

Agile-Based Field Internship Information System for Academic Administration Digitalization

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ABSTRACT

This study presents the development of a web-based internship management information system (PKL) aimed at improving the efficiency, transparency, and accountability of internship administration and supervision processes in the Department of Information Technology, Politeknik Negeri Bali. The system was developed using the Agile methodology to allow iterative and adaptive development, supported by the CodeIgniter 4 framework for lightweight and modular implementation. Core system features include online registration, internship letter submission, document uploads, supervision logs, and lecturer monitoring tools, all integrated to facilitate collaboration among students, supervisors, and administrators. The system's performance was evaluated using black-box testing, which confirmed valid results across all major functional requirements, ensuring technical reliability. Furthermore, a usability assessment using the System Usability Scale (SUS) involving 20 respondents produced a score of 84.50, categorized as excellent, indicating high user satisfaction, ease of use, and efficiency. These findings demonstrate that the system not only fulfills its functional objectives but also enhances the digital transformation of vocational academic services, offering a replicable and scalable model for other educational institutions aiming to modernize their internship management processes.

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1. INTRODUCTION

The Internship Program (Praktik Kerja Lapangan/PKL) is a vital component of vocational education curricula, including at the Department of Information Technology, Politeknik Negeri Bali. PKL aims to bridge the gap between academia and industry, allowing students to gain real-world professional experience [1]. Therefore, the administrative and supervision processes of PKL require an efficient, structured, and accountable system. However, management is still conducted manually, making it prone to delays, data duplication, and recording errors [2]. Manual PKL management not only complicates the registration and reporting processes for students but also hinders supervisors and study programs from effectively monitoring and evaluating progress [3]. Administrative processes such as document uploads, supervision logs, and verification are often carried out through email or physical documents, which are difficult to track [4]. Hence, an information system that can automate the entire PKL workflow, from registration to final reporting is urgently needed.

A web-based information system enables more effective collaboration between students, supervisors, and program administrators through centralized and real-time access to academic data [5], [6]. Manually, each step would take several working days, depending on the time availability of the users involved. With the implementation of an information system, processing time is reduced to a few hours, resulting in increased service efficiency [5]. However, the success of such systems depends not only on technical functionality but also on ease of use and user acceptance. Therefore, usability evaluation becomes a crucial part of educational information system development [7], [8]. One of the most widely used instruments is the System Usability Scale (SUS), which has been proven effective and reliable for measuring user perceptions of digital systems [9].

In system development, the choice of methodology is also a key factor [5]. The Agile method offers an iterative approach that enables developers to respond quickly and flexibly to changing requirements [10]. This approach is suitable for academic systems because it supports continuous improvement cycles based on user feedback [4]. The framework employed in this study is CodeIgniter [11], which is suitable for medium-scale academic systems due to its comprehensive documentation, strong community support, and compatibility with popular databases such as MySQL [12]. The combination of the Agile methodology and CodeIgniter framework is expected to produce a system that is technically stable, flexible, and user-friendly [13], [14].

This research focuses on developing a web-based internship information system that supports registration, document uploads, supervision records, and monitoring processes. In addition to technical validation through black-box testing, the system was evaluated in terms of usability using the SUS questionnaire. By involving end-users in the evaluation process, the system is expected to effectively address real-world needs. This study

contributes to the digital transformation of vocational education and serves as a replicable model for other academic information systems.

2. RESEARCH METHOD

In the initial stage, problem identification and literature review were conducted, as illustrated in Figure 1. This study employed a software engineering approach based on the Agile methodology, which allows for incremental, iterative, and adaptive system development in response to changing user requirements [15]. Agile was selected for its flexibility and strong support for close collaboration between developers and end-users, particularly in higher education environments [16]. The process was divided into four sprints, each lasting two weeks, covering planning, design, unit testing, documentation, and deployment.

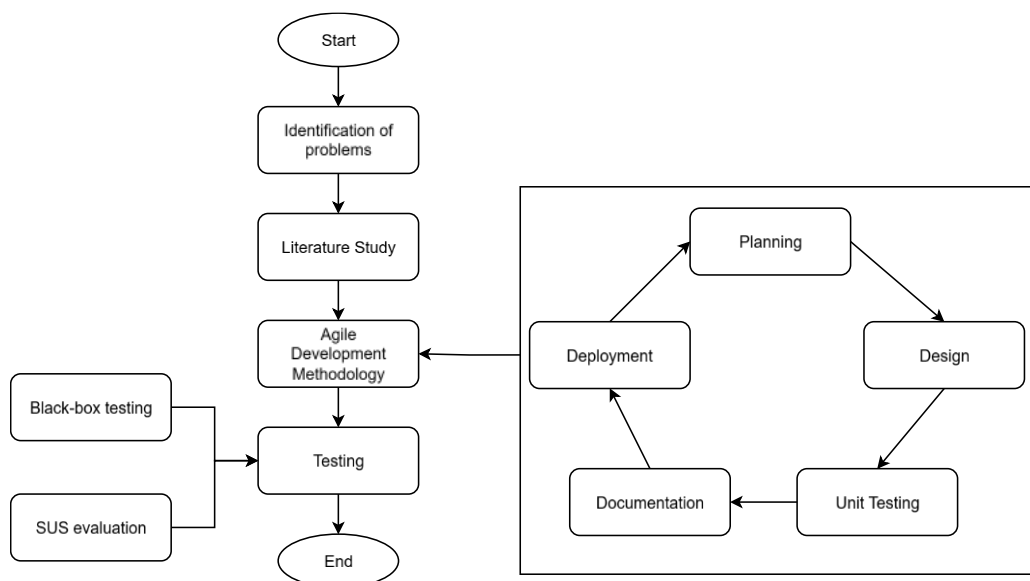


Figure 1. Research Method

The developed system is a web-based information system built using the CodeIgniter 4 framework [17], [18]. CodeIgniter 4 was chosen because it implements a modern architecture, stronger security, and optimized performance compared to previous versions. With PHP 7+ support, a modular structure, Composer integration, and features like flexible routing, filters, and a debug toolbar, application development and maintenance are easier and more efficient than previous versions [19]. The user interface was designed using Bootstrap 5.0 to ensure responsiveness and cross-device accessibility. The system was developed using PHP 8.1 and managed with a MySQL 8.0 database [12], with a relational schema accommodating core entities such as students, supervisors, supervision logs, and administrative statuses.

Functional testing was performed using the black-box testing method, which evaluates system functions based on input and output without examining internal code structure [20]. This approach is suitable for ensuring the quality of developed features [21]. The tested features included login, internship letter submission, administrative verification, supervision logging, and internship evaluation. Each scenario was tested with varied input, and the results were recorded in test tables comparing expected and actual outcomes.

Table 1. SUS Questionnaire

No	Statements	Strongly Disagree		Strongly Agree		
		1	2	3	4	5
1	Saya berpikir akan menggunakan sistem ini lagi. (I think that I would like to use this system.)					
2	Saya merasa sistem ini rumit untuk digunakan. (I found the system unnecessarily complex.)					
3	Saya merasa sistem ini mudah digunakan. (I thought the system was easy to use.)					
4	Saya membutuhkan bantuan dari orang lain atau teknisi dalam menggunakan sistem ini. (I think that I would need the support of a technical person to be able to use this system.)					
5	Saya merasa fitur-fitur sistem ini berjalan dengan semestinya. (I found the various functions in the system were well integrated.)					
6	Saya merasa ada banyak hal yang tidak konsisten (tidak serasi pada sistem ini). (I thought there was too much inconsistency in this system.)					
7	Saya merasa orang lain akan memahami cara menggunakan sistem ini dengan cepat. (I would imagine that most people would learn to use this system very quickly.)					
8	Saya merasa sistem ini membingungkan. (I found the system very cumbersome to use.)					
9	Saya merasa tidak ada hambatan dalam menggunakan sistem ini. (I felt very confident using the system.)					
10	Saya perlu membiasakan diri terlebih dahulu sebelum menggunakan sistem ini. (I needed to learn a lot of things before I could get going with this system.)					

In addition to technical validation, usability evaluation was conducted using the System Usability Scale (SUS) instrument (Table 1) [22], [23]. SUS is a valid and reliable tool for assessing user perceptions of ease of use in information systems, including web-based platforms [24], [25]. The evaluation involved 20 respondents through purposive sampling to ensure representation from the main user groups of the PKL system. The sample consisted of five department heads, two internship coordinators, ten students, and three supervisors who met the criteria of active involvement in PKL activities and availability for the guided system trial. The instrument comprises ten items rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), which were then converted into a total usability score. Scores above 70 indicate good usability [26].

Data collection was conducted through direct system trials at the Department of Information Technology, Politeknik Negeri Bali. Participants were given access to perform

tasks according to their roles. After completing the tasks, participants filled out the SUS questionnaire. The collected data were analyzed quantitatively to evaluate system functionality (black-box testing) and user satisfaction (SUS), providing a comprehensive view of system quality from both technical and user perspectives. This approach aligns with modern educational information system development principles that emphasize adaptability and active user involvement [27].

3. RESULTS AND DISCUSSION

3.1. Design Results

The system design employs a use case diagram and an entity relationship diagram (ERD). The use case diagram illustrates interactions among four main entities: students, supervisors, department heads, and internship administrators (Figure 2). Each user must log in to access role-specific features. This role distribution ensures the system operates efficiently and accurately in supporting internship administration within the institution.

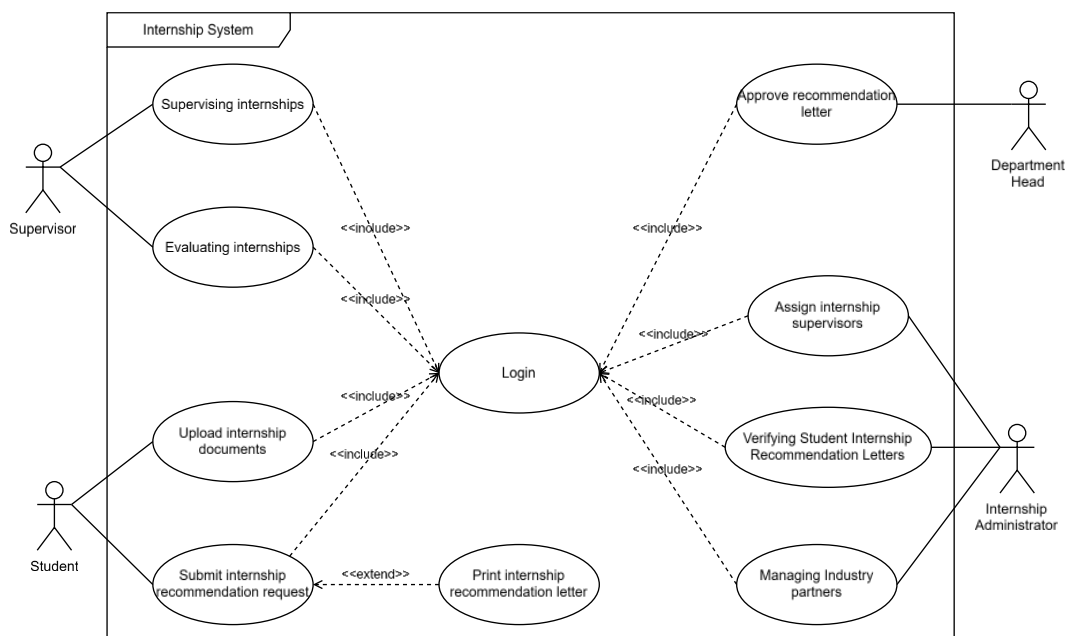


Figure 2. Use Case Diagram of the Internship System

The Entity Relationship Diagram (ERD) of the internship management information system illustrates the relationships among the main entities within the system along with their key attributes. Figure 3 presents the ERD of the developed system. This diagram serves as the foundation for database design, ensuring data consistency and integrity across all system components.

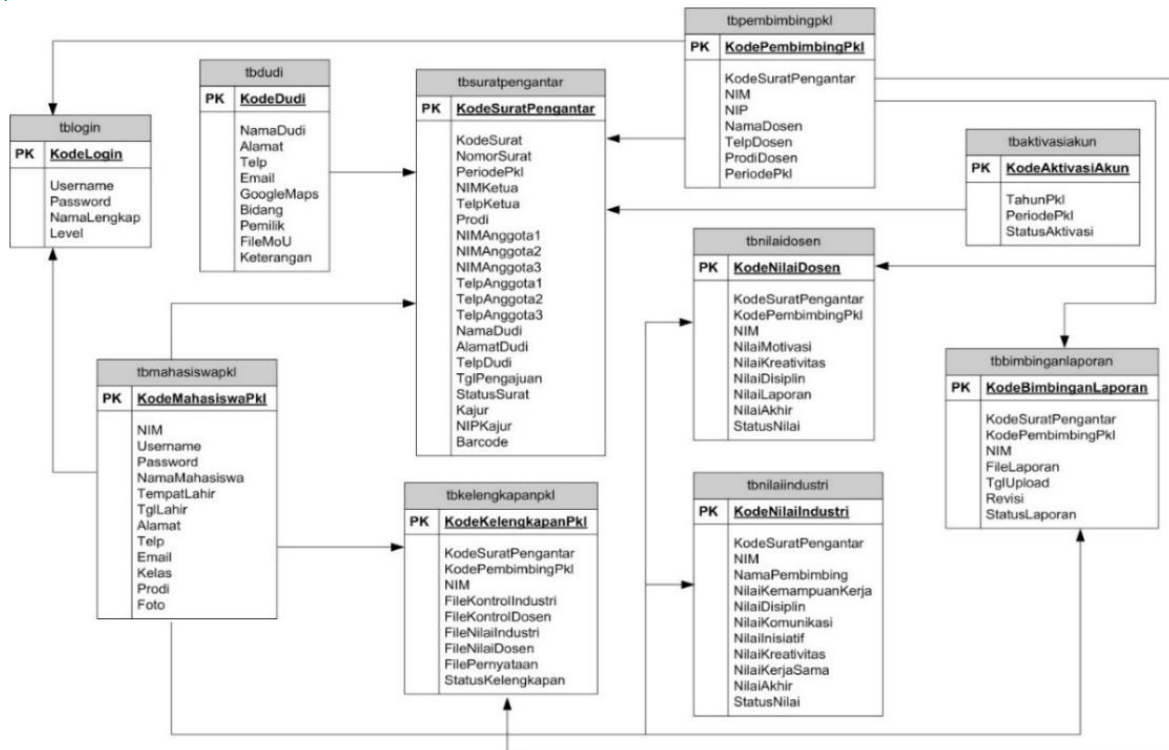


Figure 3. ERD of the Internship System

3.2. Implementation Results

The internship recommendation request page allows students to fill out forms and submit applications independently (Figure 4). The submitted data are forwarded to the internship administrator and department head for approval, after which students can print the approved recommendation letter digitally. In addition, the internship document upload page enables students to submit required files such as control sheets, supervision logs, evaluation forms, and plagiarism-free statements. These features streamline administrative processes and ensure the completeness of internship data in a fully digital format.

Figure 4. Student Internship Recommendation Request Page

Lecturers have access to integrated internship supervision and assessment features within the system, as shown in Figure 5. Through the supervision page, lecturers can provide direct feedback on students' reports, with each interaction automatically recorded to facilitate progress monitoring. On the assessment page, lecturers can input evaluation components based on predefined criteria, and the results are stored and accessible to students. The integration of these two features makes the supervision and assessment process more efficient, structured, and accurate in supporting the digitalization of internship administration.

No	Komponen Penilaian	Bobot	Nilai (1-10)
1	Motivasi	20 %	98
2	Kreativitas	20 %	87
3	Disiplin	20 %	88
4	Metode Pembahasan Laporan	40 %	90

Figure 5. Student Internship Supervision and Assessment Page

Figure 6 shows the internship recommendation approval page managed by the department head. This page is used to process student internship recommendation requests.

The department head can review the submission details and provide approval directly through the system. Once approved, the status of the letter automatically updates and can be printed by the student. This process streamlines the approval workflow and reduces reliance on manual procedures.

No	Nomor Surat	Prodi	Nama Mahasiswa PKL	Tempat PKL	Tgl Pengajuan	Aksi
1	07.001/PL8/TL/DT/2025	D3 Manajemen Informatika	1). I Putu Pande Ardi Widana (2315323011)	UD. Bali Teknologi Jl. Gemitir Jl. Graha Liva D No.14, Kesiman Kertalangu, Kec. Denpasar Tim., Kota Denpasar, Bali 80237 Telp. 0361898768	2025-07-13	Pilih Surat Belum Persetujuan Ubat Surat

Figure 6. Internship Recommendation Approval Page by the Department Head

Administrators have access to manage supervisors (Figure 7) and verify internship recommendation letters. Through the supervisor management page, administrators can assign lecturers to each student or internship group, with assignment data automatically stored and displayed on both lecturer and student accounts. Meanwhile, the recommendation verification page allows administrators to review and ensure data completeness before approval by the department head. These features ensure that the internship supervision and approval processes are well-coordinated, orderly, and effectively controlled within the system.

Pelayanan Proses Bimbingan PKL - Teknologi Informasi

Pemilihan Pembimbing
Bimbingan Laporan PKL

Pemilihan Dosen Pembimbing PKL

Pilih Nomor Surat
Pilih
Lihat Surat

Tambah Nama Dosen Pembimbing

Dosen Pembimbing
198802152022031001 - Made Pradnyana Ambara, S.Kom., M.T
Telp/WA
081999123373

Prodi
D3 Manajemen Informatika

Periode Waktu
11 Agustus 2025 - 31 Januari 2026

Simpan
Batal

No	Periode	Prodi	Nama Mahasiswa PKL	Tempat PKL	Dosen Pembimbing	Aksi
1	11 Agustus 2025 - 31 Januari 2026	D3 Manajemen Informatika	1). I Putu Pande Ardi Widana (2315323011)	UD. Bali Teknologi Jl. Gemitir Jl. Graha Liva D No.14, Kesiman Kertalangu, Kec. Denpasar Tim., Kota Denpasar, Bali 80237 Telp. 0361898768	Made Pradnyana Ambara, S.Kom., M.T	

Figure 7. Internship Supervisor Management Page

3.2.1. Testing Results

Testing was conducted based on the main functions and access levels defined at the initial stage. The results showed valid outcomes for the five core requirements of the internship system, as presented in Table 2. These results were supported by ten testing scenarios aligned with the respective system functions and user access levels.

Table 2. Black-box Test Results

No.	Requirements	Functional	Testing Scenario	Results
1	Login	Enter correct login data.	1. The user accesses the login page.	Valid
			2. The user enters valid login credentials.	
			3. The system displays the user's main dashboard.	
		Enter incorrect login data.	1. The user accesses the login page.	Valid
			2. The user enters invalid login credentials.	
			3. The system reloads the login page and displays an error notification.	
2	Students	Submit internship recommendation request.	1. The student accesses the internship recommendation letter menu.	Valid
			2. The system displays the recommendation letter form.	
			3. The student fills in the required data and clicks the Submit button.	
			4. The system validates the input; if valid, the data are saved, otherwise the system redisplay the form with an error message.	
		Print internship recommendation letter.	1. The student accesses the internship recommendation letter menu.	Valid
			2. The system displays the recommendation letter data previously submitted.	
			3. The student clicks the Print Letter button.	

No.	Requirements	Functional	Testing Scenario	Results
3	Lecturer	Upload internship documents.	4. The system generates and prints the approved recommendation letter.	Valid
			1. The student accesses the internship document upload menu.	
			2. The system displays the document upload interface.	
			3. The student uploads the required internship documents and clicks Save .	
		Supervise internship report.	4. The system validates the input; if valid, the data are saved, otherwise the page reloads with an error notification.	Valid
			1. The lecturer selects a student under their supervision.	
4	Department Head	Input student internship grades.	2. The system displays the supervised student's report data.	Valid
			3. The lecturer inputs supervision notes or feedback.	
			4. The system validates the data; if valid, they are saved, otherwise the supervision page reloads with an error notification.	
		Approve recommendation letter.	1. The lecturer accesses the internship evaluation menu.	Valid
			2. The system displays the evaluation interface.	
			3. The lecturer selects the student to be graded.	
5	Administrator	Assign internship supervisors.	4. The system displays the student's details and evaluation form.	Valid
			5. The lecturer inputs the student's evaluation data.	
			6. The system validates the data; if valid, they are saved, otherwise the system reloads the evaluation page with an error notification.	
		Verifying Student Internship Recommendation Letters	1. The department head accesses the recommendation letter menu.	Valid
			2. The system displays the recommendation letter list.	
			3. The department head selects a student's recommendation letter data.	
5	Administrator	Assign internship supervisors.	4. The system displays the detailed submission.	Valid
			5. The department head approves the request.	
			6. The system updates the letter status to "Approved by the Department Head."	
		Verifying Student Internship Recommendation Letters	1. The administrator accesses the internship supervision management menu.	Valid
			2. The system displays the supervision management interface.	
			3. The administrator assigns a lecturer as the internship supervisor and clicks Save .	
5	Administrator	Verifying Student Internship Recommendation Letters	4. The system validates the input; if valid, the data are saved, otherwise the page reloads with an error notification.	Valid
			1. The administrator accesses the recommendation letter menu.	
			2. The system displays the recommendation letter interface.	
		Verifying Student Internship Recommendation Letters	3. The administrator selects a student's recommendation letter data.	Valid
			4. The system displays the detailed information of the selected letter.	
			5. The administrator verifies the submission.	
5	Administrator	Verifying Student Internship Recommendation Letters	6. The system updates the status of the student's recommendation letter to "Verified by Administrator."	Valid

This study involved 20 respondents, including students, lecturers, internship administrators, and the department head. Data collected from the completed questionnaires were compiled and analyzed to calculate the final SUS score, as shown in Table 3. The

analysis produced a score of 84.50, which falls within the “excellent” category based on standard SUS interpretation [8], [24]. This result indicates that users found the system easy to use, efficient, and capable of delivering a positive interaction experience. Furthermore, the high score demonstrates that the system meets user expectations in terms of navigation simplicity, functional clarity, and overall comfort. Hence, the findings provide strong evidence that the system is highly usable and ready for wider implementation without requiring significant usability improvements.

Table 3. SUS Calculation Results

Respondent	Calculated Score										Total	Value
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		(Total x 2.5)
R1	3	3	4	3	4	3	3	4	2	4	33	83
R2	3	3	3	3	4	3	4	3	4	3	33	83
R3	4	3	3	3	3	3	4	3	3	3	32	80
R4	4	3	4	3	4	3	4	3	4	4	36	90
R5	3	3	4	4	3	3	3	4	3	3	33	83
R6	4	4	3	3	4	4	4	3	4	3	36	90
R7	3	3	3	4	3	3	3	4	3	4	33	83
R8	4	3	4	3	4	4	3	3	2	3	33	83
R9	3	4	4	3	4	2	4	3	4	4	35	88
R10	4	3	4	3	4	3	4	4	4	3	36	90
R11	4	4	3	3	4	3	4	3	3	3	34	85
R12	3	3	2	3	3	3	3	3	4	4	31	78
R13	4	4	4	4	2	4	4	4	4	3	37	93
R14	2	3	3	3	4	3	4	3	3	3	31	78
R15	3	3	3	3	2	3	3	3	4	3	30	75
R16	4	4	4	4	3	4	3	4	3	4	37	93
R17	3	3	4	4	4	4	2	3	3	3	33	83
R18	4	4	3	3	3	4	4	3	4	3	35	88
R19	4	4	3	2	4	3	3	4	4	3	34	85
R20	4	3	4	3	4	3	3	3	4	3	34	85
Average Score (Final Result)												84,50

3.2.2. Discussions

The black-box testing results of the internship management information system show that all core functionalities operated validly according to the predefined scenarios. The testing covered five primary system requirements and involved multiple user roles, including students, lecturers, department heads, and internship administrators. A total of ten testing scenarios produced the expected outcomes, such as login, submission and printing of recommendation letters, document uploads, supervision, evaluation, verification, and approval processes. These valid results indicate that the system functions effectively from a technical perspective and successfully supports the administrative processes of the internship program.

The usability evaluation using the SUS questionnaire further reinforces the system’s success. With a final score of 84.50 from 20 respondents, the system achieved an excellent

usability rating [8], [28]. This reflects users' positive perceptions of ease of use, system efficiency, and interaction comfort. However, the results should be viewed cautiously due to the small sample size, an unbalanced proportion of lecturers and students that may introduce role bias, potential social bias from overly positive responses, and limited generalizability as the evaluation was conducted within a single department. For future research, further development is recommended—particularly in enhancing reporting features, integrating with broader academic systems, and applying additional usability testing methods such as task-based testing or heuristic evaluation [29], [30], to gain deeper insights into user experience and identify opportunities for continued system improvement.

4. CONCLUSION

This study successfully developed a web-based internship information system using the CodeIgniter framework and the Agile methodology. Based on the testing and evaluation results, it can be concluded that the internship management information system was successfully implemented and fulfilled all defined functional requirements. All testing scenarios produced valid outcomes, indicating that the system operated as intended for each user role. The usability evaluation using the SUS questionnaire yielded a score of 84.50, categorized as excellent, demonstrating that the system is easy to use, efficient, and provides a positive user experience. Overall, the system is feasible for broader adoption to support internship administration and management in higher education institutions. Future enhancements are recommended to extend the system to a mobile platform, integration with campus Single Sign-On (SSO), and the addition of analytics dashboards. Further research may also incorporate advanced evaluation metrics, such as approval cycle time, upload error rate, and post-release user satisfaction—to deepen system performance insights and broaden generalizability across multiple institutional contexts.

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