung Province. Despite the rapid technological progress, it is regrettable that as of now, a specialized information system tailored to provide details about cultural heritage buildings, areas, and sites within the Lampung Province has yet to be established.

Based on the problem statement and to support the government's initiatives in preserving cultural heritage and participating in the introduction and promotion of culture and historical legacy in Lampung Province, this study formulates an intriguing problem: "How to design a Historical and Cultural Heritage Portal to contribute to the development of cultural heritage and tourism in Lampung Province?" With the aim of enhancing the tourism sector through the potential of cultural heritage, there is a need for the development of an information system to assist in digitally promoting tourist destinations. Consequently, this endeavor is crucial and must be pursued to ensure the successful development

of the tourism sector leveraging the potential of cultural heritage.

Several previous studies related to this research have been conducted, such as: [5][6][7] Discussing strategies for the development of cultural heritage and tourism using digital heritage, one of the key points derived is the utilization of web-based information systems in digital heritage development., [8] discusses the development of an E-Heritage portal for cultural information in the Banten Province, featuring photographs of cultural heritage sites within the Banten Province. [9][10] Creating digital heritage for museums. From the previous research exposition, there has not been any study that utilizes Progressive Web App (PWA) technology, which allows the application to be accessed both online and offline. PWAs can be accessed online, similar to conventional websites, but their unique advantage lies in being accessible even when users are offline and not connected to the internet.

The choice of Progressive Web App (PWA) technology for our digital heritage portal builds upon the existing research in this field. While previous studies have explored various digital heritage strategies, web-based information systems, and even dedicated E-Heritage portals, none have leveraged the capabilities of PWA technology. PWA technology presents a compelling solution due to its ability to provide a seamless user experience, bridging the gap between conventional websites and native mobile applications. It allows our digital heritage portal to be accessible online, like traditional websites, but it excels by enabling offline access, which is particularly advantageous in areas with unreliable or limited internet connectivity. This strategic choice aligns with our aim to make cultural heritage and tourism information more accessible and inclusive, catering to a wider audience, including those who may not always have a reliable internet connection

RESEARCH METHOD

This study adopts a systematic development approach, commencing with an analysis of the issues pertaining to historical relics in Lampung Province. The data collection process involves documentation techniques and observations. For the system development phase, the Waterfall method is employed, progressing through stages such as Requirement Analysis, System Design, Coding, and System Testing. The Waterfall development method provides a structured step-by-step framework for planning application creation, which includes software evaluation as an integral part of the process. [11].



Figure 1. Research method

Problem analysis

Problem analysis is necessary to identify the issues present in the development of cultural heritage and tourism related to historical relics in Lampung Province. The cultural diversity, local wisdom, historical buildings, historical areas, and historical sites can enhance the appeal for tourists interested in visiting Lampung Province. Despite rapid technological advancements, it is unfortunate that, as of now, there hasn't been a dedicated information system designed to provide information about historical buildings, areas, and sites within the Lampung Province.

Data Collection

a. Observation

The researcher conducts direct observations of the condition of cultural heritage sites and their surroundings, including infrastructure and activities taking place around these sites in Lampung Province.

b. Documentation

The researcher takes photographs of cultural heritage sites and collects data from relevant documents pertaining to cultural heritage, such as historical documents.

c. Interviews

The researcher conducts direct interviews with the managers of cultural heritage sites, discussing visitor numbers, ticket prices, maintenance, and promotional efforts.

System Requirements Analysis

In this stage, the researcher analyzes the collected data and then processes it by categorizing the results into system requirements, including Functional Requirements. Functional

Requirements encompass information about various processes that the system can execute. [12]. Non-Functional Requirements, non-functional requirements refer to specifications related to system limitations, application development, and necessary equipment. [12].

Design Phase

The design phase runs in alignment with the requirements outlined during the analysis step. This stage involves creating multiple diagrams that illustrate the system using diagrammatic formats, aiming to craft a comprehensive blueprint for the upcoming system. Unified Modeling Language (UML) diagrams are commonly employed for this purpose.

Coding

Application Portal Design for Historical and Cultural Tourism in Lampung Province, as developed in the system design phase, is then implemented through coding using Progressive Web App (PWA) technology. PWA stands for "Progressive Web Apps," which are web applications designed to offer user experiences similar to native apps, including capabilities to function offline, deliver push notifications, and access hardware features like cameras and microphones. [13]. PWA is typically constructed using web technologies such as HTML, CSS, and JavaScript, and can be accessed via web browsers on desktop or mobile devices without the need for separate app downloads or installations. PWAs are often faster and more user-friendly compared to native apps, and they allow users to add app icons to their device's home screen for quick access. [13]

Deployment

In this stage, the deployment process takes place, where the coded application is uploaded to a web server hosting to make it accessible online. This step also requires a domain, such as "lampungharitage.id," for example.

System Testing

In this phase, after the coding is completed, the next step involves testing. Testing is conducted as insurance that the system can function properly and aligns with the data collection and analysis outcomes. The testing is performed using the Black Box Testing technique. [14].

RESULTS AND DISCUSSION

System Requirements Analysis

Based on the data collected through direct observation of 20 historical and cultural heritage sites in Lampung, as well as interviews with their respective managers, the historical and cultural tourism portal application for Lampung is divided into two main sections:

a. Functional Requirements for Admin

Tabel 1. Admin Fungsional requirements

No	Keterangan
1	Login dan Logout
2	Manage Hero Slide
3	Manage Admin Accounts
4	Manage Types of Cultural Heritage Tourism
5	Manage Cultural Heritage Tourism
6	Manage Lampung's Historical Information
7	Manage Reviews
8	Manage Visitor User Accounts

b. Functional Requirements for Visitors

Tabel 2. Visitor Functional Requirements

No	Keterangan
1	Register, Log in / Log out
2	Provide Rating
3	Leave Comments or Reviews

Design

a. Use case Diagram

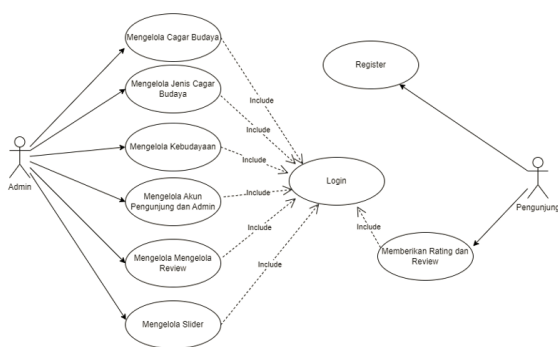


Figure 2. Use case diagram

In the depicted use case diagram, two actors are present: Admin and Visitor. Each actor is engaged in activities that align with the functional system requirements identified during the analysis phase.

b. Activity Diagram

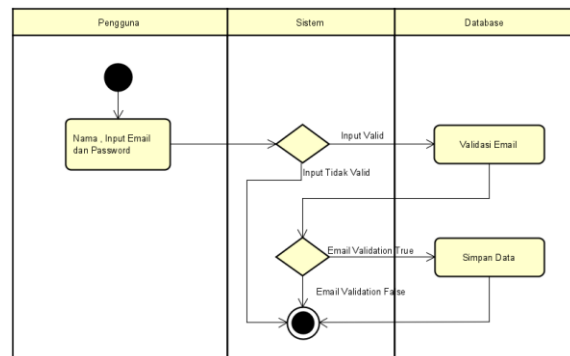


Figure 3. Activity Visitor Registration

The Activity Diagram illustrates that a Visitor needs to first initiate registration. During this process, they input their email address. Subsequently, they must verify their email address to activate their account. Afterward, they can log in, provide ratings, and leave reviews.

Application Interface

Home page application

Below is the interface of the homepage of the historical and cultural tourism portal application for Lampung.

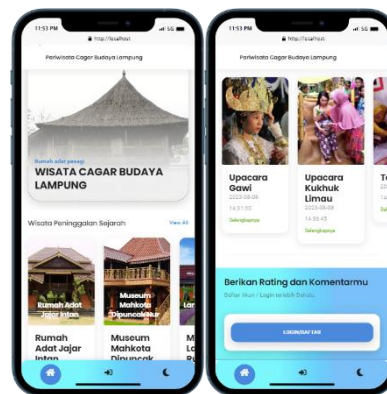


Figure 4. Home page

The home page of the Progressive Web App (PWA)-based Digital Heritage Portal consists of a slider containing images and information that can be managed through the admin panel. It also features a list of historical and cultural heritage tourism sites in Lampung Province, information about Lampung's culture, and categories of historical heritage tourism. To access detailed information about historical heritage sites, users

can click the "Read More" button. Below is the interface of the detail page for historical heritage tourism on the digital heritage portal of Lampung Province.

Page Detail for Historical Heritage Tourism

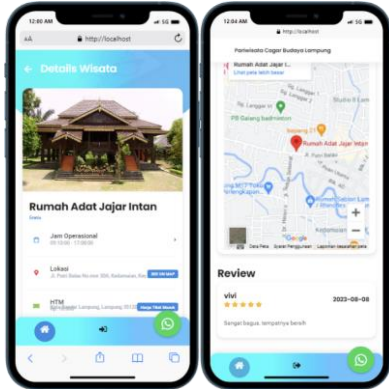


Figure 5. Details Page

The detail page for historical heritage tourism provides information about the location, operating hours, ticket prices, map, and detailed description of the historical heritage site. App users can contact the historical heritage site through a WhatsApp button available on the detail page for historical heritage tourism in Lampung Province. If users tap on this WhatsApp button, they will be automatically redirected to the WhatsApp page and initiate a direct chat with the historical heritage site manager. To leave a review, users/visitors must first register an account and log in to the application.

Registration Page and Login Page

Visitors who wish to leave reviews and ratings for historical heritage sites need to register an account first by inputting information such as their name, email address, and phone number. After registration, visitors must then verify their email and log in to their account by accessing the login page

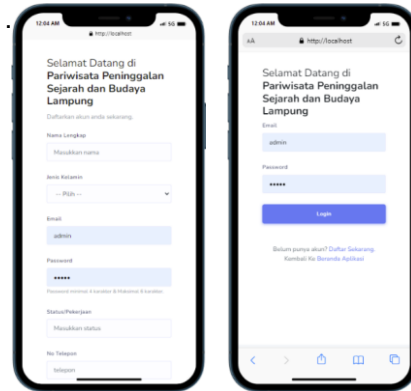


Figure 6. Registration Page and Login Page

Culture Listing Page and Cultural Detail Page

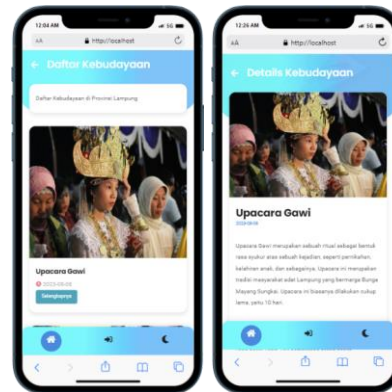


Figure 7. Culture Listing Page and Cultural Detail Page

Admin Page

To access and enter this page, the admin needs to first log in to the admin dashboard. After a successful login, the user is redirected to the admin dashboard page, as shown in the image below.

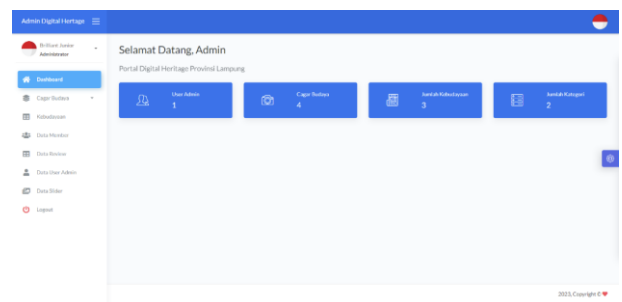


Figure 8. Admin page

Within the admin page, there are provisions to manage various aspects including historical heritage tourism (adding, deleting, editing, and viewing), tourism categories, Lampung's cultural

information, sliders, reviews, visitor accounts, and admin accounts.

Testing

In this step, the first activity involves compatibility testing of the application across various devices and browsers.

Tabel 3. Compatibility Testing

No	Device	Browser	Result
1	Laptop	Chrome	ok
2	PC	Mozilla	ok
3	Iphone 11	Safari	ok
4	Infinix note 30	Chrome	ok
5	PC	Edge	ok

Subsequently, black-box testing is carried out. Here is one of the outcomes obtained from conducting black-box testing on the login form.

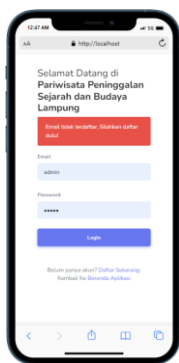


Figure 9. Login Testing

The image above illustrates that in a login scenario where no data is provided, the form is left empty, or some data fields are left blank, the system is capable of performing validation and presenting error messages in response. In the second

CONCLUSION

The development of the historical and cultural heritage tourism portal application for Lampung Province has been successfully accomplished using the waterfall methodology, which involves stages such as analysis, data collection, requirements analysis, design, deployment, and system testing. The system testing phase included compatibility checks on various devices and black-box testing. The results reveal that the historical and cultural heritage tourism portal for Lampung is highly compatible, and all application functions are performing effectively.

However, the current version of the application solely provides information on ticket prices and does not yet facilitate online ticket purchases. In terms of future prospects for development, the addition of online ticket purchasing features is recommended.

ACKNOWLEDGMENT

We express our sincere gratitude to the Ministry of Education, Culture, Research, and Technology for the generous provision of the Research and Community Service Grant for the year 2023 through the National Competitive Grant Program for Early Career Lecturers (PDP). Your support is invaluable in advancing our research and community engagement initiatives, and we are truly thankful for this opportunity.

REFERENCES

- [1] A. N. Mutia, "Islam Dan Kearifan Lokal Lampung (Studi Atas Nilai-Nilai Islam Pada Tradisi Ngejalang Masyarakat Lampung Saibatin)," Uin Raden Intan Lampung, 2023.
- [2] S. Ariatama, H. Yanzi, M. M. Adha, A. Mentari, And A. T. Hartino, "Inovasi 'Coplasma Cec' Sebagai Upaya Pelestarian Budaya Lampung Ditengah Masyarakat Multikultural Dan Globalisasi Melalui Optimalisasi Pusat-Pusat Kesenian Dan Kebudayaan Di Provinsi Lampung," Fakultas Keguruan Dan Ilmu Pendidikan Universitas Lampung, 2022.
- [3] Satrio Alpen Pradanna, "Kearifan Lokal Dalam Tradisi Manjau Maju Masyarakat Lampung Saibatin Pekon Kedaloman Kabupaten Tanggamus," *Univ. Lampung*, 2021.
- [4] U. Idris, S. Abdi, K. Frank, M. Z. Muttaqin, P. Studi, And A. Sosial, "Sosialisasi Uu No. 5 Tahun 2017 Tentang Pemajuan Kebudayaan Kepada Fresh Graduate Alumni Antropologi Di Kota Jayapura Papua," *Community Dev. J. J. Pengabdian Masyarakat*, Vol. 1, No. 3, Pp. 312–316, Oct. 2020, Doi: 10.31004/Cdj.V1i3.1014.
- [5] I. Purnama And K. T. Hermawan, "Digital Heritage Menuju Pengembangan Pariwisata Dan Budaya Kota Cirebon," *J. Din. Pembang.*, Vol. 2, No. 1, Jun. 2022.
- [6] D. E. Agustinova, "Strategi Pelestarian Benda Cagar Budaya Melalui Digitalisasi,"

- Istor. J. Pendidik. Dan Ilmu Sej.*, Vol. 18, No. 2, Oct. 2022, Doi: 10.21831/Istoria.V18i2.52991.
- Equivalence Partitions,” *J. Teknol. Sist. Inf. Dan Apl.*, Vol. 3, No. 2, P. 82, 2020, Doi: 10.32493/Jtsi.V3i2.4693.
- [7] R. Adriyani, E. Erna, And R. Indrianto, “Pengembangan Cagar Budaya Dan Pariwisata Berbasis Digital Heritage,” *Exchall Econ. Chall.*, Vol. 5, No. 1, Pp. 12–24, Mar. 2023, Doi: 10.47685/Exchall.V5i1.348.
- [8] M. Subali, M. Andriansyah, I. Purwanto, And D. Saptono, “Rancang Bangun Portal Web E-Heritage Sebagai Platform Sistem Informasi Warisan Budaya,” *J. Ilm. Teknol. Dan Rekayasa*, Vol. 26, No. 3, Pp. 240–253, Feb. 2022, Doi: 10.35760/Tr.2021.V26i3.5357.
- [9] M. A'yun, C. I. Ratnasari, And A. R. Pratama, “Digital Transformation In Heritage Tourism Management: The Case Of Kampung Wisata Kauman Yogyakarta,” *Ajp Conf. Proc.*, Vol. 2508, No. 1, P. 020025, Mar. 2023, Doi: 10.1063/5.0119548.
- [10] R. Firdaus, W. Suana, A. R. Riyanda, And M. K. Sagala, “Membangun Heritage Dalam Penerapan Transformasi Digital Museum Kekhatuan Semaka Pekon Sanggih Unggak Kecamatan Bandar Negeri Semuong Kabupaten Tanggamus,” *J. Inform. Glob.*, Vol. 13, No. 2, Aug. 2022, Doi: 10.36982/Jiig.V13i2.2324.
- [11] A. Rohman And R. P. Brilian, “Sistem Informasi Manajemen Tabungan Pada Bank Sampah Rafflesia Menggunakan Metode Waterfall,” *Jbmi (Jurnal Bisnis, Manajemen, Dan Inform.)*, Vol. 19, No. 3, Pp. 192–204, 2023, Doi: 10.26487/Jbmi.V19i3.25061.
- [12] A. Turserno And R. I. Rosihan, “Analisis Kebutuhan Fungsional Sistem Informasi Manajemen Gudang Dengan Metode Pieces (Studi Kasus Cv Karya Bangsa),” *J. Ind. Manuf.*, Vol. 7, No. 1, Pp. 01–10, Feb. 2022, Doi: 10.31000/Jim.V7i1.5966.
- [13] P. D. M. Kenar, “Implementasi Progressive Web App (Pwa) Pada Pengembangan Kuesioner Digital,” 2022.
- [14] I. A. Aziz, B. Setiawan, R. Khanh, G. Nurdiyansyah, And Y. Yulianti, “Pengujian Black Box Pada Aplikasi Sistem Kasir Berbasis Website Menggunakan Teknik