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ORIGINAL

Development of a Web-Based Boarding House Information System with GPS Integration for Students.

Desarrollo de un sistema de información de internados basado en la Web con integración GPS para estudiantes.

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ABSTRACT

Introduction: This study develops an information system aimed at helping students locate appropriate boarding houses, tackling the shortcomings of conventional approaches that depend on recommendations from local residents or peers. Frequent challenges, such as restricted access, erroneous data, and unfulfilled anticipations, underscore the necessity for an efficient resolution. The system is designed to deliver thorough and current information regarding available accommodations, thereby improving accessibility and facilitating informed decision-making for students.
Methods: The study utilizes the waterfall model, which includes four distinct phases: analysis, design, coding, and testing. In the analysis phase, user requirements were discerned through surveys and interviews, yielding valuable insights into the particular needs of students. The design phase encompassed the development of system architecture and prototypes for user-friendly interfaces, with a strong emphasis on accessibility and functionality. The coding phase executed the system, converting designs into a working web-based platform. The testing process included thorough validation conducted by media professionals and users to evaluate usability and effectiveness.
Results: The validation from media experts resulted in a score of 0.88, indicating that the system is classified as "meeting standards" in terms of technical design and functionality. The evaluations conducted by users resulted in a score of 90.1, which is classified as "highly feasible," indicating a strong level of satisfaction and usability. The findings validate the system's capability to streamline the boarding houses search process.
Conclusions: Essential elements encompass comprehensive room descriptions, current availability, pricing details, and location mapping, providing students with a dependable and effective resource to obtain accommodations that meet their requirements. By minimizing the time and effort needed to locate boarding houses, the system improves user satisfaction and fosters a more fluid academic experience.

Keywords: Boarding House, information system, web-based, GPS, waterfall model.

RESUMEN

Introducción: Este estudio desarrolla un sistema de información destinado a ayudar a los estudiantes a encontrar pensiones adecuadas, abordando las deficiencias de los enfoques convencionales que dependen de las recomendaciones de los residentes locales o de sus compañeros. Los desafíos frecuentes, como el acceso restringido, los datos erróneos y las expectativas incumplidas, subrayan la necesidad de una solución eficiente. El sistema está diseñado para proporcionar información completa y actualizada sobre las opciones de alojamiento disponibles, mejorando así la accesibilidad y facilitando la toma de decisiones informada por parte de los estudiantes.
Métodos: El estudio utiliza el modelo en cascada, que incluye cuatro fases distintas: análisis, diseño, codificación y prueba. En la fase de análisis, se discernieron los requisitos de los usuarios a través de encuestas y entrevistas, lo que produjo información valiosa sobre las necesidades particulares de los estudiantes. La fase de diseño abarcó el desarrollo de la arquitectura del sistema y prototipos para interfaces fáciles de usar, con un fuerte énfasis en la accesibilidad y la funcionalidad. La fase de codificación ejecutó el sistema, convirtiendo los diseños en una plataforma web funcional. El proceso de prueba incluyó una validación exhaustiva realizada por profesionales de los medios y usuarios para evaluar la usabilidad y la eficacia.
Resultados: La validación por parte de los expertos en medios de comunicación arrojó una puntuación de 0,88, lo que indica que el sistema está clasificado como "que cumple con los estándares" en términos de diseño técnico y funcionalidad. Las evaluaciones realizadas por los usuarios arrojaron una puntuación de 90,1, que se clasifica como "muy factible", lo que indica un alto nivel de satisfacción y facilidad de uso. Los hallazgos validan la capacidad del sistema para agilizar el proceso de búsqueda de pensiones.
Conclusiones: Los elementos esenciales incluyen descripciones completas de las habitaciones, disponibilidad actual, detalles de precios y mapas de ubicación, lo que proporciona a los estudiantes un recurso confiable y eficaz para obtener alojamiento que cumpla con sus requisitos. Al minimizar el tiempo y el esfuerzo necesarios para localizar pensiones, el sistema mejora la satisfacción del usuario y fomenta una experiencia académica más fluida.

Palabras clave: Pensión, sistema de información, web, GPS, modelo cascada.

INTRODUCTION

The rising need for boarding accommodations among students poses considerable challenges, especially for those studying away from their hometowns. Observations indicate that students generally seek boarding house by inquiring with local residents or peers, a method that frequently yields unsatisfactory results. Frequent challenges involve accommodations that are completely booked or properties that do not align with students' expectations. The identified challenges underscore the pressing necessity for a solution that enhances efficiency and reliability in the accommodation search process.

Prior investigations corroborate this conclusion. Ariefah highlighted the essential importance of temporary housing for workers and students pursuing their studies away from their hometowns (1). In a similar vein, Anggi observed that direct visits continue to be the main approach for gathering information about boarding house, a process that is both time-consuming and inefficient (2). Abdul noted that although rental businesses show potential, their booking systems frequently fall short in terms of effectiveness and efficiency (3). Jenie elaborated that the increasing demand for rental housing in urban

centers such as Jakarta intensifies the challenge of locating accommodations close to places of employment or educational facilities (4).

This study presents a web-based boarding house information system designed to tackle these challenges by integrating GPS technology, allowing users to search for, book, and manage boarding accommodations efficiently. The extensive use of web-based platforms guarantees accessibility, rendering this system feasible for both users and property owners. The system enhances the search and booking experience for students by providing comprehensive details on boarding house availability, pricing, and facilities. This offers property managers a digital platform to showcase their accommodations to a wider audience, thereby improving business visibility and competitiveness.

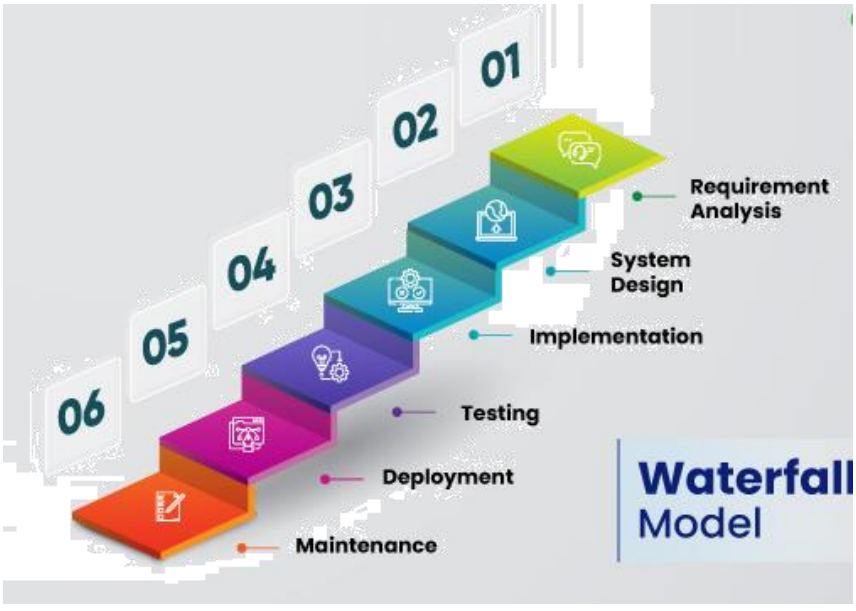
The design of the system includes elements like real-time availability updates, options to filter by type (such as male-only, female-only, or family accommodations), and the ability to customize searches according to facilities, location, and rental costs. This method corresponds with conclusions drawn from recent studies, emphasizing the advantages of web-based information systems in improving accessibility and efficiency (5,6). These systems offer comprehensive descriptions, encompassing location mapping, price ranges, and availability, thereby enhancing the user experience for both those seeking accommodations and the providers.

The proposed web-based boarding house information system in this study effectively tackles current inefficiencies in the search process while also playing a significant role in the digital transformation of the accommodation rental sector. This system signifies a notable progression in addressing students' housing requirements and boosting the competitiveness of boarding businesses in a rapidly evolving market by utilizing technology to enhance accessibility, transparency, and user satisfaction.

METHODS

This study employed a Research and Development (R&D) methodology adhering to the Waterfall development model, renowned for its sequential and systematic approach in software development. The Waterfall model was selected for its capacity to define distinct phases, facilitating methodical advancement and stringent quality control at each stage, as noted by Sommerville (7,8) and Pressman (9). The methodology consisted of five key phases: requirements analysis, system design, implementation, testing, and maintenance, can be seen in Figure 1.

Figure 1. Waterfall model



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Source: Pressman (9)

The requirements analysis phase entailed comprehensive data collecting via interviews, questionnaires, and direct observations to ascertain both functional and non-functional requirements. The result of this phase was a detailed Software Requirements Specification (SRS) document, guaranteeing conformity with the requirements of end-users and stakeholders. This phase is essential for reducing uncertainty and creating a robust foundation for other stages, as emphasized by Pressman (9).

During the system design phase, the requirements were converted into a comprehensive system architecture. This encompassed user interface (UI) prototypes, data flow diagrams (DFDs), and database structures. This phase highlighted modularity, scalability, and user-centric design concepts, guaranteeing the system's adaptability to future needs. Pressman (9) asserts that a robust design framework greatly improves the maintainability and extensibility of software systems.

The implementation step entailed transforming the design into executable code while adhering to best practices in software development. Code quality was maintained by following defined programming standards, utilizing version control, and doing peer reviews. McConnell (10) asserts that disciplined coding approaches mitigate technological debt and enhance overall system reliability. This phase produced a functioning software prototype prepared for validation. During the testing phase, the program underwent stringent validation to confirm it satisfied specified requirements and operated as intended. A synthesis of unit testing, integration testing, and system testing was employed to detect and rectify any mistakes. Myers et al. (11) emphasize that comprehensive testing is essential for identifying latent flaws and ensuring software robustness. This phase confirmed the system complied with performance standards, hence improving user happiness.

The concluding step, maintenance, tackled post-deployment issues, encompassing error rectifications, system enhancements, and responsiveness to changing user requirements. Maintenance strategies were informed by the ideas established by Leffingwell and Widrig (12), emphasizing continual improvement and long-term system sustainability. This step guaranteed the software's relevance and functionality in evolving operating environments. The organized character of the Waterfall approach was particularly advantageous for this investigation, since it enabled thorough planning, recording, and validation at every level. This method guaranteed a superior final product that met user requirements and allowed opportunities for iterative improvements informed by user feedback and technology progress.

The research included 35 participants from Faculty of Teacher Training and Education, Universitas Sultan Ageng Tirtayasa, Indonesia, providing a diverse representation of students across multiple demographic categories. The gender distribution was balanced, comprising 17 males and 18 females, which facilitated equitable insights from both perspectives. The ages of the respondents varied from 18 to 24 years, with a mean age of 20.97 years, characteristic of a university population. The largest group of participants consisted of first-year students (10), followed by second-year and third-year students (9 each), and fourth-year students (7). The respondents encompassed various departments, with the greatest participation from Indonesian Language Education and Primary Education, each comprising 6 students, followed by English Education with 5 students. The variation in gender, age, year of study, and department facilitates a thorough comprehension of the perspectives within the student population, can be seen in Table 1.

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Table 1. The demography of Respondent.

Category	Variable	Details
Gender	Male	17 students
	Female	18 students
Age	Mean Age	20.97 years
	Standard Deviation	2.06 years
	Minimum Age	18 years
	Maximum Age	24 years
	Median Age	21 years
Year of Study	1st Year	10 students
	2nd Year	9 students
	3rd Year	9 students
	4th Year	7 students
Department	Indonesian Language Education	6 students
	Primary Education	6 students
	English Education	5 students
	Guidance and Counseling	4 students
	Mathematics Education	4 students
	Chemistry Education	4 students
	Physics Education	3 students
	Electrical Engineering Education	2 students
	Biology Education	1 student

Source: Own elaboration

RESULTS AND DISCUSSION

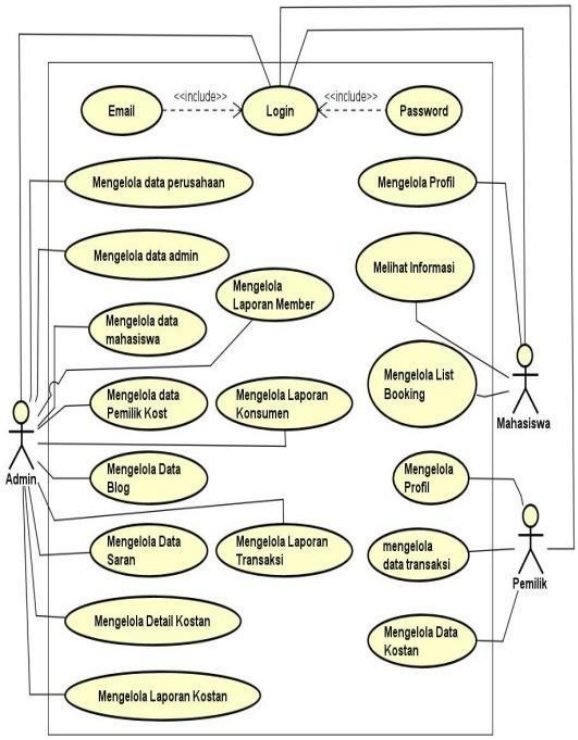
This research produces a web-based boarding house search information system for FKIP Untirta students. This boarding house search information system involves three users: the administrator, students seeking boarding houses, and boarding house owners.

The use case diagram illustrates the functional requirements of a rental management system tailored for three primary user groups: Admins, Students, and Property Owners. Each actor engages with the system according to their specific roles and responsibilities. The Admin occupies a pivotal position within the system, overseeing multiple categories of data, such as company data, administrative data, student data, property owner data, blog content, feedback, and property listings. The administrator is responsible for generating and managing various reports, including member, consumer, transaction, and property reports, to ensure the system operates smoothly. Additional administrative functions encompass the management of comprehensive property data and the oversight of system interactions.

The students primarily function as consumers of the system, with features tailored to meet their needs. Users can access the system with an email and password, manage their profiles, view information on available rental properties, and manage their booking lists. This facilitates an efficient process for students to locate and reserve accommodations. The Property Owners utilize the system for the management of property data, transaction records, and personal profiles. Their responsibility is to maintain the system with precise property information, thereby aiding in the attraction of prospective tenants. Property owners, similar to students, utilize email and password credentials to access the system.

The system is organized around a central login feature, utilized by all users, which depends on email and password credentials for secure access. The relationships among the actors and system functionalities are distinctly outlined, with administrators possessing the most extensive control over the system. The incorporation of fundamental elements, including authentication and data administration, guarantees a resilient and secure system. This design emphasizes the system's capacity to address the requirements of various user groups while ensuring distinct boundaries and responsibilities for each role, leading to an efficient and user-centered rental management platform. The use case diagram can be seen in Figure 2. (13)

Figure 2. Use Case Diagram



Source: Own elaboration.

The role of admin encompasses the management of company data, administrative data, student data related to boarding houses, data pertaining to boarding house owners, blog data, suggestion data, details of boarding houses, boarding house reports, member reports, consumer reports, and transaction reports. Students seeking boarding houses can manage profiles, transaction data, and booking lists. The boarding house owner's responsibilities include managing profiles, transaction data, and boarding house data. The activity diagram can be seen in Figure 3.

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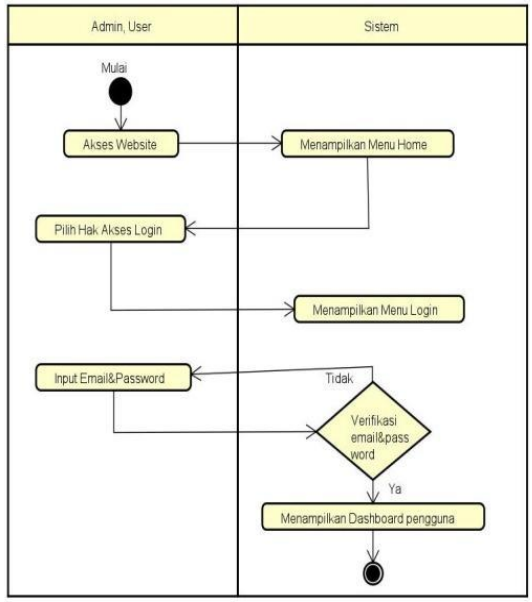
Figure 3. Activity Diagram

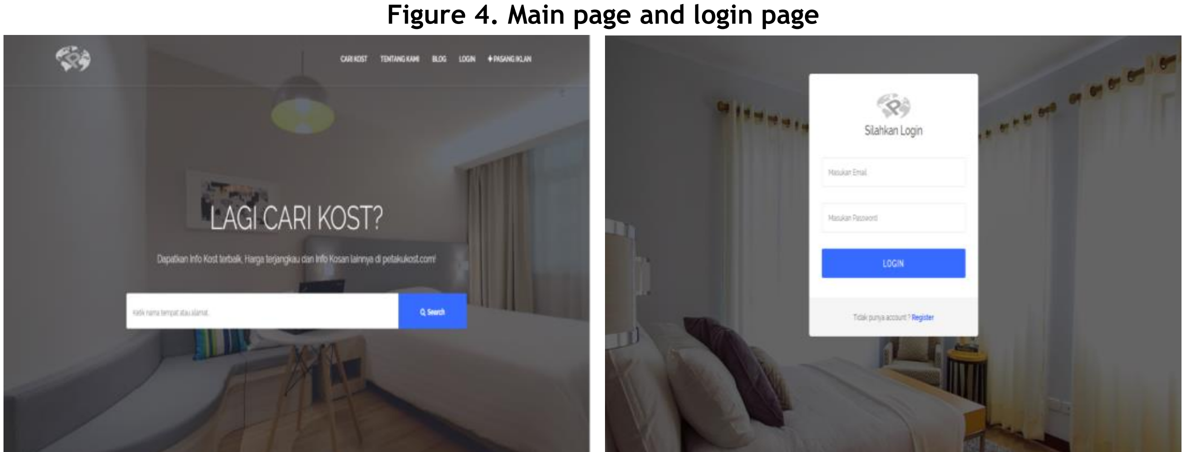


Source: Own elaboration.

The FKIP Untirta student rental search information system implementation has two phases: function and database. The system must meet functional and data management criteria during these stages. In function implementation, various critical system interfaces were created. Upon entering the system, users land on the Main Page, can be seen in Figure 4. This page makes it easy to login, register, and browse rental properties. The second is the Login Page, where students and property owners can safely log in using their email and password to access role-specific features. Third, the User Registration Page lets students and property owners register. Student and property owner registrations are necessary to book and post rental properties on the platform. Users cannot use important system functions without an account. These interfaces provide security, usability, and access control.

MySQL is used to structure and store system data during database construction (13–16). Two major tables were constructed for data management. The first table, tbl_user, stores user IDs, email addresses, passwords, and roles (e.g., student or property owner). This table uniquely identifies users and defines their system access rights. The second table stores rental property data: tbl_kosan. The system provides accurate and efficient property listings by including property ID, name, address, owner data, availability status, and rental prices in this table.

Figure 4. Main page and login page



Source: Own elaboration.

The validation and testing phase of the rental search information system for FKIP Untirta students comprised two primary stages: Media Validation Testing and User Validation Testing (17–20). Each phase assessed the system from various perspectives, confirming its compliance with functionality and usability standards.

Media Validation Testing

The system's functionality was evaluated by two media experts employing a Guttman Scale. A score of 1 was allocated for a "Yes" response, signifying agreement, whereas a score of 0 was assigned for "No," denoting disagreement. A score of 0.88, approaching 1, signifies that the system effectively meets functionality standards. This result indicates that the system exhibits high reliability in executing its intended functions, as per software quality benchmarks such as ISO/IEC 25010. Results are presented in Table 2.

Table 2. Media Validation Testing Result.

No.	Respondent	Yes	No
1	Media Expert 1	21	1
2	Media Expert 2	18	4

Source: Own elaboration.

User Validation Testing

Usability testing involved 35 participants, comprising 29 students (rental seekers) and 6 property owners (rental providers). Participants evaluated the system through a 25-item Likert scale survey, addressing dimensions including content, accessibility, and interface design. The scoring system utilized a scale from 1 (strongly disagree) to 4 (strongly agree). Table 3 presents the total and average scores.

Table 2: User Testing Results

Aspect	Content	Accessibility	Interface Design	Total Score
Respondent 1	32	22	37	91
Respondent 2	28	22	37	87
Respondent 3	29	21	36	86
Respondent 4	28	22	39	89
Respondent 5	28	22	40	90
Respondent 6	29	23	39	91
...	...	...	...	...

Aspect	Content	Accessibility	Interface Design	Total Score
Respondent 35	28	20	39	87
Total (Σ)				3156
Average (X)				90.1

Source: Own elaboration.

The usability testing indicated an average score of 90.1, categorizing the system as "Very Feasible" according to the established scoring criteria. The high score, surpassing the 75 threshold, indicates substantial user satisfaction in the critical areas of content, accessibility, and design. The system attained a feature completeness score of 0.88, indicating its effectiveness in performing intended functions and compliance with design phase requirements. The average user satisfaction score of 90.1 indicates the system's effectiveness in fulfilling the expectations of both rental seekers and property owners. The platform provides an intuitive, accessible, and visually appealing interface, thereby improving the overall user experience. The system is classified as "Very Feasible," indicating its preparedness for implementation as a dependable rental search platform designed for FKIP Untirta students and property owners. The system has achieved high standards of functionality and user satisfaction; however, future enhancements should target minor aspects, including accessibility features and usability concerns identified by specific users during testing. This guarantees the system's robustness and user-friendliness during its continuous implementation.

CONCLUSIONS

The establishment of a rental search system for FKIP Untirta students has markedly improved the efficiency of locating appropriate boarding houses. The system enhances student satisfaction by minimizing the time needed to find accommodations, thereby streamlining the process. A feasibility analysis involving two media experts and 35 respondents, comprising 29 FKIP Untirta students and six boarding house owners, evaluated three fundamental aspects: functionality, usability, and efficiency. The system achieved a functionality score of 0.88, indicating its effectiveness in meeting its intended objectives. The usability assessment yielded an average score of 90.1, classifying the system as "Very Feasible" and indicating a high degree of user satisfaction with its interface, accessibility, and overall user experience. The system's efficiency was confirmed with an average page load time of 3.43 seconds, aligning with established standards for a smooth and time-efficient browsing experience. The analysis demonstrates that the system is superior in functionality, usability, and efficiency, positioning it as a reliable resource for FKIP Untirta students during their accommodation search.

REFERENCES

1. Rachmawati A. Membangun Informasi Layanan Umum Rumah Kos Melalui Aplikasi Berbasis Web. Jurnal Ilmiah FIFO. 2017;9(2):155.
2. Sagita A, Simpony BK. Web Sistem Informasi Pencarian Info Kostan Menggunakan Google Maps API 3. IJCIT(Indonesian Journal on Computer and Information Technology). 2018;3(1):18–25.
3. Sabirin AR, Sulfia. Sistem Informasi Jasa Pemesanan Kamar Kost Online Di Kota Baubau. Jurnal Informatika. 2018;7(2).
4. Sundari J, Arumaryawan D. Sistem Informasi Geograpfis dengan Google Map Untuk Pencarian Rumah Kost. INOVTEK Polbeng - Seri Informatika. 2018;3(1):1.
5. Negara YDP, Setiawan DR, Rochman EMS, Mufarroha FA. Development Of A Boarding House Search Information System Using The Waterfall Model. E3S Web of Conferences [Internet]. 2021

Dec 6 [cited 2025 Jan 3];328:04030. Available from: https://www.e3s-conferences.org/articles/e3sconf/abs/2021/104/e3sconf_icstunkhair2021_04030/e3sconf_icstunkhair2021_04030.html
6. Zimmermann A, Schmidt R, Alt R, Masuda Y, Chehri A. Digital Strategy and Architecture for Human-Centered Intelligent Systems. Smart Innovation, Systems and Technologies [Internet]. 2023 [cited 2025 Jan 3];359 SIST:33–42. Available from: https://link.springer.com/chapter/10.1007/978-981-99-3424-9_4
7. Adetokunbo A, Basirat A. Software Engineering Methodologies: A Review of the Waterfall Model and Object- Oriented Approach. International Journal of Scientific & Engineering Research. 2014;4(7):427–34.
8. Petersen K, Wohlin C, Baca D. The waterfall model in large-scale development. In: Lecture Notes in Business Information Processing [Internet]. Springer Verlag; 2009 [cited 2022 Sep 12]. p. 386–400. Available from: https://link.springer.com/chapter/10.1007/978-3-642-02152-7_29
9. Pressman RS. Software Engineering: A Practitioner's Approach . 6th Edition. New York: McGraw Hill; 2005.
10. McConnell S. Code Complete: A Practical Handbook of Software Construction. Second Edi. Microsoft Press; 2004.
11. Myers GJ, Badgett T, Sandler C. The Art of Software Testing [Internet]. Myers GJ, Badgett T, Sandler C, editors. Boston: Wiley; 2012 [cited 2025 Jan 3]. Available from: https://onlinelibrary.wiley.com/doi/book/10.1002/9781119202486
12. Leffingwell, D., Widrig D. Managing Software Requirements: A Use Case Approach. Second Edi. Addison-Wesley; 2003.
13. Hamid MA, Aribowo D, Anggraini R. Design and Development of Alumni Career Information System using PHP MySQL. Elinvo (Electronics, Informatics, and Vocational Education) [Internet]. 2021 Sep 13 [cited 2022 Feb 6];6(1):81–9. Available from: https://journal.uny.ac.id/index.php/elinvo/article/view/30200
14. Luo G. A web-based virtual experimental platform for the course of automatic control principle. International Journal of Electrical Engineering Education [Internet]. 2018 Jun 17 [cited 2021 Mar 9];002072091878086. Available from: http://journals.sagepub.com/doi/10.1177/0020720918780862
15. Oktarina D, Sukrianto D, Wistiana W. Penerapan Web Mobile Pada Sistem Informasi Pencarian Dan Pemesanan Rumah Kos Di Kota Pekanbaru. It Journal Research and Development. 2019;3(2):19–29.
16. Zubaedah R, Snyompwain P. Sistem Pemesanan Rumah Sewa Pada Kabupaten Merauke Berbasis Web. Musamus Journal of Technology & Information. 2018;1(1):16–23.
17. Hamid MA, Permata E, Aribowo D, Darmawan IA, Nurtanto M, Laraswati S. Development of cooperative learning based electric circuit kit trainer for basic electrical and electronics practice . Journal of Physics: Conference Series [Internet]. 2020 Jan [cited 2020 Apr 11];1456(1). Available from: https://iopscience.iop.org/article/10.1088/1742-6596/1456/1/012047/meta
18. Hamid MA, Sudira P, Triyono MB, Rizqillah MA, Irwanto I, Setiawan D, et al. Variable Frequency Drive (VFD) Trainer Kits for Electronic Control System Subjects in Vocational Secondary Schools. International Journal of Evaluation and Research in Education. 2024;13(5).
19. Mustakim W, Effendi H, Aswardi, Giatman M, Hariyadi, Wulandari DP. Development of Internet of Things Trainer Kit as a Learning Media for Digital Circuit Subjects in Higher Education. International Journal of Online and Biomedical Engineering (iJOE) [Internet]. 2024 Jun 20 [cited 2024 Dec 6];20(09):4–16. Available from: https://online-journals.org/index.php/i-joe/article/view/48349
20. Nahrowi D, Aribowo D, Hamid MA. Pengembangan Trainer Kit Mikrokontroler ATMega16 untuk Sekolah Menengah Kejuruan. Jurnal Pendidikan Teknologi dan Kejuruan [Internet]. 2020 Jul 31 [cited 2020 Sep 12];17(2):145–55. Available from: https://ejournal.undiksha.ac.id/index.php/JPTK/article/view/24366.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest..

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