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Development of An Android-Based Field Work Practice Information System In Vocational Schools

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ABSTRACT: Field Work Practice (PKL) is an important part of vocational education as a means of strengthening student competencies through direct experience in the world of work. However, the implementation of PKL in schools still faces various obstacles, such as manual administration, monitoring that has not been optimally documented, and limited access to information between related parties. This study aims to develop and test the effectiveness of an Android-based Field Work Practice Information System (SI-PKL) at SMK Negeri 1 Koto Baru Dharmasraya. The research method uses Research and Development (R&D) with a Software Development Life Cycle (SDLC) Waterfall model approach. The research stages include needs analysis, system design, implementation, testing, and evaluation. Application development was carried out using Flutter, Dart, Android Studio , and Supabase as the backend system . The research subjects consisted of supervising teachers, students, and industrial supervisors. The development results show that the system is able to integrate the attendance process, activity journals, monitoring, and PKL assessment in one digital platform. Based on alpha and beta tests, the system is considered valid, practical, and effective in improving administrative efficiency, information access, and monitoring of PKL activities. Thus, the Android-based SI-PKL can be a digital solution that supports the transformation of PKL management in vocational schools.

KEYWORDS: Android, Field Work Practice, SDLC, Information Systems, Waterfall

I. INTRODUCTION

Vocational education plays a strategic role in preparing graduates who possess competencies aligned with industry needs and are ready to compete in the workforce. According to the Indonesian National Education System Law No. 20 of 2003, education aims not only to develop intellectual abilities but also to shape individuals who are skilled, independent, and capable of contributing to society. In the era of globalization and the Industrial Revolution 4.0, educational institutions are required to integrate technological literacy and practical competencies into the learning process to produce adaptive and competitive human resources.

One form of education that emphasizes practical competence development is vocational education implemented through Vocational High Schools (Sekolah Menengah Kejuruan / SMK). SMK education focuses not only on theoretical mastery but also on psychomotor skills through practical learning activities and Praktik Kerja Lapangan (PKL) or internship programs. PKL serves as an essential component of Work-Based Learning (WBL), enabling students to integrate classroom knowledge with authentic workplace experience. Bilderback (2023) states that internship activities provide students with real-life experiences where academic and technical skills can be directly applied in professional environments. Furthermore, PKL is considered an effective pedagogical model that places students in authentic workplace contexts to strengthen technical competence, professional attitudes, and work readiness (C. Lee, 2025).

The implementation of PKL in Indonesia is regulated under the Regulation of the Minister of Education and Culture (Permendikbud) No. 50 of 2020, which defines PKL as a learning activity conducted in the workplace for vocational students according to curriculum requirements and industry demands. Recent studies emphasize that structured internship programs support competency-based learning and help educators assess students' abilities to perform professional tasks independently (Davidson et al., 2024). Consequently, PKL becomes a critical bridge in realizing the link and match concept between vocational education and industry needs.

The rapid advancement of digital technology has also transformed internship management systems in educational institutions. Research shows that digital or technology-based internship systems can improve accessibility, reduce administrative

barriers, and support wider student participation (C. Lee, 2025). However, poorly designed internship information systems may create challenges such as weak mentoring quality, limited social interaction, and increased technostress among users (Alkhayyal & Bajaba, 2024). Therefore, the development of effective and user-friendly internship management systems becomes increasingly important in supporting vocational education transformation.

IJMRA, Volume 00 Issue (Month) YEAR

At SMK Negeri 1 Koto Baru, the PKL program is implemented systematically through planning, implementation, and evaluation stages. However, preliminary observations conducted by the researcher revealed several administrative and monitoring problems during PKL implementation. Information regarding internship schedules, student placement, supervising teachers, and industry partners is still distributed manually and not integrated into a centralized system. Attendance and daily activity journals are managed using paper documents, WhatsApp, and Google Forms, causing inefficiency, high operational costs, and difficulties in real-time monitoring. In addition, supervision activities and industry assessments are still conducted manually, increasing the risk of data loss and administrative errors.

Previous studies have developed web-based internship information systems to simplify registration, automate attendance, and provide digital activity reporting, resulting in improved transparency and monitoring efficiency (Izzatul et al., 2025; Santosa & Nurkhamid, 2024). Meanwhile, mobile-based systems such as Android internship applications provide more flexible access and faster information dissemination for users (Rosadi & Yusuf, 2020). Asa et al. (2023) also emphasize that Android-based information systems are more accessible for users because mobile applications are easier to use compared to computer-based systems.

Based on these problems and previous studies, this research aims to develop and evaluate the effectiveness of an Androidbased Internship Information System (Sistem Informasi Praktik Kerja Lapangan / SI-PKL) at SMK Negeri 1 Koto Baru. The system is expected to improve information accessibility, optimize attendance and daily journal management, facilitate teacher supervision, and digitalize internship assessment processes. Ultimately, the proposed system is expected to support more effective, efficient, and integrated internship management in vocational schools.

II. METHODOLOGY

A. Research Approach

The research and development procedure used in this study is the System Development Life Cycle (SDLC) with the Waterfall method. The research and development procedure in this study uses the System Development Life Cycle (SDLC) approach with the Waterfall method. The Waterfall model is a classic approach to system development that has structured and systematic stages, starting from requirements analysis to system maintenance. The Waterfall model describes a sequential software development process, where each stage must be completed before proceeding to the next (Pressman & Maxim, 2020). The Waterfall method was chosen because the development process is carried out in stages and systematically, starting from requirements analysis **,** system design **,** implementation (coding) **,** testing **,** and system implementation and maintenance **.** Each stage has an important role in ensuring the system developed is in accordance with user needs and can function optimally. (Kirman, Erdi Epta Saputra, 2022) . The Waterfall model is a classic approach in system development that has structured and systematic stages, starting from requirements analysis to system maintenance.

B. Research Site

The research was conducted at SMK Negeri 1 Koto Baru West Sumatera Indonesia. The research subjects consisted of supervising teachers, students participating in PKL, and industrial supervisors.

C. The system development stages include:

The stages in the procedure for developing an Android-based Field Work Practice (PKL) information system using the Waterfall method are as follows:

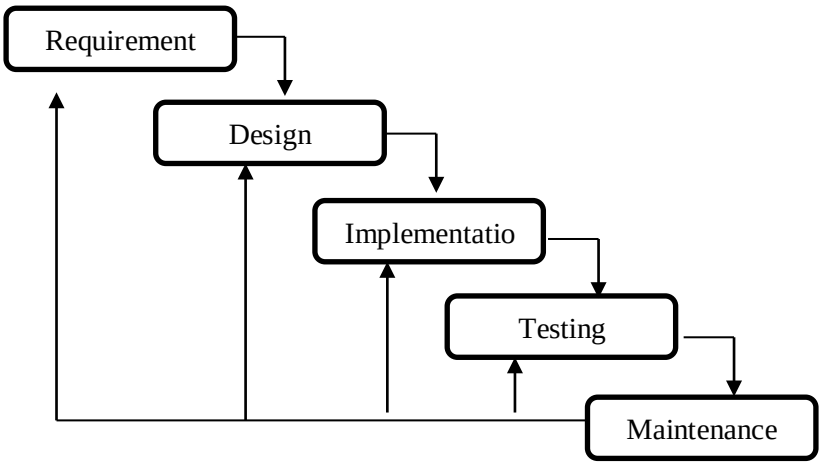


Figure 1. Waterfall method stages

1. **Needs Analysis (Requirement Analysis)**

   At this stage, the researcher conducted observations and interviews with the PKL supervising teacher, the vice principal, and students. to find out the problems that occur in the PKL management system at SMK Negeri 1 Koto Baru. Requirements analysis is the process of documenting functional and non-functional requirements that form the basis for system design (Ian, (2022). Based on the problem identification, the following is a list of the main problems found :

No.	Problems	Reason	Impact / Consequences
1	Limited Access to Information	Dissemination of information about schedules, locations and supervisors is still manual through direct announcements or messages in groups. WhatsApp that often piles up.	Students, teachers, and industry often miss important information (miscommunication).
2	Weak Attendance Validation	Attendance recording only relies on signatures on paper or Google Forms without real-time location verification.	Opens up loopholes for cheating (leaving absences/data manipulation), and makes it difficult for the committee to monitor students' presence live.
3	High Operating Costs	Use of physical documents for guidebooks, activity journals and daily attendance.	Schools have to pay for printing/duplicating documents, and physical files take up space in the school's archives.
4	Unrecorded Monitoring	The results of the supervising teacher's monitoring visits are often only recorded in a personal agenda or conveyed verbally.	Schools do not have a database of student progress history in the field, so evaluation of problems is often handled too late.
5	Risk of Losing Value Data	Assessment from industry mentors uses physical paper sheets brought by students.	Grade documents are vulnerable to being lost, damaged, or torn before they reach the committee, which requires a reevaluation process.
6	Slow Data Recapitulation	The committee must copy the data one by one from paper (attendance & grades) to the computer application (Excel/Report Card).	The final reporting process is long, inefficient, and carries a high risk of data input errors (human error).

2. **System Design (Design)**

   This activity includes designing the system architecture; Use case diagrams, activity diagrams, database designs, and application user interface designs. The goal is for the system to be developed in accordance with user needs and easy to operate. The system design stage plays a crucial role in transforming user needs into a visual model that will be used in the implementation stage (Sukamto & Shalahuddin, 2021)

3. System Implementation (Implementation)

   System implementation is carried out using predetermined hardware and software specifications to ensure the application runs optimally during the development and deployment processes.

   a. Hardware : Development was conducted using a computer with an Intel Core i7 processor and 16GB of RAM to run the Android emulator smoothly. Field testing was conducted using an Android smartphone with a minimum of Android 8.0 (Oreo) and active GPS.

   b. Software

   a) Flutter SDK & Dart: As the main framework for mobile application development.
   b) Android Studio / VS Code: As an Integrated Development Environment (IDE) for writing program code.
   c) a Backend-as-a-Service (BaaS) provider for PostgreSQL database management and user authentication.

4. **System Testing (Testing)**

   The PKL Information System (SI-PKL) trial was conducted in stages, involving several parties who have strategic roles in assessing the quality and feasibility of the product. The first trial was an alpha test conducted by competent media experts in their fields to determine the feasibility of the media. The results of the alpha test were used as a basis for revising the developed application. In this study, the alpha test was only conducted at the media testing stage, because the next stage was the beta test, which is an assessment of the product's feasibility by users. This trial was to determine the effectiveness of using this Android-based information system.

5. **Maintenance**

   The final stage in the Waterfall model is system maintenance. At this stage, updates, bug fixes, and system adjustments are made to meet new user needs. Maintenance is a crucial phase to ensure the system remains relevant and can function optimally as user needs and technology evolve. Pressman & Maxim, (2020)

III. RESULTS AND DISCUSSIONS

A. Development Results

This research resulted in an Android-based Field Work Practice Information System (SI-PKL) developed using the Waterfall Software Development Life Cycle (SDLC) model. The system was developed to assist with the administration, monitoring, and assessment of PKL activities at SMK Negeri 1 Koto Baru Dharmasraya.

System development is carried out through several stages: requirements analysis, system design, implementation, testing, and maintenance. During the implementation phase, the application is developed using Flutter as the primary framework, Dart as the programming language, Android Studio as the Integrated Development Environment (IDE), and Supabase as the backend and database services.

The system developed has several main features, namely:

1. Multi-user login for students, tutors, and industry mentors.
2. Location-based attendance (GPS Location).
3. Student daily activity journal.
4. Monitoring of PKL activities by the supervising teacher.
5. Digital assessment by industry.
6. PKL report dashboard.

The following is a presentation of the implementation results of the main features of the Android-based Field Work Practice Information System (SI-PKL):

1. Login Page Implementation (Authentication)

The login page is implemented as the application's primary security gateway. This interface requires users to enter credentials, including an email address and password. The system logic on this page is directly connected to the Supabase Auth service. If the credentials are declared valid by the server, the system extracts the role attribute from the profiles table and redirects the user to the main page appropriate to their access rights.



Figure 2. Login Page View

2. Dashboard Page Implementation

The system implements a dynamic dashboard that automatically adjusts the display and navigation menu based on the type of user who successfully logs in:

a. Student Dashboard: Presents information centered on students' daily operations, displaying a summary of today's attendance, shift schedule status from the industry_schedule table, as well as shortcut buttons to the Attendance, Journal, and Permit menus.

b. Mentor & Industry Dashboard: Displays an analytics interface that displays a list of students being mentored or placed with the institution. This view allows teachers and mentors to comprehensively monitor student activity status.



Figure 3. Main Page Interface (Dashboard)

3. Implementation of Location-Based Attendance Page (Geotagging)

The attendance page is the core of solving the attendance validation problem. This page is implemented by utilizing the Global Positioning System (GPS) sensor on the user's Android device. When the page is opened, the system renders a map and detects the user's latitude and longitude coordinates in real time .

The system then runs a distance calculation algorithm against the agency coordinates stored in the industry table. The "Check-in" or "Check-out" buttons will only be active and data will be successfully saved to the attendance table if the user's distance is below the radius_meter tolerance. If the user is outside the radius, the system will display an error prompt .

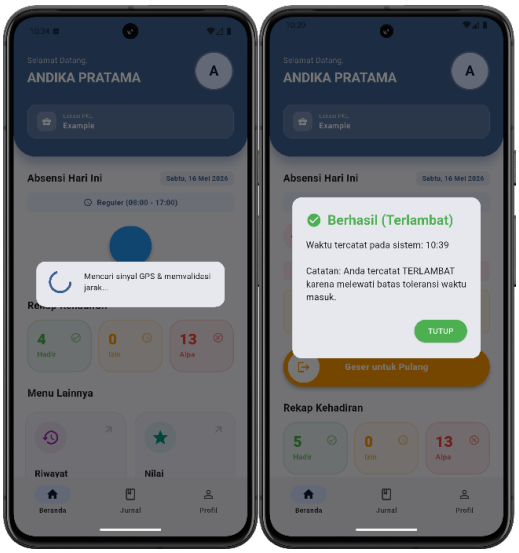


Figure 4. Geotagging -Based Attendance Page Interface

4. Implementation of the Permit Application Page

To facilitate absence administration, which previously required physical letters, a digital leave application page has been implemented. This interface provides a form for students to select the leave type (Sick/Permission), specify a date range, provide a reason, and a button to upload photo evidence (e.g., a doctor's note) from their smartphone gallery . This data is forwarded directly to the Industry dashboard for approval .

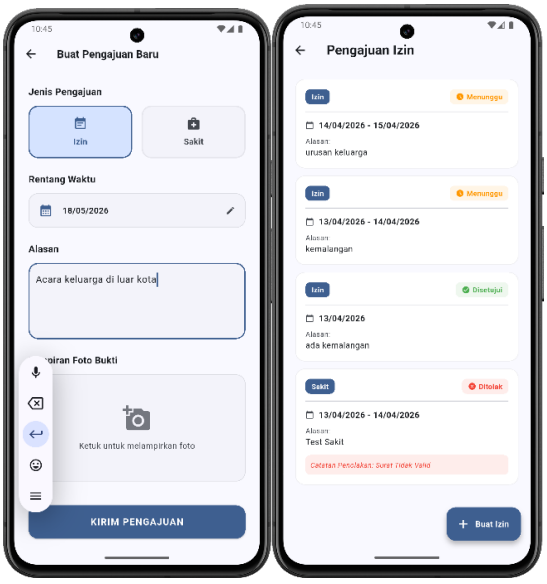


Figure 5. Student Permit Application Page Interface

5. Implementation of Activity Journal Page (Logbook)

A journal page was developed to digitize physical diaries. Students are presented with a daily activity input form interface that requires the inclusion of descriptive text and photo documentation. Once saved, this data is displayed in a list view sorted by the most recent date, making it easier for students and supervisors to track their work.

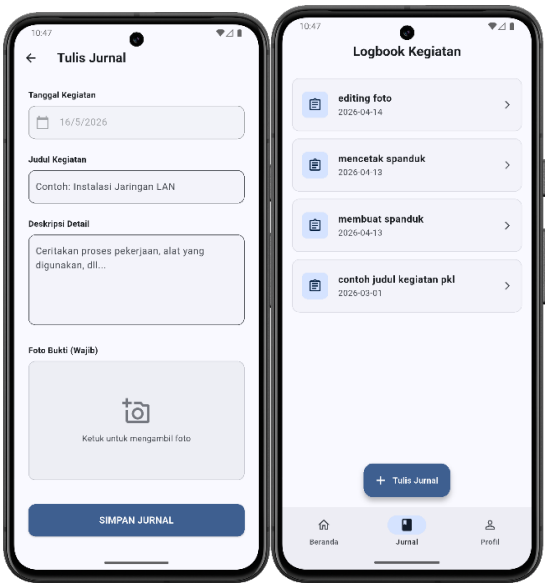


Figure 6. Activity Journal Page Interface (Logbook)

6. Monitoring Page Implementation (Teachers Only)

This feature is implemented exclusively for Supervisor Teacher access rights. The monitoring interface facilitates teachers conducting field supervision at industrial and industrial (DUDI) institutions. The provided form accommodates input of evaluation notes and uploading of photo documentation of the visit. The results of the input in this interface are stored in a monitoring table as an official report of the PKL site evaluation.

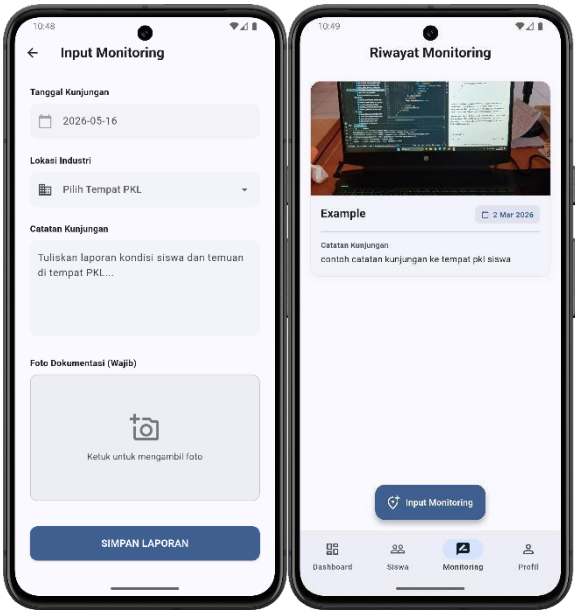


Figure 7. Teacher Supervision Monitoring Page Interface

7. Implementation of Assessment Page (Industry Specific)

As the final step in the system flow, an assessment page was implemented for industry mentors. This interface features numeric input fields for technical and non-technical grade components, as well as a text field for qualitative student evaluation notes. With this page, schools can directly receive grades in real time into the database without having to wait for students to submit physical grade sheets to the school.

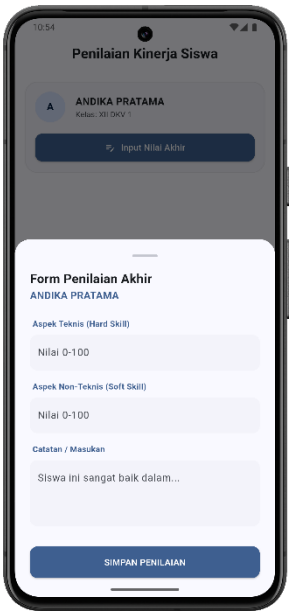


Figure 8. Industry Assessment Input Page Interface

B. Testing

1. Alpha Test Results

Alpha testing was conducted by media experts to determine the system's validity in terms of functionality, user interface (UI/UX), and language. The testing used a Likert-scale questionnaire with a score range of 1–4. Based on the test results, the following results were obtained:

Table 1. Alpha test

Assessment Aspects	Percentage	Category
Functionality	93%	Very Valid
Appearance (UI/UX)	90%	Very Valid
Language	95%	Very Valid
Average	**92.67%**	**Very Valid**

These results indicate that the system meets the validity requirements and is suitable for use in the next testing phase. The validators stated that all of the application's main features functioned well, meeting user needs. The application's appearance was deemed attractive, navigation was easy to understand, and the language used was communicative and easy to understand.

2. Beta Test Results

Beta testing was conducted on students and supervising teachers as end users of the application. The testing aims to determine the level of practicality and effectiveness of using the system in implementing PKL. Student beta testing was conducted on 12th-grade students who were undergoing internships. The test results are shown in the following table:

Table 2. Student beta test

Assessment Aspects	Percentage	Category
Ease of Use	86%	Very Worthy
Appearance	84%	Very Worthy
Utility	88%	Very Worthy
Effectiveness	85%	Very Worthy
Average	**85.75%**	**Very Worthy**

These results show that the application is easy to use, has an attractive appearance, and is able to help students in carrying out PKL activities such as attendance and filling out daily journals. Beta testing was conducted on PKL mentor teachers. The results showed that the application received an average rating of 88%, categorized as "Very Appropriate."

Table 3. Teacher beta test

Assessment Aspects	Percentage	Category
Convenience	87%	Very Worthy
Monitoring	89%	Very Worthy
Evaluation	86%	Very Worthy
Benefit	90%	Very Worthy
Average	**88%**	**Very Worthy**

Teachers stated that the application helps the process of monitoring students, checking activity journals, and managing PKL assessments more effectively than manual methods.

The results of the study show that the development of an Android-based Field Work Practice Information System (SI-PKL) is able to be a digital solution in supporting the implementation of PKL at SMK Negeri 1 Koto Baru Dharmasraya. The results of this study are in line with previous research which stated that an Android-based information system is able to increase the effectiveness of PKL management, improve communication between related parties, and increase the efficiency of school administration. Thus, the Android-based Field Work Practice Information System (SI-PKL) can be an alternative digital solution to support the transformation of PKL management in vocational schools.

IV. CONCLUSIONS

This study successfully developed an Android-based Internship Information System (Sistem Informasi Praktik Kerja Lapangan / SI-PKL) for SMK Negeri 1 Koto Baru using the Software Development Life Cycle (SDLC) Waterfall model. The development process consisted of requirement analysis, system design, implementation, testing, and maintenance stages. The application was developed using Flutter and Dart for mobile application development, while Supabase was utilized as the backend service and database platform.

The developed SI-PKL application integrates several essential internship management features, including multi-user authentication, GPS-based attendance, daily activity journals, teacher monitoring, industrial assessment, and internship reporting dashboards. These features were designed to support the digital transformation of internship management processes, making them more effective, efficient, and well-organized.

The results of alpha testing conducted by media experts showed that the system achieved a validity score of 92,67%, categorized as “Highly Valid.” This indicates that the application fulfills the required standards in terms of functionality, user interface (UI/UX), and language usability. Furthermore, the beta testing results demonstrated high practicality and effectiveness, with average scores of 85.75% from student and 88% from supervising teachers categorized as “Highly Feasible.” These findings indicate that the SI-PKL application is easy to use, supports internship monitoring and assessment processes, and improves the effectiveness of internship implementation.

Therefore, the Android-based SI-PKL developed in this study can serve as an effective digital solution to support internship management in vocational schools. The system contributes to improving administrative efficiency, enhancing communication among stakeholders, and facilitating real-time monitoring and assessment of internship activities. Future research is recommended to expand the system with additional features such as automated notifications, web and iOS integration, advanced data analytics, and enhanced security mechanisms, as well as conducting broader implementation studies across multiple vocational schools.

REFERENCES

1) Alkhayyal, S., & Bajaba, S. (2024). Countering technostress in virtual work environments: The role of work-based learning and digital leadership in enhancing employee well-being. Acta Psychologica, 248(May), 104377. https://doi.org/10.1016/j.actpsy.2024.104377
2) Asa, J. S., Bumma, O., Tamara, D., & Sarungu, C. M. (2023). Android Based Job Search Application “Megawe” for The Segment of Workers with an Education Level Below a University Degree. Procedia Computer Science, 227, 194–203. https://doi.org/10.1016/j.procs.2023.10.517

3) Bilderback, S. (2024). Work-based learning opportunities through the Tennessee economic boom: training for generations. Development and Learning in Organizations, 38(1), 1–3. https://doi.org/10.1108/DLO-01-2023-0016
4) Davidson, D., Vasey, N., Mundell, A., Richardson, C. L., & Rathbone, A. P. (2024). A novel experiential work-based learning model in paediatric secondary care using entrustable professional activities to develop clinical knowledge and communication skills. Currents in Pharmacy Teaching and Learning, 16(10), 102125. https://doi.org/10.1016/j.cptl.2024.102125
5) Ian, S. (2022). Software Engineering (11th ed.). Pearson Education Limited.
6) Izzatul, R., Anwar, Y., Wahyu, T., Banjarmasin, B., & Banjarmasin, A. B. (2025). Aplikasi Manajemen Mahasiswa PKL Diskominfo Provinsi Kalimantan Selatan Berbasis Web. 1.
7) Kirman, Erdi Epta Saputra, U. M. B. (2022). Metode SDLC Waterfall Pada Rancang Bangun Sistem Informasi Sekolah SMP Negeri 10 Kaur. 4, 112–118.
8) Lee, C. (2025). Virtual internships as alternative work-based learning: Examining access, quality, and outcomes for underserved students. Computers and Education, 239(January), 105439. https://doi.org/10.1016/j.compedu.2025.105439
9) Peraturan Pemerintah RI. (2020). Peraturan Menteri Pendidikan Dan Kebudayaan Republik Indonesia Nomor 50 Tahun 2020 Tentang Praktik Kerja Lapangan Bagi Peserta Didik. Jurnal Pendidikan, 2013–2015. https://peraturan.bpk.go.id/Home/Details/163849/permendikbud-no-50-tahun-2020
10) Pressman, R. S., & Maxim, B. R. (2020). Software Engineering: A Practitioner's Approach (9th ed.). McGraw-Hill Education.
11) Rosadi, D., & Yusuf, M. (2020). Rancangan Bangun Apliasi Electronic-PKL (E-PKL) Akademi Telkom Jakarta Berbasis Android Menggunakan Android Studio. EJurnal Informatika Dan Telekomunikasi, 6.
12) Santosa, B., & Nurkhamid. (2024). Pengembangan Sistem Informasi Praktik Kerja Lapangan Berbasis Website Smk Negeri 1 Pengasih. Journal of Information Technology and Education (JITED), 2(1), 3026–6564. https://journal.uny.ac.id/publications/jited/article/view/276
13) Sukamto, R. A., & Shalahuddin. (2021). Rekayasa Perangkat Lunak Terstruktur dan Berorientasi Objek. Infromatika.

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