

Web-Based Student Internship Attendance Application System for Effective Student Attendance Monitoring

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Abstract: The Web-Based Student Internship Attendance Application System revolutionizes the management of internship programs in higher education institutions and companies. This innovative platform addresses the critical need for a streamlined process in handling internship attendances, a vital component of higher education that equips students with essential real-world experience. Traditional methods of managing these attendances have been fraught with complexity and inefficiency. Our system introduces a user-friendly, web-based interface that enables students to record their daily attendance effortlessly using mobile devices or computers. Beyond mere attendance tracking, the system empowers students to submit detailed reports on their daily assignments and experiences. For program organizers, the system provides instantaneous access to attendance data, thereby facilitating better management and evaluation of the internship programs. Key benefits of this system include enhanced efficiency, improved accuracy, and greater transparency in attendance recording. Its capability to minimize human error in attendance tracking and to maintain a comprehensive historical record of data is invaluable for assessing program effectiveness and informing future improvements. This advancement in internship management through web technology not only enriches the student experience but also aids educational institutions and companies in optimizing their internship programs. The Web-Based Student Internship Attendance Application System represents a significant step towards modernizing and elevating the quality of internship management.

Keywords: Internship Attendance Application; Monitoring Student Attendance; Effective Student Attendance; Developing an Attendance System, Waterfall.

1. Introduction

The concept of a 'system', derived from Latin (*systema*) and Greek (*sustēma*), refers to a cohesive unit comprising interconnected elements that facilitate the flow of information, material, or energy towards a specific objective. In the realm of information technology, particularly in higher education, this term has assumed a pivotal role, transcending from being a mere support tool to a fundamental necessity in today's digitally driven era [1][2]. The Practical Work course program, a cornerstone of higher education, aims to cultivate a comprehensive skill set in students, encompassing personality development, knowledge acquisition, innovation capabilities, and community engagement through student-centered learning (SCL). These programs often take place in diverse settings, ranging from entrepreneurial ventures to public and private organizations [3].

Internship programs, a critical component of these educational frameworks, have also been significantly influenced by advancements in information technology. While internships bridge academic theory with practical fieldwork, facilitating real-world experience for students, their management poses considerable challenges, notably in tracking and recording student attendance. Traditional manual methods for timekeeping are not only laborious but also prone to administrative inaccuracies, presenting substantial obstacles for program organizers in maintaining reliable attendance records [4].

In response to these challenges, the development of a web-based internship attendance system emerges as a viable solution [5]. This system leverages web technology to streamline and enhance the efficiency of the internship participation process. It promises to eliminate manual recording, fostering transparency, accuracy, and overall quality in the management of internship programs [6]. This introduction sets the stage for discussing the concept and implementation of a web-based internship registration system, its significance in the realms of higher education and the professional world, and its potential impacts. Additionally, it outlines the objectives, limitations, and research relevance pertaining to the system's development [7]. Higher education serves as a crucial phase in students' personal and professional growth, with internships playing a key role in melding academic theories with practical workplace experiences [8]. However, the efficacy of these programs is often hampered by logistical challenges, particularly in accurately tracking student attendance. Traditional manual attendance methods, such as signing attendance books or sheets, are not only time-consuming but also susceptible to human errors like duplications or omissions [9]. In an era increasingly dominated by information technology, the urgency to modernize these processes is evident. The proposed web-based student internship registration system addresses this need by enabling online participation through mobile devices or computers, thus saving time, and reducing the likelihood of human error during the registration process.

2. Research Method

This research adopts the Waterfall method, a software development approach characterized by its sequential phases, each requiring completion before moving on to the next. This method is particularly effective for projects with well-defined and stable requirements, like our Web-based Student Internship Registration System. It ensures systematic progress and high-quality outcomes due to its gradual and comprehensive focus [10][11].

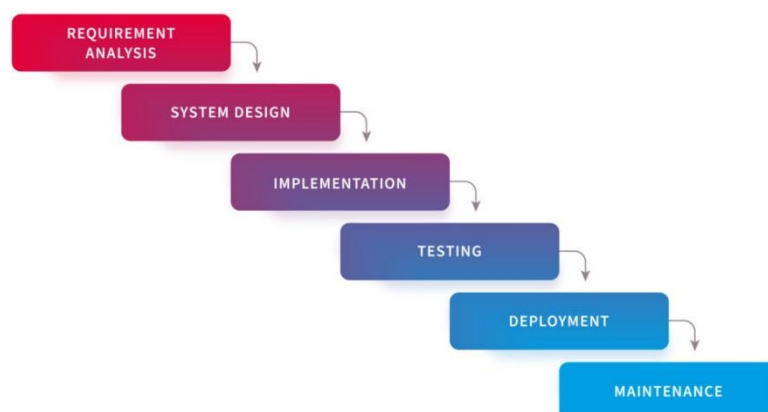


Figure 1. Waterfall Method

The Waterfall method's analysis stage, following initial planning, is crucial in our project. This phase involves a deep dive into the project requirements to ensure thorough understanding and precise documentation [12]. The analysis stage encompasses the following key components:

- 1) Needs Gathering: Engaging with stakeholders (e.g., supervisors, students, administrators) to identify and document system requirements, including both functional and non-functional aspects, alongside compliance with security policies and legal requirements.
- 2) Requirements Analysis: Detailed examination and articulation of the gathered requirements to ensure clarity and precision. This phase underpins the foundation for subsequent development stages.
- 3) Student Identification: Establishing criteria for student registration, necessary data inputs (e.g., student ID, activity descriptions), and effective student data management.
- 4) User Interface (UI): Designing an intuitive UI that facilitates easy data entry for attendance and access to reports, thus enhancing the user experience and operational efficiency.
- 5) Data Security: Specifying robust security measures to protect sensitive student and attendance data, adhering to privacy regulations, and maintaining data integrity.
- 6) Experimental Design: Implementing a randomized control group design to evaluate the system's effectiveness in enhancing attendance process efficiency and accuracy. The control group will use traditional methods, while the experimental group will employ the web-based application, with random group selection to mitigate research bias [13].

Table 1. Attendance Table Structure

Column	Data Type	Description
Id_absensi	Integer	Primary key, unique absence identifier
Id_mahasiswa	Integer	Foreign key, linking to the Student table
Status	Integer	Absence status (present, sick, excused, etc.)
Waktu	Date	Time of student absence
tanggal	Time	Date of student absence

This structured approach to data management ensures precise tracking and analysis of student attendance [14]. The attendance table is complemented by related tables, such as the student table, which contains comprehensive student details, interlinked via the Student_ID foreign key. By using this attendance table, student attendance data can be organized and stored in a structured manner in a database. Every time a student takes an absence, a new record will be added to this table with relevant information such as student ID, date, time, and absence status. This allows schools to track student attendance accurately and provides a basis for further analysis of student attendance [14]. Apart from this attendance table, there are usually other related tables, such as the student table which contains complete information about each student (such as name, npm, and other personal information). This attendance table can be related to the student table via the student ID_ column which is a foreign key. With this connection, attendance information can be linked to the relevant student data, enabling more comprehensive processing and analysis. At the implementation stage, coding is carried out using several programming languages. In this research, the programming languages used are HTML, CSS, PHP, and MySQL as databases [15]. The use of these languages allows the development of effective and efficient web-based information systems. The current system analysis shows the use of a manual system. However, in this research stage, an analysis of the running system is carried out. Apart from that, use case and activity diagrams were also developed that describe the system workflow. This stage also produces system appearance designs, data structures and soft architecture which become the basis for developing better web-based information systems. By using the waterfall method and an appropriate programming language, this research aims to develop an information system that meets student attendance needs. With a more efficient and structured system, it is hoped that students can optimize operations and improve their internship attendance performance.

3. Result and Discussion

3.1 Results

The development and implementation of the Web-based Student Internship Attendance Application yielded significant outcomes, enhancing the management of attendance data in educational settings. The application's user-friendly interface and efficient data processing capabilities have streamlined attendance management. Key results include:

- 1) **Efficiency and Accuracy in Attendance Tracking:** The application demonstrates a notable improvement in the efficiency and accuracy of attendance recording. Automated data capture and validation technologies have minimized the time and effort traditionally required for manual attendance management, while also increasing the accuracy of the data collected.
- 2) **Ease of Access and Real-time Updates:** The application offers convenient access for lecturers, staff, and other authorized personnel via a standard web browser. This ease of access, coupled with real-time data updating, ensures prompt and responsive decision-making in response to student attendance trends and special events.
- 3) **Enhanced Reporting and Analytical Capabilities:** The application's ability to automatically generate detailed attendance reports facilitates more effective analysis of student attendance patterns. This functionality is instrumental for educational institutions in identifying trends in absenteeism and implementing strategies to improve attendance management and student engagement.
- 4) **Benefits Across the Educational Ecosystem:** The application's implementation has yielded benefits for teachers, administrative staff, students, and parents. Teachers can redirect time previously spent on attendance management towards instructional activities, while administrative staff benefit from reduced administrative burdens and more accurate data. Students and parents gain access to real-time attendance information, raising awareness of the importance of consistent attendance.
- 5) **Challenges and Recommendations:** The research identified potential challenges, including the need for ongoing technology maintenance and user training. Recommendations to address these challenges include developing robust support mechanisms and comprehensive training programs to ensure smooth operation and user proficiency.

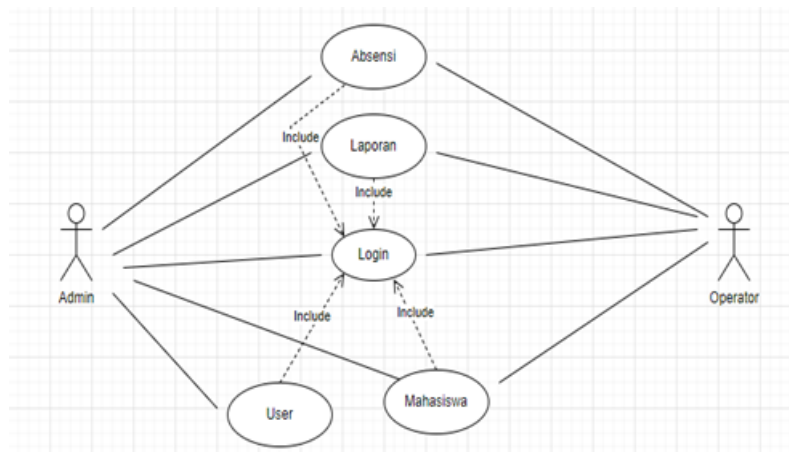


Figure 2. Use Case Display of Student Internship Attendance Application

This figure illustrates the various interactions between users and the Student Internship Attendance Application. It depicts the roles of different user types, such as students, lecturers, and administrators, and how they interact with the application. The use case diagram details the functionalities available to each user type, providing a comprehensive overview of the application's capabilities and user interactions.

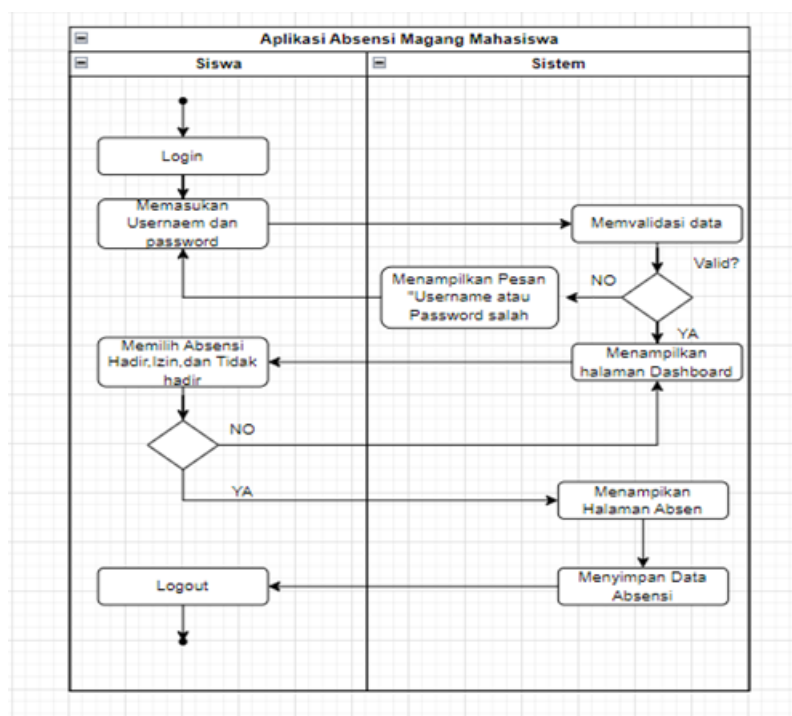


Figure 3. Activity Diagram Display of Student Internship Attendance Application

Figure 3 presents the activity diagram of the application, outlining the sequence of steps involved in the attendance process. This diagram demonstrates the workflow from student login to attendance recording and data submission. It highlights the logical flow of actions, ensuring clarity in the application's operational procedures.

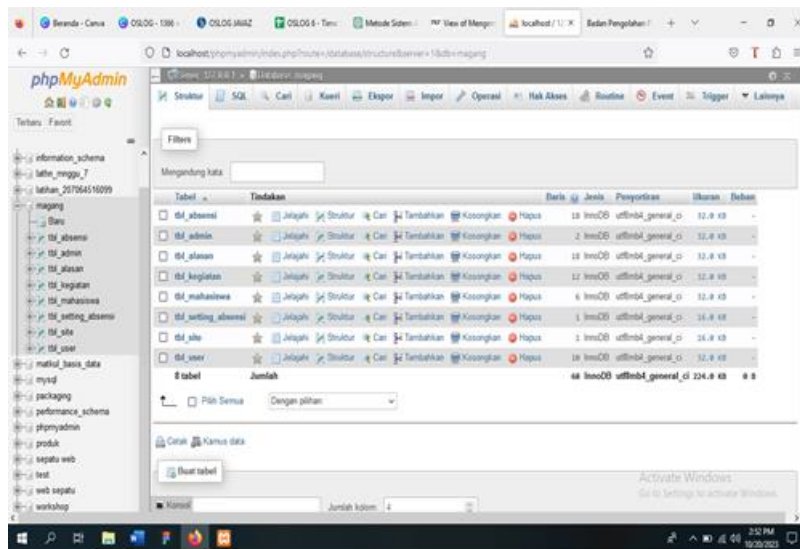
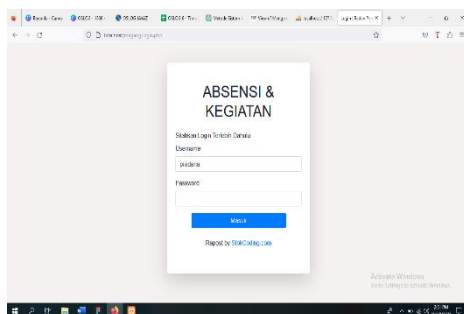
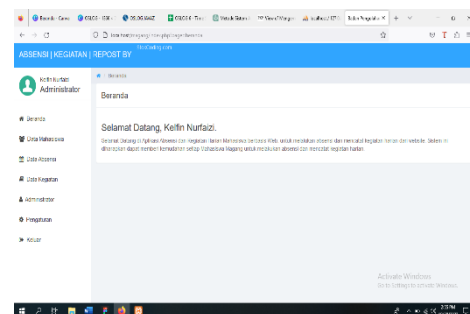


Figure 4. Display of the Student Attendance Application Database

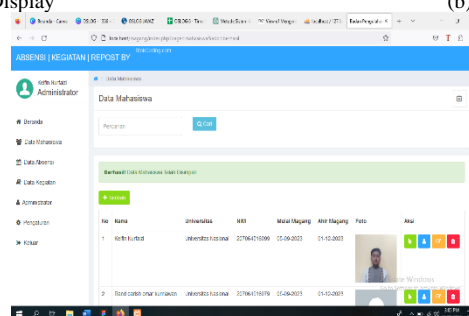
This figure provides a visual representation of the application's database structure. It details the organization of key data elements such as student details, attendance records, and timestamps. The database structure is crucial for understanding how data is stored, managed, and retrieved within the system.



(a) Attendance Log in Display



(b) Application Home View



(c) Display of Student Data.

Figure 5. App View

Figure 5.a shows the login interface of the Student Internship Attendance Application. It emphasizes the user-friendly design and secure access mechanism of the application. This interface is the gateway for users to access their respective functionalities within the application. Figure 5.b Application Home View, This figure displays the home view of the application, showcasing the main dashboard that users see upon successful login. It highlights the intuitive design and easy navigation of the application, providing users with a quick overview of the key features and access points. Figure 5.c Display of Student Data, The final figure presents the application's display of student data. It illustrates how student attendance records are organized and visualized within the application. This display is essential for users to review, manage, and analyze attendance data effectively.

3.2 Discussion

The implementation of the Web-based Student Internship Attendance Application has yielded noteworthy results, particularly in terms of enhancing the efficiency and accuracy of attendance management in educational settings. The shift from manual to automated attendance tracking significantly reduces labor and minimizes errors, a crucial

improvement for managing large student populations. Moreover, the ease of access through web browsers and the provision of real-time data updates are pivotal in ensuring up-to-date attendance records and facilitating timely responses to absenteeism trends. These features exemplify the growing importance of immediacy and accessibility in educational tools. Beyond administrative convenience, the application's reporting and analytical capabilities offer valuable insights into student attendance patterns. This data-driven approach enables educational institutions to make informed decisions, reflecting a shift towards more data-centric management practices in education. The benefits of the application extend to various stakeholders: teachers save valuable time previously spent on administrative tasks, students and parents gain access to transparent attendance records, promoting accountability and better attendance. However, challenges such as the necessity for ongoing technological maintenance and user training have been identified. Addressing these issues is crucial for the application's long-term success. Solutions include establishing robust technical support and comprehensive training programs to ensure effective and continuous use. Furthermore, the research highlights the superiority of the web-based system over traditional attendance methods, underscoring the need for educational institutions to embrace digital transformation. Looking forward, the application offers room for further enhancements. Potential developments include integration with other educational tools, implementation of advanced data analytics, and expanding its functionalities to address a wider array of educational needs. This discussion underlines the transformative impact of the application in higher education, indicative of a broader trend towards integrating digital solutions in educational environments, and points to its significant benefits and potential for future advancements.

4. Related Work

This research draws upon a body of existing work focused on the development and implementation of web-based systems in educational and organizational, particularly in the realm of attendance management and student engagement systems. Wiyatno and Zy (2022) demonstrate the practical application of web-based systems in managing internship attendance, emphasizing the importance of such systems in streamlining administrative processes in the digital era [1]. This aligns with Rosana's (2010) observations on the rapid advancement of information and communication technology, impacting various sectors including education [2]. The development of web-based systems for practical work programs, as explored by Safitri and Supriyadi (2015), further highlights the relevance of digital solutions in educational settings, particularly in managing fieldwork practices [3]. Mardiani *et al.* (2023) extend this understanding to the realm of e-commerce, illustrating the broader applicability of web-based systems in different organizational settings [4]. The work of Samsudin, Nurhalizah, and Fadilah (2022) on internship registration systems provides insights into specific applications of these technologies in educational administration [5]. The research into desktop-based applications by Azis and Hakim (2020) offers a comparative perspective, showcasing alternative approaches to managing attendance and other administrative tasks [6]. Siswadi's (2023) exploration of educational concepts further contextualizes the importance of technology in modern educational systems [7]. Saraswati *et al.* (2021) and Muharir and Anggraini (2023) delve into the practical implications of such systems in internship and on-the-job training programs, highlighting the benefits and challenges of their implementation [8][9]. The methodological approach, particularly the Waterfall model as discussed by Satriawan (2021) and Wahid (2020), provides a framework for the systematic development of these systems [10][12]. Hikmah *et al.* (2021) demonstrates the application of this methodology in developing web-based attendance systems for schools, offering parallels to this research [11]. Ramadhan and Putra's (2022) work on attendance applications using PHP and MySQL presents technical insights relevant to this study [13]. Wandira (2019) and Noviana (2021) contribute examples of web-based applications in different educational, illustrating the versatility and adaptability of these systems [14][15]. Hindarto's works (2023) on system design using Unified Modeling Language (UML) provide a methodological perspective that is crucial for understanding the design and implementation of complex systems, including those in commercial and culinary applications [16][17][18].

5. Conclusion

Based on research conducted on student internship attendance applications, it can be concluded that the use of this application provides significant benefits in increasing the efficiency and accuracy of the attendance process at an internship site. The student internship attendance application provides easy access, real-time data updates, automatic reporting, and more effective analysis of student attendance. By building this web-based internship student attendance program, it is hoped that it will make it easier to manage student attendance. Assisting internship supervisors in the daily attendance process for students so that they do not require manual attendance processes which are less effective. Making student attendance reports is done quickly and accurately so that errors in report calculations can be minimized, internship supervisors can also more easily monitor and manage student attendance reports. Some important conclusions from this research are as follows:

- 1) Efficiency and accuracy: The student internship attendance application increases the efficiency of the attendance process by reducing the time required to manage attendance manually. Apart from that, the accuracy of attendance data has also increased due to the use of automation and data validation technology.
- 2) Ease of access and real-time updates: This application provides easy access for lecturers, internship supervisors, and other authorities through a web browser connected to the University management system. Attendance data updates can be done in real-time, allowing student attendance information to be updated and accessed quickly.
- 3) Attendance reporting and analysis: The student internship attendance application can generate attendance reports automatically, assisting University staff in analyzing student absence patterns, identifying absenteeism trends, and taking necessary actions. This information provides valuable insight for the University in improving the efficiency of student attendance management.
- 4) Benefits for various parties: Implementation of the student internship attendance application provides benefits for lecturers, university staff, students, and internship supervisors. Lecturers can save time and focus on learning activities, while University staff can reduce administrative burdens and obtain more accurate attendance data. Students can also gain access to real-time attendance information, increasing awareness of the importance of attendance at an internship company.

References

- [1] Wiyatno, T.N. and Zy, A.T., 2022. Implementasi Sistem Informasi Absensi Peserta Magang Berbasis Web di Dinas Komunikasi dan Informatika. *AMRI Jurnal Nasional Analisa Metode Rekayasa Informatika*, 1(2), pp.137-147. DOI: <https://doi.org/10.33633/amri.v1i2.6992>.
- [2] Rosana, A.S., 2010. Kemajuan Teknologi Informasi dan Komunikasi dalam Industri Media di Indonesia. *Gema Eksos*, 5(2), p.218225.
- [3] Safitri, S.T. and Supriyadi, D., 2015. Rancang bangun sistem informasi praktek kerja lapangan berbasis web dengan metode waterfall. *Jurnal Infotel*, 7(1), pp.69-74.
- [4] Mardiani, E., Suhatmojo, G.T., Nurfaizi, K., Perdana, M.R., Putro, P.D.C., Dhema, S.P. and Prasetyo, Y.D., 2023. Mengembangkan Penjualan UMKM Alby Key dengan Web E-Commerce. *Jurnal JTik (Jurnal Teknologi Informasi dan Komunikasi)*, 7(3), pp.383-388. DOI: <https://doi.org/10.35870/jtik.v7i3.877>.
- [5] Samsudin, S., Nurhalizah, N. and Fadilah, U., 2022. Sistem Informasi Pendaftaran Magang Dinas Pemuda Dan Olahraga Provinsi Sumatera Utara. *Jurnal Teknologi Dan Sistem Informasi Bisnis*, 4(2), pp.324-332. DOI: <https://doi.org/10.47233/jteksis.v4i2.489>.
- [6] Azis, M.S. and Hakim, L., 2020. Perancangan Aplikasi Berbasis Desktop Dengan Microsoft Visual Basic (Studi Kasus: Aplikasi Absensi Anak Magang 1.0). *Jurnal Responsif: Riset Sains Dan Informatika*, 2(1), pp.44-52. DOI: <https://doi.org/10.51977/jti.v2i1.170>.
- [7] Siswadi, G.A., 2023. Konsep Kebebasan dalam Pendidikan Perspektif Rabindranath Tagore dan Relevansinya Bagi Pengembangan Sistem Pendidikan Di Indonesia. *Padma Sari: Jurnal Ilmu Pendidikan*, 2(02), pp.97-108. DOI: <https://doi.org/10.53977/ps.v2i02.809>.
- [8] Saraswati, K.D.H., Mandey, K.Y., Ramadhani, L.A., Stephanie, R. and Tiatri, S., 2021. Pelaksanaan MBKM Magang Industri di Fakultas Psikologi Universitas X. *Prosiding Serina UNTAR MBKM*, pp.71-77.
- [9] Muharir, M. and Anggraini, L., 2023. Aplikasi Pendaftaran On The Job Training pada Dunia Usaha-Dunia Industri (DU-DI) untuk Sekolah Menengah Kejuruan. *Jurnal Sains Sistem Informasi*, 1(2), pp.94-101. DOI: <http://dx.doi.org/10.31602/jssi.v1i2.11869>.
- [10] Satriawan, N., 2021. Pengertian Metode Waterfall dan Tahap-Tahapnya. *Retrieved from Ranah Research: https://ranahresearch.com/metode waterfall*.
- [11] Hikmah, A.B., Mulyani, Y.S., Alawiyah, T., Wiguna, W. and Ridwan, R.R.A., 2021. Rancang Bangun Sistem Informasi Absensi Siswa Berbasis Web Pada SMAN 1 Singaparna. (Indonesian Journal on Computer and Information Technology. 6(2), pp. 138-150.

- [12] Wahid, A.A., 2020. Analisis metode waterfall untuk pengembangan sistem informasi. *J. Ilmu-ilmu Inform. dan Manaj. STMIK*, no. November, pp.1-5.
- [13] Ramadhan, W. and Putra, S.H., 2022. Aplikasi Absensi Mahasiswa dan Dosen Politeknik Ganesha Medan Berbasis Web Menggunakan PHP dan MySql. *REMIK: Riset dan E-Jurnal Manajemen Informatika Komputer*, 6(3), pp.526-533. DOI: <https://doi.org/10.33395/remik.v6i3.11674>.
- [14] Wandira, A., 2019. *Aplikasi Mahasiswa PKL Pada Kanwil BPN Prov. Sumsel Berbasis Website* (Thesis, STMIK Palcomtech).
- [15] Noviana, A., 2021. Aplikasi Monitoring Praktek Kerja Industri Peserta Didik SMK Mutiara Bangsa Berbasis Android. *Jurnal Riset dan Aplikasi Mahasiswa Informatika (JRAMI)*, 2(02), pp.341-348. DOI: <https://doi.org/10.30998/jrami.v2i02.670>.
- [16] Hindarto, D. and Hariadi, M., 2023. Information System Design at FGH Stores with Unified Modelling Language. *Journal of Computer Networks, Architecture and High Performance Computing*, 5(2), pp.623-633. DOI: <https://doi.org/10.47709/cnahpc.v5i2.2702>.
- [17] Hindarto, D., 2023. Indonesian Culinary Application System Design with UML Method. *Journal of Computer Networks, Architecture and High Performance Computing*, 5(2), pp.612-622. DOI: <https://doi.org/10.47709/cnahpc.v5i2.2675>.
- [18] Hindarto, D., 2023. The Role of E-Commerce in Increasing Sales Using Unified Modeling Language. *International Journal Software Engineering and Computer Science (IJSECS)*, 3(2), pp.120-129. DOI: <https://doi.org/10.35870/ijsecs.v3i2.1503>.