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Development of Employee Management Information System UI/UX Using a User Centered Design Approach

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Abstract.
Purpose: This study aims to develop a user interface and user experience (UI/UX) prototype for an Employee Management Information System (EMIS) at PT. Galsoft. The research focuses on addressing the manual administrative processes that are still widely used in the company's daily operations. The primary objective is to produce an interface design that aligns with user needs and improves the efficiency of work processes.
Methods: This research adopts a User Centered Design (UCD) approach, consisting of four main stages: understanding the context of use, specifying user requirements, designing solutions, and evaluating the design. The prototype developed focuses solely on the UI/UX aspects without involving full system implementation. Usability evaluation was conducted using the System Usability Scale (SUS), involving 38 respondents from various divisions within the company.
Result: The evaluation results show that the developed UI/UX prototype achieved an average SUS score of 89.4. This score indicates that the design has a high level of usability, is easy for users to operate, and supports the administrative workflows required by the organization. These findings demonstrate that the UCD approach effectively contributed to creating a design that is both functional and responsive to user needs.
Novelty: This study contributes to the field of administrative information system prototyping in workplace environments that have yet to adopt digital solutions. The novelty of this research lies in the comprehensive application of the UCD approach, combined with SUS based usability evaluation, to produce a relevant and functional design that is ready to be further developed into a fully implemented system.

Keywords: UI/UX, User centered design, System usability scale, Employee management, Prototype
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INTRODUCTION

The rapid advancement of information technology has brought significant changes to various aspects of life, including the way people interact and work [1]. In a business context, information technology plays a crucial role in supporting work efficiency, data accuracy, and transparency in information management. One form of utilizing this technology is the implementation of management information systems, which assist organizations in handling administrative processes and human resource management more effectively. Unfortunately, many small to medium sized enterprises have yet to adopt digital systems and still rely on manual processes, which are prone to errors, slow, and difficult to monitor [2]. In the development of information systems, the aspects of user interface (UI) and user experience (UX) design play a critical role. UI refers to visual and interactive layout elements such as buttons, menus, and icons [3] while UX pertains to the user's perception and comfort when using the system, including ease of use, efficiency, and satisfaction in completing tasks [4]. Designing systems without considering UI/UX quality can lead to low user adoption and hinder the achievement of organizational goals. Therefore, user focused interface design is increasingly being adopted, one of which is through the User Centered Design (UCD) approach. Several previous studies have demonstrated the successful implementation of UCD in developing systems tailored to user needs. Arisa [5] successfully redesigned the CROWDE website interface using the Design Thinking approach, achieving an average usability score above 5.5.

Another study focused on developing a job vacancy portal for the Karawang region using UCD, which resulted in significant improvements in ease of use (90%), access speed (95%), and feature relevance (85%) [6]. Further evidence of UCD's effectiveness was reported in the development of the Santri Information

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Management System (SAIMS), where evaluation results indicated a high level of user acceptance [7]. Other studies [8], [9] have also shown that the UCD approach, when combined with evaluation methods such as the System Usability Scale (SUS), can produce user interfaces that are both functional and satisfying from the user's perspective. Additionally. Additionally, research on the development of a flower bouquet ordering application using UCD and SUS reported an 8% increase in usability [10], Prawastiyo & Hermawan [11] reported a SUS score of 83 for the front-end of the National Library of Jakarta's website, which falls into the "acceptable" category.

Several previous studies have explained that the UCD process is iterative, which directly involves users and measurable usability evaluations such as the System Usability Scale (SUS), is an approach that has proven effective in developing an application interface prototype. In this study, there is a case study on a software and website development company based in Bali called PT. Galsoft. Despite operating in the technology sector, the company still relies on manual processes for managing employee administration. Critical tasks such as leave requests, daily task reporting, and item requisitions are still carried out conventionally, using paper forms or spreadsheet documents. This condition has led to various issues, including delays in approval processes, data duplication, difficulty in tracking submission histories, and miscommunication between staff and management. The lack of a centralized system further slows down workflow and negatively impacts the overall operational efficiency of the company. Employees from various divisions have expressed that the current manual system is no longer relevant to their dynamic work needs. They require an employee management system that not only includes features aligned with administrative tasks but is also easy to use, quick to access, and adaptable to their existing work routines. Response to these challenges, this study was designed to produce a user focused interface design solution, rather than directly developing a fully integrated system. In addressing these needs, this research does not aim only to develop a fully integrated system, but rather focuses on designing a UI/UX prototype that is tailored to user needs. The researcher chose the User Centered Design (UCD) approach in this development because this approach is known to involve users directly in the design process, so that it can produce solutions that are more relevant and adaptive to the user context [12], [13]. Meanwhile, the evaluation of the prototype was carried out using the system usability scale (SUS) method which is considered effective and efficient in measuring user perceptions of the usefulness of a design quantitatively [14].

Although some previous studies have successfully provided results by applying the User Centered Design (UCD) approach and using the System Usability Scale (SUS) for user interface design evaluation, most of these studies were conducted in a context where they had previously built a digital system. There is still a lack of research that specifically focuses on the development of UI/UX prototypes for employee management information systems (EMIS) in companies that still use entirely manual processes. This gap is important because companies that are just starting their digital transformation face several unique challenges related to user adoption, expectations for ease of use, and the relevance of system design. By addressing this gap, this study can provide practical insights for similar organizations that want to start digitizing through a user-centered design approach.

METHODS

The research object in this study is the employees of PT Galsoft, a software and web development company based in Bali. Participants were selected from various divisions involved in the daily administrative process, such as leave applications, task reporting, and goods requests. A total of 38 employees were involved as user representatives to participate in the requirements gathering stage, interface testing, and usability evaluation using the System Usability Scale (SUS) method. Participants were selected because they represent the main users of the planned Employee Management Information System (SIMK) interface prototype.

Research Model

User Centered Design (UCD) is an iterative design approach that places users at the center of the entire system development process [15]. UCD emphasizes active user participation, a deep understanding of the context of use, and an iterative evaluation process to achieve optimal usability [16]. This approach consists of four main stages: understanding the context of use, determining user needs, designing solutions, and evaluating based on those needs [17]. By involving users directly, the resulting system is expected to be more in line with the needs and preferences of end users.

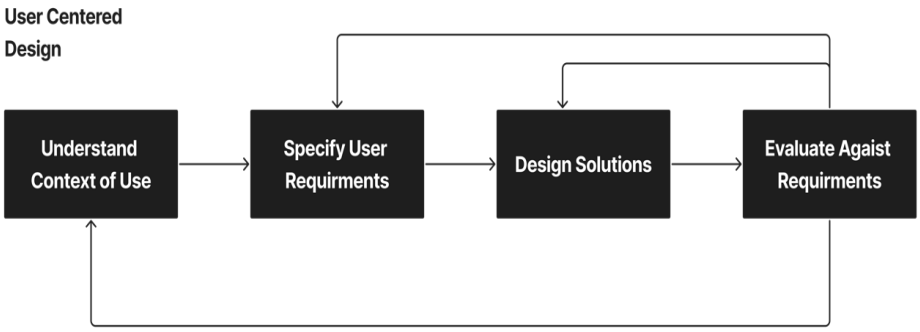

Figure 1. User centered design approach flow
Source: (Apriliyanti et al., 2023)

The development of the Employee Management Information System (EMIS) interface prototype in this study was carried out through the following User Centered Design (UCD) stages:

Understand Context of Use
This initial phase of the UCD approach focuses on understanding the system's usage context [13]. The researcher gathered information about users management have 10 members (Consisting of directors, managers, and supervisors who participate in monitoring, verifying, and approving administrative activities. Directors focus on strategic decisions, managers handle final agreements, and supervisors conduct initial checks on task reports, leave, and material requirements. Their primary roles are control, monitoring, and administrative decision-making.) and staff 28 members (Covering employees from IT, HR & GA, finance, and marketing divisions who carry out administrative processes such as leave applications, daily task reports, and operational needs. They need an efficient and responsive system, including real-time application status notification features) their objectives, work environment, and challenges. Data was collected through interviews, work observations, and user needs the mapping. To gain structured insights distributed to staff and management across divisions.

Specify User Requirements
After understanding the context of use, the next step was to define the user requirements in more detail [6]. These requirements include the necessary features, expected workflows, and aspects of comfort and ease of use in the interface [10]. At this stage, user personas were also developed to represent the primary user profiles. The results of this stage serve as a reference in the design process in developing the EMIS prototype [17].

Design Solution
For this stage, it is a stage in designing a UI/UX prototype based on existing user needs, researchers use tools such as Figma in designing and implementing functional, transmission and efficient interface design principles. This design stage starts from the development of a wireframe that is low fidelity and becomes a prototype that has a high fidelity category and is ready to be tested on users. This prototype functions as a basic product that will be developed later into a complete system in the next implementation stage.

Evaluate Agaist Requirements
The last is the evaluation stage, namely assessing how well the prototype developed is in accordance with user needs and expectations. This evaluation uses the System Usability Scale (SUS), a method that is measured quickly and effectively in measuring interface usability based on user feedback [18]. After testing the prototype, users will complete the SUS questionnaire task with a Likert scale consisting of 10 items. Then the respondent's value will be converted into a score of 0 to 100, to provide ease of use and user satisfaction. SUS is considered effective and efficient because it is easy to use, fast, and has strong validity in usability studies [19], [20].

Table 1. System Usability Scale (SUS) questions

Code	Question
Q1	I think that I would use this system frequently.
Q2	I found the system unnecessarily complex.
Q3	I thought the system was easy to use.
Q4	I think that I would need the support of a technical person to be able to use this system.
Q5	I found the various functions in this system were well integrated
Q6	I thought there was too much inconsistency in this system
Q7	I would imagine that most people would learn to use this system very quickly
Q8	I found the system very cumbersome to use.
Q9	I felt very confident using the system
Q10	I needed to learn a lot of things before I could get going with this system

SUS is a simple evaluation measurement tool in its use, but very effective because it has been widely used in various fields of study related to measuring interface design [21]. This method was developed by Brooke (1995), SUS consists of 10 question items arranged on a 5 point Likert scale, by combining positive and negative questions [22]. The final score will then be converted into a value of 0 to 100 to describe how easy and practical the interface is for users when used [23]. This method is also considered easy to use and reliable, even with a relatively small number of respondents [24]. As explained previously, the calculation of SUS scores is done differently based on odd or even question numbers. Here is the calculation : [25].

- For odd numbered questions (1,3,5,7, and 9), calculate using the formula (1):

$$\text{Odd Score} = \text{Response} - 1 \quad (1)$$

- For even numbered questions (2, 4, 6, 8, and 10), calculated using the formula (2):

$$\text{Even Score} = 5 - \text{Response} \quad (2)$$

Each item thus yields a score ranging from 0 to 4. Once all 10 items have been scored, the total is summed and then multiplied by 2.5 to obtain the final SUS score (see formula (3)), which ranges from 0 to 100.

$$\text{Final SUS Score} = (\text{Total score of all items}) \times 2.5 \quad (3)$$

After individual scores from each respondent are obtained, the average score across all respondents is calculated to determine the overall SUS score, which serves as an indicator of the usability level of the evaluated prototype.

RESULTS AND DISCUSSIONS

Understand Context of Use

The researcher conducted direct observations and interviews with several users to understand the current administrative processes. Following this, a questionnaire was distributed to 38 respondents to validate the initial findings. The questionnaire results indicated that the majority of respondents considered the manual administrative process to be ineffective (71.1%) and not time-efficient (84.2%). Satisfaction with the manual system was also low, with 79% of respondents feeling dissatisfied or very dissatisfied. In contrast, 92.1% of respondents stated that quick access to administrative information is very important. These findings clearly highlight that the current manual system does not adequately meet user needs, thereby necessitating a more efficient digital solution.

Specify User Requirements

This phase aims to define user requirements as the foundation for designing the user interface (UI/UX) prototype, rather than developing a complete system. The goal is to ensure that the prototype reflects the actual needs, expectations, and work behaviors of its intended users. These requirements were derived from the contextual understanding obtained through the initial questionnaire distributed to employees across different divisions. Based on the collected data, the researcher identified several key pain points frequently encountered in the current manual administrative process. These pain points represent real obstacles that

reduce productivity, increase the risk of errors, and lead to dissatisfaction among users. Understanding these issues is essential in formulating a design that is not only functional but also user-friendly and contextually relevant. Some of the recurring problems reported by users include:

Figure 2. User pain points

The figure illustrates five key pain points experienced by users in the employee administration process. First, leave applications are still submitted manually using paper forms without status tracking, often resulting in delays. Second, item requests must go through a multi-layered approval process without a tracking system, causing delays even for urgent needs. Third, daily reporting through Google Sheets is inefficient due to inconsistent formatting and the high risk of data loss. Fourth, data is scattered across various manual platforms, making it difficult to search and compile. Fifth, managers struggle to monitor team performance because the information is not centralized or available in real time.

After identifying the main pain points faced by users in the manual administrative process, the next step was to develop user personas. User personas are used to represent user characteristics, needs, and goals based on the previous findings. By understanding who the primary users of the system are, the UI/UX design process can be more focused and aligned with the real-world context of the workplace.

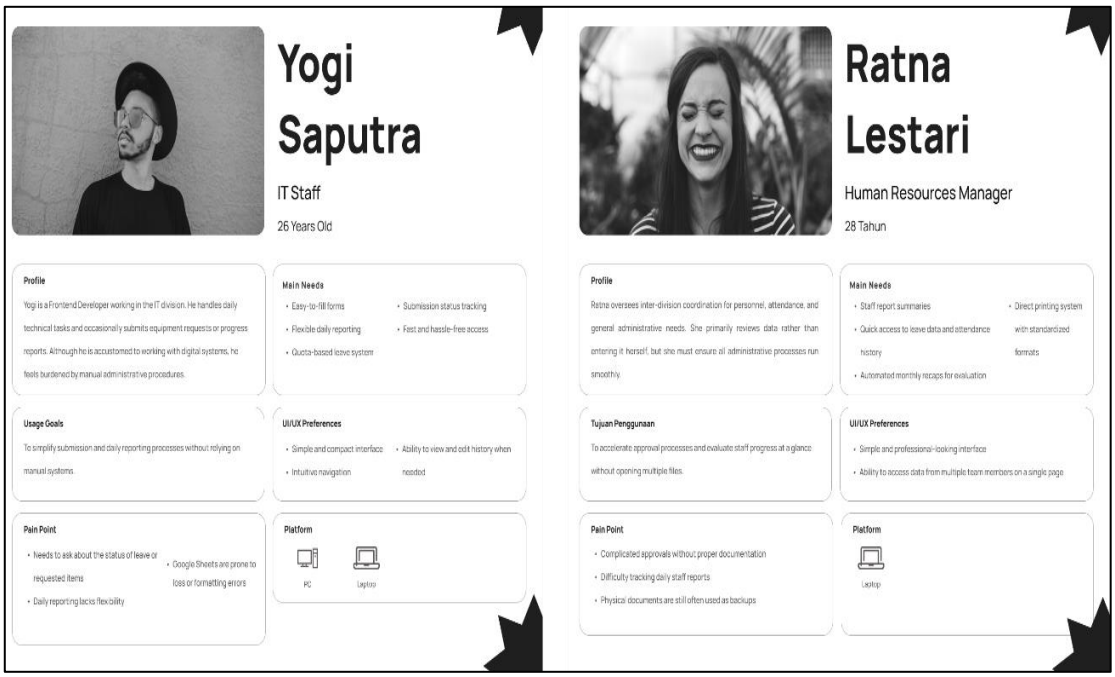

Figure 3. User persona

Based on the pain points identified through data collection, user personas were developed as fictional representations that reflect users' challenges, needs, and the real conditions within the workplace. These

user personas aim to provide a clearer and more human centered understanding of who the users are, how they work, and the daily challenges they face. In this study, two user personas were created to represent the two main roles involved in employee administration processes: IT Staff and HR Manager. These roles were selected due to their distinct responsibilities, needs, and interactions with the system, yet they are interconnected within the administrative workflow.

- The IT Staff is portrayed as an operational user who is accustomed to digital systems but feels burdened by manual administrative tasks, such as inflexible daily reporting, unmonitored submissions, and the need to verbally follow up on request statuses.
- The HR Manager is depicted as a user focused on coordination, monitoring, and decision-making. This persona faces challenges such as complex approval workflows, poorly documented staff reports, and difficulties in accessing data quickly and in a structured manner.

The purpose of these two user personas is to support the UI/UX design process in becoming more focused and aligned with the real characteristics of users. Personas help the design team understand the users' mindset, needs, and usage context, ensuring that the solutions developed are not only functional but also relevant and easy to use for the target users.

Design Solution

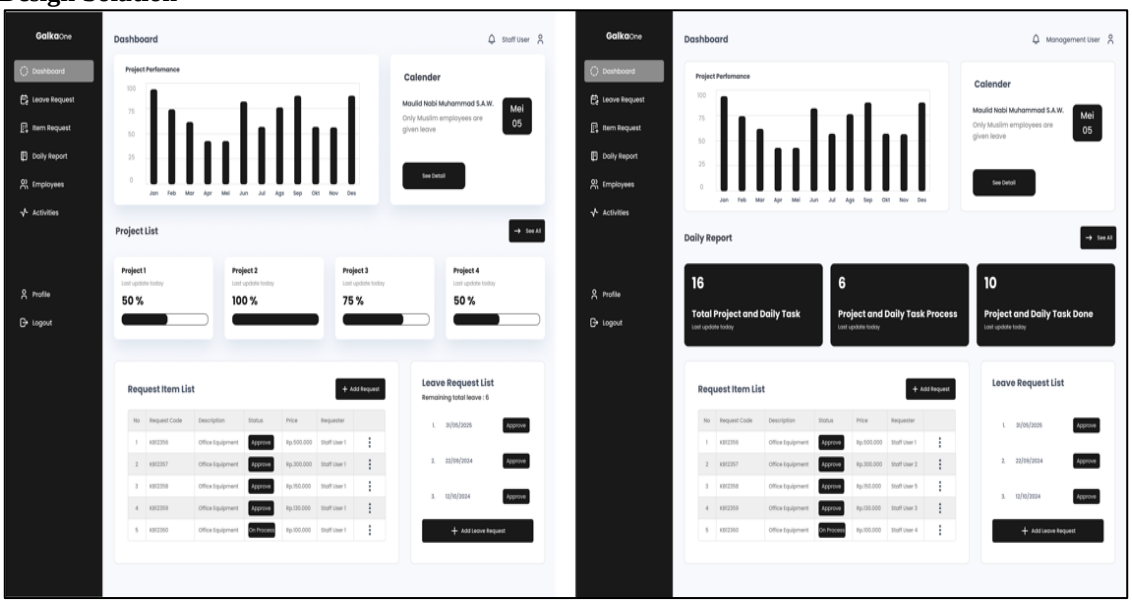

Figure 4. Wireframe user staff and management

After determining user needs, the researchers continued the design process by creating a high-fidelity prototype using Figma software. This prototype was designed to represent the appearance and function of the system close to the final version, although it has not been integrated with the backend. The main focus of the design was to ensure easy access to core features such as leave submission, task reporting, and item requests. The display displays work progress in percentage form, and displays data submissions in a concise and organized manner. Action buttons such as "Send New Leave Acknowledgement" are designed to be easily recognized and accessed by users. On the management side, the interface presents details of team performance status, number of employees, and item requests in visual forms such as graphs and status indicators. The use of color also helps differentiate status information, thus supporting efficient monitoring and decision making processes.

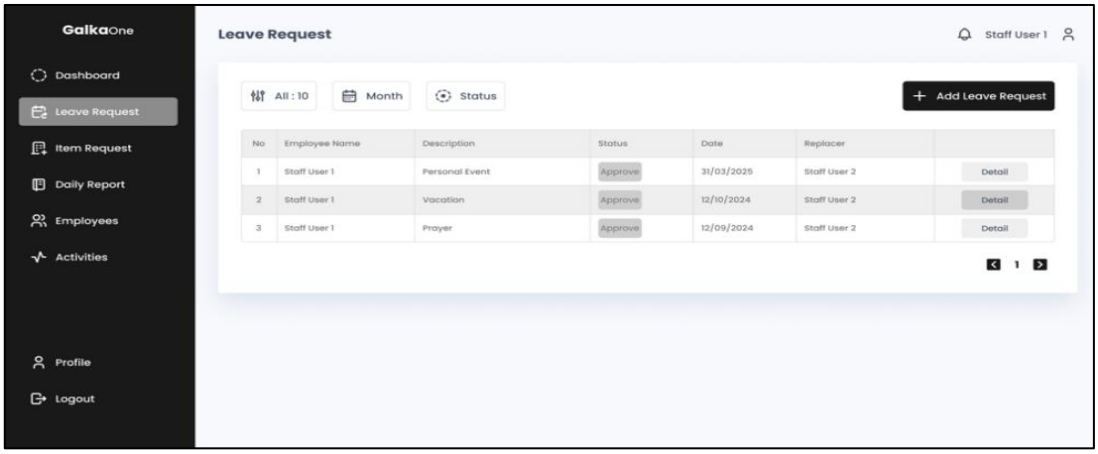

Figure 5. User interface staff users

The image above shows the interface designed for staff users. This image is a simpler user staff interface that only focuses on personal user staff data. Therefore, the features available are more limited. User staff can only view and filter data by month and status, without the ability to access data from other employees. Each data displayed represents an activity carried out by the user, with the "Detail" button serving to view more detailed information.

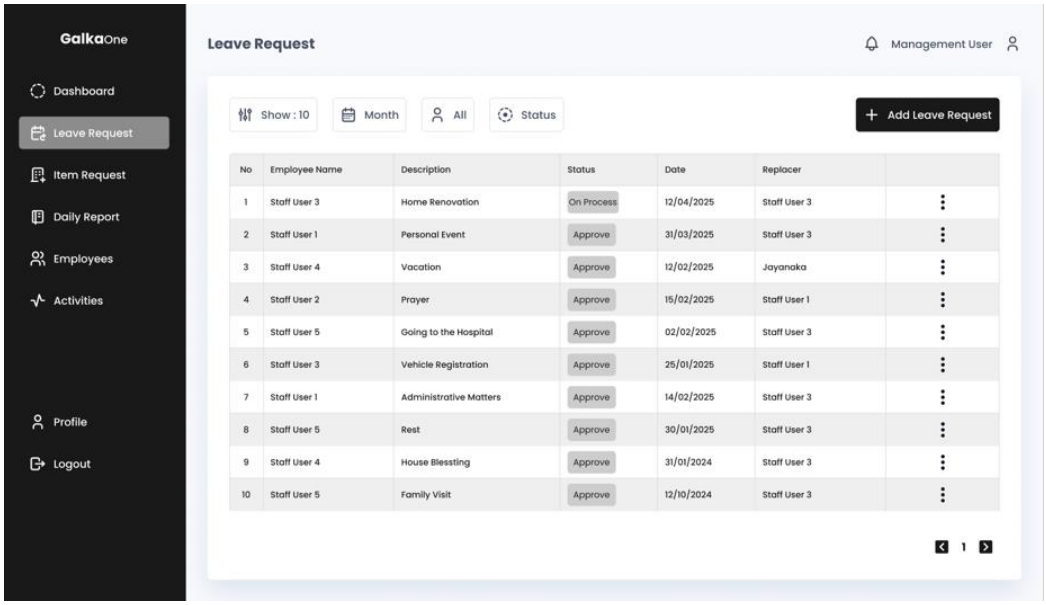

Figure 6. User interface management users

The second image displays a prototype designed for management level users, such as supervisors or division managers. In this interface, users can view and filter all administrative data, including leave requests, item requests, and daily reports submitted by all team members within their division, in addition to their own data. The available filtering options include month, status, and employee name, allowing management to easily supervise and evaluate team performance.

This prototype development has 2 types of user views based on user roles, namely staff and management:

- The staff user interface is more restricted. Staff users have limited access, only able to view and manage their own personal data, such as leave applications, daily task reports, and goods operational requests. To support work efficiency, the staff user interface is designed to be simple and practical, with filter features that only include months and application status. They do not have access to view other employees' data or perform approval actions.
- The management user interface provides broader access, management users have broader access than staff. They can view all staff data, filter by month, status, and employee name, and approve requests

such as leave and goods requests. The interface is designed to support efficient monitoring and decision-making functions.

Evaluate Agaist Requirements

The evaluation stage aims to assess the extent to which the developed prototype can meet the needs and expectations of users. In this study, the evaluation uses the System Usability Scale (SUS) method, users will be asked to fill out the SUS questionnaire consisting of 10 questions, each of which is given a Likert scale rating from 1 (strongly disagree) to 5 (strongly agree) [18]. The results of each respondent's score are then calculated using the standard SUS assessment formula, where each item will be converted, added up, and finally multiplied by 2.5 to produce a final score ranging from 0 to 100 [22], [25]. The table below is a table of SUS scores from respondents, which are calculated based on the SUS method:

Table 2. Results of respondents SUS score calculation

No	Respondent	Question Code										Total	SUS Score
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	R1	4	4	4	3	3	3	4	4	3	1	33	82,5
2	R2	4	3	3	3	3	3	3	3	3	1	29	72,5
3	R3	4	4	4	4	4	3	4	4	4	4	39	97,5
4	R4	4	4	4	4	4	4	4	4	4	4	40	100
5	R5	4	3	4	4	4	4	4	4	4	4	39	97,5
6	R6	4	4	4	4	4	4	4	4	4	4	40	100
7	R7	4	3	4	4	4	4	3	3	4	3	36	90
8	R8	4	3	4	4	4	4	4	4	4	4	39	97,5
9	R9	4	3	4	3	3	3	3	3	4	3	33	82,5
10	R10	3	3	4	3	4	3	4	4	4	4	36	90
11	R11	4	4	4	4	4	3	3	4	4	4	38	95
12	R12	3	4	4	3	4	4	3	4	4	4	37	92,5
-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	R38	4	4	4	4	4	4	4	4	4	4	40	100
Average SUS Score													89,4

The results of the System Usability Scale (SUS) questionnaire filled out by 38 respondents obtained an average score of 89.4. This score exceeds the minimum standard SUS limit for the "Good" category, which is 70 [26], indicating that the developed UI/UX prototype is included in the "Very Good" category in terms of usability. These results indicate that users consider the interface design to be very user friendly, intuitive, and supportive of completing their administrative tasks.

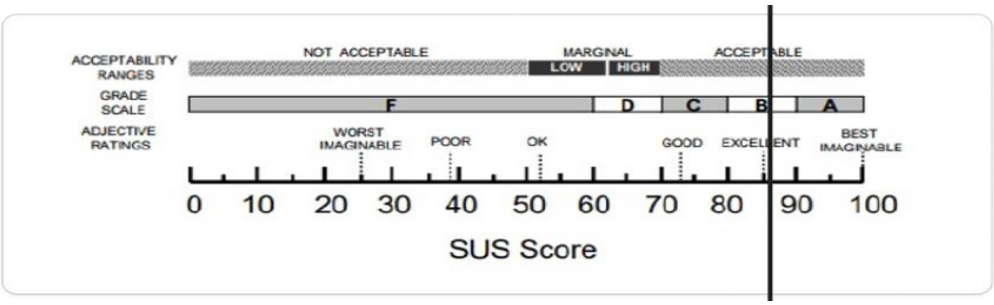

Figure 7. Interpretation Results of the SUS Score for the EMIS Prototype

This score indicates that users do not experience significant obstacles in testing the prototype in their administrative needs. In addition, this evaluation revealed that positive perceptions were felt by both groups of users, namely staff and management. These results indicate that the prototype design has succeeded in meeting user needs in 2 users with consistent results and good inclusiveness. These overall results reinforce that the User Centered Design (UCD) approach applied in this study is able to provide final results in the

form of a prototype with high usability, and can serve as a strong foundation in further development in the implementation into a system.

CONCLUSION

The conclusion of this study, the development of a UI/UX prototype for an employee management information system using the User Centered Design (UCD) approach has succeeded in providing a high-fidelity prototype design that is in accordance with user needs and their administrative workflow. By applying the principles in UCD to all stages such as problem recognition, understanding the context, determining user requirements, design solutions, and evaluating the prototype, it achieves a marketing and functional interface. By producing an average score of the System Usability Scale (SUS) of 89.4 which is categorized as "Very Good". This confirms that the prototype is easy to use and well received by users from various roles. These findings prove user involvement throughout the design process and indicate strong feasibility for further development and integration into the system for the company.

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