Jurnal Abdimas Cendekiawan Indonesia
Vol. 3 No. 2 May (2026)
https://doi.org/10.56134/jaci.v3i2.170

ISSN: 3046-6520 (print)
ISSN:3046-6490 (online)

Digital Monitoring System for Field Work Practice in Vocational Schools

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Abstract

The implementation of Field Work Practice (PKL) in vocational schools still faces administrative and monitoring challenges due to reliance on manual reporting systems. These limitations affect reporting efficiency, transparency, and teachers' ability to monitor student activities in real time. This community service activity aimed to implement and assist the use of a web-based PKL monitoring system at SMK Nasional Makassar to support digital monitoring, reporting, and evaluation of PKL activities. The implementation process included needs analysis, system design, implementation, user socialization, mentoring, and evaluation using the Waterfall approach. Data were collected through observation, interviews, and literature review. System evaluation was conducted through Black Box Testing and User Acceptance Testing (UAT). The Black Box Testing results showed that all main system functions operated properly in accordance with user requirements. Furthermore, the UAT results showed a feasibility percentage of 88.5%, indicating that the system was categorized as "Very Feasible." The implementation of the system improved the effectiveness of real-time monitoring, digital reporting, data management, and administrative efficiency of PKL activities in vocational schools. The findings demonstrate that the web-based monitoring system can effectively support digital transformation in vocational education management.

Keywords: Vocational Education; Field Work Practice; Monitoring System; Web-Based Application; Digital Transformation

Received: 23 January 2026 Revised: 12 March 2026 Accepted: 09 May 2026

Introduction

The development of information and communication technology has driven changes in various activities within the educational environment. The use of technology is no longer limited to learning media, but is also used in administrative management, academic data storage, and monitoring school activities (Bagde et al., 2021; Carrión-Mart'inez et al., 2020; Zafar, 2019). The integration of digital technology helps educational institutions improve service effectiveness, accelerate information management, and support the monitoring of academic activities in a more structured and well-documented manner (Ismail et al., 2020; Ngmenkpieo et al., 2023). In addition, implementing digital systems enables schools to provide information more quickly and supports data-driven decision-making in educational management (Iwogbe et al., 2025; Jesus-Silva et al., 2023; Logachev et al., 2021; Sunarjo et al., 2024).

Digital transformation in education is also beginning to be implemented in the management of vocational education activities, including Field Work Practice (PKL) in Vocational High Schools (SMK). PKL is a learning program that provides students with the opportunity to gain hands-on work experience in their respective fields of expertise (Abadiyah et al., 2025; Eldariyanti & Jabar, 2026; Putra et al., 2025; Yuliyanto & Rahmanto, 2023). This activity plays a crucial role in shaping students' work readiness because it not only focuses on mastering technical skills but also fosters discipline, responsibility, and adaptability to the industrial environment (Fania et al., 2024; Salsabilla & others, 2024; Sudarwati et al., 2025). Therefore, implementing PKL requires a monitoring system that effectively supports the monitoring and evaluation of student activities.

In practice, monitoring of internship activities in some schools is still done manually through daily report books submitted periodically to the supervising teacher. This results in a less-than-optimal monitoring process, as the supervising teacher cannot directly monitor student progress during the internship (Afrizal et al., 2025; Asrul et al., 2025). In addition, the use of physical documents in the reporting process also creates various obstacles, such as delays in evaluation, difficulties in data retrieval, the risk of document loss, and low transparency in monitoring student activities (Hanafiah et al., 2024; Perdana et al., 2025; Sembiring et al., 2025). These issues indicate the need for a technology-based monitoring system to support more effective and structured PKL management.

Makassar National Vocational School (SMK Nasional Makassar) is a vocational school in Makassar City that implements internships (PKL) as an important part of the student learning process. Based on initial observations, the

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PKL monitoring process at this school still relies on manual recording in students' daily report books. These reports are then submitted periodically to the supervising teacher for review and evaluation. This system slows the monitoring and evaluation process because information on student activities is not immediately available. Furthermore, managing reports that still rely on physical documents is inefficient for storing and retrieving data, especially when the number of students participating in the PKL is large. Given these conditions, it is necessary to implement a web-based PKL monitoring system to help schools more effectively manage the reporting, monitoring, and evaluation of student activities. The web-based system allows students to submit daily reports digitally, enabling the supervising teacher and field supervisor to monitor practical activities directly. In addition to improving monitoring effectiveness, the use of a digital system supports more structured, easily accessible, and well-documented data management.

Several previous studies have discussed the implementation of web-based PKL monitoring systems in vocational education environments. (Febriani et al., 2022) developed a PKL monitoring system at SMK Negeri 1 Sintuk Toboh Gadang to support student supervision during internship activities. The system was considered effective in monitoring student activities, but still had limitations in its digital attendance features and daily report integration. Other research by (Priyolistiyanto & Handayani, 2024) shows that the use of manual methods in monitoring PKL causes delays in evaluation and difficulties in monitoring student activities on an ongoing basis. In addition, (Samsudin & Januar, 2024) developed a web-based PKL information system at Wyata Dharma Vocational School to assist with the administrative management of PKL activities. However, the study did not address real-time monitoring, digital report verification, or the involvement of field supervisors in evaluating student activities.

Based on several previous studies, the PKL monitoring system still has room for development, particularly in real-time monitoring, digital report management, and transparency in student activity evaluation. Therefore, this activity implemented a web-based PKL monitoring system at SMK Nasional Makassar to support the digitalization of PKL management in vocational schools. The main advantages of the implemented system lie in the integration of digital daily reporting, real-time monitoring of student activities, verification of reports by field supervisors, and more structured, documented management of PKL activity data. In addition to system implementation, this activity involved socialization and assistance with using the system to supervise teachers, school administrators, and students. Assistance was provided to ensure all users could use the system optimally during the PKL implementation. Through the implementation of this web-based PKL monitoring system, it is hoped that the monitoring, reporting, and evaluation of PKL activities can be conducted more effectively and transparently, in line with the needs of vocational education in the digital era.

Method

The implementation of a web-based Field Work Practice (PKL) monitoring system was carried out at Makassar National Vocational School, involving students participating in the PKL, supervising teachers, field supervisors, and school administrators as the main partners. The activity's implementation used a user-centered system development approach with the Waterfall model because it provides systematic stages and is well-suited to developing a web-based monitoring system in an educational environment (Aldi, 2022; Borecky et al., 2016; Oluwaseun et al., 2017; Senarath, 2021). The activity stages include needs analysis, system design, system implementation, user socialization and mentoring, and system evaluation. Data collection was conducted through observation, interviews, and literature review. Observations were conducted to identify the PKL monitoring process, which previously relied on manual recording and physical documents. Interviews were conducted with supervising teachers, students, and school administrators to identify obstacles encountered in monitoring, reporting, and evaluating PKL activities. Furthermore, a literature review was conducted by examining previous studies on web-based PKL monitoring systems, digital transformation in education, and technology-based vocational education management.

The needs analysis phase was conducted using the PIECES (Performance, Information, Economy, Control, Efficiency, Service) method to identify weaknesses in the previous monitoring system. The analysis results showed that the manual reporting process led to monitoring delays, difficulties in monitoring student progress in real time, low evaluation transparency, and inefficient document management for PKL activities. Based on the analysis results, a web-based monitoring system was developed to support reporting on daily student activities, digital attendance, PKL activity monitoring, report verification, and a more structured student evaluation process. The system design phase was carried out using the Unified Modeling Language (UML), which includes use case diagrams, activity diagrams, and database design. The system was then implemented as a web-based application using PHP and MySQL. The system was designed to be accessible online, enabling real-time monitoring and reporting of PKL activities by students, supervising teachers, and field supervisors.

In addition to system implementation, this activity also included socialization and guidance on system usage for all users. Supervisors and school administrators were trained in student data management, monitoring internship activities, verifying digital reports, and using the system for student evaluation. Meanwhile, students were provided with guidance on using the daily reporting feature, filling out digital attendance records, and uploading documentation of internship activities. The guidance was provided in stages to enable users to adapt and utilize the system optimally during the internship.

The system evaluation was conducted using Black-Box Testing and User Acceptance Testing (UAT). Black Box Testing was used to evaluate the system's main functions, including login, student data management, activity reporting, digital attendance, student activity monitoring, report verification, and student assessment. Testing was conducted to ensure all features functioned as required by user needs and as specified in the system design. Next, User Acceptance Testing (UAT) was conducted to assess user acceptance of the implemented system. Testing was conducted on usability, user interface, performance, and functionality aspects using a Likert-based questionnaire. System implementation and mentoring activities were carried out over a period of three months. The implementation involved 30 students participating in PKL activities, while the User Acceptance Testing (UAT) evaluation was conducted using responses from 30 users representing students, supervising teachers, field supervisors, and school administrators. The evaluation results were used to assess the effectiveness of the web-based internship monitoring system in supporting the monitoring, reporting, and evaluation of internship activities in the vocational school environment.

Results and Discussion

The implementation of the web-based monitoring system improved the effectiveness of monitoring, reporting, and evaluating Field Work Practice (PKL) activities at SMK Nasional Makassar. The implementation was carried out to support the digitalization of the monitoring, reporting, and evaluation processes for PKL activities within the vocational school environment. This activity involved PKL participants, supervising teachers, field supervisors, and school administrators as the system's primary users. The system was developed using a user-centered approach and a waterfall model, ensuring a gradual, user-tailored development process for the school environment. The implementation results show that the web-based PKL monitoring system can more effectively monitor student activities than previously used conventional methods. Prior to the system's implementation, student activity reporting was conducted using daily report books and physical documents submitted periodically to the supervising teacher. This condition resulted in suboptimal monitoring, as the supervising teacher could not directly observe students' progress during practical activities. After the system was implemented, the reporting process was conducted digitally, allowing both the supervising teacher and the field supervisor to monitor student activities in real time.

In addition to improving monitoring effectiveness, implementing this system also increases the efficiency of PKL activity administration. All student activity reports are automatically stored in the system database, making document management more structured and easier to access when needed. The use of a digital system helps reduce reliance on physical documents previously used in PKL activity reporting and evaluation. With a web-based system, schools also find it easier to search for student report data because all activities are stored in an organized manner. The developed PKL monitoring system comprises several key features: user authentication, student data management, digital attendance, daily activity reports, student progress monitoring, report verification, and PKL activity assessment. All features were developed based on observations and interviews with schools, enabling the system to adapt to the needs of PKL implementation within a vocational school environment. The system also implements role-based access control, ensuring that each user can access only the features within their assigned authority. This access rights management helps maintain the security of PKL monitoring data while also improving order in the process of managing student activity information.

System Login Page

The login page is the first step in the authentication process that users must complete before accessing the web-based PKL monitoring system. This feature is designed to differentiate user access rights based on their respective roles, such as admin, student, supervising teacher, and field supervisor. In addition to improving system security, the login feature ensures that only users with registered accounts can access PKL monitoring data. The system will display an error notification if the user enters a username or password that does not match the data stored in the system database.

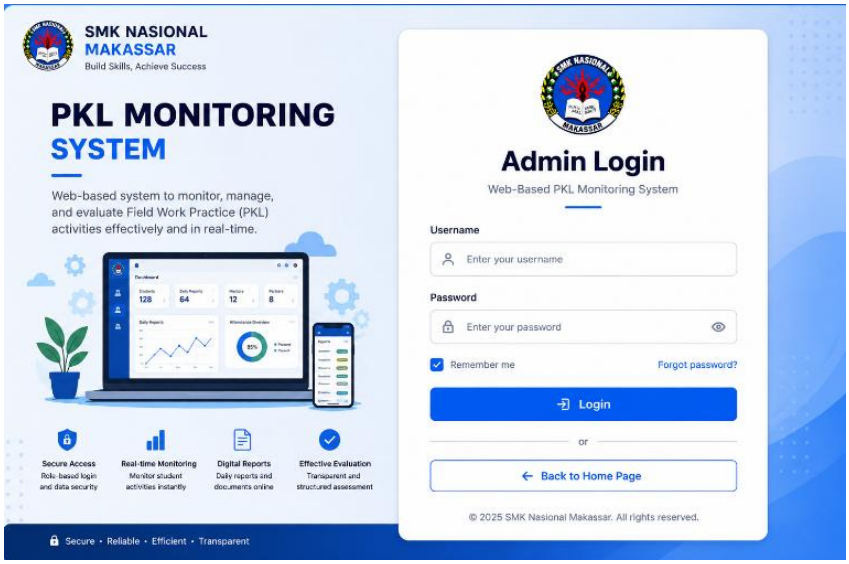

Figure 1. Login page of the web-based PKL monitoring system

The login page is designed with a simple interface for ease of use for all system users. The simple interface facilitates user adaptation, especially for students and supervising teachers who are unfamiliar with web-based monitoring systems. The login interface is also responsive, allowing access from both computers and smartphones as long as the user has an internet connection.

Admin Home Page

The main admin page is the central management hub for the web-based PKL monitoring system. Admins have access to manage student data, supervising teacher data, PKL location data, student activity reports, and other user activities. The admin dashboard also displays a summary of key data related to PKL implementation, including the number of active students, the number of activity reports received, and the verification status of student reports.

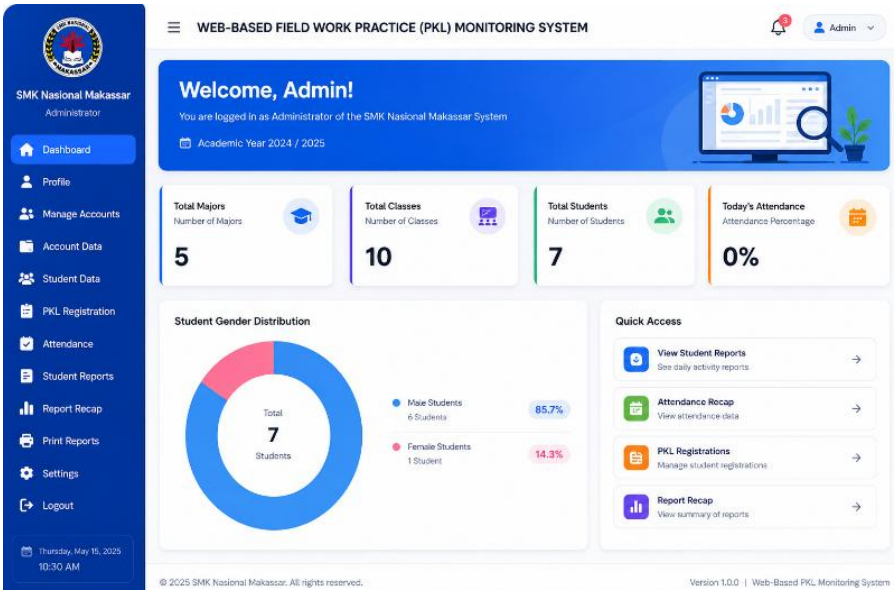

Figure 2. Admin page

The admin dashboard is designed to facilitate more effective and structured data monitoring. The information displayed on the dashboard helps administrators track the overall progress of the internship program without having to manually review the data. Additionally, admins can manage user data if there are changes to student or supervising teacher data during the internship. Implementing a web-based admin dashboard improves the efficiency of internship administration compared to the previously used manual method.

Supervising Teacher and Field Supervisor page

The teacher-supervisor page is designed to simplify monitoring student activities during the internship. On this page, teacher-supervisors can view students' daily reports directly, without waiting for regular physical reports to be submitted. Furthermore, teacher-supervisors can provide feedback and evaluations of student activities through a digital system, making the monitoring process more effective and sustainable.

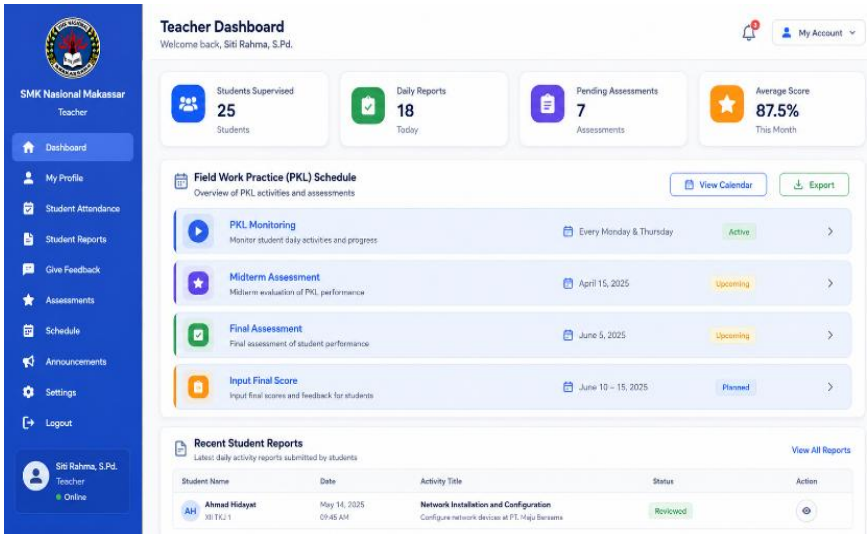

Figure 3. The main page of the supervising teacher

The use of a web-based monitoring system helps improve the effectiveness of communication between supervisors and students during internships. Prior to the system's implementation, communication regarding student activity reports was manual and unintegrated, often leading to delays in evaluation. After the system's implementation, supervisors can provide direct feedback, resulting in a more expedited and structured monitoring process. Meanwhile, the field supervisor page is designed to facilitate partner agencies' involvement in monitoring and evaluating student activities during internships. Through this page, field supervisors can verify student attendance, provide feedback, and assess student activities during their internship.

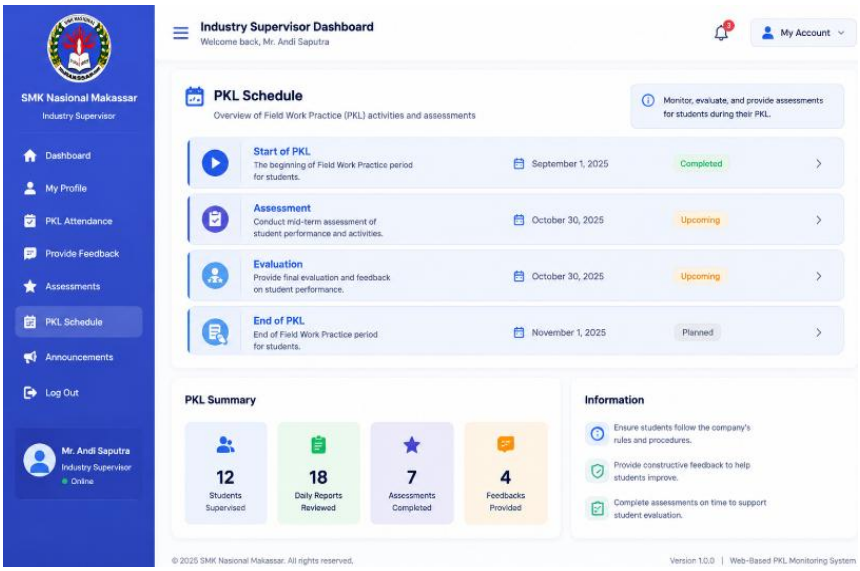

Figure 4. Field supervisor page

The involvement of field supervisors in the system helps increase transparency and objectivity in the evaluation process of internship activities. Prior to the system's implementation, the verification process was manual, making it difficult for supervisors to verify student activity at the internship site. With the digital system, the verification process can be carried out directly by field supervisors, resulting in more valid and well-documented student activity reports.

Daily Report of PKL Activities

The daily report feature is a key component of the web-based PKL monitoring system. Through this feature, students can submit digital daily activity reports and documentation of their activities during the PKL. Supervising teachers and field supervisors can then verify and evaluate these reports directly through the system.

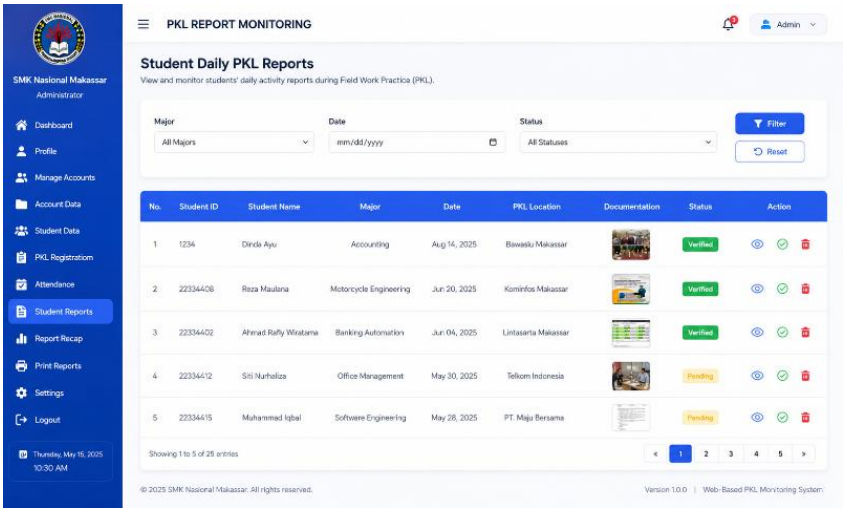

Figure 5. Student PKL daily report page

The use of digital reports makes the monitoring process faster and better documented than conventional methods that rely on manual recording. In addition, the report filter feature, which allows filtering by date, major, and report status, helps users manage student activity data more efficiently. All student reports are automatically stored in the system database, simplifying the search and management of PKL activity data. The implementation of the digital daily report feature also positively impacts student discipline in submitting activity reports. The reporting process is carried out online and automatically documented, encouraging students to more routinely fill in daily activities during the PKL implementation. This condition indicates that implementing a web-based monitoring system not only supports administrative functions but also improves the digital reporting culture in the vocational school environment.

System Testing Using Black Box Testing

Once the system is fully implemented, the next stage is testing using the Black Box Testing method. Testing is conducted to ensure that all the system's main functions operate in accordance with user requirements and the system's design specifications. Black Box Testing focuses on testing the system's input and output without considering the internal structure of the program code (Nidhra & Dondeti, 2012; Verma et al., 2017). Testing was conducted on several key features, such as login, dashboard, activity reports, attendance, student data management, report verification, and student assessments. The test results showed that all key system features performed as expected, and no functional errors were found. The test results are presented in Table 1.

Table 1. Black Box Test Results

Components tested	Expected results	Test results	Conclusion
Login form	Users are directed to the appropriate page based on their access rights.	As expected	Valid
Dashboard	Displaying a summary of PKL data	As expected	Valid
Report menu	Displaying students' daily reports	As expected	Valid
Attendance menu	Displaying student attendance data	As expected	Valid
Value menu	Display and input student assessments	As expected	Valid
Student menu	Display and manage student data	As expected	Valid
Verify report	Teachers and supervisors can verify reports	As expected	Valid
Logout	The system terminates the user session	As expected	Valid

Test results show that the system can perform all key functions required by the user. The validity of all features indicates that the web-based PKL monitoring system is suitable for supporting digital monitoring and reporting of PKL activities in vocational schools.

System Evaluation Using User Acceptance Testing (UAT)

The system evaluation was conducted through User Acceptance Testing (UAT) to assess user acceptance of the implemented web-based PKL monitoring system. Testing was conducted using a Likert-scale questionnaire

administered to students, supervising teachers, field supervisors, and school administrators. The assessment focused on four main aspects: usability, user interface, performance, and functionality.

Table 2. Summary of User Acceptance Testing (UAT) Results

Aspect	Statement	Results
Usability	The system makes it easier to monitor Field Work Practice (PKL) activities	Very good
Usability	The reporting process is easy to do	Very good
User Interface	Easy-to-understand system display	Very good
User Interface	Information is clearly arranged	Very good
Performance	The system is running well	Very good
Performance	The system speeds up PKL administration	Very good
Functionality	Features according to PKL needs	Very good
Functionality	The system is suitable for continuous use	Very good

The UAT test results in Table 2 show that all test aspects achieved the "Very Good" category. This indicates that the web-based PKL monitoring system can meet user needs for monitoring and reporting PKL activities at vocational schools. The user acceptance rate percentage was calculated using the formula:

$$\text{Feasibility Percentage} = \left(\frac{Total\ Score\ Obtained}{Maximum\ Ideal\ Score}\right) \times 100\%$$

The system feasibility level is interpreted across several categories: very infeasible (0–20%), infeasible (21–40%), quite feasible (41–60%), feasible (61–80%), and very feasible (81–100%). The detailed calculation results of User Acceptance Testing (UAT) are presented in Table 3.

Table 3. User Acceptance Testing (UAT) Results

Aspect	Statement	Total Score	Category
Usability	This system makes it easier to monitor PKL activities	128	Very Good
Usability	The digital reporting process is easy to use	131	Very Good
Usability	I feel comfortable using this system during internship activities	136	Very Good
User Interface	The system display is easy to understand and visually appealing	131	Very Good
User Interface	Information access is clear and well-structured	131	Very Good
User Interface	The dashboard information supports monitoring activities effectively	132	Very Good
Performance	The system runs properly without significant errors	131	Very Good
Performance	The system accelerates PKL administration and reporting	137	Very Good
Functionality	The features provided meet PKL implementation needs	135	Very Good
Functionality	I recommend this system for continuous use in schools	136	Very Good

Based on the results presented in Table 3, the performance aspect achieved the highest score, particularly in improving the efficiency of administrative processes and digital reporting of PKL activities. This finding indicates that implementing the web-based monitoring system improved the management of PKL activities compared with the previous manual reporting approach. In addition, the functionality aspect also obtained a high score because the features provided were considered relevant to the needs of students, supervising teachers, field supervisors, and school administrators during the implementation of PKL activities. The total score obtained from the User Acceptance Testing (UAT) questionnaire was 1,328 out of a maximum ideal score of 1,500. Therefore, the feasibility percentage was calculated as follows:

$$\text{Feasibility Percentage} = \left(\frac{1328}{1500}\right) \times 100\% = 88.5\%$$

These results indicate that the web-based PKL monitoring system falls into the “Very Feasible” category and was positively accepted by users in supporting digital monitoring, reporting, and evaluation of PKL activities in vocational schools. The implementation of a web-based PKL monitoring system not only facilitates school administration but also fosters a culture of digital reporting within vocational schools. Supervisors find it easier to monitor students' activities continuously, while students become more disciplined in submitting daily activity reports because all activities are automatically recorded in the system. This demonstrates that applying digital technology to PKL monitoring can more effectively and in a more structured manner support improvements in the quality of vocational education governance.

The findings in this activity are in line with research (Febriani et al., 2022) which states that implementing a web-based PKL monitoring system can help monitor student activities more effectively than manual methods (Priyolistiyanto & Handayani, 2024). The study also showed that digitalizing PKL monitoring can help reduce reporting delays and

improve the administrative efficiency of fieldwork practices. Furthermore, the study (Samsudin & Januar, 2024) explains that the web-based PKL information system helps manage practical activity data, making it more structured and easier for users to access. Despite its similarities to several previous studies, the system developed in this activity has several advantages, particularly in its implementation of real-time monitoring, digital report verification, and the involvement of field supervisors in the student activity evaluation process. Real-time monitoring allows supervisors to track student progress without waiting for periodically submitted reports. Furthermore, the involvement of field supervisors helps increase the transparency and objectivity of the evaluation process, as the assessment is carried out not only by the school but also by the industry where students are conducting their internships.

The involvement of field supervisors in the monitoring system also helps improve collaboration between schools and partner institutions during the internship program. Through the web-based system, field supervisors can provide direct feedback and evaluation of student activities, thereby enhancing communication between schools and partner institutions. This demonstrates that implementing a web-based monitoring system can strengthen collaboration between vocational schools and industry. The implementation of a web-based PKL monitoring system also supports digital transformation in vocational education environments. The use of digital systems helps schools develop more modern, documented, and easily accessible PKL activity management for all parties involved. This finding aligns with the opinion of (Fernández et al., 2023; Harini et al., 2024; Mohamed Hashim et al., 2022) which states that digital transformation in education plays an important role in supporting the effectiveness of educational services and the more integrated management of academic data.

Although the system was successfully implemented, it still has several limitations. The system was developed at a single school, so the implementation results do not reflect the broader school environment. Furthermore, the system lacks automatic notification features and a mobile application, which could increase its usability. Another limitation is the lack of a student activity data analysis feature to support more in-depth evaluation. Based on these limitations, further development can be pursued by adding real-time notification features, integrating mobile applications, and developing an analytical dashboard to enable a more comprehensive evaluation of student activities. Furthermore, the system can be implemented across several vocational schools with varying characteristics to assess its effectiveness on a broader scale. With continued development, the web-based PKL monitoring system is expected to become a more adaptive digital solution to support improved management of field work practice activities in vocational education.

Conclusions

The implementation of a web-based Field Work Practice (PKL) monitoring system at SMK Nasional Makassar successfully supported the digitalization of monitoring, reporting, and evaluation processes in vocational school field practice activities. The system enabled students to submit daily reports digitally, assisted supervising teachers and field supervisors in monitoring student activities in real time, and improved administrative efficiency by reducing dependence on physical documents. The Black Box Testing results showed that all main system features, including login, dashboard, daily reports, attendance, report verification, and student assessment, functioned as required by users. In addition, the User Acceptance Testing (UAT) results showed a feasibility score of 88.5%, placing the system in the “Very Feasible” category. These findings indicate that the system can serve as an effective digital solution for improving the transparency, efficiency, and sustainability of PKL management in vocational schools. The implementation of digital monitoring systems also supports the broader digital transformation of vocational education management in the modern educational environment.

Acknowledgment

The authors would like to express their sincere gratitude to SMK Nasional Makassar for the support and cooperation during the implementation of this community service program. Appreciation is also extended to the teachers, industry supervisors, students, and school administrators who actively participate in implementing, testing, and evaluating the web-based PKL monitoring system. Their contributions and collaboration greatly supported the success of this program.

Funding Statement

This community service activity received no specific grant from any public, commercial, or not-for-profit funding agency.

Contribution

Asri contributed to the conceptualization, needs analysis, program implementation, data collection, data analysis, and manuscript preparation. Ming-Chung Chang contributed to system design, methodological review, and manuscript

revision. Akbar Iskandar and Maria Yertas contributed to program evaluation, discussion development, and final manuscript editing. All authors reviewed and approved the final version of the manuscript.

References

Abadiyah, L., Yayuk, E., & Restian, A. (2025). The Effect of Field Work Practice on Vocational Students'work Readiness and Career Motivation. *Jurnal Eduscience*, *12*(4), 1200–1208. https://doi.org/https://doi.org/10.36987/jes.v12i4.7334

Afrizal, D., Salsabila, S. Q. A., Tri, J. S. P., & Mashuri, M. A. I. (2025). Development of a Web-Based PKL-Hub Management Information System Using the Waterfall Method. *Journal of Applied Informatics Research*, *1*(2), 22–31.

Aldi, F. (2022). Web-Based New Student Admission Information System Using Waterfall Method. *Sinkron*. https://doi.org/10.33395/sinkron.v7i1.11242

Asrul, A., Windayani, W., Aprita, I. R., Agustina, S., & others. (2025). Implementation Of Learning Management System At Semen Tonasa Junior High School To Support Digital Learning: Mplementasi Learning Management System Pada Smp Semen Tonasa Untuk Mendukung Pembelajaran Digital. *Wisdom: Jurnal Pengabdian Kepada Masyarakat Wisdom*, *2*(1). https://doi.org/https://doi.org/10.71275/wisdom.v2i1.82

Bagde, P., Bobde, A., & Bagde, L. P. (2021). Information and Communication Technology (ICT) enabled Higher Education: Current Trends and Challenges. *Ilkogretim Online*, *20*(1).

Borecky, J., Kohlik, M., & Kubátová, H. (2016). Parity Waterfall Method. *2016 IEEE 19th International Symposium on Design and Diagnostics of Electronic Circuits & Systems (DDECS)*, 1–6.

Carrión-Mart'inez, J. J., la Rosa, A., Fernandez-Cerero, J., & Montenegro-Rueda, M. (2020). Information and communications technologies (ICTs) in education for sustainable development: A bibliographic review. *Sustainability*, *12*(8), 3288. https://doi.org/https://doi.org/10.3390/su12083288

Eldariyanti, S., & Jabar, C. S. A. (2026). Evaluation of Field Work Practices of State Vocational High Schools in Malinau Regency. *JHSS (Journal of Humanities and Social Studies)*, *9*(1), 174–179.

Fania, M., Iriani, T., & Arthur, R. (2024). Improving vocational student competencies through industrial class-based experiantial learning. *Jurnal Pensil: Pendidikan Teknik Sipil*, *13*(1), 120–129.

Febriani, R., Mary, T., & Pernanda, A. Y. (2022). Sistem Informasi Monitoring Praktik Kerja Lapangan (PKL) Berbasis Web di SMK Negeri 1 Sintuk Toboh Gadang. *Jurnal Pustaka Data (Pusat Akses Kajian Database, Analisa Teknologi, Dan Arsitektur Komputer)*, *2*(2), 95–102. https://doi.org/https://doi.org/10.55382/jurnalpustakadata.v2i2.291

Fernández, A., Gómez, B., Binjaku, K., & Meçe, E. K. (2023). Digital transformation initiatives in higher education institutions: A multivocal literature review. *Education and Information Technologies*, *28*(10), 12351–12382. https://doi.org/10.1007/s10639-022-11544-0

Hanafiah, I., Santoso, F., & Ghafur, A. (2024). Management Information System for Field Work Practice Faculty of Science and Technology. *Proceeding of International Conference of Religion, Health, Education, Science and Technology*, *1*(1), 454–462. https://doi.org/https://doi.org/10.35316/icorhestech.v1i1.5678

Harini, H., Ripki, A. J. H., Sulistianingsih, S., Herlina, H., & Putri, A. (2024). Digital transformation: the utilization of information and communication technology to enhance educational management efficiency in the modern era. *Jurnal Minfo Polgan*, *13*(2), 1668–1674. https://doi.org/10.33395/jmp.v13i2.14195

Ismail, S. A. M. M., Jogezai, N. A., & Baloch, F. A. (2020). Hindering and enabling factors towards ICT integration in schools: A developing country perspective. *Elementary Education Online*, *19*(3), 1537–1547. https://doi.org/https://doi.org/10.17051/ilkonline.2020.733176

Iwogbe, E. C., Chigbo-Obasi, T. U., Ezeanwu, M. C., & Obona, E. E. (2025). Educational Management Information System (Emis), A strategic tool for promoting primary education administration: Emerging challenges and sustainable solutions. *Int'l Journal of Education Research and Scientific Development*, *8*(1), 1–10.

Jesus-Silva, N., Carvalho, L., & Cardoso, A. (2023). Information Technologies in Quality Management in Higher Education. *2023 XIII International Conference on Virtual Campus (JICV)*, 1–3. https://doi.org/10.1109/JICV59748.2023.10565645

Logachev, M. S., Orekhovskaya, N. A., Seregina, T. N., Shishov, S., & Volvak, S. F. (2021). Information system for monitoring and managing the quality of educational programs. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 93. https://doi.org/https://doi.org/10.3390/joitmc7010093

Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. (2022). Higher education strategy in digital transformation. *Education and Information Technologies*, *27*(3), 3171–3195. https://doi.org/10.1007/s10639-021-10739-1

Ngmenkpieo, F., Tseer, T., & Chirani, F. (2023). The digital edge in education: Harnessing ICT for optimal school

management. *Political Science International Journal*, *1*(2), 87–96. https://doi.org/https://doi.org/10.33140/PSI.01.02.03

Nidhra, S., & Dondeti, J. (2012). Black box and white box testing techniques-a literature review. *International Journal of Embedded Systems and Applications (IJESA)*, *2*(2), 29–50. https://doi.org/https://doi.org/10.5121/ijesa.2012.2204

Oluwaseun, B. R., Muyiwa, O., Olanrewaju, B. A., Omolaran, B. B., & Iyabo, B. S. (2017). E-attendance system using waterfall software development life cycle simulation. *Journal of Computer Science and Control Systems*, *10*(2), 10–15.

Perdana, M. T. P., Farell, G., Sriwahyuni, T., & Mursyida, L. (2025). Design and Implementation of a Web-Based Internship Management Information System for Vocational Education. *Jurnal Vokasi Informatika*, *5*(2), 286–304.

Priyolistiyanto, A., & Handayani, S. (2024). Pengembangan Media Pembelajaran Pada Kelas Daring Materi Listrik Statis Bagi Siswa Kelas IX. *JIPETIK: Jurnal Ilmiah Penelitian Teknologi Informasi & Komputer*, *5*(1). https://doi.org/https://doi.org/10.26877/jipetik.v2i1.9389

Putra, B. J. M., Ichwanto, M. A., Suwarno, E., Alfianto, I., & Kiong, T. T. (2025). The Effect of Practical Learning and Field Work Practical Experience on the Work Readiness of Vocational School Students in The Expertise of Building Design, Modeling and Information. *LITERACY: International Scientific Journals of Social, Education, Humanities*, *4*(3), 308–315. https://doi.org/https://doi.org/10.56910/literacy.v4i3.3194

Salsabilla, I. S., & others. (2024). PKL Program Management with the Kirkpatrick Model Strategies for Developing Student Competencies in the Workplace. *EDU-RELIGIA: Jurnal Keagamaan Dan Pembelajarannya*, *7*(2). https://doi.org/https://doi.org/10.52166/edu-religia.v7i1.6861

Samsudin, A., & Januar, S. (2024). Sistem Informasi Praktik Kerja Lapangan Berbasis Web: Studi Kasus: SMK Wyata Dharma. *Infotex: Jurnal Ilmiah Bidang Ilmu Teknik*, *2*(2), 289–300.

Sembiring, E. V., Sukardi, S., Elida, E., & Giatman, M. (2025). Evaluating the Effectiveness of Teaching Factory in Culinary Education Using Tyler's Goal-Oriented Model: A Case Study from an Indonesian Vocational School. *AL-ISHLAH: Jurnal Pendidikan*, *17*(4), 8089–8099. https://doi.org/https://doi.org/10.35445/alishlah.v17i4.8415

Senarath, U. S. (2021). Waterfall methodology, prototyping and agile development. *Tech Rep*, 1–16.

Sudarwati, I., Triastuti, R., & others. (2025). Optimizing the Development of Responsibility Character through Field Work Practices (PKL): Collaborative Strategies Between Schools and Industry Supervisors. *Proceeding of International Conference on Social Sciences and Education*, 84–89.

Sunarjo, R. A., Chakim, M. H. R., Maulana, S., & Fitriani, G. (2024). Management of educational institutions through information systems for enhanced efficiency and decision-making. *International Transactions on Education Technology (ITEE)*, *3*(1), 47–61. https://doi.org/https://doi.org/10.33050/itee.v3i1.670

Verma, A., Khatana, A., & Chaudhary, S. (2017). A comparative study of Black Box Testing and white box testing. *International Journal of Computer Sciences and Engineering*, *5*(12), 301–304. https://doi.org/https://doi.org/10.26438/ijcse/v5i12.301304

Yuliyanto, R., & Rahmanto, A. A. (2023). Literature review evaluation of fieldwork practice programs in vocational high schools in indonesia. *Jurnal Hurriah: Jurnal Evaluasi Pendidikan Dan Penelitian*, *4*(4), 433–443. https://doi.org/https://doi.org/10.56806/jh.v4i4.162

Zafar, T. (2019). Role of information communication technology (ICT) in education and its relative impact. *International Journal of Engineering Research & Technology (IJERT)*, *7*(04), 1–10.