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ISO/IEC 25010-Based Evaluation of a Web-Based Internship Monitoring Information System for Vocational Education

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A B S T R A C T

A web-based internship monitoring information system was developed to address challenges in managing and monitoring student internship activities in vocational education. This study aims to evaluate the quality of the system using the ISO/IEC 25010 software quality model. Unlike previous studies that primarily focused on system development, this research provides a comprehensive software quality evaluation by integrating functional suitability, usability, reliability, and performance efficiency within a single assessment framework. Functional suitability testing involved three expert validators and 55 functional test cases. Usability evaluation was conducted with 45 respondents, consisting of students, supervising teachers, heads of study programs, and industry instructors, using the User Experience Questionnaire (UEQ). Reliability testing employed Web Application Performance Testing (WAPT), while performance efficiency was assessed using Google Lighthouse. The results showed that the system achieved a functional suitability score of 100% and a reliability score of 96.57%. Usability evaluation indicated positive user experience across all dimensions, while performance testing demonstrated acceptable performance for web-based applications. Overall, the findings indicate that the system satisfies key ISO/IEC 25010 quality characteristics and can effectively support internship monitoring activities in vocational education environments.

1. Introduction

Practical work programs or internships are an important component of vocational education that aim to bridge the gap between theoretical knowledge obtained in school and practical skills required in the industry (Maulana et al., 2024; Musa et al., 2025; Pianda et al., 2024). To ensure career readiness, students require the practical exposure and specialized learning that only an internship can provide (Alharethi et al., 2025). In vocational high schools, internship programs provide students with opportunities to develop skills and build networks that can be valuable

for their future careers (Nugraha et al., 2023). Effective implementation of internship programs requires coordination between several stakeholders, including students, teachers, school administrators, and industry supervisors (Quintua, 2025). Vocational education requires effective learning and monitoring support systems to address various challenges encountered by students during educational activities (Ocktavia & Srisudarso, 2025). Therefore, proper management and monitoring of internship activities are essential to ensure that learning objectives can be achieved effectively and that student progress can be evaluated systematically (Fakhira et al., 2023).

Despite the importance of internship programs, many educational institutions still face difficulties in managing and monitoring student activities during internships (Pianda et al., 2024). Monitoring is often conducted manually through written reports or periodic visits by supervising teachers (Quintua, 2025). Such approaches are inefficient and may lead to several problems, including delayed reporting, incomplete documentation of student activities, and limited communication between schools and industry partners (Fakhira et al., 2023). Without modern technology, vocational schools struggle with administrative requirements and manual monitoring, making it difficult for teachers to evaluate learning outcomes and ensure students are ready for the professional world (Idroes et al., 2024). These challenges highlight the need for rapid information technology development to enable more efficient operational processes, including internship management processes (Siregar et al., 2024).

The development of web-based information systems has become one of the most effective solutions for improving the management of educational programs, including internship monitoring (Quintua, 2025). Previous studies have shown that information systems can improve administrative effectiveness and support decision-making processes in educational institutions (Nikmah & Violinda, 2025). An internship information system enables registration, access to required information, reporting processes, and internship placement management more easily without relying on manual methods (Nugraha et al., 2023). Such systems can address various problems that occur in the process of internship activity data and improve administrative efficiency. Several studies have developed internship management information systems to facilitate registration processes, monitor student activities, and evaluate internship outcomes (Fakhira et al., 2023). These systems improve the efficiency and transparency of vocational internship programs by providing role-based dashboards tailored to the needs of administrators, supervising teachers, students, industry partners, and instructors (Perdana et al., 2025).

Although many internship information systems have been developed, evaluating the quality of these systems is equally important to ensure that they function effectively, meet user expectations, and support organizational needs (Firdaus Nuzula & Rochimah, 2023). Educational technology products should be evaluated not only in terms of development outcomes but also in terms of effectiveness and usability (Septiani & Yusmaita, 2025). Software quality evaluation helps determine whether a system performs reliably, efficiently, and accurately in supporting user

activities (Ndukwe et al., 2023). Without proper evaluation, information systems may suffer from performance issues, usability problems, or functional limitations that reduce their effectiveness (Gobov & Zuieva, 2025). One widely used framework for software quality evaluation is the ISO/IEC 25010 (*ISO/IEC 25010*, n.d.). This model defines several quality characteristics of software products, including functional suitability, reliability, usability, performance efficiency, security, maintainability, and portability (Yoshimichi Watanabe et al., 2024). By using this framework, developers and researchers can systematically assess the quality of software systems and identify areas for improvement (Rojas et al., 2025).

Previous studies have applied ISO/IEC 25010 to evaluate various types of information systems, including company information system, programming learning platform, and geographic information system (Anwar, 2026; Oka Cahyadi Pradipta et al., 2025; Saputra et al., 2025). These studies demonstrate that ISO/IEC 25010 provides a comprehensive approach for measuring software quality based on both functional and non-functional requirements (Yoshimichi Watanabe et al., 2024). For example, several studies evaluated information systems using characteristics such as functional suitability, performance efficiency, and reliability to determine whether the system met the expected quality standards (Rojas et al., 2025). The results of these studies indicate that systematic software quality evaluation can significantly improve the reliability and effectiveness of information systems used in different domains (Ndukwe et al., 2023).

However, limited studies have specifically examined the quality of internship monitoring information systems using ISO/IEC 25010. Most existing research focuses primarily on the development of internship management systems rather than evaluating their software quality characteristics (Fakhira et al., 2023). As a result, there remains a research gap regarding software quality evaluation of internship monitoring platforms. Evaluating such systems is crucial to ensure that they operate reliably, perform efficiently, and provide functional features that support internship management effectively.

Unlike previous studies that primarily focused on developing internship management information systems, this study contributes a comprehensive software quality evaluation framework for internship monitoring systems based on ISO/IEC 25010. The novelty of this research lies in the integration of four complementary quality characteristics (functional suitability, usability, reliability, and performance efficiency) within a single evaluation framework to assess system readiness for practical implementation in vocational education environments. This approach provides a more holistic understanding of software quality beyond system development and implementation aspects.

Therefore, this study aims to evaluate the quality of a web-based internship monitoring information system using ISO/IEC 25010. The evaluation focuses on several key quality characteristics, including functional suitability, reliability, usability, and performance efficiency. By conducting a comprehensive quality evaluation, this research is expected to provide insights into the effectiveness of the

system in supporting internship monitoring activities and contribute to the development of more reliable information systems for vocational education.

2. Methodology

Research Design

This study employed an evaluation research approach to assess the software quality of a web-based internship monitoring information system developed for vocational education. The evaluation was conducted using ISO/IEC 25010, which provides a comprehensive framework for assessing both functional and non-functional software quality characteristics. Four quality characteristics were selected for evaluation, namely functional suitability, usability, reliability, and performance efficiency. These characteristics were chosen because they represent critical aspects of software quality that directly affect the effectiveness of internship monitoring activities.

The evaluation in this study focuses on assessing the software quality of the developed system using ISO/IEC 25010, which is widely used as a framework for evaluating software quality because it defines a comprehensive set of quality characteristics that represent both functional and non-functional aspects of software systems (*ISO/IEC 25010*, n.d.; Rojas et al., 2025). This process consisted of functional suitability testing, usability evaluation, reliability testing, and performance efficiency testing. Functional suitability was assessed through expert-based functional testing. Usability was evaluated using the User Experience Questionnaire (UEQ). Reliability testing was conducted using Web Application Performance Testing (WAPT), while performance efficiency was measured using Google Lighthouse. By applying this model, the quality of the internship monitoring system can be measured systematically to determine whether the system meets the expected standards in supporting internship management. The research framework adopted in this study is presented in Figure 1.

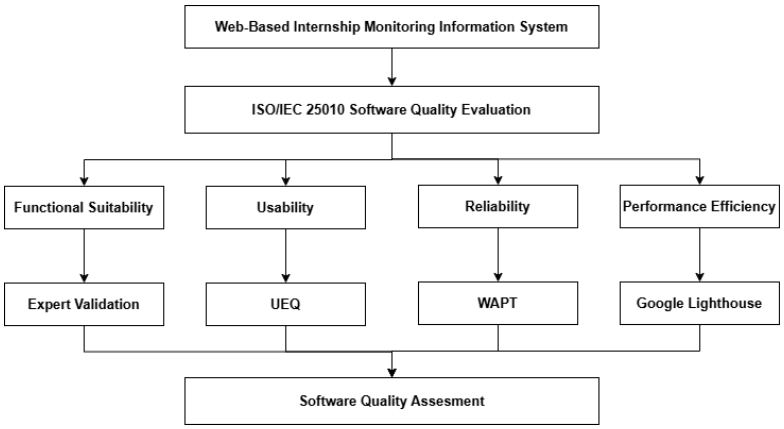


Figure 1. Conceptual Research Framework

The object of this research is a web-based internship monitoring information system designed to manage internship activities, record student daily journals, monitor student performance, and facilitate communication between students, supervising teachers, and industry supervisors. The system was developed using web technologies and implemented in a vocational education environment to support internship monitoring processes.

To provide a clearer understanding of the evaluation procedure, Figure 2 presents the sequence of activities conducted in this study. The evaluation process began with the selection of relevant ISO/IEC 25010 quality characteristics, followed by functional suitability, usability, reliability, and performance efficiency evaluations using their respective instruments and testing tools. The collected data were then analysed and interpreted to determine the overall software quality of the internship monitoring information system. The overall evaluation procedure is illustrated in Figure 2.

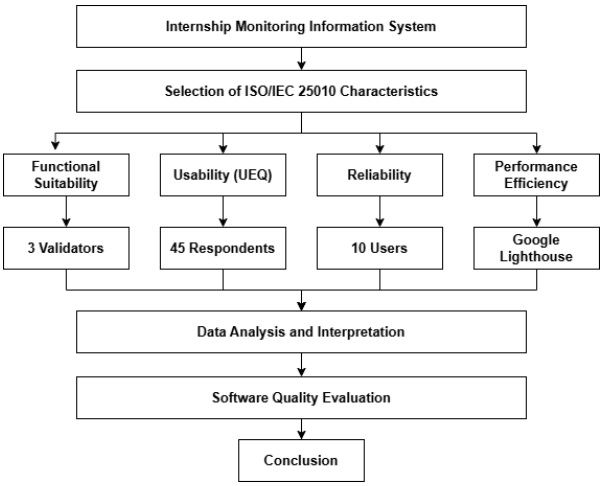


Figure 2. Evaluation Procedure of the ISO/IEC 25010-Based Software Quality Assessment

As illustrated in Figure 2, the evaluation process consisted of four complementary quality assessments. Functional suitability was evaluated through expert-based functional testing, usability was measured using the User Experience Questionnaire (UEQ), reliability was assessed through load testing using WAPT, and performance efficiency was evaluated using Google Lighthouse. The results obtained from these evaluations were integrated to provide a comprehensive assessment of the software quality of the internship monitoring information system.

System Overview

The internship monitoring information system evaluated in this study is a web-based application designed to support the management and monitoring of internship activities in vocational schools. The website-based information system is able to provide solutions to various problems found in manual systems (Krisna et al.,

2025). The system integrates several functional modules that allow stakeholders to access and manage internship-related data efficiently.

The system supports multiple user roles, including students, supervising teachers, school administrators, and industry instructors. Students can submit daily internship journals and access internship-related information, while supervising teachers and industry instructors can monitor activities, provide feedback, and conduct assessments. School administrators can manage internship placements, monitor student participation, and generate reports. Through these integrated features, the system facilitates more effective coordination and monitoring of internship activities in vocational education environments.

ISO/IEC 25010 Quality Model

Software quality evaluation in this study is based on the ISO/IEC 25010 software quality model. This model provides a standardized framework for evaluating software quality by defining several quality characteristics that represent important aspects of software performance and functionality (Rojas et al., 2025). ISO/IEC 25010 defines eight quality characteristics, namely functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability (*ISO/IEC 25010*, n.d.). The selected ISO/IEC 25010 software quality characteristics evaluated in this study are summarized in Table 1.

Table 1. ISO/IEC 25010 Quality Characteristics Used in the Study

Quality Characteristic	Evaluation Method	Testing Indicator
Functional Suitability	Functional testing	Function success rate
Usability	UEQ	Ease of Use
Reliability	WAPT stress testing	Successful sessions, failed sessions
Performance Efficiency	Google Lighthouse	Performance score

The selection of functional suitability, usability, reliability, and performance efficiency was based on the primary objectives and operational context of the internship monitoring information system. Functional suitability was considered essential because the system must provide complete and accurate functions to support internship administration, monitoring, assessment, and reporting activities. Usability was included because the system is used by diverse stakeholders, including students, supervising teachers, school administrators, and industry instructors, making ease of use and user experience critical factors for successful adoption. Reliability was selected due to the need for stable system operation during simultaneous access by multiple users throughout the internship period. Performance efficiency was evaluated because the system is implemented as a web-based application that requires acceptable response times and efficient resource utilization. Performance efficiency refers to the system's ability to provide appropriate performance relative to the amount of resources used (Yoshimichi Watanabe et al., 2024). System testing was conducted to evaluate the quality characteristics defined in ISO/IEC 25010. Several testing scenarios were designed

to assess the system's functionality, performance, and reliability under realistic usage conditions (Pressman & Maxim, 2020).

Other ISO/IEC 25010 characteristics such as security, maintainability, portability, and compatibility were not included in this study because the evaluation focused on operational quality attributes directly experienced by end users during system utilization. In addition, assessment of these characteristics generally requires specialized testing environments, source code analysis, infrastructure-level assessment, or long-term maintenance observations that were beyond the scope of the present study. Therefore, the selected four characteristics were considered the most relevant indicators for evaluating the readiness and effectiveness of the internship monitoring information system in supporting vocational education activities.

Functional Suitability Evaluation

Functional suitability evaluation was conducted to determine whether the developed system provides functions that meet specified requirements and user needs. The testing process involved executing various system functions, such as user authentication, internship data management, journal submission, and monitoring features, to ensure that all functions worked correctly without errors (Sarwosri et al., 2023). The evaluation involved three validators consisting of a software engineering expert from Universitas Negeri Yogyakarta, an industry practitioner, and a vocational education representative.

The assessment was performed by testing 55 functional scenarios representing the main features of the internship monitoring information system, including user authentication, internship registration, internship placement management, daily journal submission, monitoring activities, assessment processes, and report generation. Each testing scenario was evaluated using a dichotomous scale, where a score of 1 indicated that the function operated correctly and a score of 0 indicated failure. The functional suitability score was calculated using the ratio of valid functions to the total number of tested functions, as shown in Equation (1).

$$FS = \frac{Number\ of\ valid\ function}{Total\ function\ tested} \times 100\%$$

A system is considered functionally suitable if all critical functions operate according to the predefined requirements.

Usability Evaluation

Usability evaluation was conducted using the User Experience Questionnaire (UEQ), a standardized instrument for measuring user experience across six dimensions: attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty (Schrepp, 2021). The UEQ has been widely used in educational technology research to evaluate user perceptions regarding attractiveness, efficiency, and usability aspects (Abdurrahman et al., 2025). The evaluation involved 45

respondents consisting of students, supervising teachers, heads of study programs, and industry instructors who had experience using the system.

Before completing the User Experience Questionnaire (UEQ), all respondents were given access to the internship monitoring information system and were asked to perform several representative tasks, including login, accessing internship information, submitting internship journals, monitoring internship activities, and reviewing internship reports according to their respective user roles. After completing these activities, respondents filled out the UEQ questionnaire independently using an online form. The questionnaire consisted of 26 paired items covering six user experience dimensions: attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty. The collected responses were then processed using the official UEQ Data Analysis Tool to calculate reliability coefficients, mean scores, benchmark classifications, standard deviations, and confidence intervals.

Prior to interpretation, the reliability of the questionnaire data was examined using Cronbach's Alpha coefficient. A coefficient value greater than or equal to 0.70 indicates acceptable reliability. The collected responses were analysed using the UEQ Data Analysis Tool to obtain mean scores and benchmark classifications. The benchmark categories include Excellent, Good, Above Average, Below Average, and Bad based on the official UEQ benchmark dataset developed by Schrepp (Schrepp et al., 2025).

Usability respondents were selected using purposive sampling. Participants were required to have direct experience using the internship monitoring information system during internship management and monitoring activities. The sample consisted of 45 respondents, including 36 students, 5 supervising teachers, 2 heads of study programs, and 2 industry instructors. These user groups were selected because they represent the primary stakeholders involved in internship implementation and monitoring processes.

Reliability Evaluation

Load testing is commonly used to assess the responsiveness, throughput, scalability, and reliability of web applications under simulated user loads (Alnuhait et al., 2024). The test simulated multiple users accessing the system simultaneously to evaluate system stability and identify potential failures during the testing process (Wulandari et al., 2026).

The testing scenario simulated 10 virtual users accessing the internship monitoring information system simultaneously for a duration of 10 minutes. During the testing process, several performance indicators were recorded, including successful sessions, failed sessions, successful pages, failed pages, successful hits, and failed hits. The reliability score was calculated based on the proportion of successful operations to total operations, as presented in Equation (2).

$$R = \frac{Succesful\ Session + Succesful\ Pages + Succesful\ Hits}{Total\ session + Total\ Pages + Total\ Hits} \times 100\%$$

The load testing scenario was configured using Web Application Performance Testing (WAPT). Ten virtual users were simulated to perform concurrent access to the system over a period of 10 minutes. The testing script included several critical user activities, such as user authentication, dashboard access, internship journal management, internship monitoring, and report viewing. During the testing process, WAPT automatically recorded system performance indicators, including successful sessions, failed sessions, successful page requests, failed page requests, successful hits, failed hits, and response times. The collected data were used to evaluate the reliability of the system under concurrent access conditions.

The reliability score was calculated based on the proportion of successful system operations compared to the total number of operations generated during the testing process. The obtained reliability value was then compared with the Telcordia reliability standard, which recommends a minimum reliability value of 95% for software systems to be considered reliable.

Performance Efficiency Evaluation

Performance efficiency evaluation was conducted using Google Lighthouse, an automated auditing tool integrated into the Google Chrome browser. This tool provides performance scores that indicate how efficiently the system processes user requests and delivers web content (*Lighthouse: Automated Tool for Improving Web Page Quality*, n.d.). This evaluation aimed to assess the efficiency of the internship monitoring information system in terms of resource utilization, loading performance, accessibility, and adherence to web development best practices. Testing was performed on multiple pages within the system, including the login page, dashboard, student management page, internship placement page, journal page, guidance progress page, and report page. For each page, Google Lighthouse generated scores for several indicators, namely Performance, Accessibility, Best Practices, and Search Engine Optimization (SEO).

Performance efficiency testing was conducted using Google Lighthouse integrated within the Google Chrome browser. The evaluation was performed on a laptop equipped with an Intel Core i5 processor, 8 GB RAM, and a stable internet connection. Each evaluated page was tested individually using the Lighthouse default configuration. The assessment generated scores for Performance, Accessibility, Best Practices, and Search Engine Optimization (SEO). To improve measurement consistency, each page was evaluated under the same testing environment and browser configuration.

The obtained scores were analysed descriptively by calculating the average score across all tested pages. The resulting values were then interpreted according to Google Lighthouse performance categories, where scores between 90-100 indicate good performance, scores between 50-89 indicate performance that requires improvement, and scores below 50 indicate poor performance. During the testing process, system performance data were collected automatically by the testing tools, including metrics such as successful and failed requests, response times, and overall system performance scores (Alnuhait et al., 2024).

Data Analysis

The collected data were analysed quantitatively according to the evaluation method used for each ISO/IEC 25010 quality characteristic. The results of functional suitability testing were analysed by calculating the percentage of successfully executed system functions relative to the total number of tested functions (Widiastuti et al., 2025). The resulting percentage was used to determine the extent to which the system fulfilled its specified functional requirements.

To ensure transparency and reproducibility, all evaluation procedures were conducted using standardized instruments and testing tools. Functional suitability evaluation followed predefined testing scenarios validated by experts. Usability data were collected using the standardized UEQ instrument and analysed using the official UEQ Data Analysis Tool. Reliability testing was performed using WAPT under controlled load-testing scenarios, while performance efficiency testing employed Google Lighthouse with consistent browser and hardware configurations. The resulting data were analysed quantitatively and interpreted according to the corresponding evaluation criteria for each quality characteristic.

Usability data obtained through the User Experience Questionnaire (UEQ) were analysed using the UEQ Data Analysis Tool. Reliability of the questionnaire responses was examined using Cronbach's Alpha coefficient. Mean scores were calculated for the six UEQ dimensions, namely attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty. The resulting values were then interpreted using the official UEQ benchmark classification.

Reliability testing data generated by WAPT were analysed by calculating the proportion of successful operations compared to total operations performed during the testing scenario. The resulting reliability value was compared with the Telcordia standard to determine whether the system met the minimum reliability requirement. Performance efficiency data generated by Google Lighthouse were analysed descriptively by examining performance, accessibility, and best practice scores for each tested page. The average score for each indicator was calculated and interpreted according to Google Lighthouse evaluation criteria.

3. Results and Discussion

System Implementation

The internship monitoring information system evaluated in this study was developed as a web-based platform designed to facilitate the management and monitoring of internship activities in vocational schools. The system aims to improve coordination among students, supervising teachers, and school administrators by providing an integrated platform for managing internship data and monitoring student activities during the internship period. Figure 3 shows an example of the user interface of the internship monitoring information system.

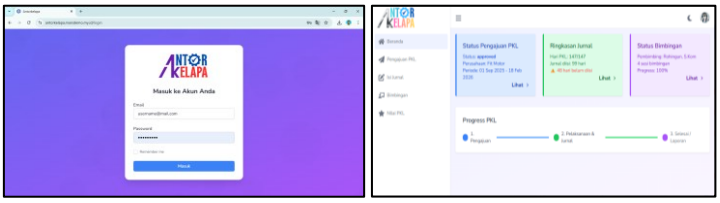


Figure 3. Internship Monitoring Information System Interface

The implementation of the internship monitoring information system enables real-time monitoring of student internship activities. The system also improves data management efficiency by storing internship records in a centralized database. This feature allows supervising teachers and administrators to access internship data more easily and generate reports related to student internship performance.

Functional Suitability Testing

The evaluation involved three validators consisting of a software engineering expert, an industry practitioner, and a vocational education representative. A total of 55 functional test cases representing the system's core features were evaluated. The tested functionalities included user authentication, internship registration, internship placement management, daily journal submission, monitoring activities, assessment and report processes. The functional suitability evaluation results are summarized in Table 2.

Table 2. Functional Suitability Testing Result

Item	Value
Total Tested Function	55
Valid Function	55
Invalid Function	0

The complete testing results showed that all evaluated functions operated successfully according to their intended purposes. Based on Equation (1), the functional suitability score was calculated as follows:

$$FS = \frac{Number\ of\ valid\ function}{Total\ function\ tested} \times 100\% = \frac{55}{55}\ x\ 100\% = 100\%$$

The evaluation results indicate that all functional requirements were successfully fulfilled, resulting in a functional suitability score of 100%. This finding demonstrates that the developed system provides complete and appropriate functionalities required to support internship management and monitoring activities. According to ISO/IEC 25010, functional suitability reflects the degree to which software provides functions that meet stated and implied needs. Therefore, the obtained score confirms that the developed system successfully satisfies its intended operational requirements and can effectively support internship-related processes in vocational education environments.

Usability Testing

Usability evaluation was conducted using the User Experience Questionnaire (UEQ) involving 45 respondents consisting of students, supervising teachers, heads of study programs, and industry instructors. Prior to interpretation, questionnaire reliability was examined using Cronbach's Alpha coefficients. The reliability analysis showed that all UEQ scales achieved Cronbach's Alpha values greater than 0.70, indicating high internal consistency and acceptable reliability of the collected responses. The results of the usability evaluation using the User Experience Questionnaire (UEQ) are presented in Figure 4 and Table 3.

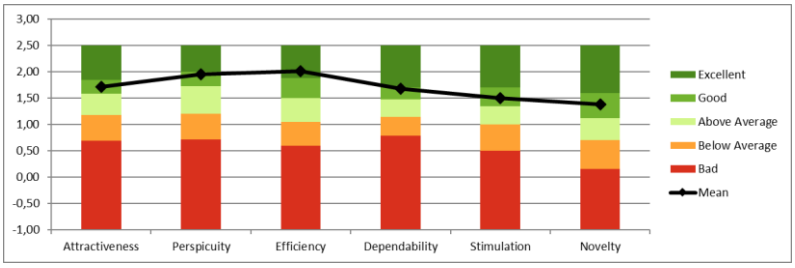


Figure 4. Usability Evaluation Result Using UEQ

Table 3. Analysis Results of UEQ

Dimension	Cronbach's Alpha	Mean	Std. Dev.	95% CI	Category
Attractiveness	0.87	1.71	1.08	1.39-2.03	Good
Perspicuity	0.79	1.95	1.05	1.64-2.26	Good
Efficiency	0.86	2.01	1.11	1.68-2.33	Excellent
Dependability	0.85	1.67	1.15	1.34-2.01	Good
Stimulation	0.82	1.50	1.30	1.12-1.88	Good
Novelty	0.80	1.38	1.30	1.00-1.76	Good

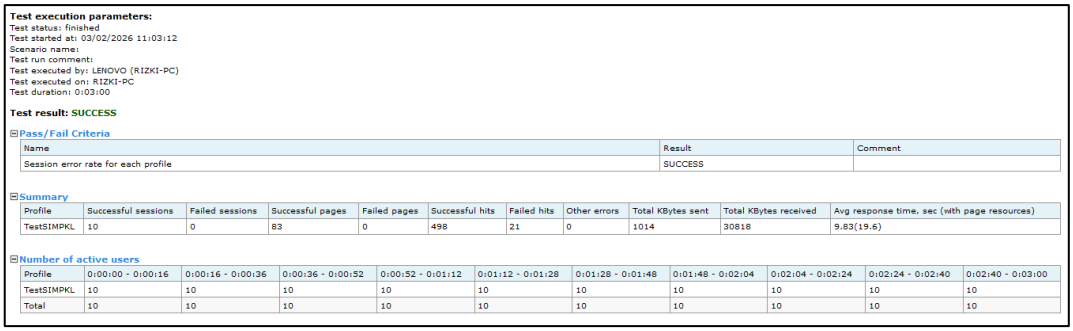
The findings demonstrate that all user experience dimensions achieved positive evaluations. The highest score was obtained by the Efficiency dimension (2.01), which falls into the Excellent category. This result suggests that users can perform internship-related activities efficiently using the system. To provide a clearer picture of response variability, standard deviations and 95% confidence intervals were also examined for each UEQ dimension. The standard deviation values ranged from 1.05 to 1.30, indicating a moderate variation in user perceptions across all dimensions. Furthermore, all confidence intervals remained within the positive evaluation range, confirming the consistency of respondents' perceptions toward the system.

The Efficiency dimension achieved the highest mean score (M = 2.01, SD = 1.11, 95% CI = 1.68-2.33), indicating that users perceived the system as efficient for performing internship-related activities. Meanwhile, the Novelty dimension obtained the lowest mean score (M = 1.38, SD = 1.30, 95% CI = 1.00-1.76), although it still remained within the positive evaluation category. These findings suggest that while users generally perceived the system positively, opportunities remain for enhancing innovative interface features and user engagement.

Meanwhile, Attractiveness, Perspicuity, Dependability, Stimulation, and Novelty were classified as Good. These findings indicate that users perceive the system as easy to understand, reliable, engaging, and capable of supporting their internship management activities effectively. Overall, the usability evaluation results demonstrate that the internship monitoring information system provides a satisfactory user experience and can be used effectively by its users. These findings indicate that the system interface and interaction design are suitable for supporting internship monitoring activities.

Reliability Testing

Reliability testing was conducted to evaluate the stability of the system under multiple user access conditions. Reliability refers to the ability of the system to maintain its performance and functionality during operation without system failures. Reliability testing was performed using Web Application Performance Testing (WAPT) to evaluate the system's ability to maintain stable performance during concurrent user access. The testing scenario simulated 10 virtual users accessing the system simultaneously for a duration of 10 minutes. Reliability testing results are presented in Figure 5 and Table 4.



Test execution parameters:
Test status: finished
Test started at: 03/02/2026 11:03:12
Scenario name:
Test run comment:
Test executed by: LENOVO (RIZKI-PC)
Test executed on: RIZKI-PC
Test duration: 0:03:00

Test result: SUCCESS

Pass/Fail Criteria

Name	Result	Comment
Session error rate for each profile	SUCCESS	

Summary

Profile	Successful sessions	Failed sessions	Successful pages	Failed pages	Successful hits	Failed hits	Other errors	Total KBytes sent	Total KBytes received	Avg response time, sec (with page resources)
TestSIMPKL	10	0	83	0	498	21	0	1014	30818	9.83(19.6)

Number of active users

Profile	0:00:00 - 0:00:16	0:00:16 - 0:00:36	0:00:36 - 0:00:52	0:00:52 - 0:01:12	0:01:12 - 0:01:28	0:01:28 - 0:01:48	0:01:48 - 0:02:04	0:02:04 - 0:02:24	0:02:24 - 0:02:40	0:02:40 - 0:03:00
TestSIMPKL	10	10	10	10	10	10	10	10	10	10
Total	10	10	10	10	10	10	10	10	10	10

Figure 5. Reliability testing results using WAPT

Table 4. Reliability Testing Result

Parameter	Successful	Failed	Total
Sessions	10	0	10
Pages	83	0	83
Hits	498	21	519

Based on Equation (2), the reliability score was calculated as follows:

$$R = \frac{Succesful\ Session + Succesful\ Pages + Succesful\ Hits}{Total\ session + Total\ Pages + Total\ Hits} \times 100\%$$

$$R = \frac{10 + 83 + 498}{10 + 83 + 519}\ x\ 100\% = 96.57\%$$

The obtained reliability score reached 96.57%, indicating that the majority of requests generated during the testing process were processed successfully. This result demonstrates that the system is capable of maintaining stable performance under concurrent access conditions.

The reliability evaluation was conducted using the operational server environment available during the study period. The testing scenario involving 10 concurrent virtual users was designed to represent the typical number of active users simultaneously accessing the system within the participating vocational school context. Although the obtained reliability score exceeded the Telcordia reliability threshold of 95%, the testing scenario does not fully represent larger-scale deployments involving multiple schools or substantially higher numbers of concurrent users. Therefore, future studies are encouraged to conduct scalability testing using more extensive load scenarios to further evaluate system performance under broader operational conditions.

Performance Efficiency Testing

In this study, performance testing was performed using Google Lighthouse, which is a performance evaluation tool integrated with the Google Chrome browser. Lighthouse evaluates various aspects of web application performance, including loading speed, accessibility, best practices, and search engine optimization. Figure 6 presents an example of the performance evaluation results generated by Google Lighthouse and Table 5 summarizes the average results obtained from all evaluated pages.

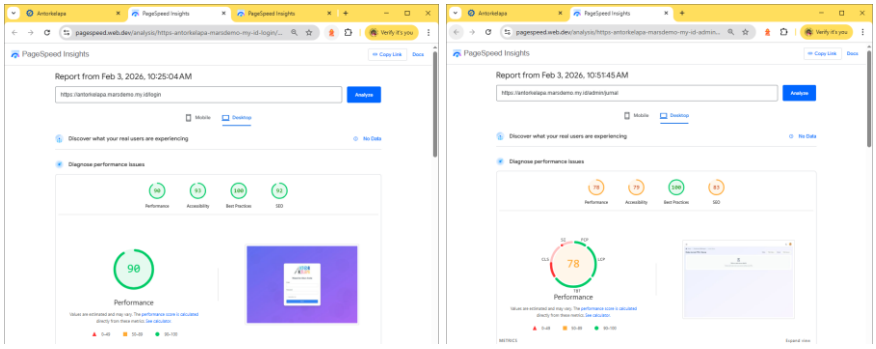


Figure 6. Performance Evaluation Result Using Google Lighthouse

Table 5. Performance Efficiency Testing Result

Indicator	Score
Performance	74.85
Accessibility	76.23
Best Practice	100
SEO	92

Although the system achieved acceptable operational performance, the Google Lighthouse results indicate that further optimization is required, particularly for the Performance (74.85) and Accessibility (76.23) indicators. The performance score may have been affected by several technical factors, including unoptimized image assets, render-blocking JavaScript resources, inefficient caching mechanisms, and database queries that require additional processing time. These factors can increase

page loading times and reduce overall responsiveness, especially when multiple users access the system simultaneously.

The accessibility score suggests that some interface components may not fully comply with modern web accessibility guidelines. Potential issues include insufficient color contrast, missing alternative text for images, incomplete form labels, and limited support for assistive technologies. Improving these aspects would enhance usability for a wider range of users and support inclusive access to the system. Future optimization efforts should focus on implementing image compression, code minification, browser caching strategies, database query optimization, accessibility auditing, and compliance with Web Content Accessibility Guidelines (WCAG). These improvements are expected to increase both performance efficiency and accessibility scores in future system versions.

The Best Practices score achieved 100, indicating full compliance with recommended web development standards. This result suggests that the system has been implemented using appropriate development practices and does not exhibit significant technical issues. Overall, the performance efficiency evaluation demonstrates that the system provides acceptable operational performance while still offering opportunities for further optimization, particularly in terms of page loading efficiency and accessibility improvements. The system is capable of supporting internship monitoring activities while maintaining stable performance and usability for its users.

Comparative Discussion

The evaluation results obtained in this study are generally consistent with previous studies that applied ISO/IEC 25010 to assess software quality. Functional suitability testing achieved a score of 100%, indicating that all evaluated functions operated according to their intended requirements. This finding is in line with previous studies that reported high functional suitability scores for information systems developed using structured software engineering approaches (Sarwosri et al., 2023; Widiastuti et al., 2025; Wulandari et al., 2026). The result confirms that the developed internship monitoring information system successfully fulfills the functional requirements needed to support internship management activities.

The usability evaluation demonstrated positive results across all UEQ dimensions, with the Efficiency dimension achieving an Excellent rating and the remaining dimensions categorized as Good. These findings indicate that users perceive the system as effective, understandable, and supportive of their tasks. Similar results have been reported in studies evaluating educational and organizational information systems, where usability was identified as a key factor influencing user acceptance and system adoption (Firdaus Nuzula & Rochimah, 2023; Saputra et al., 2025). The positive usability scores obtained in this study suggest that the system interface and interaction design successfully support the needs of students, supervising teachers, and industry instructors.

Reliability testing produced a score of 96.57%, which exceeds the minimum reliability threshold recommended by the Telcordia standard. This result is consistent with previous software quality evaluation studies reporting reliability values above 95% for systems considered suitable for operational deployment (Sarwosri et al., 2023; Wulandari et al., 2026). The high reliability score indicates that the system is capable of maintaining stable operation under concurrent access conditions and can effectively support internship monitoring activities involving multiple stakeholders.

Performance efficiency evaluation showed an average performance score of 74.85 and an accessibility score of 76.23. Although the obtained scores suggest that the system operates adequately, they also indicate opportunities for further optimization. Similar findings have been reported in web-based information system evaluations, where functionality and reliability often achieve higher levels of quality than performance efficiency due to the complexity of web application resources and page rendering processes (Anwar, 2026; Oka Cahyadi Pradipta et al., 2025). Therefore, future development efforts should focus on optimizing resource loading, script execution, and page rendering performance to improve overall system efficiency.

Compared with previous studies on internship management information systems, most research has focused primarily on system development and implementation (Fakhira et al., 2023; Nugraha et al., 2023; Perdana et al., 2025; Quintua, 2025). In contrast, this study contributes a more comprehensive evaluation by examining multiple software quality characteristics based on ISO/IEC 25010. The integration of functional suitability testing, UEQ-based usability evaluation, WAPT reliability testing, and Google Lighthouse performance assessment provides a broader understanding of software quality and system readiness for practical implementation in vocational education environments.

It should be noted that the primary objective of this study was to evaluate software quality characteristics of the internship monitoring information system based on selected ISO/IEC 25010 dimensions rather than to perform a comprehensive scalability assessment. Therefore, the reliability testing was intended to verify the system's operational stability within its actual implementation context. While the results demonstrate reliable operation under the tested conditions, additional large-scale load testing would provide further evidence regarding system scalability in broader deployment environments.

Educational Implications for Vocational Education

Beyond software quality considerations, the findings of this study have important implications for vocational education. Internship programs represent a critical component of work-based learning, requiring effective coordination among students, supervising teachers, school administrators, and industry instructors. The implementation of a web-based internship monitoring information system can support these stakeholders by providing centralized access to internship records, monitoring data, assessment information, and communication channels throughout

the internship period. Effective internship management systems may support supervision and monitoring processes in vocational education environments (Trihandayani & Haryati, 2025).

The positive evaluation results indicate that the system is capable of supporting more systematic internship supervision and documentation processes. Through digital monitoring features, supervising teachers can track student activities more efficiently, while industry instructors can provide feedback and assessments in a structured manner. These capabilities may reduce administrative burdens and improve the quality of internship supervision compared with conventional monitoring approaches.

Furthermore, the availability of centralized internship data can assist schools in evaluating internship implementation, monitoring student participation, and identifying potential issues during workplace learning activities. This supports data-driven decision-making and contributes to improving the management of vocational education programs. Therefore, the developed system has the potential not only to improve software-supported administrative processes but also to strengthen the effectiveness of work-based learning implementation in vocational education environments.

The implementation of the internship monitoring information system may contribute to reducing administrative workload for supervising teachers by automating documentation and reporting processes. In addition, the availability of real-time internship data enables school administrators to make evidence-based decisions regarding student placement, supervision intensity, and internship quality assurance. These capabilities support more effective monitoring practices and strengthen collaboration between schools and industry partners. Consequently, the system has the potential to improve the overall quality of work-based learning implementation in vocational education.

4. Conclusion

This study evaluated the software quality of a web-based internship monitoring information system for vocational education using selected characteristics of the ISO/IEC 25010 quality model. The evaluation results indicate that the developed system demonstrates satisfactory software quality in terms of functionality, user experience, reliability, and operational performance. These findings suggest that the system is capable of supporting internship management and monitoring activities effectively within vocational education environments. Beyond software quality considerations, the study highlights the educational value of implementing a centralized internship monitoring platform. The system facilitates communication among students, supervising teachers, and industry instructors while supporting more systematic supervision, documentation, and evaluation of internship activities. As a result, the system has the potential to contribute to improved internship management practices and strengthen the implementation of work-based learning in vocational education.

The evaluation results indicate that the internship monitoring information system achieved excellent functional suitability, high reliability, positive usability outcomes across all UEQ dimensions, and acceptable performance efficiency. These findings demonstrate that the system is capable of supporting internship management and monitoring activities effectively in vocational education environments. Future development should focus on improving performance efficiency and accessibility through image optimization, code minification, caching strategies, database query optimization, and compliance with web accessibility standards. In addition, further studies are recommended to evaluate additional ISO/IEC 25010 characteristics and conduct larger-scale load testing to assess system scalability in multi-school deployment environments.

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