JOMLAI: Journal of Machine Learning and Artificial Intelligence
Vol. 4, No. 3, September 2025, pp. 149~156
ISSN: 2828-9102 (Print) | 2828-9099 (Online)
DOI: 10.55123/jomlai.v4i3.6486

Design and Development of a Web-Based Boarding House Information System

Iqbal Aditya Ferryanto[1], Diyah Ruswanti [2], Dahlan Susilo[3]
[1,2,3]Universitas Sahid Surakarta

Article Info

Article history:
Diterima, 19 Juli 2025
Direvisi, 03 Agustus 2025
Disetujui, 15 September 2025

Keywords:
Boarding House Information System
System Usability Scale (Sus)
Usability Testing
Waterfall Methodology
Web-Based System

ABSTRACT

Web-based information systems serve an essential function in promoting efficient and efficient information management in the digital era. The objective of this research is to create a web-based information system for boarding houses with 6 boarding house research objects. to address challenges often encountered in manual data management, such as data inaccuracies and difficulties in accessing information. The development process employs the Waterfall methodology, which includes phases including communication, planning, planning, execution, and upkeep. The coding language applied for in creating websites is JavaScript and uses a MySQL database. Where This system offers features tailored to the needs of boarding house seeker, house owners, and administrators. Testing using the System Usability Scale (SUS) involving 38 respondents resulted in a rating of 78.16, categorized as good usability (Grade B). These results indicate that the system provides a satisfactory user experience and supports increased efficiency in managing boarding house operations.

Corresponding Author:
Iqbal Aditya Ferryanto,
Department of Engineering informatics,
Universitas Sahid Surakarta,
Email: iqbaladitya3841@gmail.com

1. INTRODUCTION

An information system is a structured method to collect, input, process, store, control, and report information, enabling organizations to achieve their predefined objectives [1]. As technology evolves rapidly, information systems become increasingly vital, providing fast, accurate, and accessible data regardless of time or location.

In today's fast-paced technological world, networks simplify and accelerate large-scale information distribution, making it accessible to anyone with internet access. A website is a collection of pages used to display textual information, static or dynamic images, videos, animations, or audio, forming an interconnected structure [2].

One application of a website-based information system is to provide accommodation and room rental services. A boarding house website offers temporary accommodation with rooms that include specific facilities and rental rates determined by the house owner [3]. Many community members operate boarding houses as a source of income, especially in areas with numerous educational institutions. While students are the primary users, employees working in different cities also frequently use boarding houses. However, many boarding house operators still manage data and information manually, leading to challenges such as data inaccuracies and difficulties in information retrieval. To address these issues, this research developed a website-based information system that provides features like pricing, facilities, and online booking. The benefits of using a boarding house information system are Simplifies the search and booking process without needing to visit the location, saving time and effort, home owner can manage Facilitates boarding house well, including room availability and communication with boarding house seeker.

2. RESEARCH METHOD

This research adopts the Waterfall methodology, a systematic approach to information system development as an integral component of the Software Development Life Cycle (SDLC). This approach focuses on a series of ordered steps requiring the completion of each phase prior to proceeding moving to the subsequent one. This approach is ideal for projects that have well-specified initial requirements [4].

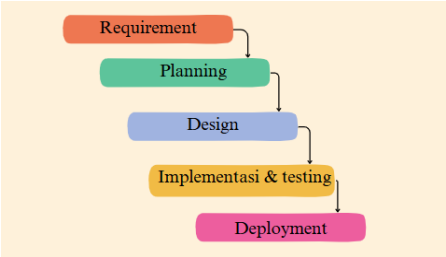

Figure 1. Waterfall Development Methodology

2.1. Requirement

At this stage, data is gathered from house owners through surveys and interviews, as well as from boarding house residents. The collected information serves as the foundation for designing the system, ensuring it fulfills the requirements and preferences of both house owners and boarding house seeker. Additional insights gained during this process also help refine the system's functionality and usability.

2.2. Planning

This phase results in a comprehensive planning document that acts as a reference for carrying out the project. This document contains an activity timeline, the development of UML diagrams and flowcharts, as well as the creation of a website designed to fulfill user requirements for the boarding house platform.

2.3. Design (Modeling)

Converts user needs into technical software designs. This step involves developing data structures, interface designs, and overall system planning to prepare for implementation. In this stage, used Flowchart and UML to make a software design.

2.4. Implementation and Testing

At this stage, the planned design is implemented through software coding. Once coding is complete, the system is tested to ensure functionality aligns with defined requirements. Used Framework PHPNative to build this information system and MySQl to build the database.

2.5. Deployment

The completed system is handed over to users for real-world application. Regular maintenance is performed to fix errors or add new features based on user needs.

3. RESULTS AND DISCUSSION

3.1 System Design

3.1.1 Website System Design

The system includes three roles: boarding house seeker, house owner, and admin. boarding house seeker can manage personal data, search for boarding house information, make bookings, and process payments. House owners can add boarding house data, manage details, and view payment reports. Admin can manage house owner accounts, boarding house data, and approve listings. Use case diagrams depict the system's functionality from the perspective of external actors [5]. Figure 2 illustrates the website's use case diagram.

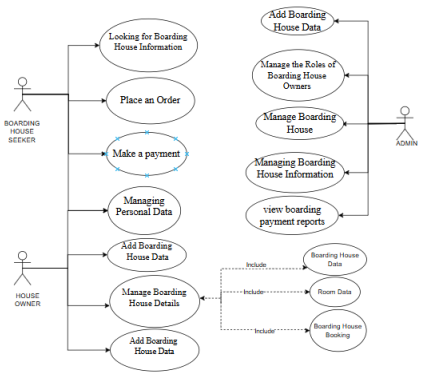

Figure 2 illustrates the website's use case diagram.

3.1.2. System Flow Diagram

The flowchart illustrates the login process as part of the problem-solving steps. It represents these steps using specific symbols, serving as a logical depiction of processes within a program [6]. In this case, two flowcharts at figure 3 and figure 4 are provided to illustrate the registration or authentication process and the workflow of the rental information system website.

3.1.2.1. Registration Flowchart

The registration or authentication flowchart outlines the steps for users of the website. Users must log in first to determine their selected role. However, they must have an account beforehand. If a user does not have an account, they can register first. After successfully logging in, users will be directed based on their assigned role. For instance, a boarding house seeker logging in will be redirected to the boarding house seeker's dashboard upon successful authentication. The login process aims to safeguard data during transmission. The flowchart for the authentication or login process is depicted in Figure 3.

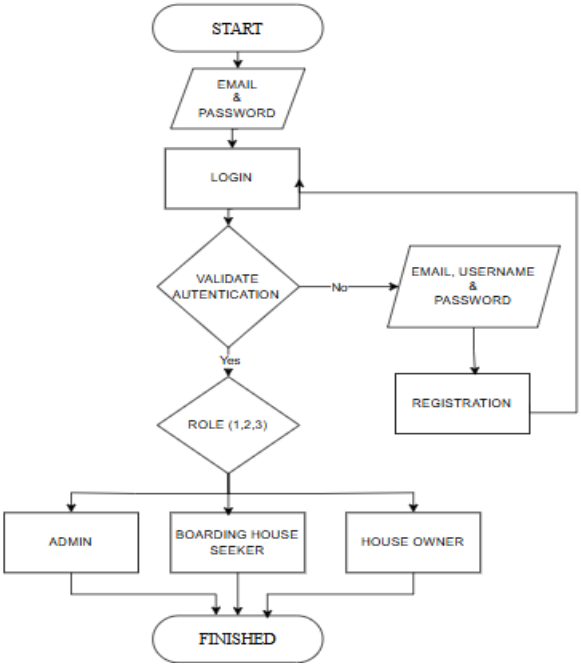

Figure 3. Authentication Flowchart

3.1.2.2. User Authentication Flowchart

This flowchart depicts the process where users who have logged in are assigned their designated roles. Users can perform actions specific to their roles, as illustrated in the workflow of the rental information system website shown in Figure 4.

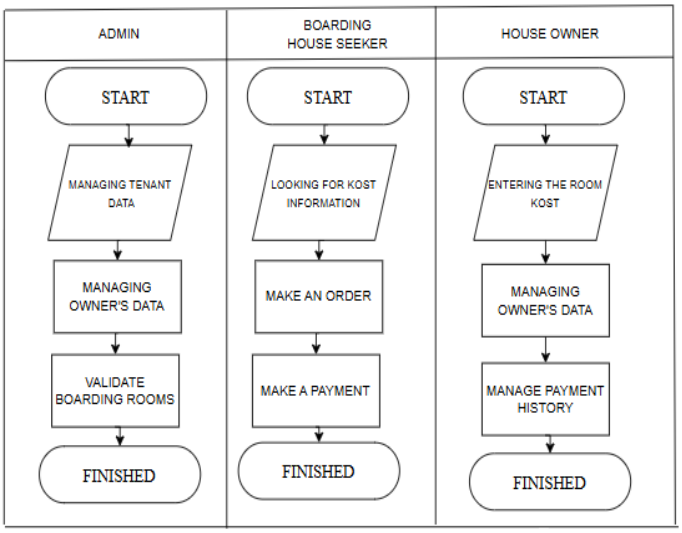

Figure 4. Information flowchart for boarding houses

3.1.3. ERD Design

The Entity Relationship Diagram (ERD) is a technique used to model the data requirements of a company or organization within the context of system analysis during the data development phase [7]. ERD consists of three fundamental elements: entities, attributes, and relationships.The process of creating an ERD begins conceptually. The first step is to identify and define the entities required to design the ERD. Entities are identified through nouns that represent people, objects, places, processes, organizations, and concepts. Mistakes made during this initial stage can lead to an incorrect database design. Therefore, careful consideration is essential when determining the types of entities needed.Every ERD has unique values and contents, though similarities may occur in certain cases. The ERD for the Rental Information System website is shown in Figure 5. The ERD consists of 12 tables, including boarding house information, user, booking, access rights, payment, expenditure, room type, type of payment status, type of expenditure, occupy, service, room

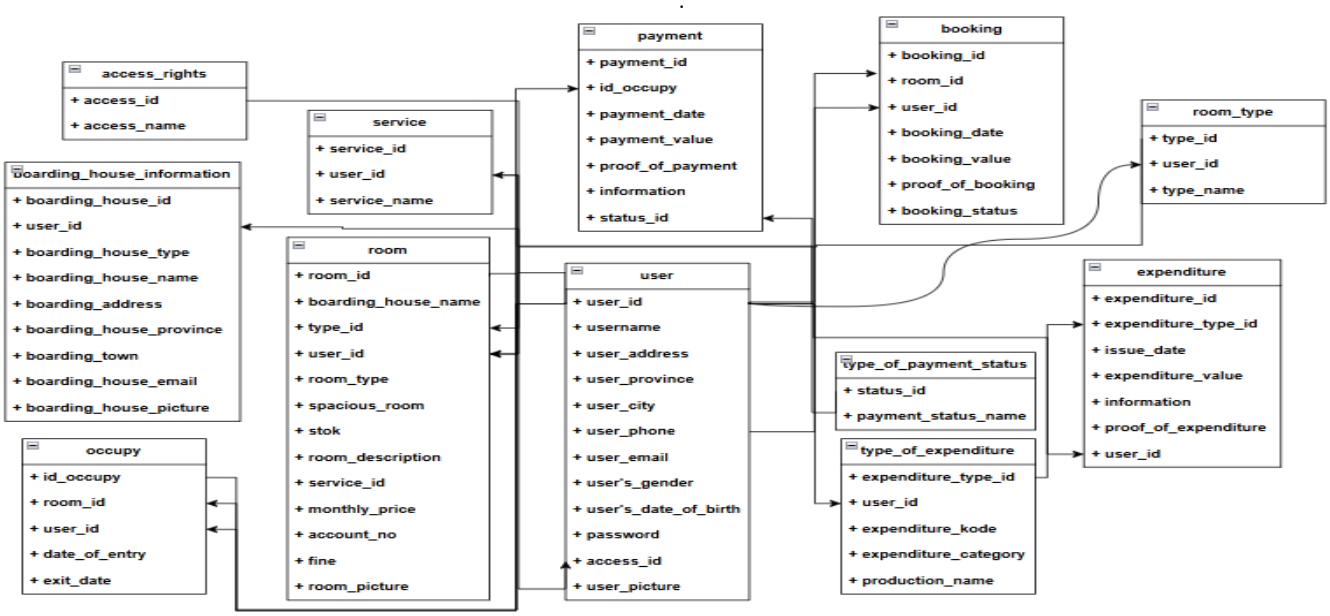

Figure 5. ERD Design

3.2 Tech Stack Front-End and Back-End

A Tech Stack refers to a set of technologies used to develop software. It commonly includes programming languages, frameworks, and tools applied across various system layers, from front-end to back-end [8]. The tech stack used in the development of the web-based Rental Information System project is **WAMP** (Windows, Apache, MySQL, PHP). This stack enables developers to build websites across all layers, including both server-side (backend) and client-side (frontend). Below is a detailed explanation of the tech stack components:

3.2.1. Programming Language: JavaScript

JavaScript is a scripting language that runs on HTML documents, enhances HTML by enabling commands to execute on the client side, specifically in the browser, rather than on the web server [9]. In the context of this Kos'An web application, JavaScript serves several key functions. It facilitates interactive functionalities like validating forms, updating content dynamically, and providing smooth navigation for users, all without the need to reload the page. Additionally, it enhances the user experience by making the interface more responsive and intuitive.

3.2.2. Frontend Framework: Bootstrap

Bootstrap is a CSS framework offering a collection of basic web interface components designed for seamless integration. Built upon HTML and CSS technologies, Bootstrap enables developers to create layouts such as pages, tables, buttons, forms, navigation menus, and other components by invoking CSS classes within specific HTML files [10]. Bootstrap plays a critical role in ensuring the website is both visually appealing and responsive across various devices. It simplifies the development process by providing pre-designed components, such as navigation bars, carousels, modal dialogs, and grid systems, that can be easily customized. With Bootstrap, developers can quickly implement a consistent design language, making the website user-friendly and professional. Furthermore, its responsive grid system allows the site to adapt seamlessly to different screen sizes, enhancing the browsing experience for both house owners and boarding house residents.

3.2.3. Backend Framework: PHP

PHP is one of the most popular programming languages among developers for creating systems, including applications and websites. It is a high-level programming language embedded within HTML documents [11]. PHP serves as the backbone of server-side processing. It handles tasks such as managing user authentication, interacting with the database to store or retrieve data, and executing backend logic to support dynamic features like generating personalized content or processing booking requests. PHP's flexibility and compatibility with databases like MySQL make it an ideal choice for building robust and dynamic web systems.

3.2.4. Runtime Server: Apache

Apache is a web server responsible for logging HTTP requests/responses and providing detailed information as part of its core functionality. Apache is compact, modular, adheres to HTTP protocol standards, and is highly popular, as evidenced by its user base, which far exceeds that of its competitors [12]. Apache serves as the backbone for hosting the website and managing the flow of data between the server and users. It ensures the reliable delivery of web pages, processes user requests efficiently, and logs server activity for debugging and analysis. Apache's flexibility and compatibility with various platforms make it an ideal choice for maintaining a stable and accessible application.

3.2.5. Database: MySQL

MySQL is a database program capable of rapidly handling and sharing data with multiple users simultaneously. It is a type of A Relational Database Management System (RDBMS) that utilizes Structured Query Language (SQL) to handle and organize database information. MySQL is available across multiple platforms, including Windows and Linux [13]. MySQL serves as the backbone for managing data related to boarding houses, including house details, user accounts, booking information, and payment records. Its capability to handle large volumes of data while allowing simultaneous access ensures the system operates smoothly and efficiently.

3.2.6. Version Control System: GitHub

GitHub is a software development platform that provides hosting services for open-source projects using the Git version control system. It enables developers to collaboratively store, manage, and review source code [14]. Additionally, GitHub supports creating applications that utilize user data, such as generating programming resumes from user profiles [15]. Thus, GitHub is not only a collaborative development platform but also an educational and application development tool leveraging user data for various purposes. In this project, GitHub is used to manage and store the codebase, allowing team members to collaborate efficiently. It also serves as A version control system that monitors code modifications, promotes seamless collaboration between developers, and minimizes the likelihood of conflicts.

3.2.7. Frontend, Backend, and Database Deployment: DomaiNesia

Deployment is the process of applying an application to a production environment continuously, periodically, and automatically through triggers. This process includes preparation, installation, and configuration to ensure that the application or system runs securely and effectively in the target environment [16].

3.3 User Interface

The Rental Information System website interface starts with a home page, providing essential features and information:On the home page, users can check room availability, learn about the advantages of the property, access the FAQ section, and register for a room.The system supports three distinct roles, each with specific functionalities:Boarding house seeker can browse available rooms and make bookings directly through the platform.House Owner have the ability to add new rooms, monitor availability, and confirm payments.Admins can oversee boarding house seeker and owner data, as well as manage room additions for the system.This role-based structure ensures tailored access and functionalities for each user type.

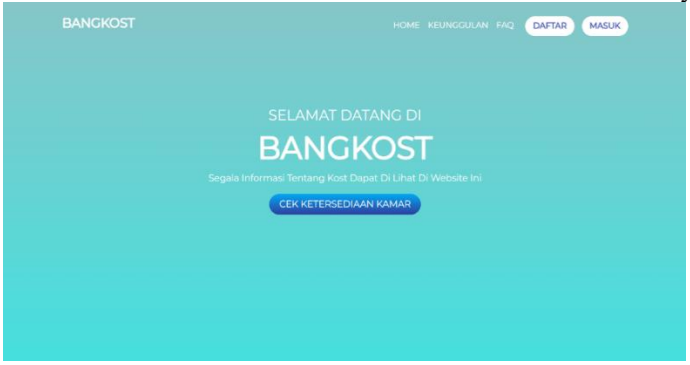

Figure 6 Website appearance

The room booking interface allows tenants to reserve a room based on type, price, size, and boarding house category. Before making a reservation, tenants are required to complete their personal information. If the biodata is not filled out, they will be unable to proceed with the booking.

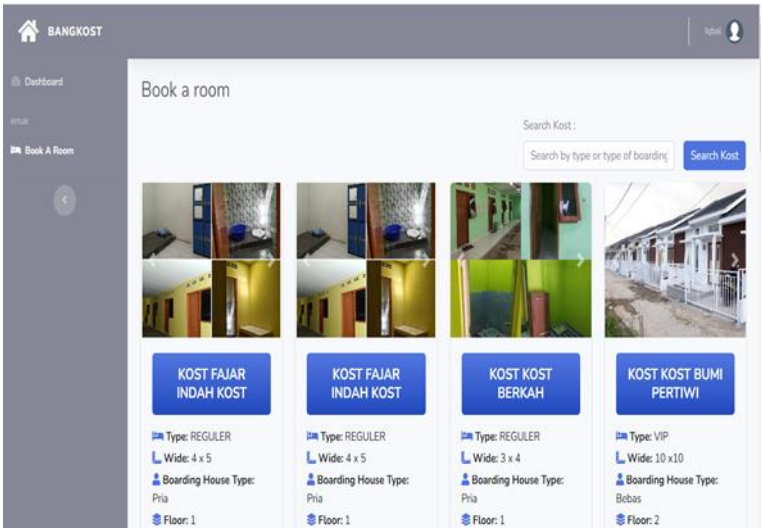

Figure 7 Book a Room

3.4 Testing

At this stage, researchers conduct testing to evaluate a product's usability using the System Usability Scale (SUS) method. SUS has several distinctive features that differentiate it from other surveys. First, it is simple, consisting of only 10 questions, making it relatively quick and easy for respondents. Second, it is highly versatile, as it is technology-agnostic and can be used to assess almost any type of interface. Lastly, SUS provides clear scoring, generating a score between 1 and 100, which is easy to interpret across various disciplines. The SUS includes 10 items, each evaluated on a 5-point scale ranging from "Strongly Disagree" to "Strongly Agree." It includes 5 positive and 5 negative statements. The SUS score is interpreted based on Jeff Sauro's grading system, which uses Percentile rankings and letter grades ranging from A to F, where A represents the highest score and F the lowest. For this study, the researcher chose to focus on the letter grades [17].

The System Usability Scale (SUS) scores are categorized into five grades based on their values. A score of 80.3 or higher falls into Grade A, while a score of at least 74 is classified as Grade B. Scores of 68 or higher are categorized as Grade C, whereas those starting from 51 belong to Grade D. Any score below 51 is classified as Grade F. The calculation of SUS scores follows specific rules. For odd-numbered questions, 1 is subtracted from the user's selected value, whereas for even-numbered questions, the value is determined by subtracting the user's selection from 5. These adjustments result in values ranging from 0 to 4, with 4 indicating the highest ranking. The final SUS score is obtained by summing all the values and multiplying the total by 2.5, converting the scale from 0–40 to 0–100.The final SUS score is the average score across all respondents [18].

$$\overline{x} = \frac{\sum x}{n}$$

(*formula 1*)

Formula Interpretation:

x: Average score

$\sum x$: Sum of SUS scores

n: Number of respondents

The meaning of x can be seen in Figure 8.

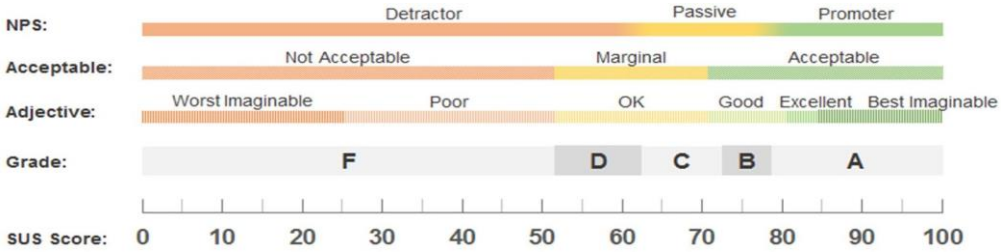

Figure 8. System Usability Scale Score [19]

The SUS testing was conducted with 38 respondents. Each respondent answered 10 questions from the SUS methodology instrument, which were distributed via Google Forms, as shown in Table 1. The data collected from the respondents were processed and analyzed to evaluate the usability of the website.

Table 1 List of Questionnaire Questions

Number	Question
1.	I believe I would consider using this system again.
2.	I feel that the system is difficult to navigate.
3.	I think the system is simple to operate.
4	I require help from someone else or a technician to operate the system.
5.	I believe the system's features work as expected.
6.	I notice several inconsistencies and areas where the system doesn't align properly.
7	I believe that others will be able to learn how to use the system quickly.
8.	I feel the system is hard to understand.
9.	I think there are no barriers to using this system.
10.	I need to familiarize myself with the system before I can use it effectively.

After collecting data using the questionnaire, the author obtained the processed results, which are presented in Table 2.

Table 2 Results of Test Data processing

NO	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	SUS Score
1	5	1	5	1	5	1	5	1	5	1	100
2	5	4	5	5	5	5	5	5	5	5	52.5
……	……	……	……	……	……	…….	……	……	…..	…..	……
38	5	1	5	1	5	1	5	1	5	1	100
RESULT											78.16

In Table 2, the values in the columns represent the total scores from Q1 to Q10, with each column reflecting the responses to the questionnaire statements. The questions, labeled Q1 to Q10, were provided to the respondents. Once the statement values are summed, the total is multiplied by 2.5 to yield a final score of 78.16 (Grade B). This result suggests that the "Kos-kosan" website delivers a positive user experience.

4. CONCLUSION

The development of this web-based Rental Information System aims to overcome challenges in manual data management, including data inaccuracies and difficulties in information retrieval. Utilizing the Waterfall model, the system provides customized access and features for boarding house seekers, house owners, and administrators. Testing with the System Usability Scale (SUS) method resulted in a score of 78.16 (Grade B), indicating a good level of usability and positive user reception.

This system offers several advantages, such as enhanced operational efficiency for house owners, improved accessibility for boarding house seekers, and a structured data management approach that reduces errors in rental information. Moreover, the online reservation feature simplifies the booking process, saving time and effort for users. However, some limitations remain, such as the system's dependence on internet connectivity, potential usability challenges for users unfamiliar with digital platforms, and the need for continuous updates to accommodate evolving user requirements.

Despite these limitations, the implementation of this system is expected to significantly improve the rental process, making it more efficient and convenient for both tenants and landlords in managing boarding house information and reservations.

REFERENCES

[1] Maulidda, T. S., dan Jaya, S. M. (2021). Perancangan Sistem Informasi Berbasis Web Melalui Whatsapp Gateway Studi Kasus Sekolah Luar Biasa-Bc Nurani. Jurnal Teknologi Informasi Dan Komunikasi, 11(1), 38–44. https://doi.org/10.56244/fiki.v11i1.421

[2] Nizar, C. (2021). Rancang Bangun Sistem Informasi Sewa Rumah Kost (E-Kost) Berbasis Website. Jurnal Sistem Informasi Dan Sains Teknologi, 3(1), 1–10. https://doi.org/10.31326/sistek.v3i1.852

[3] Satria, S., Gusman, D., dan Azrialdi, E. (2022). Rancang Bangun Sistem Informasi Kos Berbasis Web di Kecamatan Tampan: Design and Build of Web-Based Boarding Information System In Tampan District. MALCOM: Indonesian Journal of Machine Learning and Computer Science, 2(1), 28-36.
[4] Amrin, M., Larasati, M. D., dan Satriadi, I. (2020). Model Waterfall untuk Pengembangan Sistem Informasi. Jurnal Teknik Komputer AMIK BSI, 6(1), 137. [E-ISSN: 2550-0120].
[5] Rohmanto, R., & Setiawan, T. (2022). Perbandingan Efektivitas Sistem Pembelajaran Luring dan Daring Menggunakan Metode Use case dan Sequence Diagram. INTERNAL (Information System Journal), 5(1), 53-62.
[6] Pemrograman, Algoritma D. A. N. 2020. "Pseudocode." Definitions. doi: 10.32388/tf77dy.
[7] Pulungan, S. M., Febrianti, R., Lestari, T., Gurning, N., & Fitriana, N. (2023). Analisis Teknik Entity-Relationship Diagram Dalam Perancangan Database. Jurnal Ekonomi Manajemen dan Bisnis (JEMB), 1(2), 143-147
[8] Smith, J. (2020). Understanding the Importance of Technology Stacks in Modern Software Development. Journal of Software Engineering, 12(3), 45-56.
[9] Sahi, A. (2020). Aplikasi Test Potensi akademik seleksi saringan masuk LP3I berbasis web online menggunakan framework codeigniter. Tematik, 7(1), 120-129.
[10] Ibnu Sa'ad. Muhammad, Otodidak Web Programming: Membuat Website Edutainment. Jakarta: Elex Media Komputindo, 2020.
[11] Ilmi, F. A., Sasmoko, D., Suasana, I. S., Sulartopo, dan Adi Putra, T. W. (2024). Saturnus : Jurnal Teknologi dan Sistem Informasi. Saturnus, 2(3), 95–105. https://doi.org/10.61132/saturnus.v2i3.186
[12] Kusuma, G. H. A. (2021). Perancangan Skema Sistem Keamanan Jaringan Web Server menggunakan Web Application Firewall dan Fortigate untuk Mencegah Kebocoran Data di Masa Pandemi Covid-19. Journal of Informatics and Advanced Computing (JIAC), 2(2), 1-4.
[13] Ramadhan, R. F., dan Mukhaiyar, R. (2020). Penggunaan Database Mysql dengan Interface PhpMyAdmin sebagai Pengontrolan Smarthome Berbasis Raspberry Pi. JTEIN: Jurnal Teknik Elektro Indonesia, 1(2), 129-134.
[14] Sari, E. F., & Ekohariadi. (2021). Penerapan GitHub sebagai Media E-Learning untuk Mengetahui Keefektifan Kolaborasi Project pada Mata Pelajaran Pemrograman Web dan Perangkat Bergerak di SMK Negeri 2 Surabaya. Jurnal IT-EDU, 6(3).
[15] Putra, I. K. A. S., Mahendra, I. B. M., & Karyawati, A. A. I. N. E. (2023). Pengembangan Aplikasi GitHub CV Generator Berdasarkan Data GitHub User untuk Kepentingan Pembuatan CV Programmer. Jurnal Pengabdian Informatika, 1(2), 551-556.
[16] Ramadhan, R. (2023). Optimasi Deployment Aplikasi Berbasis Server ke Cloud Environment dengan Metode Continuous Deployment. Universitas Sriwijaya
[17] Kosim, M. A., Aji, S. R., dan Darwis, M. (2022). Pengujian Usability Aplikasi Pedulilindungi Dengan Metode System Usability Scale (Sus). Jurnal Sistem Informasi Dan Sains Teknologi, 4(2), 1–7. https://doi.org/10.31326/sistek.v4i2.1326
[18] Fauzi, F. N., dan Sujarwo, A. (2023). Rancang Bangun UI/UX Aplikasi Nestify untuk Manajemen Rumah Kos dengan Metode Lean UX. JoMMiT : Jurnal Multi Media Dan IT, 7(2), 116–123. https://doi.org/10.46961/jommit.v7i2.955
[19] Kesuma, D. P. (2021). Penggunaan Metode System Usability Scale Untuk Mengukur Aspek Usability Pada Media Pembelajaran Daring di Universitas XYZ. JATISI (Jurnal Teknik Informatika Dan Sistem Informasi), 8(3), 1615–1626. https://doi.org/10.35957/jatisi.v8i3.1356