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# Optimization of Employee Certification System UI Using User-Centered Design Model

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**Abstract:** A digital-based employee certification system plays a crucial role in ensuring compliance with industry standards while enhancing employee engagement and productivity. However, a less intuitive interface design remains a challenge in its implementation. This study aims to evaluate the usability of an employee certification website using the User-Centered Design (UCD) approach and the System Usability Scale (SUS) to enhance user experience and information accessibility. The research method involved system testing by 30 employee respondents as primary users, with evaluations based on the SUS. The analysis results indicate that the system achieved an average SUS score of 84.8, classified as "Very Good" and "Acceptable," signifying a high level of usability. These findings confirm that UCD-based design can improve user satisfaction and the efficiency of the certification process. However, certain aspects still require optimization, particularly regarding navigation and system feedback to support more effective interaction. The implications of this study include design improvement recommendations to enhance user engagement, accessibility, and overall certification platform effectiveness. Thus, this research contributes to the development of a more inclusive and responsive certification system that better meets user needs, ultimately supporting the achievement of organizational goals more effectively.

**Keyword:** Web, User-Centered Design, Employee Certification, User Experience Evaluation, System Usability Scale.

## INTRODUCTION

The phenomenon of employee certification interface systems presents complex challenges encompassing technological, organizational, and psychological dimensions. The digitalization of the certification process is a crucial element in enhancing employee performance and ensuring compliance with industry standards. However, the implementation of such systems still faces various obstacles, particularly in terms of intuitive and user-friendly interface design. Onufriev (2024) highlights the importance of graphical interfaces in multi-user systems to support effective decision-making, while Vyshnivska (2024) emphasizes the

need for an objective certification methodology to create a supportive social and psychological climate within organizations.

Organizational culture also plays a vital role in the effectiveness of certification systems. Dashko (2022) reveals that certification is not merely an administrative procedure but also a strategy to enhance employee engagement and productivity. Management support is a critical factor in the successful implementation of this system, as stated by Vyshnivska (2024), who stresses that strong leadership is essential in driving certification initiatives .

With technological advancements, the User-Centered Design (UCD) approach has become widely adopted to improve user experience in various digital systems, including employee certification websites. UCD focuses on user needs and preferences at every stage of development, potentially enhancing the efficiency of the certification process, workforce quality, and compliance with industry standards. Astina (2024) found that user comfort-oriented design can increase user satisfaction, while Abyakta (2023) highlights the importance of aligning design with user needs to optimize their experience . However, there remains a research gap regarding the application of UCD in the specific context of employee certification websites, particularly in terms of efficient navigation, information accessibility, and inclusive user experience.

Although UCD has been individually proven effective in improving user experience, its integration into the development of employee certification websites remains underexplored. The primary challenges in developing these platforms include presenting complex information, simplifying the certification process, and enhancing user engagement. Imbesi & Scataglini (2021) argue that adapting UCD in the certification context requires a more specific approach , while Dooley et al. (2021) emphasize the importance of understanding diverse user needs to create a more inclusive design. Additionally, Campoverde-Molina et al. (2021) highlight that accessibility is a key factor in improving user experience, particularly on platforms designed for professional purposes. The problem formulation contains article questions that must be explained in the discussion and answered in the conclusion.

Based on this background, this study aims to explore the effectiveness of integrating User-Centered Design (UCD) in enhancing usability and user satisfaction on employee certification websites. This research also seeks to address specific challenges in the development of certification platforms by providing intuitive design solutions, improving information accessibility, and offering feedback mechanisms that support continuous improvement. Thus, the findings of this study are expected to contribute to the development of a more effective certification interface, increase employee engagement, and support the overall achievement of organizational goals.

Additionally, evaluation plays a crucial role in User Experience (UX) by assessing or identifying any issues that may hinder user satisfaction, examining how comfortable users feel with the product, and making necessary adjustments before the final product launch. This evaluation can take various forms, including usability testing or the System Usability Scale (SUS), where real users interact with the product and provide feedback on its functionality and ease of use. Research has shown that SUS scores are effective in categorizing usability levels, with scores above 68 indicating acceptable usability. This approach provides a comprehensive understanding of the effectiveness and quality of user experience in relation to the designed system.

## METHOD

This study employs the User-Centered Design (UCD) approach, a design philosophy that emphasizes active user involvement throughout the design and development process to ensure that the final product is effective, relevant, and user-friendly. This approach is implemented through four iterative phases, as illustrated in Figure 1, which include understanding the context of use, defining user needs, designing solutions, and evaluating against those needs. Each phase

is interconnected and plays a vital role in ensuring that the final product is both effective and user-friendly.

Moreover, the UCD approach has been proven to enhance usability and user satisfaction through iterative methods such as interviews and usability testing, including for user groups with special needs. By integrating these elements, this study ensures that the final product is not only functional but also relevant and engaging for end users, promoting higher adoption rates and usability.

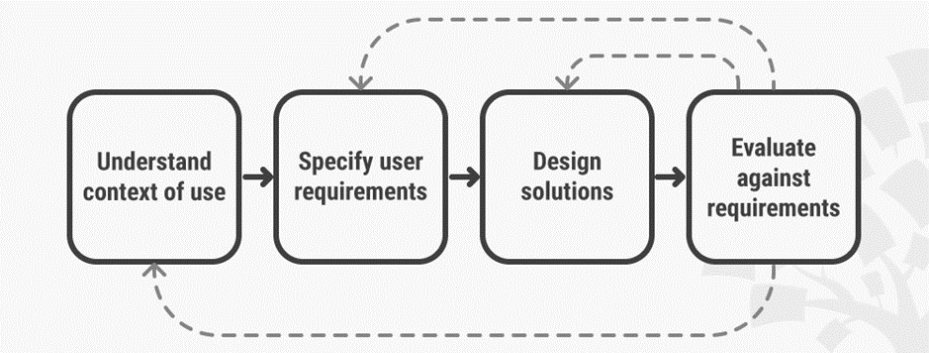


**Figure 1. User-Centered Design Flow**

The first phase, understanding the context of use, involves gathering comprehensive insights about users, their tasks, and the environment in which they will interact with the product. Interview and observation methods are highly effective in accurately capturing the context in which users operate. This phase is crucial as it serves as the foundation for all subsequent design activities.

The second phase, defining user needs, focuses on determining what users require from the product based on the insights collected in the first phase. This involves articulating user goals, tasks, and any constraints they may face. In the third phase, designing solutions, designers create prototypes or models based on the identified user needs. This phase is characterized by creativity and innovation, where various design alternatives are explored. Since visual design is the primary tool for communicating with most users through digital media, the iterative nature of UCD means that designers frequently revisit this phase, refining their solutions based on user feedback.

The final phase, evaluating against user needs, involves testing design solutions to ensure they meet the defined user requirements. This study utilizes the System Usability Scale (SUS) as a widely recognized evaluation tool for assessing the usability of various systems, including web interfaces and applications. In some cases, additional interviews are conducted with participants who experience difficulties to gain deeper insights into the challenges they face.

## RESULTS AND DISCUSSION

The results of this study are divided into seven sections, including data collection, which covers user personas; user requirements, which include class diagrams, use cases, and conceptual models; design solutions, which encompass low-fidelity and high-fidelity prototypes; and finally, testing and feedback using the System Usability Scale (SUS).

### 1. Data Collection

Data was gathered through in-depth interviews involving employees in Purwakarta, West Java. These interviews aimed to explore potential users, user workflows, required features, the existing certification system—which currently relies on Google Spreadsheets for manual certification data storage—and other relevant needs, including database management. The

collected information was then summarized into user personas, designed to concisely and informatively depict user profiles based on various variables such as demographics, behavior, goals, and challenges. These representations help developers gain a deeper and more contextual understanding of users, serving as a guide in designing a more relevant and user-centric system.

Table 1. User Persona

| Characteristics | Representation |
|---|---|
| Demographics | Age 17-56, Male and female, Staff or Employees |
| Goals | Users want to ensure that employee certification data is accurately available and well-organized, facilitating management and tracking of employee certifications. |
| Challenges | Data complexity involving thousands of employees with various certification levels and different categories, as well as ensuring certification data security against unauthorized access. |
| Needs and Expectations | Ease of use, full integration with the company's system, and effective reporting features for strategic decision-making related to employee career development. |
| Motivation | Users are interested in an employee certification data application to help the company identify employee potential and development needs more effectively. |

## 2. User Requirements

User requirements were analyzed in-depth by integrating observations and information gathered from user personas. This analysis aims to identify specific needs that must be addressed in designing the system solution.

Based on the analysis results, user needs were formulated and systematically presented in Table 2, which outlines the essential features and elements required to support the use of the employee certification website in this study.

Table 2. User Requirements

| Needs | Feature Requirements |
|---|---|
| Certification Overview Diagram displaying the validity status of employee certificates | Displays a percentage diagram on the homepage showing three certificate categories: Valid, Expiring within one month, and Expired. |
| List of employees with certification | Provides a menu page displaying a complete list of employees along with their departments and types of certifications. |
| Employee list, departments, and certification types | Provides a menu page displaying separate lists of employees, departments, and certification types within the company. |
| Export certification reports | Provides a page to display all lists, including employee certifications, employees, departments, and certification types, which can be directly exported as a document. |

| | |
|---|---|
| Create, Update, Delete, and View data (admin access) | Allows website admins to add, edit, delete, and view detailed data for all lists, except for certification reports, with an integrated database. |
| Table Filter and Search function | Provides a search bar and data filtering feature, allowing users to select a filter column and sort data. |
| Horizontal Scroll Bar for data tables | Adds a horizontal scroll bar for tables with more columns than the table width. |

In addition to the user persona, the author also created a Class Diagram in Figure 2 to represent the user interface and their interactions with the underlying classes. This representation helps in understanding how various system components collaborate and serves as an overview of the database structure to meet user requirements.

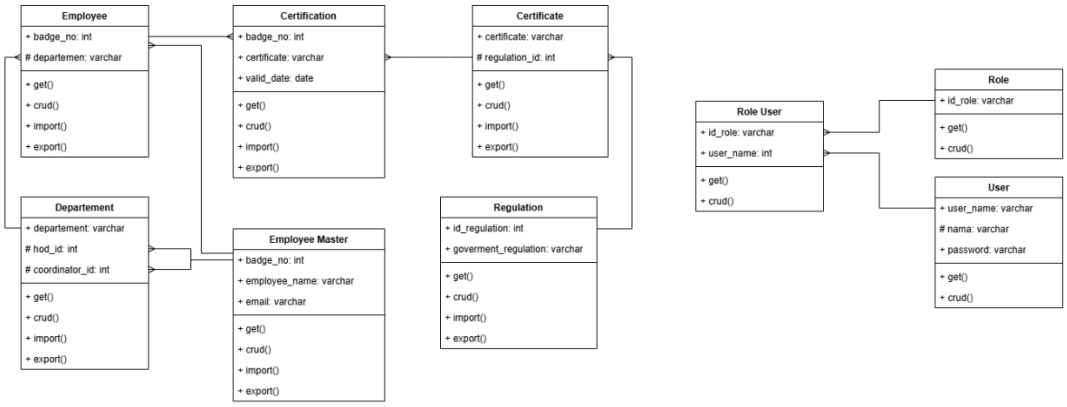


**Figure 2. Class Diagram**

Next, the author created a Use Case Diagram, which plays a crucial role in defining how users will interact with the system. The use case diagram also contributes to a clearer understanding of system behavior and the relationships between various components, thereby enhancing the overall design process. Users are divided into two categories: Admin and User, as detailed in Figure 3.

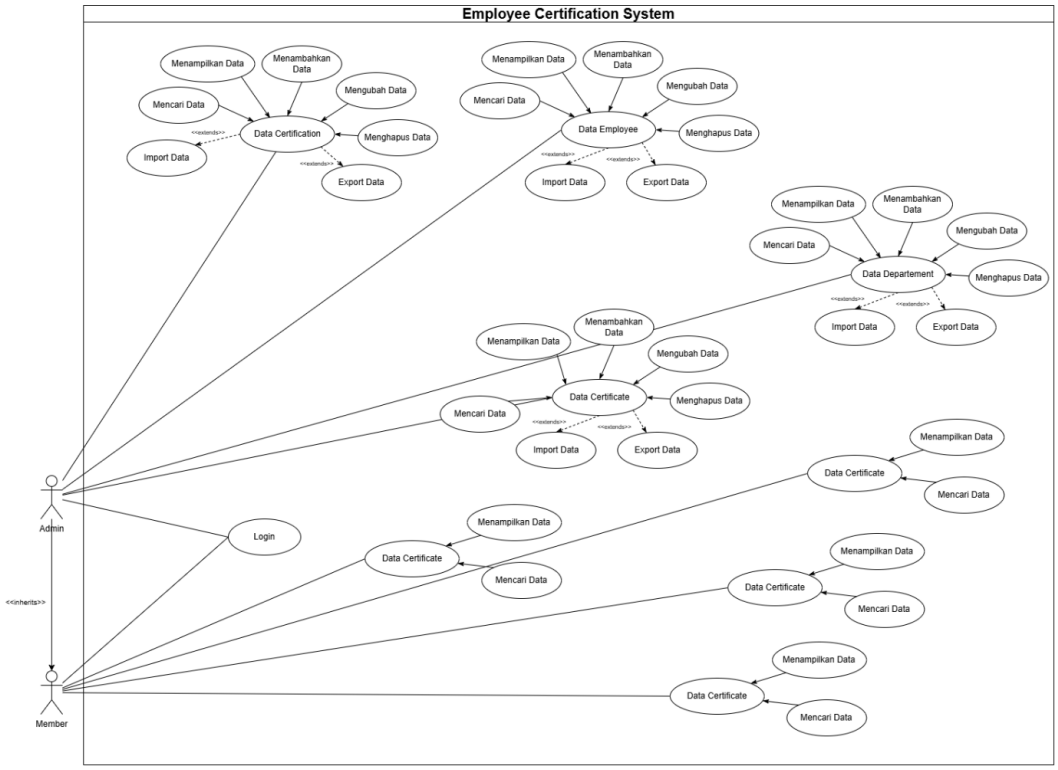


**Figure 3. Use Case Diagram**

## 3. Design Solution

At this stage, the research focuses on developing a design solution based on the user requirements formulated in the previous phase. This process begins with mapping the conceptual model, as shown in Table 3, which serves as a fundamental framework for visualizing user interactions with the system, providing a primary guide for the proposed features, and ensuring that design decisions remain relevant to real-world contexts.

**Table 3. Conceptual Model**

| Task | Subtask | Response | Placement | Element | Description |
|---|---|---|---|---|---|
| Homepage | | Displays the initial page containing the Certification Overview percentage diagram | Appears when the user first visits the employee certification website | Diagram, text | Centered layout display |
| | Menu pada NavBar | Displays the initial page containing the Certification Overview percentage diagram | Appears when the user first visits the employee certification website | Button | |
| NavBar Menu | | Displays a list of all databases in the system | Appears when the user clicks a menu button | Table, button, text | Tampilan tata letak berpusat |
| CRUD and Look Data | Create Data | (On Click) Navigates to a pop-up page for adding new data | Appears when the user clicks the "Add Data" button | Button, pop-up, input box, dropdown, text | Display layout appears at the top right of the table |

| Task | Subtask | Response | Placement | Element | Description |
|---|---|---|---|---|---|
| | Update Data | (On Click) Navigates to a pop-up page for editing existing data | Appears when the user clicks the pencil icon on the data row to be edited | Button, pop-up, input box, dropdown, text | Display layout appears inside the data table, last column of the selected data row |
| | Delete Data | (On Click) Navigates to an alert: "Are you sure you want to delete this data? If you delete it, the data will be permanently | Appears when the user clicks the trash icon on the data row to be deleted | Button, alert, text | Display layout appears inside the data table, last column of the selected data row |
| | Look Data | (On Click) Navigates to a pop-up page displaying detailed data | Appears when the user clicks the eye icon on the data row to be viewed | Button, pop-up, text | Display layout appears inside the data table, last column of the selected data row |
| Table Filtering and Sorting | Select Table Column | (On Click) A dropdown appears containing the names of the table columns | Appears when the user clicks the "Select Column" dropdown | Button, dropdown, text | Display layout appears above the data table |
| | Select Sorting Order | (On Click) A dropdown appears with options like Ascending and Descending | Appears when the user clicks the "Sort By" dropdown | Button, dropdown, text | Display layout appears above the data table |
| Export Certificatio n Report | Export Data from Report Page | (On Click) Navigates to a pop-up print preview page of the Employee Certification report | Appears when the user clicks the "Export Data" button | Button, pop-up, text | Display layout appears at the top right of the table |
| Horizontal scroll bar | Select a menu containing a data table | (On Click and Hold) The table scrolls left or right to view more data | Appears when the user clicks and holds the cursor on the data table | Teks, tabel | Centered layout display |

The design solution was developed gradually, starting with the creation of the User Interface (UI), which serves as the visual representation of the product that connects the system with users and provides functional benefits. This was followed by the development of a low-fidelity prototype, which plays a crucial role in the early stages of design. In the low-fidelity prototype, the number of diagrams and menus was adjusted according to user requirements. For example, in the data table and homepage, there are three category diagrams representing certificates that are still valid, those that will expire within one month, and those that have already expired.

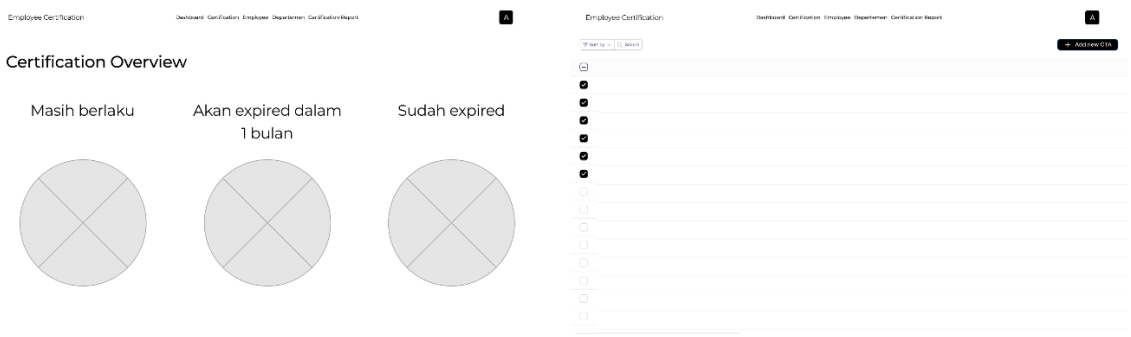


**Figure 4. Low-Fidelity Prototype**

After developing the low-fidelity prototype, this study continued with the creation of an interactive design using a high-fidelity prototype. This prototype was developed using Figma, a design tool that supports the entire design workflow, from initial wireframes to high-fidelity mockups, making it a versatile tool for various stages of product development. The high-fidelity prototype was designed with detailed visual elements, including the use of colors, typography, and images, to create a realistic representation that closely resembles the final product. These elements not only help reflect the product's aesthetics but also ensure a more realistic user experience during the testing process.


**Figure 5. Color Palette Used**

The user interface (UI) design in this study focuses on desktop devices, integrating a green and white color palette, chosen based on psychological and functional considerations. Green has significant psychological implications, particularly in creating a sense of calm, security, and relaxation. Research indicates that green can effectively filter distractions and enhance focus, making it an ideal color to support user experience in digital environments.

Additionally, the use of green in UI design has been proven to improve readability and recognition efficiency, especially when paired with a contrasting background. On the other hand, white is often associated with simplicity, cleanliness, and clarity, which psychologically promotes a sense of peace and reduces users' cognitive load. As a background color, white allows other elements such as text and icons to stand out clearly, improving readability and user engagement. This color combination is designed to create an aesthetic, functional, and intuitive interface aligned with user-centered design principles. Figure 6 presents an illustration of the prototype design for the Dashboard page, created using Figma.

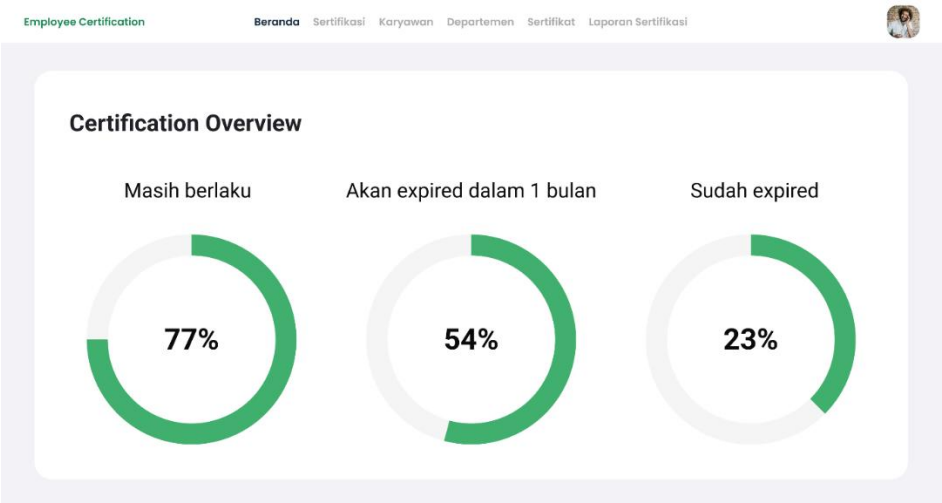


**Figure 6. High-Fidelity Dashboard Prototype**

Next, Figure 7 presents the data table page for employee certification information, which can be viewed, edited, and deleted by the admin.

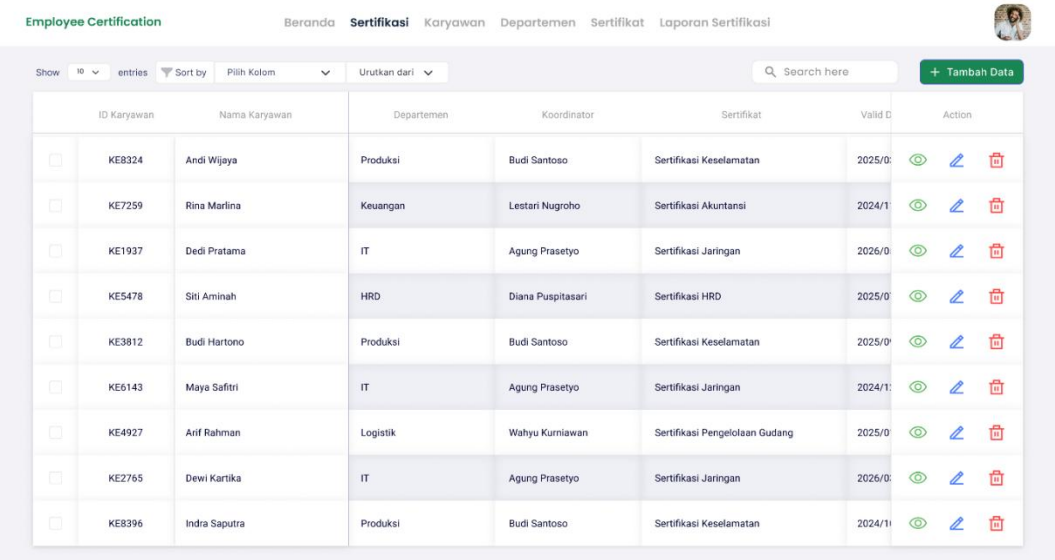


**Figure 7. High-Fidelity Prototype of the Certification Data Table**

In addition to the data table that can be modified by the admin, there is also a member page that contains comprehensive data, which cannot be edited. This data table can also be directly exported into a file that can be saved or downloaded, as shown in Figure 8.

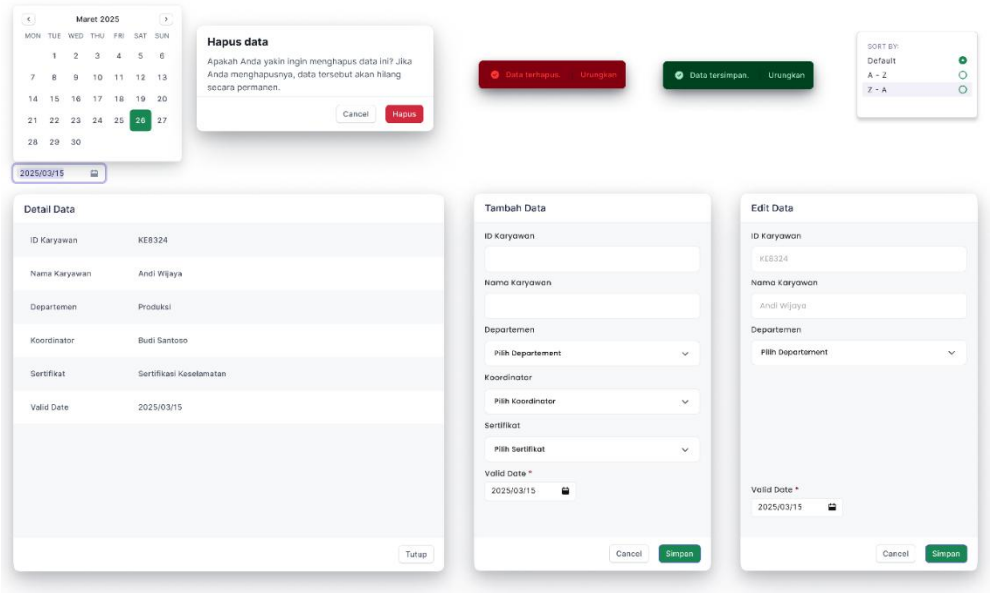


**Figure 9. Supporting Components**

## 4. Testing and Feedback

The testing phase involved 30 respondents, consisting of employees in the Purwakarta regency who are the primary users of the system. Respondents were asked to use the system and complete a set of specific tasks, such as navigating through each menu, accessing data tables, and viewing available data, as outlined in Table 4.

**Table 4. List of Respondent Tasks**

| No | Item |
|---|---|
| 1 | Check if the Certification Overview percentage diagram appears on the homepage. |
| 2 | Access one of the menus in the NavBar. |
| 3 | Verify if the database list appears based on the selected menu. |
| 4 | Add new data. |
| 5 | Edit existing data. |
| 6 | Delete a data entry. |
| 7 | View details of a specific data entry. |
| 8 | Select a column to filter data. |
| 9 | Try sorting data in Ascending/Descending order. |
| 10 | Scroll the data table horizontally. |

To create the System Usability Scale (SUS) questionnaire used in the interface design evaluation, this study follows the standard SUS structure. The questionnaire consists of ten statements, including five positive statements and five negative statements, designed to capture various aspects of the user experience. Responses to each statement are given on a five-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree," to provide standardized and consistent measurements in assessing system usability. This structure ensures a balance between positive and negative perspectives to reduce potential bias in user responses. Table 5 presents the ten items used in this SUS questionnaire.

**Table 5. SUS Questionnaire Items**

| No | Item |
|---|---|
| 1 | I think I would use this system frequently. |
| 2 | I feel that this system is not unnecessarily complex. |
| 3 | I think this system is easy to use. |
| 4 | I think I would need the support of a technical person to use this system. |
| 5 | I feel that the various functions in this system are well integrated. |
| 6 | I feel that there is too much inconsistency in this system. |
| 7 | I imagine that most people would learn to use this system very quickly. |
| 8 | I find using this system to be very cumbersome. |
| 9 | I feel very confident using this system. |
| 10 | I need to learn a lot of things before I can start using this system. |

To calculate the System Usability Scale (SUS) score, this methodology involves adjusting the raw scores from the questionnaire responses using the following steps:

1. Odd-numbered items (1, 3, 5, 7, 9): The user's score is reduced by 1. For example, if a user gives a score of 5 for these items, the contribution to the score is 4.
2. Even-numbered items (2, 4, 6, 8, 10): The user's score is subtracted from 5. For instance, if a user gives a score of 2, the contribution becomes 3.
3. The adjusted scores from all ten items are summed, resulting in a total score ranging from 0 to 40.
4. Finally, to convert this score into a 0-100 scale, the total score is multiplied by 2.5 and divided by the total number of respondents, which is 30.

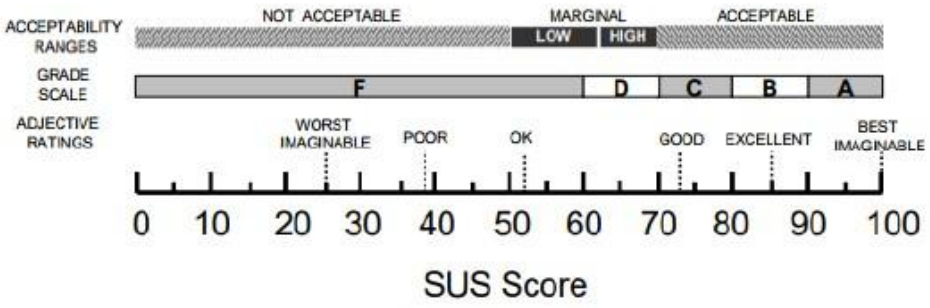


**Figure 10. System Usability Scale (SUS) Range**

The final score represents the system's usability level, with higher scores indicating better usability. As illustrated in Figure 11, SUS is widely recognized for assessing the usability of various systems, generating scores on a 100-point scale. Score interpretation follows an adjective rating scale that categorizes usability into five levels: "Excellent" (score > 80), "Good" (69–80), "Acceptable" (68), "Poor" (51–67), and "Very Poor" (< 51).

**Table 6. SUS Score Results**

| Responden | SUS | | | | | | | | | | Total | Skor SUS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | | |
| R1 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 37 | 93 |
| R2 | 4 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 36 | 90 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R3 | 4 | 4 | 3 | 3 | 2 | 4 | 4 | 4 | 4 | 3 | 35 | 88 |
| R4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 37 | 92,5 |
| R5 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 3 | 31 | 77,5 |
| R6 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 33 | 82,5 |
| R7 | 3 | 3 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 4 | 33 | 82,5 |
| R8 | 4 | 3 | 3 | 3 | 4 | 3 | 2 | 4 | 4 | 3 | 33 | 83 |
| R9 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 3 | 35 | 87,5 |
| R10 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 36 | 90 |
| R11 | 3 | 3 | 4 | 4 | 2 | 3 | 4 | 3 | 4 | 4 | 34 | 85 |
| R12 | 4 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 2 | 3 | 33 | 82,5 |
| R13 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 4 | 32 | 80 |
| R14 | 4 | 3 | 3 | 4 | 4 | 3 | 2 | 3 | 4 | 3 | 33 | 83 |
| R15 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 34 | 85 |
| R16 | 4 | 3 | 3 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 34 | 85 |
| R17 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 36 | 90 |
| R18 | 3 | 3 | 2 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 35 | 87,5 |
| R19 | 4 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 4 | 32 | 80 |
| R20 | 4 | 3 | 4 | 3 | 2 | 4 | 3 | 3 | 4 | 3 | 33 | 82,5 |
| R21 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 3 | 3 | 3 | 31 | 78 |
| R22 | 4 | 3 | 4 | 3 | 4 | 3 | 2 | 4 | 3 | 3 | 33 | 83 |
| R23 | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 34 | 85 |
| R24 | 4 | 3 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 36 | 90 |
| R25 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 35 | 88 |
| R26 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 35 | 87,5 |
| R27 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 4 | 2 | 3 | 33 | 83 |
| R28 | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 3 | 4 | 3 | 31 | 77,5 |
| R29 | 3 | 3 | 2 | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 34 | 85 |
| R30 | 4 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 34 | 85 |
| SUS Result | | | | | | | | | | | | **84,8** |

Table 6 presents the results of the employee certification website, which achieved an SUS score of 84.8, categorizing it as "Very Good" and "Acceptable", as illustrated in Figure 11. User feedback provided recommendations for improvements, including several strategic steps such as fixing problematic features and increasing font size to enhance readability. Additionally, users suggested adding visual elements such as graphs or status indicators to help them quickly and efficiently understand information. These enhancements are expected to not only improve user experience but also reinforce the system's professionalism, ensuring it meets user needs optimally.

## CONCLUSION

This study aims to evaluate the usability level of a web-based online certification system using the System Usability Scale (SUS) approach. A total of 30 respondents, consisting of employees as primary users, participated in the testing. The data analysis results indicate an average SUS score of 84.8, which falls into the "Very Good" and "Acceptable" categories based on standard SUS interpretation. This score signifies that the system has successfully met good usability criteria, provides a satisfactory user experience, and effectively supports users' functional needs. However, the study also identified certain weaknesses in specific aspects that need improvement to further enhance system performance and user comfort for optimal usability.

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