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Optimization of Web Based Academic Information System Design to Increase Efficiency in Junior High Schools

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Abstract

School is a system consisting of components that are interrelated and influence each other to achieve one goal. In an effort to achieve school goals, a lot of data processing is carried out. However, middle school academic data processing, especially around me, is still done manually and is still less effective and efficient. Manual processes are error-prone, time-consuming, and often lead to data inconsistencies. By designing this web-based academic information system, it is hoped that it can increase efficiency and effectiveness in processing data and accessing data quickly. The design of this system is expected to be able to manage student data, teacher data, class data, schedule data and student grade data efficiently. Web-based solutions provide the flexibility to access the system from anywhere, which is especially useful for teachers, students and administrative staff. This accessibility will facilitate better communication and collaboration between all stakeholders in the school environment. Additionally, features such as automatic report generation, attendance tracking, and real-time updates will significantly reduce the administrative workload and allow teachers to focus more on educational activities. By implementing this web-based academic information system, the school environment is expected to experience positive impacts, including increased data accuracy, better resource allocation, and increased decision-making abilities. Ultimately, the system aims to support the school's mission of providing quality education and fostering an environment where students can thrive academically. The successful implementation of this system will become a model for other schools that want to modernize their academic data management processes.

Keywords: School, Systems, Web, Academic, Data.

1. Introduction

Technological developments are increasingly advancing rapidly, especially in the field of information systems[1], almost all technological fields have launched various sophisticated tools to make human work easier[2]. Talking about technology is endless. In the digital era, developments in information technology cannot be ignored[3]. Currently, information technology users cover almost all age groups, including children, adults and the elderly[4], almost every agency or company needs information that is fast, accurate and precise[5]. Information systems consist of interconnected elements with the aim of collecting, processing, storing and disseminating data and information[6]. The development of information technology facilitates all activities of institutions and organizations in accordance with their areas of expertise, supports the performance of institutions and organizations, and is used by the community to simplify and make work in their place easier. Effective for both data processing and data storage[7]. The use of technology can have a positive impact on work activities, including information systems[8].

An information system is a collection of interconnected subsystems that form input, processes and outputs based on managed data so as to produce useful information[9]. According to John F Nash, an information system is a combination of people, technological tools, facilities, processes and controls to manage important communication networks, specific and general transaction processes, assistance for internal and external managers and users, and provide a basis for making appropriate decisions[10].

In simple terms, an information system can be defined as a computer system that provides information to many users with diverse needs[11]. Information systems can provide necessary reports to other parties[12]. Information systems aim to convey information in the process of organizing, planning and controlling up to decision making[13].

An academic information system is an application that integrates all the basic processes of an educational company into an information system supported by the latest technology[14]. This academic information system brings many benefits to organizations in the education sector, both in processing educational data, value data and other data related to academic learning[15].

Meanwhile, the school academic information system is a system used to manage school academic information and data in the form of data about students, teachers, classes, time schedules and assessment data[16]. Websites

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or web pages themselves are internet resources in the form of documents in Hypertext Markup Language format[17]. Websites are media that are easily accessible at any time without any geographical restrictions for use by schools[18].

School is a system that includes many components that are interconnected and influence each other[19]. As an educational institution that is committed to providing the best service for students, academic information systems are the main choice for searching for information in certain data[20]. Currently, many academic service systems in junior high schools, especially in the area around me, still use manual methods for scheduling, student data, teacher data and value input still use a system of sticking paper on the school wall for scheduling and value information, this way of working is very slow and not yet effective[21].

So in this case, based on the problems above, the author will design a web-based junior high school academic information system to increase effectiveness. An academic information system is a system that manages data and processes academic activities related to students, teachers and other attribute data[22]. Information systems and communication technology are something that is really needed in the world of education[23]. This system can be used to improve student services[24].

2. Research Methods

In this design the author will use the Agile method. The agile method was chosen because of its flexibility and adaptation to changing user needs[25]. Agile is an iterative and gradual software development approach[26], which allows developers to respond flexibly to changing needs and requirements that may arise during the development process[27]. The Agile method allows creating applications quickly, flexibly and without fear of sudden changes, in contrast to old methods[28] Development stages in the Agile method:

1. Planning
   is one of the initial stages in the classification process which requires a step or stage[29] where data is collected to obtain the required information[30]. At this stage, developers and users make plans and agreements and collect the necessary data.
2. Implementation
   The implementation stage is a stage that concretizes the results of the planning stage into the form of a Web-based application based on the application design that has been previously built[31]. So at this stage the data collection process must have been implemented to create the desired program or application.
3. Testing
   The final stage carried out in the Agile Method is maintenance. This stage aims to ensure that there are no errors that interfere with the software and ensure that functions run properly[32]. Application testing will be carried out at this stage to ensure the success of the application created and that it meets user needs
4. Documentation
   At this stage, documentation of the modules and application functions is carried out as a note during development[33]. This documentation stage aims to facilitate further development in the future.
5. Deployment
   This Deployment stage involves system testing to ensure that the software is of high quality and is appropriate[34]. And can be launched or published to users
6. Maintenance
   The final stage carried out in the Agile Method is maintenance. This stage aims to ensure that there are no more bugs that interfere with the software[35]. The finished application will be maintained at this stage.

3. Results and Discussion

3.1. Needs Analysis

In this academic information system there are 4 users who interact with each other in the system, namely:

1. Admin
   The admin here is tasked with managing all activities in the system such as adding, deleting, updating data on teachers, students, classes and lesson schedules. Admin has full access rights and is responsible for the application.
2. Headmaster
   The school headmaster has an important role in this system to monitor and view report data on the number of teachers, students and also the classes used.
3. Teacher
   Teachers have access rights to input grades, take attendance, and view student data.
4. Students
   Students have access rights to see exam results, see the lesson schedule, and can also see a list of teachers who will teach, apart from that, they can also see attendance data for themselves.

3.2. Data Flow Diagram (DFD).

Data Flow diagram is a graphic tool used to describe the flow of data in an information system[36]. This DFD is useful for understanding the system's work processes in a logical, structured and clear manner[37]. The following is an overview of the data flow diagram in the system that will be built:

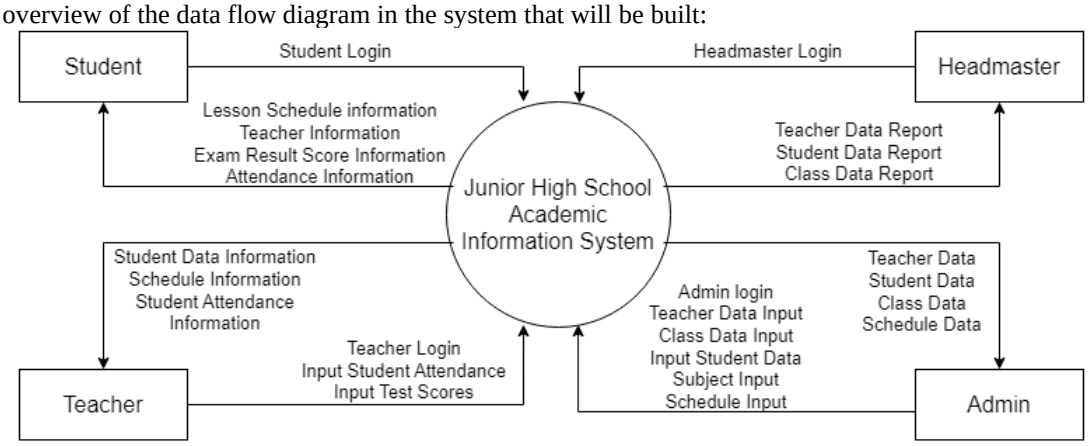

Figure 1. DFD Level 0

Figure 1 shows the level 0 data flow diagram for the system that will be built where there are four entities that each have access rights.

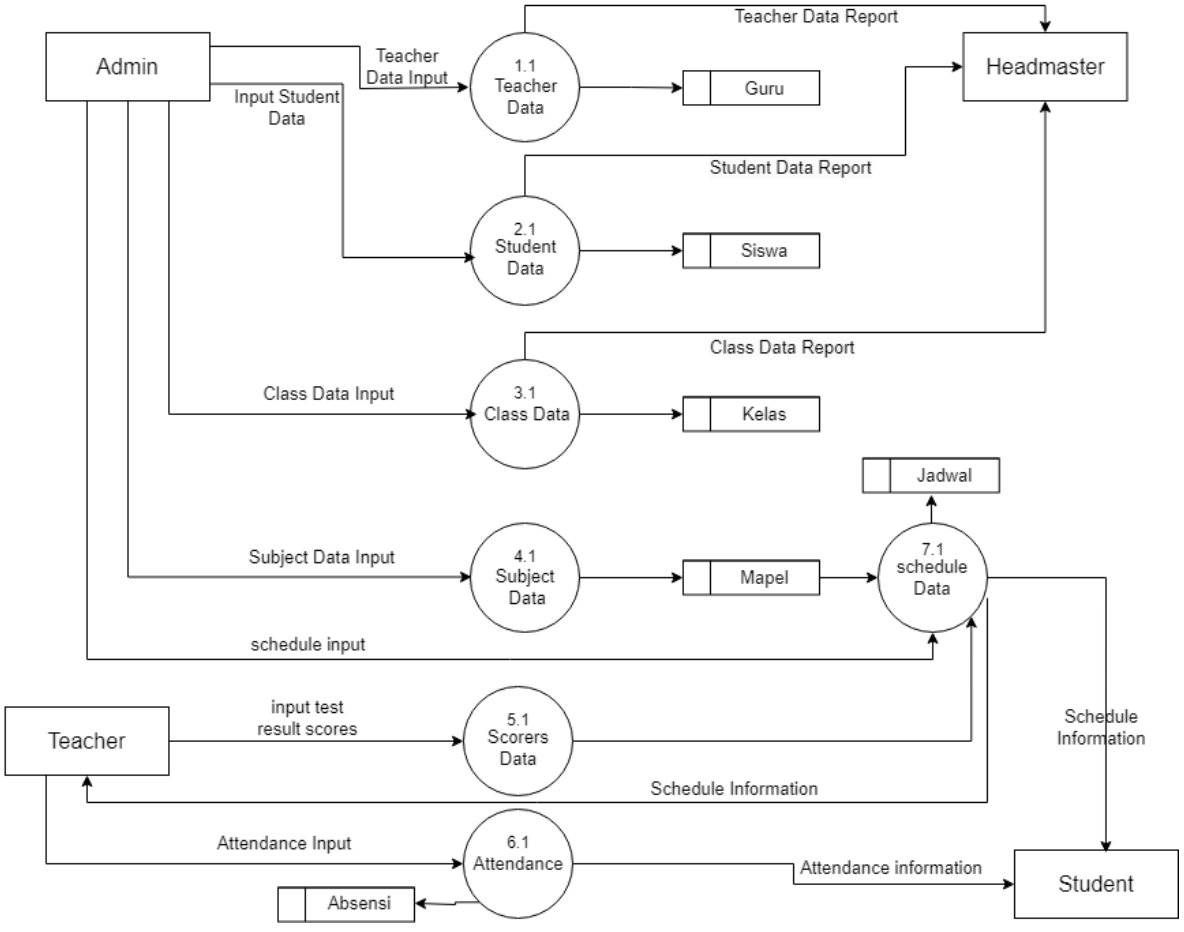

Figure 2. DFD Level 1

Figure 2 DFD Level 1 shows the system flow where all entities exercise their respective access rights.

3.3. Display Design

The following is a system display design that will be built based on a pre-existing needs analysis:

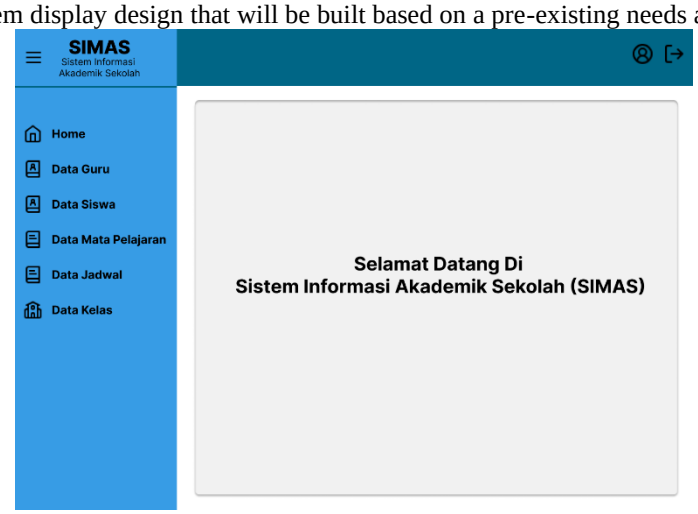

Figure 3. Admin view

Figure 3 is a display illustration for the Admin user entity.

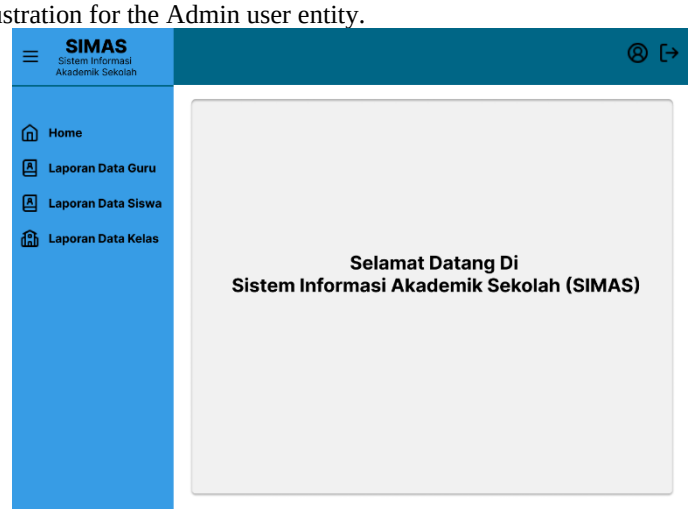

Figure 4. Headmaster view

Figure 4 is a display illustration for the Headmaster user entity.

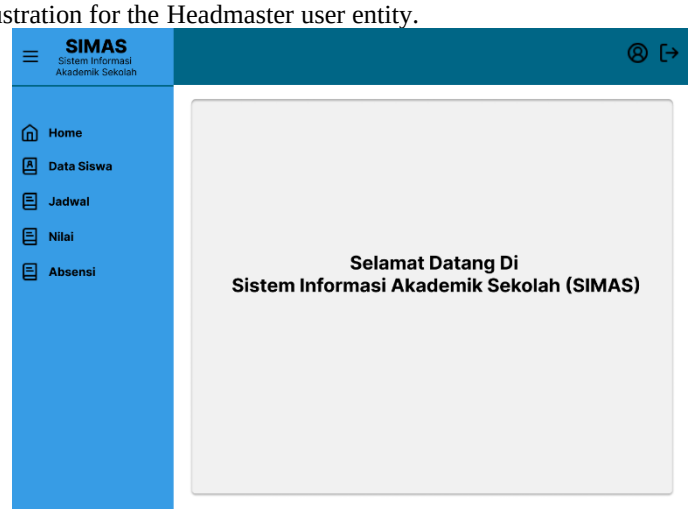

Figure 5. Teacher view

Figure 5 is a display illustration for the Teacher user entity.

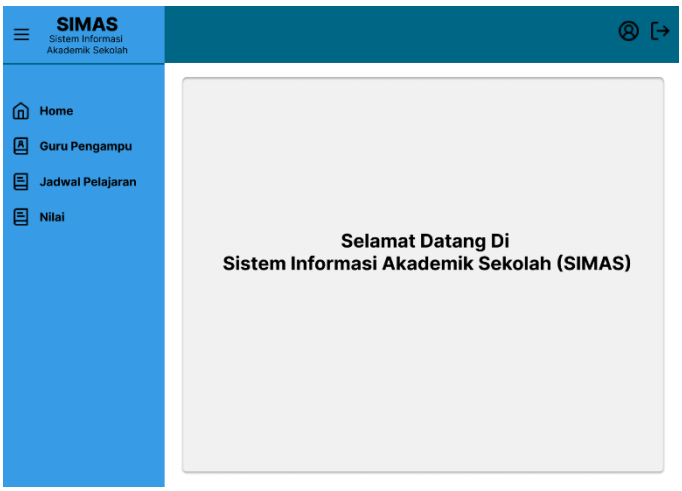

Figure 6. Student view

Figure 6 is a display illustration for the Student user entity.

3.4. System Flowchart

A flowchart is a graphical representation of the steps and sequence of processes in a program[38]. A flowchart is a diagram with certain symbols that describe a process flow sequence[39], flowcharts are generally used to facilitate solving a problem when further evaluation is carried out[40]. The following is a flowchart for each existing user:

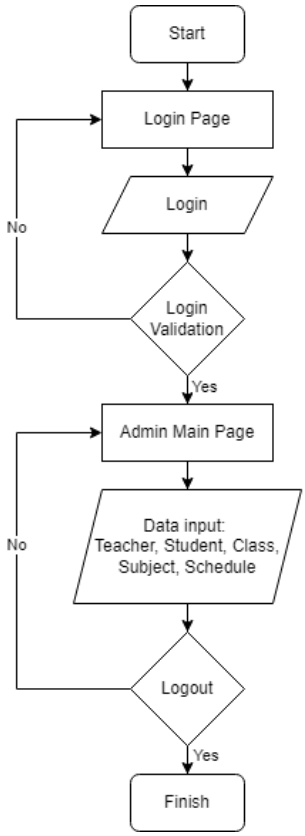

Figure 7. Admin flowchart

Figure 7 is a flowchart of the system flow from the admin user.

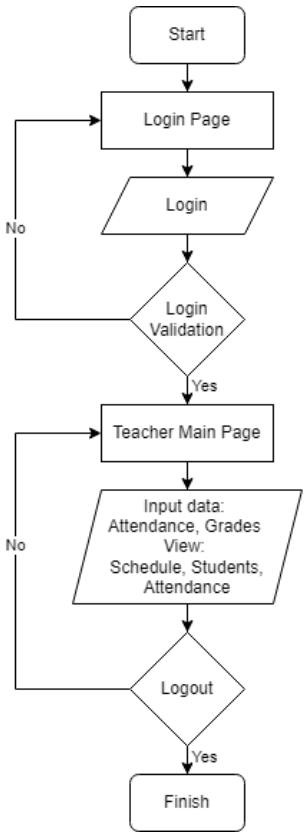

Figure 8. Teacher flowchart

Figure 8 is a system flowchart for teacher users.

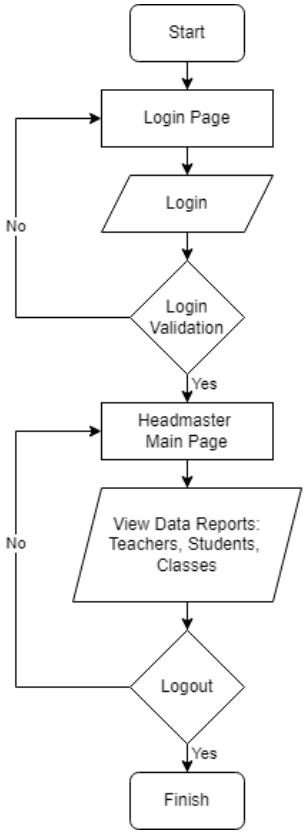

Figure 9. Headmster flowchart

Figure 9 is an illustration of the system flow for school headmaster users.

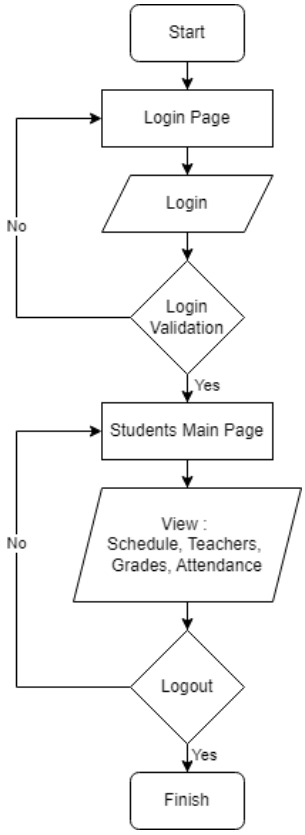

Figure 10. Student flowchart

Figure 10 is a system flowchart for student users.

4. Conclusion

From the discussion above, it can be concluded that this academic information system is really needed to be able to record data, process data into information that can be accessed quickly so that the delivery of information is more effective for both school principals, teachers and students.

References

[1] S. Rahmalisa, "Perancangan dan Implementasi Sistem Informasi Akademik di Sekolah Dasar Islam Terpadu Bustanul Ulum Pekanbaru Berbasis Web," *Jurnal Ilmu Komputer*, vol. 11, no. 2, pp. 86-93, 2022.

[2] F. P. E. Putra, M. Riski, M. S. Yahya, and M. H. Ramadhan, "Mengenal Teknologi Jaringan Nirkabel Terbaru Teknologi 5G," *Jurnal Sistim Informasi dan Teknologi*, pp. 167-174, 2023.

[3] M. I. Syahib, "Rancang Bangun Sistem Informasi Akademik Sekolah Menengah Kejuruan Negeri 1 Loea," *Jurnal Ilmu Manajemen Sosial Humaniora (JIMSH)*, vol. 5, no. 1, pp. 79-90, 2023.

[4] V. Apriana, "Penerapan Metode Waterfall Pada Sistem Informasi Akademik Sekolah Menengah Kejuruan," *Artikel Ilmiah Sistem Informasi Akuntansi*, vol. 2, no. 1, pp. 1-5, 2022.

[5] F. Putra, T. J. Irwanto, and A. Y. Heryadi, "The design and implementation of management information system on student real work (KKN) in Madura University," *International Journal of Civil Engineering and Technology*, vol. 10, no. 2, pp. 159-175, 2019.

[6] A. D. Mirza, S. A. Wicaksono, and A. Rachmadi, "Pengembangan Sistem Informasi Manajemen Akademik Sekolah menggunakan Metode Prototyping (Studi pada Sekolah SMA Negeri Mojoagung)," *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer*, vol. 7, no. 4, pp. 1670-1678, 2023.

[7] A. Herdiansah, Y. Sugiyani, N. Fitriawati, and H. N. Cholid, "Sistem Informasi Akademik Penilaian Hasil Kegiatan Belajar Mengajar Sekolah Menengah Pertama," *JIKA (Jurnal Informatika)*, vol. 7, no. 3, pp. 364-370, 2023.

[8] M. Purnasari, "Analisis dan Evaluasi Sistem Informasi Pengawasan Manejerial dan Akademik Sekolah (SIPMAS) Menggunakan Cobit Framework," *Resolusi: Rekayasa Teknik Informatika dan Informasi*, vol. 4, no. 1, pp. 165-172, 2023.

[9] K. S. Kartini, I. N. T. A. Putra, K. J. Atmaja, and N. P. S. Widiani, "Sistem Informasi Penjualan Pada Salad Yoo," *Jurnal Krisnadana*, vol. 1, no. 2, pp. 45-53, 2022.

[10] S. Dwiyatno, S. Sulistiyono, H. Abdillah, and R. Rahmat, "Aplikasi Sistem Informasi Akademik Berbasis Web," *PROSISKO: Jurnal Pengembangan Riset dan Observasi Sistem Komputer*, vol. 9, no. 2, pp. 83-89, 2022.

[11] L. Santoso and J. Amanullah, "Pengembangan Sistem Informasi Akademik Berbasis Website Menggunakan Metode Rapid Application Development (RAD)," *Elkom: Jurnal Elektronika dan Komputer*, vol. 15, no. 2, pp. 250-259, 2022.
[12] L. Tastilia, D. A. Megawaty, and A. Sulistiyawati, "Sistem Informasi Administrasi Akademik Untuk Meningkatkan Pelayanan Terhadap Siswa (Study Kasus: SMA PGRI Katibung)," *Jurnal Teknologi dan Sistem Informasi*, vol. 3, no. 2, 2022.
[13] A. Y. Pratama and J. A. Razaq, "Integrasi Sistem Informasi Akademik dan Elearning Moodle Dengan Rest Api," *Jurnal Manajemen Informatika dan Sistem Informasi*, vol. 6, no. 1, pp. 26-38, 2023.
[14] A. Setiawan, S. Samsugi, and D. Alita, "Rancang Bangun Sistem Informasi Akademik SMK TAMAN SISWA 1 Tanjung Karang BERBASIS WEB," *Jurnal Informatika dan Rekayasa Perangkat Lunak*, vol. 4, no. 1, pp. 53-59, 2023.
[15] R. Widyastuti, "Penerapan Sistem Informasi Akademik Di Smk Yaspen Jakarta," *Prosisko: Jurnal Pengembangan Riset dan Observasi Sistem Komputer*, vol. 9, no. 2, pp. 9-24, 2022.
[16] D. R. Kaparang, R. Ilyas, and S. Pratasik, "Perancangan Sistem Informasi Akademik Berbasis Web pada SMK," *Edutik: Jurnal Pendidikan Teknologi Informasi dan Komunikasi*, vol. 2, no. 5, pp. 696-703, 2022.
[17] D. A. Saputra, S. Sucipto, and T. Andriyanto, "Analisis Kualitas Website Sistem Informasi Akademik Universitas Nusantara PGRI Kediri," *RESEARCH: Journal of Computer, Information System & Technology Management*, vol. 5, no. 1, pp. 17-22, 2022.
[18] I. Zulfa and R. Wanda, "Rancangan Sistem Informasi Akademik Berbasis Website Menggunakan PHP dan MySQL," *KLIK: Kajian Ilmiah Informatika dan Komputer*, vol. 3, no. 4, pp. 393-399, 2023.
[19] L. Lutviana, I. Arfianto, T. F. Rohman, R. B. B. Sumantri, and R. Suryani, "Perancangan Sistem Informasi Akademik Sekolah Dasar Dengan Metode Waterfall Berbasis Website," *Buletin Sistem Informasi dan Teknologi Islam (BUSITI)*, vol. 4, no. 1, pp. 1-8, 2023.
[20] F. P. E. Putra, M. U. Mansyur, K. Z. Imam, and S. Katsir, "Optimalisasi pengembangan sistem informasi laboratorium terintegerasi sistem akademik menggunakan metode scrumb," *Jurnal Informatika*, vol. 23, no. 2, pp. 183-198, 2023.
[21] F. S. Sulaeman and N. A. Tahir, "Sistem Informasi Akademik Sekolah Berbasis Web (Studi Kasus: SMK Pasundan 2 Cianjur)," *IKRA-ITH Informatika: Jurnal Komputer dan Informatika*, vol. 8, no. 1, pp. 69-78, 2024.
[22] P. G. Cahyanti and W. Kurnia, "Rancang Bangun Sistem Informasi Akademik Sekolah Luar Biasa (SLB) Dharma Bakti Kemiling Bandar Lampung," *Jurnal Teknologi dan Sistem Informasi*, vol. 3, no. 3, 2022.
[23] F. Prasetyo, U. R. Jannah, and M. U. Mansyur, "Penggunaan Stb Sebagai Media E-Learning Berbasis Moodle," *J. Inform*, vol. 23, no. 1, pp. 35-42, 2023.
[24] N. Oktaviani, F. Panjaitan, and Y. Rosadi, "Sistem Informasi Akademik pada Sekolah Menengah Atas Negeri 1 Tanjung Lubuk Menggunakan Metode Web Engineering," *Journal of Software Engineering Ampera*, vol. 3, no. 1, pp. 38-46, 2022.
[25] F. P. E. Putra, M. N. Arifin, K. Z. Imam, and E. Saputra, "Pengembangan Sistem Informasi Laboratorium Terintegerasi Sistem Akademik Menggunakan Agile Scrum," *Jurnal Informasi dan Teknologi*, pp. 109-119, 2023.
[26] N. Nuroji, "Penerapan Metode Agile Dalam Permodelan Sistem Informasi Inventory Barang," *Journal of Artificial Intelligence and Technology Information*, vol. 1, no. 4, pp. 138-145, 2023.
[27] S. B. Atim, "Permodelan Sistem Informasi Penjualan Barang Berbasis Website Menggunakan Metode Agile," *Journal of Artificial Intelligence and Technology Information*, vol. 2, no. 1, pp. 14-25, 2024.
[28] A. Kurniawan, "SIMPEL (Sistem Informasi Manajemen Pelatihan) Internal BRI Menggunakan Metode Agile dengan Model Extreme Programming dan Scrum," *Jurnal JTIK (Jurnal Teknologi Informasi dan Komunikasi)*, vol. 7, no. 2, pp. 270-279, 2023.
[29] I. M. W. Widiarta, Y. Mulyanto, and A. Sutrianto, "Rancang Bangun Sistem Informasi Inventory Menggunakan Metode Agile Software Development (Studi Kasus Toko Nada)," *Digital Transformation Technology*, vol. 3, no. 1, pp. 133-143, 2023.
[30] R. Al Kiramy, F. R. Halim, D. Oktoriani, S. Vernia, D. Erlangga, and M. L. Hamzah, "Rancang Bangun Sistem Informasi Pengumuman Kelulusan Siswa Berbasis Web Menggunakan Metode Agile," *Jurnal Testing dan Implementasi Sistem Informasi*, vol. 1, no. 2, pp. 67-81, 2023.
[31] A. B. Prahastyo, A. Triayudi, and B. Rahman, "E-Commerce Produk Hasil Pertanian Berbasis Web dengan Metode Agile Software Development," *KLIK: Kajian Ilmiah Informatika Dan Komputer*, vol. 3, no. 6, pp. 1334-1339, 2023.
[32] V. B. Gulo, A. Triayudi, and A. Iskandar, "Sistem Informasi Aplikasi Pemesanan Makanan Restoran Berbasis Web Menggunakan Metode Agile Development," *JURIKOM (Jurnal Riset Komputer)*, vol. 10, no. 1, pp. 154-164, 2023.
[33] D. L. Alexandes, R. Aditio, and Y. Jumaryadi, "Implementasi Metode Agile dalam Pengembangan Sistem E-document," *Journal of Information System Research (JOSH)*, vol. 4, no. 1, pp. 318-329, 2022.
[34] M. A. Arba, N. M. Cia, and D. Ananda, "Perancangan Sistem Informasi Peminjaman Proyektor Menggunakan Metode Agile Software Development Pada Universitas," *SENTIMAS: Seminar Nasional Penelitian dan Pengabdian Masyarakat*, pp. 214-222, Aug. 2023.
[35] F. Hafizh and M. B. S. Junianto, "Analisa Dan Perancangan Sistem Informasi Perhitungan Rencana Anggaran Biaya (RAB) Pekerjaan Eksterior Pembesian Dengan Metode Agile Berbasis Android," *Jurnal Informatika Multi*, vol. 1, no. 1, pp. 48-54, 2023.
[36] M. Irfan, D. Mirwansyah, and K. A. Zahro, "Perancangan Sistem Informasi Monitoring Akademik dengan Menggunakan Data Flow Diagram," *Jurnal Locus Penelitian dan Pengabdian*, vol. 2, no. 12, pp. 1201-1207, 2023.
[37] L. M. W. Satyaninggrat, P. D. N. Hamijaya, and K. Rahmah, "Analisis Pemodelan Data Flow Diagram pada Sistem Basis Data Wisata Kuliner di Kota Balikpapan: Analysis of Data Flow Diagram on Culinary Tourism Database System in Balikpapan City," *MALCOM: Indonesian Journal of Machine Learning and Computer Science*, vol. 3, no. 2, pp. 236-246, 2023.

[38] Z. Tuasamu et al., "Analisis Sistem Informasi Akuntansi Siklus Pendapatan Menggunakan DFD Dan Flowchart Pada Bisnis Porobico," *Jurnal Bisnis dan Manajemen (JURBISMAN)*, vol. 1, no. 2, pp. 495-510, 2023.
[39] A. Zalukhu, S. Purba, and D. Darma, "Perangkat Lunak Aplikasi Pembelajaran Flowchart," *Jurnal Teknologi, Informasi dan Industri*, vol. 4, no. 1, pp. 61-70, 2023.
[40] K. I. Listyoningrum, D. Y. Fenida, and N. Hamidi, "Inovasi Berkelanjutan dalam Bisnis: Manfaatkan Flowchart untuk Mengoptimalkan Nilai Limbah Perusahaan," *Jurnal Informasi Pengabdian Masyarakat*, vol. 1, no. 4, pp. 100-112, 2023.