


## WEB-BASED LIBRARY INFORMATION SYSTEM ( E-PERPUS) USING THE AGILE METHOD AT SMP NEGERI 13 MEDAN

Tasya syalsabilla<sup>1</sup>, Muhamad alda<sup>2</sup>

State Islamic University of North Sumatra, Medan City, North Sumatra Province, Indonesia

Article Info	ABSTRACT
<b>Keywords:</b> information systems website e-Library Agile	School libraries play an important role in supporting the educational process and improving student literacy. However, manual library management is still common, including at SMP Negeri 13 Medan. This causes various obstacles such as searching for book and member data, limited access to information outside school hours, and delays in returning books. To overcome these problems, this study developed a web-based library information system (e-Perpus) using the Agile method. The system is designed with the PHP programming language and MySQL database with the laravel framework. The Agile method allows for the development of systems that are flexible and adaptive to user needs. The results of the implementation show that the e-Perpus system is able to improve the operational efficiency of libraries and facilitate access to information for students and school staff.
This is an open access article under the <a href="#">CC BY-NC</a> license 	<b>Corresponding Author:</b> Tasya syalsabilla State Islamic University of North Sumatra Medan City, North Sumatra Province, Indonesia. <a href="mailto:tasyasyalsabilla31@gmail.com">tasyasyalsabilla31@gmail.com</a>

### INTRODUCTION

In the field of education, it is inevitable that there is a collection of library books in a school, for example, such as the increase in the collection of books in the library, this activity is very beneficial for the development of individual human beings. By reading, one will be trained to understand things from different points of view (Mushtaq et al., 2021) Moreover, advances in information technology have significantly improved daily life. An information system is a network of interrelated elements that acquire, process, store, and disseminate information to facilitate decision-making and management procedures in an organization. (Raihan Harianto & Hasyifah Sibarani, 2024) Therefore, information technology has changed significantly, both in form and function, making it easier for everyone to use (Ardhana & Alda, 2025) The times are developing very rapidly, along with the development and level of needs, the development of technology and information in this era of globalization is increasing, this development has led humans to determine a high level of efficiency in all fields. (Hutagalung & Syalsabilla, 2024) The availability of information needed by the library, but it was found that the problem was in the form of limited library staff services which often arose in terms of library management. School libraries are essential to

improve the educational process and improve student literacy. However, traditional libraries often experience a number of difficulties in organizing and disseminating knowledge. The entire library at SMP Negeri 13 Medan is still managed with a process of recording on books, causing several problems. Ineffective administration of searching for member data and book data, challenges in finding books, and limited access to library materials for staff and students outside of working hours are some of the problems faced. The availability of information needed by the library, but it was found that the problem was in the form of limited library staff services which often arose in terms of library management. School libraries are essential to improve the educational process and improve student literacy.

However, traditional libraries often experience a number of difficulties in organizing and disseminating knowledge. The entire library at SMP Negeri 13 Medan is still managed with a process of recording on books, causing several problems. Ineffective administration of searching for member data and book data, challenges in finding books, and limited access to library materials for staff and students outside of working hours are some of the problems faced. Delay in returning books is one example of the many inaccuracies in data collection caused by recording and managing books that are still carried out with the recording process where the process is less effective, Effective in this case is to achieve goals according to planning and efficiency to carry out work correctly and organized.(Raihan Harianto & Hasyifah Sibarani, 2024) This research develops a web-based library Information System with features of book search, book lending, book returns, book fines against sanctions for untimely book returns, reminder notifications of book return deadlines, and making research reports using the Agile method The system to be built is an e-library system using the php programming language where PHP is an interpreter programming process, which is the process of translating lines of source code into machine code that the computer understands directly at the time the line of code is executed. PHP is referred to as Server Side Programming, this is because the entire process is run on the server and not on the client. PHP is an open copyright language or also known as Open Source, where users can develop PHP function code with their needs.(Hidayat et al., 2017), the data base used is MySQL where MySQL is a database server program that is able to receive and transmit data very quickly, multi-user, and use standard SQL commands (Ahmadar et al., 2021). Therefore, the e-Perpus system is expected to significantly improve the quality of library services and help school-based academic activities. In implementing the e-library system, the agile method is used, where the agile method is an approach in software development that focuses on collaboration, collaboration, and fast delivery of results. The Agile method is used in response to the flexible device development method and can deliver fast results and can be easily used by users.(Lutfiani et al., 2020)

## METHODS

This research uses a qualitative methodology that focuses on a strong comparative process and the application of scientific logic to analyze the dynamics of relationships between observable events. Rather than being grouped into phrases like quantitative approaches, qualitative research produces unique information in the form of words composed of the subjects studied(Yustika et al., 2023).The method used in conducting research in the library of SMP Negeri 13 Medan is a qualitative method where the qualitative

method is a research approach used to understand social or cultural phenomena in a deep and holistic way. This method emphasizes on understanding the context, perspective, and experience of the research subject, often using nonnumerical data from data collection to design and build an E-library website at SMP Negeri 13 Medan, the author carried out two stages, as follows:

a) Observation

At this observation stage, the author made direct observations of the research object, namely SMP Negeri 13 Medan, the purpose of the observation stage was to find out directly about the process of borrowing books, searching for books, and recording what kind of borrower data.

b) Interview

At this stage of the interview, the author conducted a direct interview with the library of SMP Negeri 13 Medan, which aims to directly from the library of SMP Negeri 13 Medan regarding the system that is running, starting from recording data on visitors searching for books, as well as what kind of book borrowing. This interview stage will make it easier for the writer to build a system later

c) Literature Studies

Literature study is a way of collecting data on various materials contained in the library space, such as newspapers, books, magazines, manuscripts, documents and so on that are relevant to research. Literature study is a technique of collecting data and information through reading literature or written sources such as books, previous research, papers, journals, articles, reports and magazines related to research. With this technique, the researcher can collect various theoretical references about the visual study of a visual communication design, film posters, and other theories related to this problem and research.

The strategy used in this study combines data collection techniques and system development. Agile development methodologies are used. Agile Development Methods are a set of software development processes known as "Agile development methods", which are built on a shared set of principles and emphasize the rapid response of developers to any form of change. One of the fast, lightweight and responsive software development approaches (Alda, 2023) and emphasizes rapid developer response to any form of change. One approach to software development that is fast, lightweight and responsive



**Figure 1.** Agile Method

The steps of the agile method consist of the stages of plan, design, develop, test, deploy, review and launch

1. Plan, on the current system as well as a review of the needs of the new system application design is developed during the planning phase using UML. This planning consists of use cases, sequences, activities, and class diagrams. using the Laravel framework, the system design results are converted into databases and code during the application development phase.
2. Design, Developer creates a system design that includes common system architecture and device specifications The device manages the system display according to user needs.
3. Develop, At this stage focuses on the development and implementation of the system At this stage the aim is to produce a system that is suitable and can be used well.
4. Test, stages in the process ensure that the system built meets the needs of the user and works properly needs for users and functions well
5. Deployment, The process of implementing a system that has been built into a research environment and ensure the system meets user needs.
6. Review, evaluate and systematically assess in a system to ensure that the system built is in accordance with the needs of its users and detect if any errors or system deficiencies are found
7. Launch when the system is built according to needs, then the system will be introduced for users to ensure that the system can be used properly

## RESULTS AND DISCUSSION

### Running system analysis

At the time of the data collection process, it can be concluded that SMP Negeri 13 Medan carries out the process of operating the library manually, namely by recording in a book where the process is prone to data collection errors and book loss When analyzing data requirements, there are several stages that are carried out, namely identifying application requirements, application functions, designing implementation(Hidayatullah et al., 2024)

### Proposal System Analysis

From the analysis that has been carried out, the author proposes a system that has the following flow:

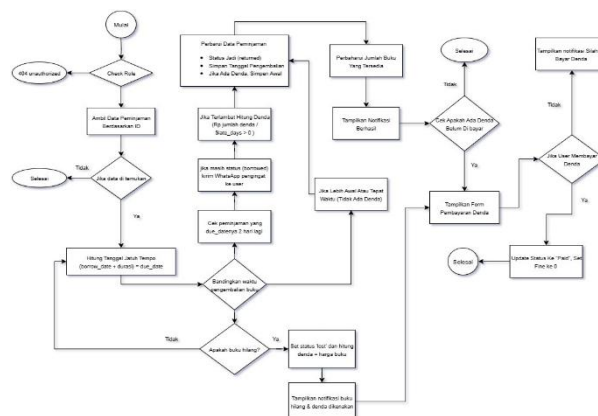


Figure 2. Flowchart

A flowchart is a graphical representation of the steps and sequence of procedures in a program. A system flowchart is a sequence of processes within a system, showing the input and output media, and the type of media used for data storage. A program flowchart is a diagram with specific symbols that depicts a detailed sequence of processes and the relationship between one process (instruction) and another within a program. (Zalukhu et al., 2023) From the design of the system above, it can be concluded that the system can later have features: book lending, book returns, fines for book loss, fines for late book returns, notifications as a reminder of the deadline for returning books and the results of library operation reports. To design the program visually, the tools used are Unified Modeling Language (UML) which is a language that is visualized in the form of images or graphs that function to provide an overview of and specifications in the construction and documentation of the development of an object-oriented system (*object oriented*) UML is a standard writing or a kind of blueprint which includes a business process, writing classes in a specific language. (Ramdany, 2024) UML provides a standard for creating a blueprint system, which can consist of system concepts, creating classes that can be expressed in a specific programming language, database design, and components needed in system development (Siska Narulita et al., 2024)

### Use Case diagram

Use case diagram is a behavioral modeling (*behavior*) of a system that is needed and expected by the user. Use case used to find out what functions exist in the system and who or actors have the right to use those functions (Suharni et al., 2023) Provides an overview of the relationship between the actors involved and the system to be built. (M Taufiq Rachman Siregar et al., 2023)

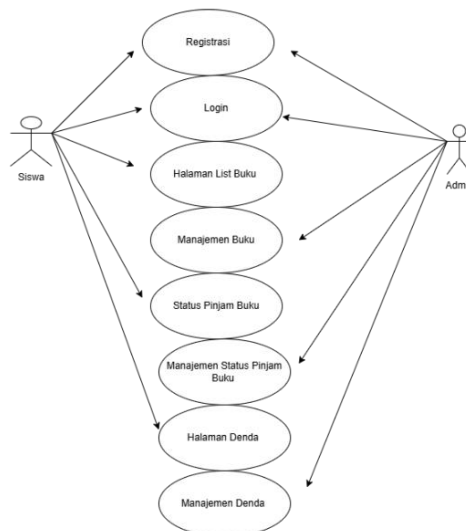


Figure 3. Use Case Diagram

### Activity diagram

An activity diagram is a workflow for each use case. The activity diagram for this analysis includes an activity chart for each use case. To simplify the operation

diagram(Waliyansyah et al., 2022) The goal is to provide a detailed explanation of a business process or logic, including decision making and branching.(Ali Ikhwan et al., 2025)

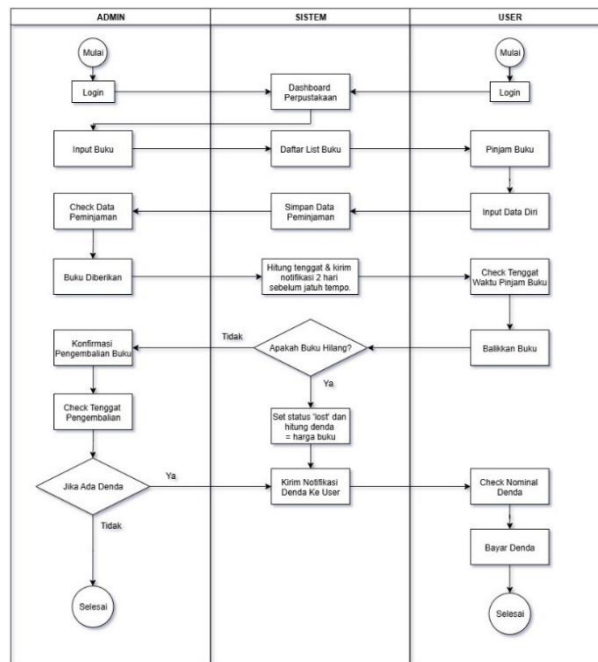


Figure 5. Activity Diagram

### Class diagram

Class diagram is the relationship between classes and the detailed explanation of each class in the design model of a system, as well as showing the rules and responsibilities of the entities that determine the behavior of the system. Classes have what are called attributes and methods or operations.(Fianto & Andrianto, 2021)Class diagrams are called a type of structure diagram because they depict what should be present in the system being modeled, with various components.(Dirgantara & Suryadarma, n.d.) So it can be said that Class Diagram is the visual of the structure of the program system in the types that are formed. Class Diagram is the flow of a database on the system that is to be built or created.(Nabila et al., 2021)

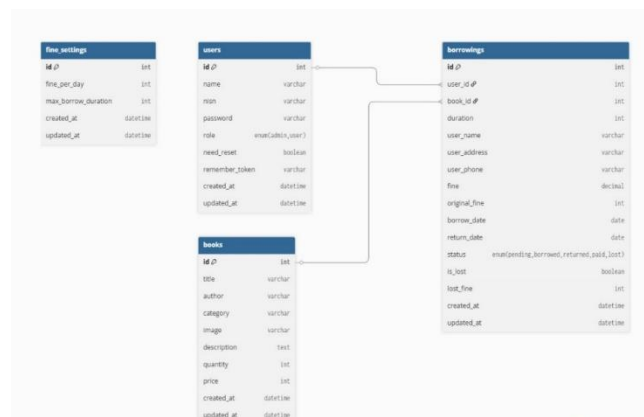


Figure 6. Class Diagram

After carrying out the uml design process, it is followed by application development using mysql database and Laravel framework, here is the form of display on the web-based library information system (E-Perpus) using the Agile method:

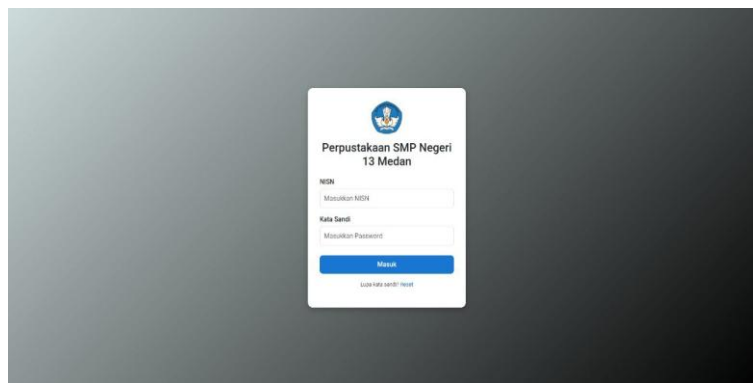


Figure 7. Login View

The image above is a login display where on the display there is a logo and login form that includes email and password and there is a login button to display the dashboard page if the user or admin does not have an account then must enter the account registration page first

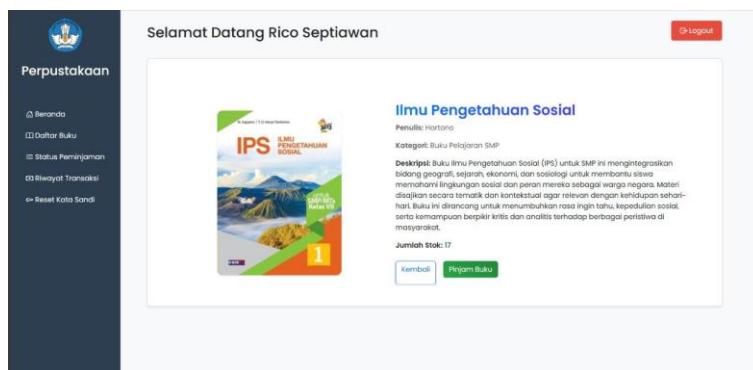


Figure 8. Detailed view of books

The image above is a book details display where users can see the details of the books to be borrowed or lent on the book details page there is a display of the book title, author, category, description and number of book stock.

No	Nama User	Alamat	No. Telepon	Durasi Pinjam (Hari)	Tanggal Denda	Jumlah Denda	Judul Buku	Tanggal Pinjam	Tanggal Kembali	Status	Aksi	
1	Rico Septiawan	Jalan Dendal Medan	0812229810	3	09-07-2025	Belang ditabung	Seni Budaya	08-07-2025		Belum Dibayar	Pinjam	Konfirmasi
2	Rico Septiawan	Jalan Dendal Medan	0812229810	8	14-07-2025	Belang ditabung	Bahasa Inggris	06-07-2025		Belum Dibayar	Pinjam	Konfirmasi
3	Joson Ananta	Jalan Halat Medan	0812229881	7	13-07-2025	Belang ditabung	Pendidikan Kewarganegaraan	08-07-2025		Belum Dibayar	Pinjam	Konfirmasi
4	Joson Ananta	Jalan Halat Medan	0812229881	5	11-07-2025	Belang ditabung	Ilmu Pengetahuan Alam	06-07-2025		Belum Dibayar	Pinjam	Konfirmasi
5	Tasya Syalsabilla	Jermal 3 Medan Dendal	0812229872	3	09-07-2025	Belang ditabung	Ilmu Pengetahuan Alam	08-07-2025		Belum Dibayar	Pinjam	Konfirmasi
6	Tasya Syalsabilla	Jermal 3 Medan	0812229872	5	11-07-2025	Belang ditabung	Ilmu Pengetahuan Sosial	08-07-2025		Belum Dibayar	Pinjam	Konfirmasi

Figure 9. Loan history view

The image above is the display of the borrowing history page of the page including the title of the borrowed book, the date of borrowing, the date of return, the status of the return and the description where students can see the status of the borrowed book.

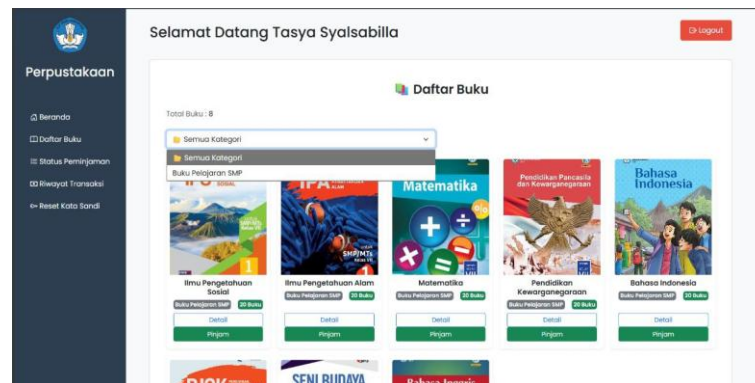


Figure 10. Book list view

The image above is a student dashboard view where the display contains a book list page that is useful for viewing any book which is available at the library of SMP Negeri 13 Medan where the book will later be input by the library officer.

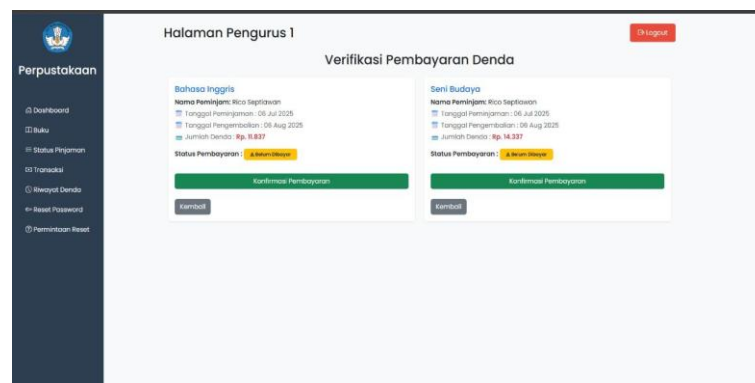


Figure 11. Fine payment view

The image above is a display of fine payment where students can see fines due to late book returns and the fine will later be paid to the admin as a sanction for late book returns.

## CONCLUSION

This research has developed a web-based library information system (e-Perpus) for SMP Negeri 13 Medan to overcome various problems in the management of traditional libraries. By implementing the PHP programming language, MySQL database, and Laravel framework, this system is able to improve library operational efficiency, make it easier to find and borrow books, and optimize library administration. The main advantage of this system is that it has more complete features compared to previous research, including book search, book borrowing and returns, recording late fines with the Agile method, and automatic report generation. The system ensures a structured and organized process, resulting in a more stable and reliable system. With the existence of e-Perpus, it is hoped that library services

at SMP Negeri 13 Medan can increase significantly, provide easy access to information for students and staff, and support a more effective learning process. The implementation of this system can also be the first step in digital transformation in the field of education, especially in school library management

## REFERENCE

- Ahmadar, M., Perwito, P., & Taufik, C. (2021). PERANCANGAN SISTEM INFORMASI PENJUALAN BERBASIS WEB PADA RAHAYU PHOTO COPY DENGAN DATABASE MySQL. *Dharmakarya*, 10(4), 284. <https://doi.org/10.24198/dharmakarya.v10i4.35873>
- Alda, M. (2023). Pengembangan Aplikasi Penggajian Karyawan Dengan Menggunakan Metode Agile Berbasis Mobile Android. *Komputika : Jurnal Sistem Komputer*, 12(1), 43–51. <https://doi.org/10.34010/komputika.v12i1.8030>
- Ali Ikhwan, Fahar Abdul Aziz, Muhammad Prahmana Tirta, Masayu Wianda Putri, & Ananda Utami. (2025). Perancangan Sistem Informasi Manajemen Antrian untuk Meningkatkan Efisiensi di Puskesmas Stabat Lama. *Saturnus : Jurnal Teknologi Dan Sistem Informasi*, 3(1), 68–78. <https://doi.org/10.61132/saturnus.v3i1.648>
- Ardhana, M. R., & Alda, M. (2025). Mudik Assistance Application Using Android-Based Scrum Method. *Journal of Computer Networks, Architecture and High Performance Computing*, 7(1), 1–20. <https://doi.org/10.47709/cnahpc.v7i1.4863>
- Fianto, A. Y. A., & Andrianto, N. (2021). Strategi Komunikasi Pengembangan Wisata Jodipan dan Kampung Topeng Kota Malang. *Communicator Sphere*, 1(2), 47–51.
- Hidayat, H., Hartono, & Sukiman. (2017). Pengembangan Learning Management System (LMS) untuk Bahasa Pemrograman PHP. *Jurnal Ilmiah Core It*, 5(1), 20–29. <http://ijcoreit.org/index.php/coreit/article/view/11>
- Hidayatullah, C., R, R. K., & Armansyah, A. (2024). Pencarian Rute Terpendek Dalam Pendistribusian Darah di Palang Merah Indonesia (PMI) dengan Algoritma Dijkstra. *TIN: Terapan Informatika Nusantara*, 4(11), 727–738. <https://doi.org/10.47065/tin.v4i11.5028>
- Hutagalung, M. R. S., & Syalsabilla, T. (2024). Analisis Dan Perencanaan Sistem Informasi Pengumpulan Tugas Magang Pada Dinas Komunikasi Dan Informatika Kota Medan. *Technologia : Jurnal Ilmiah*, 15(1), 185. <https://doi.org/10.31602/tji.v15i1.13926>
- Lutfiani, N., Harahap, P., Aini, Q., Dimas, A., Ahmad, A. R., & Rahardja, U. (2020). Inovasi Manajemen Proyek I-Learning Menggunakan Metode Agile Scrum. *InfoTekJar : Jurnal Nasional Informatika Dan Teknologi Jaringan*, 5(1), 96–101.
- M Taufiq Rachman Siregar, Ilka Zufria, & Raissa Amanda Putri. (2023). Aplikasi Loka Pasar Medan Creative Market Terintegrasi Dengan Midtrans Payment Gateway Di Dinas Pariwisata Kota Medan. *Jurnal Ilmiah Binary STMIK Bina Nusantara Jaya Lubuklinggau*, 5(1), 8–14. <https://doi.org/10.52303/jb.v5i1.90>
- Mushtaq, S., Soroya, S. H., & Mahmood, K. (2021). Reading habits of generation Z students in Pakistan: Is it time to re-examine school library services? *Information Development*, 37(3), 389–401. <https://doi.org/10.1177/0266666920965642>
- Nabila, S., Putri, A. R., Hafizhah, A., Rahmah, F. H., & Muslikhah, R. (2021). Pemodelan Diagram UML Pada Perancangan Sistem Aplikasi Konsultasi Hewan Peliharaan Berbasis Android (Studi Kasus: Alopét). *Jurnal Ilmu Komputer Dan Bisnis*, 12(2), 130–

139. <https://doi.org/10.47927/jikb.v12i2.150>
- Raihan Harianto, D., & Hasyifah Sibarani, F. (2024). Sistem Informasi Human Resource Management Pada Hotel Nivia Menggunakan Metode Pieces Berbasis Web. *Journal of Science and Social Research*, 4307(2), 685–690. <http://jurnal.goretanpena.com/index.php/JSSR>
- Ramdany, S. (2024). Penerapan UML Class Diagram dalam Perancangan Sistem Informasi Perpustakaan Berbasis Web. *Journal of Industrial and Engineering System*, 5(1). <https://doi.org/10.31599/2e9afp31>
- Siska Narulita, Ahmad Nugroho, & M. Zakki Abdillah. (2024). Diagram Unified Modelling Language (UML) untuk Perancangan Sistem Informasi Manajemen Penelitian dan Pengabdian Masyarakat (SIMLITABMAS). *Bridge : Jurnal Publikasi Sistem Informasi Dan Telekomunikasi*, 2(3), 244–256. <https://doi.org/10.62951/bridge.v2i3.174>
- Suharni, Susilowati, E., & Pakusadewa, F. (2023). Perancangan Website Rumah Makan Ninik Sebagai Media Promosi Menggunakan Unified Modelling Language. *Rekayasa Informasi*, 12(1), 1–12. <https://ejournal.istn.ac.id/index.php/rekayasainformasi/article/view/1527/1021>
- Waliyansyah, R. R., Hermawan, G., & Herlambang, B. A. (2022). Sistem Informasi Pengelolaan Zakat Fitrah dan Donasi pada Masjid Jami' Al Jannah Menggunakan Metode Rule Based Berbasis Android. *Walisongo Journal of Information Technology*, 4(1), 33–42. <https://doi.org/10.21580/wjit.2022.4.1.10350>
- Yustika, W., Siregar, N. T., Barus, V. A., Hasibuan, M. A. A., & Nurbaiti. (2023). Peranan Sistem Database Di Dalam Sistem Informasi Manajemen Pada UINSU(Universitas Islam Negeri Sumatera Utara). *SURPLUS: Jurnal Ekonomi Dan Bisnis*, 1(2), 188–196.
- Zalukhu, A., Swingly, P., & Darma, D. (2023). Perangkat Lunak Aplikasi Pembelajaran Flowchart. *Jurnal Teknologi, Informasi Dan Industri*, 4(1), 61–70. <https://ejournal.istp.ac.id/index.php/jtii/article/view/351>