

Evaluation of the Effectiveness, Efficiency, and Usability of the SI-PERISAI K3 Web-Based Occupational Safety Reporting System

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Abstract

Introduction: Reporting hazards, occupational accidents, and occupational diseases at UPT K3 Region XYZ previously used paper-based forms, which hindered reporting and led to the development of SI-PERISAI K3 as a web-based reporting system. **Objective:** This study evaluated its effectiveness, efficiency, and usability. **Method:** A quantitative evaluative study supported by qualitative data involved 30 employees using saturated sampling. Effectiveness was measured by the completion rate of 12 tasks, efficiency by comparing manual and digital reporting times, and usability using the System Usability Scale (SUS), with qualitative data obtained from open-ended questions. **Result and Discussion:** The average completion rate was 95.8%, with 20 respondents (66.7%) completing all tasks; the lowest rates occurred for incident time (70.0%) and victim data (86.7%). Mean reporting time decreased from 251.7 seconds manually to 187.4 seconds digitally, achieving 25.6% efficiency. The SUS score was 85.6 (Excellent). Users positively perceived the system's ease, speed, and QR Code accessibility, while network connectivity and photo uploading were the main challenges. **Conclusions:** SI-PERISAI K3 showed high effectiveness, improved reporting efficiency, and excellent usability. Priorities for improvement include incident-time and victim-data fields, QR Code expansion, form simplification, and a progress-checking feature.

Introduction

Occupational Safety and Health (OSH) is an important component of protecting workers and managing safe, healthy, and productive workplaces. The implementation of OSH in Indonesia is supported by Law Number 1 of 1970 concerning Occupational Safety and Law Number 13 of 2003 concerning Manpower. The implementation of the Occupational Safety and Health Management System (OSHMS) is also regulated through Government Regulation Number 50 of 2012. These regulations require the integrated implementation of the Occupational Safety and Health Management System (OSHMS) to create a safe, healthy, and productive work environment and prevent occupational accidents and occupational diseases (Pemerintah RI, 2012; Pemerintah RI, 2003). One of the main principles of OSHMS is prevention through the early identification and reporting of hazards (hazard reporting), in line with Government Regulation Number 50 of 2012, which requires every company to have a hazard reporting system understood by all workers. Data from the Ministry of Manpower of the Republic of Indonesia indicate that the national number of occupational accidents remains relatively high each year, making the strengthening of reporting systems one of the strategies for controlling OSH risks in the workplace (Kementerian Ketenagakerjaan RI, 2024, 2025).

Poor reporting practices in occupational safety and health can have consequences beyond administrative inefficiency (Mixafenti *et al.*, 2025). When hazards, unsafe conditions, occupational accidents, or occupational diseases are not reported, organizations may lose opportunities to identify workplace risks, initiate timely investigations, and implement preventive measures. Unreported or delayed reports can limit the availability of information needed to identify recurring hazards, assess occupational health risks, and prevent similar incidents from affecting other workers. Inadequate reporting may also hinder the early recognition of occupational diseases and the documentation of work-related health problems, potentially delaying appropriate follow-up and risk control. Therefore, effective reporting supports the preventive function of OSHMS by linking hazard identification with corrective action and risk reduction (Glevitzky *et al.*, 2025).

Underreporting is an important concern in occupational safety reporting because the number of reported cases may not fully reflect the actual occurrence of workplace hazards, accidents, and occupational diseases (Biggs & Russell, 2024). Underreporting may occur when workers are unaware of reporting procedures, perceive reporting as difficult or time-consuming, experience limited access to reporting facilities, or do not receive adequate feedback after submitting reports. Consequently, reporting data may provide an incomplete picture of workplace risks and may limit the organization's ability to prioritize preventive interventions. A reporting system should therefore be evaluated not only based on whether users can submit reports, but also on whether its design supports accessible reporting, accurate information capture, verification, and follow-up (Singh & Sittig, 2020).

Fostering a hazard reporting culture can increase workers' awareness of potential hazards in the workplace (Yogama *et al.*, 2022). In addition, the use of digital technology for recording and reporting occupational accidents and occupational diseases is one approach to improving the effectiveness of OSH information management (Andi Bulaeng *et al.*, 2025). The use of reporting applications enables workers to report potential hazards, unsafe conditions, and unsafe actions more easily, systematically, and efficiently, while also having the potential to increase awareness and worker participation in efforts to prevent occupational accidents (Vitra Ali *et al.*, 2024).

Research on the design of an Android-based e-Incident application prototype at PKU Muhammadiyah Gamping Hospital showed that manual OSH reporting caused reporting delays, prevented data from being presented in real time, and created difficulties in monitoring and evaluation, whereas the development of an Android-based application provided benefits in terms of reporting convenience and speed (Herawati *et al.*, 2022). Research on the Android-based Temu Bahaya dan Pencemaran (TEBARAN) application at PT NUSIRA showed that the system supported the reporting of unsafe actions, unsafe conditions, and environmental pollution by making the reporting process easier and faster (Ridwan, 2022). This is supported by research on Incident Reporting Development: PaSIR (Patient Safety Incident Reporting) System, which showed the benefits of an electronic incident reporting system in improving reporting convenience (Budi *et al.*, 2022).

In addition to mobile applications, website-based digitalization can support efficiency, accuracy, and ease of access in information management (Sofia *et al.*, 2025). The digital transformation of HAZOB reporting has also been reported to improve safety operational performance by changing the reporting process from conventional forms to a digital system (Santoso *et al.*, 2020). Previous studies have showed the benefits of digitalizing OSH reporting; however, most have focused on the development or use of systems for specific types of reporting. User-based evaluation of a system that integrates hazard, illness risk, and OSH incident reporting on a single platform while simultaneously measuring effectiveness, efficiency, and usability remains limited. This gap provides the basis for evaluating SI-PERISAI K3 in the present study.

The relationship between reporting system performance and OSH risk control can be described as a sequential process involving hazard identification, reporting, verification, corrective action, and risk reduction (Chenani *et al.*, 2024). Hazard identification provides the initial recognition of unsafe conditions, unsafe actions, and work-related health risks. Reporting transfers this information to the responsible organization, while verification determines the validity and relevance of the reported information. Corrective action then addresses the identified hazards or incident-related problems, with the expected outcome of reducing exposure to occupational risks and preventing recurrence (Chan *et al.*, 2023). Failures at any stage, including underreporting, incomplete information, delayed verification, or inadequate follow-up, may weaken the overall prevention process. This process shows that the value of a reporting system extends beyond the submission of reports to its contribution to the continuity of OSH risk management.

Based on a preliminary study at UPT K3 Region XYZ, reporting of hazards, occupational accidents, and occupational diseases was previously conducted using paper forms. This condition potentially resulted in reporting delays, risks of document loss, difficulties in tracing historical data, and limited transparency in monitoring report follow-up. These conditions may also create opportunities for underreporting or incomplete reporting when workers face difficulties accessing reporting facilities or when submitted information is not adequately documented and followed up (Kyung *et al.*, 2023). Such limitations may reduce the availability of information for hazard verification, corrective action, and occupational risk reduction. In response to these conditions, SI-PERISAI K3 (Integrated Reporting System for Hazards, Illness Risks, and OSH Incidents) was developed as a website-based system designed to accommodate three groups of reports on a single platform: hazards in the form of unsafe actions and unsafe conditions; illness risks in the form of occupational diseases and medical emergencies;

and OSH incidents in the form of near misses and occupational accidents. The system can be accessed by reporters by scanning a QR Code without requiring a login process and is equipped with a digital form, photo upload, report number, and Progress Check feature, allowing reporters to submit reports easily and quickly whenever needed. On the management side, the system provides verification, validation, follow-up management, report forwarding to the PIC, approval, and report download functions. These features correspond to different stages of the program framework by facilitating hazard reporting, supporting verification and validation, and providing mechanisms for follow-up management and progress monitoring. However, the effectiveness of these features in supporting the reporting process needs to be assessed from the users' perspective.

The integration of these three types of reporting into a single digital system also provides an opportunity for organizations to centrally monitor incident histories and analyze OSH incident trends over time, which is difficult to achieve with manual paper-based reporting systems. By supporting the documentation and monitoring of reported hazards and incidents, the system may contribute to the information requirements of OSH risk management. Nevertheless, improved reporting accessibility and system usability do not automatically establish reductions in occupational accidents, occupational diseases, or underreporting. These outcomes require evaluation of actual reporting behavior, verification, corrective action, and risk-control indicators over time. Therefore, evaluation is necessary to determine the system's performance from the user's perspective. This study aimed to evaluate the effectiveness, efficiency, and usability of SI-PERISAI K3 in supporting the reporting of hazards, occupational accidents, and occupational diseases.

Method

This study was an evaluative study using a quantitative approach supported by qualitative data. Evaluative research is conducted systematically to assess a system based on predetermined objectives and criteria (Edward Suchman, 1967). The evaluation of SI-PERISAI K3 referred to the concept of *usability* in ISO 9241-11:2018, which encompasses effectiveness, efficiency, and satisfaction within a specific context of use (*ISO 9241-11 Ergonomics of Human-System Interaction*, 2018). Usability was evaluated through effectiveness, efficiency, and user satisfaction, with *completion rate* used to measure effectiveness, completion time used to measure efficiency, and SUS used to measure perceived usability/user satisfaction.

The study was conducted at UPT K3 Region XYZ, an institution that provides OSH testing, inspection, training, certification, and development activities. The study population consisted of all 30 employees of UPT K3 Region XYZ. All population members were included as respondents using a saturated sampling technique (Sugiyono, 2016). Testing was conducted with 30 respondents using the same reporting scenario. The SI-PERISAI K3 testing process began by scanning the *QR Code* using a mobile phone, accessing the main page, selecting the "Buat Laporan Sekarang" button, completing the form, and submitting the report. Twelve tasks were observed using a checklist as Table 1.

Table 1
 Twelve Task Activity Assessed

Task	Activity Assessed
T1	Scanning the reporting <i>QR Code</i>
T2	Selecting/opening “Buat Laporan Sekarang”
T3	Entering the incident location
T4	Entering the incident time
T5	Entering the incident description/chronology
T6	Entering victim data (presence of a victim, name, condition, and injured body part)
T7	Entering damage information
T8	Entering witness information
T9	Entering other notes
T10	Uploading incident photos
T11	Entering the reporter’s name
T12	Finalizing and submitting the report

Time measurement was conducted using both the manual method and SI-PERISAI K3. During testing, some respondents used the manual method first, while others used SI-PERISAI K3 first. The proportion of respondents according to the order of use was not documented; therefore, the effect of usage order was not analyzed separately.

Effectiveness was measured using the *completion rate*, defined as the percentage of reporting tasks successfully completed by respondents compared with the total number of tasks in the assigned scenario, assessed using an observation sheet (*checklist*). The formula used by equation (1).

$$\text{Completion Rate (\%)} = \frac{\text{Number of successfully completed tasks}}{\text{Total tasks}} \times 100\% \quad (1)$$

Each task was assigned a score of 1 if successfully completed and 0 if unsuccessful. In addition to the average *completion rate* per respondent, the *completion rate* for each task was calculated to identify the stages of the workflow that most frequently experienced failure. Efficiency was measured using *time efficiency*, defined as the percentage of completion-time savings when using the digital system compared with the manual form, measured using a stopwatch and a time observation sheet (*time on task*). Individual efficiency was calculated using the equation (2).

$$\text{Efficiency (\%)} = \frac{\text{Manual time} - \text{Digital time}}{\text{Manual time}} \times 100\% \quad (2)$$

The *usability* aspect was measured using the *System Usability Scale* (SUS) questionnaire, consisting of questions using a 1-5 Likert scale and converted into a score of 0-100. The SUS questionnaire used in this study had been adapted into Indonesian and was declared reliable, with a Cronbach’s Alpha value of 0.841 (Sharfina & Santoso, 2016). SUS score interpretation referred to the *adjective rating* category, with a score of 85.6 classified as *Excellent* (Bangor *et al.*, 2009). In addition to quantitative measurements, qualitative data were collected through open-ended questions to obtain information regarding users’ experiences, difficulties, and suggestions concerning SI-PERISAI K3.

Qualitative data were obtained through four open-ended questions concerning effectiveness and ease of use, difficulties, development suggestions, and perceptions of the influence of digitalization on the OSH reporting culture. Responses were analyzed narratively by grouping response tendencies into themes of user experience, difficulties, and development suggestions. Qualitative findings were used as supporting data to clarify the quantitative results. Quantitative data were analyzed descriptively using means and percentages. The study did not conduct hypothesis testing or statistical tests of differences; therefore, the results were interpreted as a description of system performance within the testing context. Qualitative data were used to enrich the interpretation of the findings. This study obtained an Ethical Eligibility Statement from the Health Research Ethics Committee of Poltekkes Kemenkes Yogyakarta, Number DP.04.03/e-KEPK.1/1303/2026, valid from July 20, 2026, to July 20, 2027.

Result and Discussion

General Overview of SI-PERISAI K3

SI-PERISAI K3 (Integrated Reporting System for Hazards, Illness Risks, and OSH Incidents) is a website-based digital system prototype developed to facilitate the reporting of hazards, illness risks, and OSH incidents on a single platform. Hazard reporting includes unsafe conditions and unsafe actions; illness risks include occupational diseases and medical emergencies; while OSH incidents include occupational accidents and near misses. The system has three access levels, namely Reporter, K3L Secretary, and K3L Team Leader, and can be accessed by scanning a *QR Code* without requiring a login process for reporters, thereby facilitating and accelerating the reporting process.

Table 2

SI-PERISAI K3 Main Features by Access Level

Access Level	Main Features
Reporter	<i>QR Code</i> scanning, OSH education, digital reporting form, incident photo upload, report preview and finalization, Report Progress Check
K3L Secretary	Login, summary dashboard, report verification and validation, marking invalid reports, completion of follow-up data, graphs, forwarding reports to PIC
K3L Team Leader	Login, approval dashboard, report approval/rejection, PDF report download, graphs

Technically, the usage flow of SI-PERISAI K3 can be shown as Figure 1. Then, The reporter scans the QR Code provided at the workplace using a mobile phone camera without requiring a login process and is then directed to the main page displaying OSH educational information and the “Buat Laporan Sekarang” button as shown in Figure 2. After selecting the button, the reporter completes the digital form, attaches an incident photo, and reviews the report preview before submitting it as shown in Figure 3. Each submitted report receives a report number that can be used by the reporter to monitor the follow-up status through the Report Progress Check feature as shown in Figure 4. On the management side, the K3L Secretary logs in to access the summary dashboard, verify and validate incoming reports, complete follow-up data, and forward reports to the PIC, while the K3L Team Leader accesses the approval dashboard to approve or reject reports and download reports in PDF format in Figure 5.

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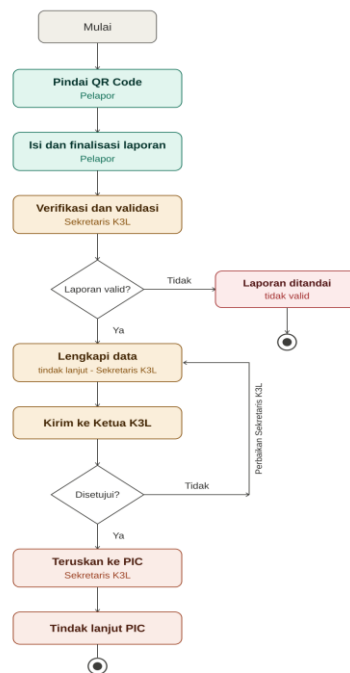


Figure 1. SI-PERISAI K3 Flowchart



Figure 2. SI-PERISAI K3 Main Page Interface

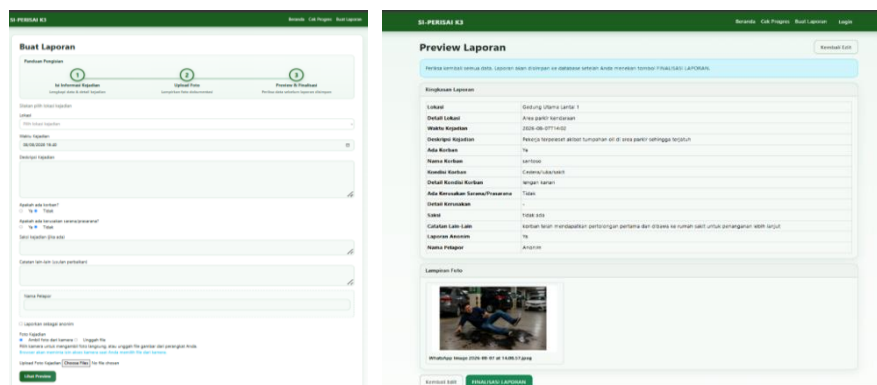


Figure 3. Digital Reporting Form and Report Preview

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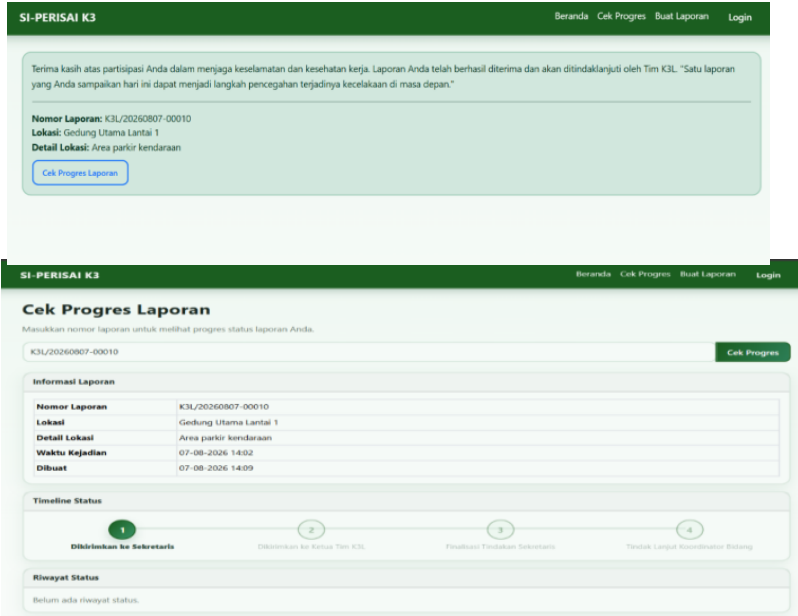


Figure 4. Reporter Participation Feedback

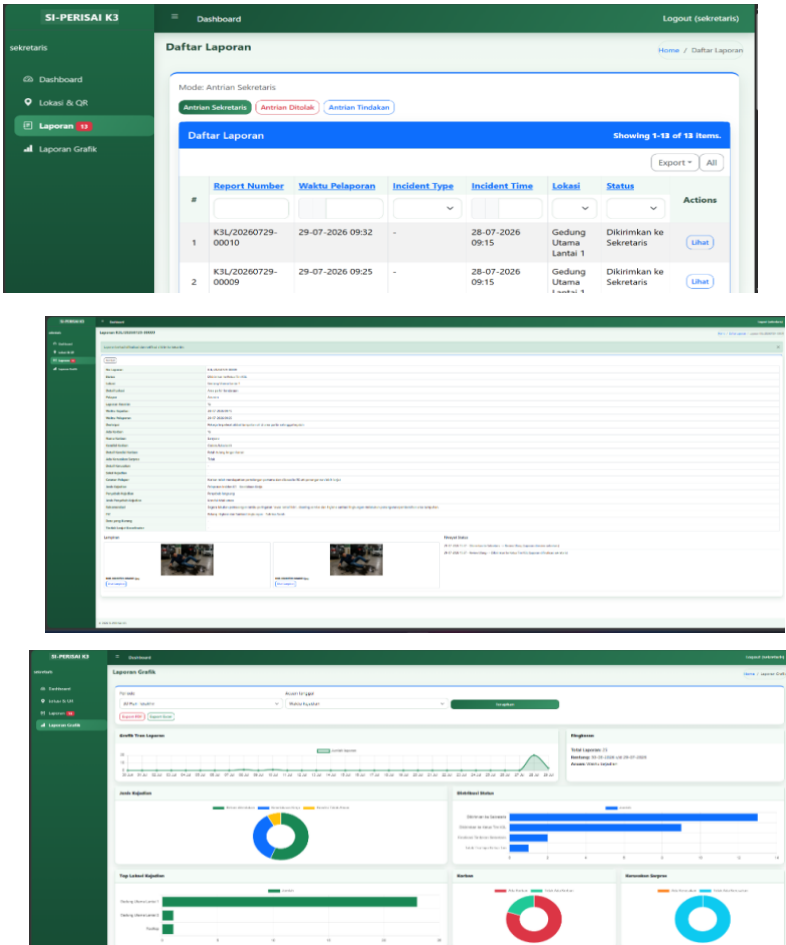


Figure 5. Management Dashboard (K3L Secretary and K3L Team Leader)

System Performance

The performance evaluation of SI-PERISAI K3 covered task completion and reporting time. These measures describe whether users could complete the reporting process and how long the process required under the testing. Therefore represent observed system performance rather than changes in users actual reporting behavior.

Task Completion Effectiveness

The results of SI-PERISAI K3 testing involving 30 respondents who completed the same reporting scenario showed an average *completion rate* of 95.8%, with 20 of 30 respondents (66.7%) successfully completing all 12 tasks without failure. The lowest *completion rates* were found for entering the incident time at 70.0% (21/30) and victim data at 86.7% (26/30), while witness data and other notes each achieved 96.7% (29/30).

Table 3
Completion Rate Testing Results

Task	Successful (n = 30)	Completion Rate
T1	30	100.0%
T2	30	100.0%
T3	30	100.0%
T4 - Incident time	21	70.0%
T5	30	100.0%
T6 - Victim data	26	86.7%
T7	30	100.0%
T8 - Witness data	29	96.7%
T9 - Other notes	29	96.7%
T10	30	100.0%
T11	30	100.0%
T12	30	100.0%

Task-level analysis showed that most tasks achieved a *completion rate* of 100%. The incident-time task had a *completion rate* of 70.0%, victim data 86.7%, and witness data and other notes each 96.7%. The high *completion rate* indicates that most respondents were able to complete the reporting scenario. However, these findings describe task performance during a controlled testing scenario and should not be interpreted as evidence that users will consistently report hazards or incidents in routine workplace conditions.

Failures concentrated on incident time and victim data indicate the need for improvements in field design, input instructions, or input validation. This finding is also consistent with the open-ended responses suggesting that the incident date and time fields should be made clearer and should not automatically follow the time when the report is created. These results indicate that most of the workflow can be completed, but incident-time and victim-data entry are the areas requiring the most improvement.

Reporting Time Efficiency

Regarding the efficiency of SI-PERISAI K3, the average reporting time among the 30 respondents using the manual form was 251.7 seconds, compared with 187.4 seconds using SI-PERISAI K3, representing a time efficiency of 25.6%. This finding indicates the potential of digitalization to reduce the stages involved in manually recording and submitting reports. This finding is consistent with research on a website-based digital

work reporting system, which showed the benefits of digitalization in process and documentation efficiency (Ramadhan & Ma'sum, 2025).

The digital transformation of HAZOB also showed a change from conventional forms to websites or mobile applications and improvements in safety operational performance (Santoso *et al.*, 2020). However, the efficiency results should be interpreted cautiously. The order of using the manual and digital methods was not standardized, and the number of respondents assigned to each sequence was not documented. Therefore, the study could not separately assess the influence of *order effect* or *learning effect*. In addition, completion time may have been influenced by internet connectivity, device proficiency, and task characteristics. Thus, the 25.6% efficiency represents the results under the specific testing conditions and scenario rather than a guaranteed estimate of time savings under all operational conditions.

The performance results show that SI-PERISAI K3 enabled most respondents to complete the assigned reporting tasks and reduced reporting time under the test conditions. However, these findings concern system performance during testing and do not establish that the system increases the frequency of actual reporting, reduces underreporting, or changes workplace safety behavior.

Usability

Regarding *usability*, the mean SUS score was 85.6, which falls into the *Excellent* category based on the *adjective rating*. This result indicates that, overall, respondents perceived SI-PERISAI K3 as having very good usability within the testing context (Bangor *et al.*, 2009). The SUS measurement provides an overall assessment of *usability* and was not used as a substitute for *completion rate* or completion-time measurements. This score is consistent with several studies evaluating the *usability* of mobile-based applications that also reported good user acceptance of systems designed to provide easy access and simple workflows (Ali *et al.*, 2022). In addition, research on electronic safety reporting systems has showed that digitalization can provide benefits for safety reporting and information management processes (Elliott *et al.*, 2014).

By providing access through a QR Code without requiring a login for reporters, SI-PERISAI K3 reduces several initial steps that users must complete before submitting a report. The photo-upload feature also enhances documentation capabilities compared with paper-based forms. The SUS result reflects favorable perceived usability, but it needs to be distinguished from behavioral outcomes. A high usability score means that respondents found the system easy and acceptable to use, however, it does not show whether users report more frequently, report hazards that might otherwise go unreported, or consistently complete follow-up actions during routine implementation.

User Perceptions and Behavioral Outcomes

Qualitative analysis of the open-ended questions showed generally positive perceptions of SI-PERISAI K3 compared with the manual mechanism. The system was perceived as easier, more practical, faster, and more effective, particularly because it could be accessed by scanning a *QR Code* without depending on the availability of paper forms and was equipped with a photo-upload feature and report number for monitoring follow-up progress. The main challenges were technical and related to user adaptation. Respondents mentioned internet connectivity, devices, taking or uploading photos, typing errors when in a hurry, and the need for initial understanding of the system workflow.

These challenges indicate that successful implementation of a digital system depends not only on application design but also on user readiness and infrastructure conditions.

User suggestions included placing QR Codes at more locations or in each unit/room, simplifying the form, providing brief socialization or orientation, improving the Progress Check feature, adding report history, and developing a feature that allows PICs to upload follow-up evidence. These suggestions indicate a need to develop the system beyond reporting toward greater traceability of the follow-up process. The distinction between user perception and behavioral outcomes is important in interpreting these findings. Respondents' statements that digitalization facilitates and accelerates reporting reflect their perceptions and experiences during the evaluation, whereas behavioral outcomes would require evidence of actual changes in reporting frequency, reporting completeness, reporting timeliness, or follow-up behavior during routine use.

Regarding the question about the influence of digitalization on reporting culture and support for OSHMS, all responses indicated a tendency to perceive digitalization as facilitating and accelerating reporting. However, these findings represent respondents' perceptions. The study did not measure changes in actual reporting behavior before and after implementation, including reporting frequency, underreporting, repeated reporting, or the proportion of reports that proceeded to corrective action.

Implementation Implications for OSH Management

Practically, SI-PERISAI K3 has the potential to strengthen OSH information management by providing an easily accessible and documented reporting channel. The integration of reporting with verification, validation, report forwarding to the PIC, approval, and monitoring can support process traceability. This is relevant to organizational needs for obtaining information on hazards and incidents more rapidly as a basis for follow-up actions. However, the success of digital reporting cannot be assessed solely based on ease of completion or the number of reports submitted. For SI-PERISAI K3 to contribute to OSH risk reduction, reports need to proceed through verification, follow-up, and corrective action. Thus, system implementation should be evaluated beyond user acceptance by monitoring whether submitted reports are verified, acted upon, and documented until the relevant corrective actions are completed.

Therefore, the proposed addition of follow-up evidence by the PIC is an important development for strengthening traceability from the reporting stage through completion of corrective actions. Expansion of QR Code access points, simplification of reporting fields, clearer incident-time and victim-data inputs, user orientation, and improved Progress Check functions may also support continued use of the system. Nevertheless, their effects on actual reporting behavior and OSH outcomes require longitudinal evaluation.

Study Limitations

This study has several limitations. Testing was conducted among 30 employees in a single UPT K3 and used a reporting scenario; therefore, the results cannot be generalized to other organizations or considered representative of actual OSH incident reporting. The testing also did not evaluate long-term performance, advanced data security, the quality of follow-up by PICs, or changes in reporting frequency and OSH culture. In addition, the order of using the manual and digital methods was not standardized, while the proportion of respondents assigned to each sequence was not documented, preventing

separate analysis of *order effect* and *learning effect*. Therefore, the time comparison is interpreted as the result under the specific testing conditions and scenario.

Conclusion

SI-PERISAI K3 showed a high task completion rate under the testing scenario, with an average completion rate of 95.8%, and 20 of 30 respondents (66.7%) successfully completing all 12 tasks. The lowest completion rates were observed for entering the incident time (70.0%) and victim data (86.7%), making these two areas priorities for improvement. The average reporting time using SI-PERISAI K3 was 187.4 seconds, shorter than the manual method at 251.7 seconds, with an average efficiency of 25.6%. The SUS score of 85.6 was categorized as Excellent, indicating very good usability within the testing context. Qualitatively, respondents generally perceived SI-PERISAI K3 as easier, more practical, and faster, particularly due to its QR Code access, digital forms, photo upload, report number, and Progress Check features. Future development should prioritize improvements to the incident-time and victim-data fields, expansion of QR Code access points, form simplification, enhancement of the Progress Check feature, user orientation, and documentation of follow-up evidence by PICs. Broader implementation should be accompanied by longitudinal evaluation of actual use, report follow-up, data security, and changes in OSH reporting indicators.

Declaration of AI Assistance

AI tools, including ChatGPT, Gemini, or Claude AI, were used during the preparation of this manuscript for grammar checking, paraphrasing, and translation. The authors reviewed and verified the final content and take full responsibility for its accuracy and scientific integrity

Reference

- Ali, O. V., Siboro, I., & Ramdan, M. (2024). Efektivitas Pelaporan Bahaya Pada PT Petrosea di Balikpapan. *Identifikasi*, 10(2), 334-338. <https://doi.org/https://doi.org/10.36277/identifikasi.v10i2.391>
- Ali, W., Riaz, O., Mumtaz, S., Khan, A. R., Saba, T., & Bahaj, S. A. (2022). Mobile Application Usability Evaluation: A Study Based on Demography. *IEEE Access*, 10, 41512–41524. <https://doi.org/10.1109/ACCESS.2022.3166893>
- Andi Bulaeng, Sakinah, N., & Tri Bata Biru Saputri. (2025). Perancangan Aplikasi Laporan Pegawai Health, Safety And Environment Pada PT IWIP Weda By Industrial Park. *Jurnal Informasi, Sains Dan Teknologi*, 8(1), 284–298. <https://doi.org/10.55606/isaintek.v8i1.345>
- Bangor, A., Kortum, P. T., & Miller, J. T. (2008). An empirical evaluation of the system usability scale. *International Journal of Human-Computer Interaction*, 24(6), 574–594. <https://doi.org/10.1080/10447310802205776>
- Bangor, A., Kortum, P., & Miller, J. (2009). Determining What Individual SUS Scores Mean: Adding an Adjective Rating Scale. In *Journal of Usability Studies* (Vol. 4).
- Biggs, A. T., & Russell, D. W. (2024). Safety underreporting during naval operations: Prevalence, associated risk, and several contributing factors. *Safety Science*, 180, 106645. [10.1016/j.ssci.2024.106645](https://doi.org/10.1016/j.ssci.2024.106645)
- Budi, S. C., Sunartini, S., Dewi, F. S. T., Lazuardi, L., & Rokhman, N. (2022). Incident Reporting Development: PaSIR (Patient Safety Incident Reporting) System for Better Patient Safety. *Jurnal Aisyah: Jurnal Ilmu Kesehatan*, 7(4). <https://doi.org/10.30604/jika.v7i4.1287>
- Chan, A. P., Guan, J., Choi, T. N., Yang, Y., Wu, G., & Lam, E. (2023). Improving safety performance of construction workers through learning from incidents. *International journal of environmental research and public health*, 20(5), 4570. <https://doi.org/10.3390/ijerph20054570>
- Chenani, K. T., Zarei, E., Yazdi, M., Klockner, K., Alimohammadlou, M., & Kamalinia, M. (2024). A systematic review of the integration between occupational and process safety risk analysis methodologies. *Journal of Loss Prevention in the Process Industries*, 91, 105387. <https://doi.org/10.1016/j.jlp.2024.105387>
- Edward Suchman. (1967). *Evaluative Research: Principles and Practice in Public Service and Social Action Programs*. Russel Foundation.
- Elliott, P., Martin, D., & Neville, D. (2014). Electronic Clinical Safety Reporting System: A Benefits Evaluation. *JMIR Medical Informatics*, 2(1). <https://doi.org/10.2196/medinform.3316>
- Glevitzky, M., Popa, M., Mucea-Ştef, P., & Popa, D. M. (2025). A risk management approach in occupational health and safety based on the integration of a weighted composite score. *Safety*, 11(4), 103. <https://doi.org/10.3390/safety11040103>
- Herawati, D., Askar, N. F., & Pratomo, D. N. (2022). Perancangan Prototipe Aplikasi e-Incident Berbasis Android di Rumah Sakit PKU Muhammadiyah Gamping. *Jurnal Rekam Medis Dan Informasi Kesehatan*, 5(1), 59–65. <https://doi.org/10.31983/jrmik.v5i1.8403>
- ISO 9241-11 *Ergonomics of human-system interaction*. (2018).
- Kementerian Ketenagakerjaan RI. (2024). Kasus Kecelakaan Kerja Tahun 2024. <https://Satudata.Kemnaker.Go.Id/Data/Kumpulan-Data/2447>.

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Web-Based Occupational Safety Reporting System**

- Kementerian Ketenagakerjaan RI. (2025). *Kasus Kecelakaan Kerja Tahun 2025*. <https://satudata.kemnaker.go.id/data/kumpulan-data/2447>
- Kyung, M., Lee, S. J., Dancu, C., & Hong, O. (2023). *Underreporting of workers' injuries or illnesses and contributing factors: a systematic review*. *BMC public health*, 23(1), 558. <https://doi.org/10.1186/s12889-023-15487-0>
- Mixafenti, S., Moutzouri, A., Karagkouni, A., Sartzetaki, M., & Dimitriou, D. (2025). Assessment of occupational health and safety management: Implications for corporate performance in the secondary sector. *Safety*, 11(2), 44. <https://doi.org/10.3390/safety11020044>
- Pemerintah RI. (2003). *Undang-Undang Republik Indonesia Nomor 13 Tahun 2003*.
- Ramadhan, S. F., & Ma'sum, H. (2025). *Perancangan Sistem Laporan Kerja Digital Berbasis Web Di DPMPTSP Kota Bandung*. *Jurnal Informatika Dan Teknik Elektro Terapan*, 13(2). <https://doi.org/10.23960/jitet.v13i2.6454>
- Ridwan, A. (2022). *Temu Bahaya & Pencemaran (TEBARAN) Berbasis Aplikasi Android Pada Sistem Sumbang Saran di PTNUSIRA, Untuk Mencegah Terjadinya Kecelakaan Kerja, Pencemaran Lingkungan Di Lingkungan Kerja*. *JURNAL TEKNOLOGI DAN ILMU KOMPUTER PRIMA (JUTIKOMP)*, 5(2), 66-73. <https://doi.org/10.34012/jutikomp.v5i2.2902>
- Santoso, S., Rochman, Fourmarch, Pawenary, & Fithri, prima. (2020). *Transformasi Digitalisasi Pelaporan HAZOB Untuk Meningkatkan Kinerja Keselamatan Kerja di Perusahaan*. *Jurnal Sains, Teknologi Dan Industri*, 18(1), 112–119.
- Sharfina, Z., & Santoso, H. B. (2016). An Indonesian adaptation of the System Usability Scale (SUS). *2016 International Conference on Advanced Computer Science and Information Systems (ICACISIS)*, 145–148. <https://doi.org/10.1109/ICACISIS.2016.7872776>
- Singh, H., & Sittig, D. F. (2020). *A sociotechnical framework for safety-related electronic health record research reporting: the SAFER reporting framework*. *Annals of Internal Medicine*, 172, S92-S100. <https://doi.org/10.7326/M19-0879>
- Sofia, R. A., Sunaryo, M., Fitria, S. N., & Ratriwardhani, R. A. (2025). *Digitalisasi Dokumen Keselamatan Dan Kesehatan Kerja Pada PT. Wijaya Karya Bangunan Gedung Tbk*. 4.
- Sugiyono. (2016). *Metode Penelitian Kuantitatif Kualitatif Dan R&D*.
- Undang-Undang Nomor 1 Tahun 1970 tentang Keselamatan Kerja*. (n.d.).
- Yogama, C. D., Djunaidi, Z., & Rahmawati, F. F. (2022). *Implementasi Program Pelaporan Unsafe Action & Unsafe Condition Di Pt Xyz*. *Prepotif: Jurnal Kesehatan Masyarakat*, 6(1), 231-243. <https://doi.org/https://doi.org/10.31004/prepotif.v6i1.2933>