

UI/UX Design of the HaloRT Application Using the Design Thinking Method

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Abstract

Administrative processes and security reporting at the Neighborhood Association (RT) level are generally still carried out using conventional methods. Digital transformation is often hindered by low adoption rates due to interface designs that lack inclusivity regarding the accessibility needs of elderly users. Therefore, this study aims to design the User Interface and User Experience (UI/UX) of the HaloRT application featuring a "Senior Mode" to enhance inclusivity, and to objectively evaluate its usability. A Design Thinking approach was applied through the Empathize, Define, Ideate, Prototype, and Test stages. The evaluation was conducted using the System Usability Scale (SUS) instrument involving 15 respondents from various age groups. The results indicate that the interactive prototype successfully mapped the residents' needs and integrated reporting, financial, and inclusive setting features. The SUS testing yielded an average score of 71.17, which falls within the Acceptable range with a Good rating. In conclusion, the HaloRT interface is proven to be inclusive, easy to navigate, and well-received across all ages, thus holding great potential to optimize the digitalization of RT administration on a sustainable basis.

Keywords: RT Digitalisation, Design Thinking, System Usability Scale, UI/UX.

1. Introduction

Community safety and administrative order are essential basic needs in social life. In the smallest social units, such as Neighborhood Associations (RT), administrative management and resident data collection are often still carried out conventionally, relying on paper-based methods or word of mouth [1]. The mechanism for reporting security disturbances generally also still relies on manual communication via WhatsApp groups or reporting directly to the RT committee [2]. Based on direct field observations, particularly in the area of RT 09/RW.dk.12, Sonopakis Kidul, Ngestiharjo, Kasihan Subdistrict, Bantul Regency, Special Region of Yogyakarta, which is currently facing real challenges in promoting digital literacy and resident data collection, these conventional methods have significant shortcomings, such as decentralized data, reports being prone to being overlooked, and a lack of traceability regarding the resolution of issues. This creates a gap between the current state of community management and the ideal scenario where micro-scale public services should operate quickly, transparently, and be well-documented.

The importance of designing an appropriate user interface in the digitization of micro-scale services has been highlighted by various previous studies. The use of instant messaging apps for citizen complaints has proven ineffective due to the lack of structured interaction flows and record-keeping [3]. Meanwhile, Mahendra states that the utilization of information technology in RT/RW communities remains very limited [4]. This is supported by the findings of Magdalena et al., which highlight the low adoption rate of citizen management apps in the community [5]. This series of problems indicates that the availability of a functional system alone is not enough. Low levels of digital participation among residents actually demonstrate a critical gap in the design of the User Interface (UI) and User Experience (UX), which are not yet centered on user-friendliness, making it difficult for residents to adapt.

The low adoption rate of this technology highlights a specific issue that is often overlooked: the lack of design inclusivity for the user demographic [6]. The Central Statistics Agency notes that the percentage of the elderly population in Indonesia has been increasing consistently every year [7]. This group, ranging from pre-elderly to elderly individuals, often comprises the most active members and plays a central role in community management and

social activities at the Neighborhood Association (RT) level. However, currently available neighborhood management apps generally have not adapted to the visual and cognitive limitations of the elderly. The limitation of previous studies, which focused solely on the completeness of administrative features without prioritizing age-friendly design, has become a major gap hindering the creation of a comprehensive digital ecosystem for residents.

To address these issues, the HaloRT application interface was designed—a mobile-based platform for reporting, communication, and financial administration management for residents. The novelty of this research lies in the design of an inclusive User Interface and User Experience (UI/UX) through the integration of the “Senior Mode” feature. This feature simplifies the application’s interface with larger text, ensuring accessibility for elderly users. Therefore, this scientific article aims to describe the HaloRT UI/UX design while objectively evaluating its usability level using the System Usability Scale (SUS) method. The results of this evaluation are expected to prove the validity of the cross-age design and serve as an empirical foundation for the design of inclusive public service applications to realize sustainable community digitalization.

2. Research Method

This study employs the Design Thinking method to develop innovative solutions focused on user needs, with the aim of effectively addressing the problems encountered [8]. According to Istiqomah et al. [9], Design Thinking is an iterative process aimed at understanding users, reframing problems, and generating solutions by integrating user needs into prototypes that are subsequently tested for feasibility. In this study, a process of identifying needs and collecting information regarding the features required by residents in the HaloRT application was conducted, particularly regarding reporting, communication, and administrative management at the RT level. This study consists of five main stages: Empathize, Define, Ideate, Prototype, and Test, as shown in Figure 1.



Figure 1. Stages of the Design Thinking Method [8]

2.1 Empathize

The Empathize stage in Design Thinking focuses on gaining a comprehensive understanding of the problems faced by the research subjects [10]. In practice, the Empathize stage involves exploring user needs through an emotional approach. Researchers are required to understand the feelings, goals, and constraints experienced by the informants, so that they can identify user needs, potential obstacles, and user expectations regarding the problems faced [11]. The Empathize stage is carried out through a process of interviews involving relevant informants directly related to the case study, namely the RT Head and resident representatives who have experienced challenges in the administration and environmental reporting of the RT.

2.2 Define

During the Define phase, an analysis of the previously collected data is conducted to formulate the problem in a more focused and clear manner [12]. Data processing at this stage involves grouping information based on the results of identifying user experiences and perspectives. Through this process, researchers can explore users’ feelings and experiences, thereby gaining a deeper understanding of their perspectives. Additionally, this stage involves the creation of user personas aimed at describing the characteristics of potential users of the HaloRT app, such as neighborhood association leaders, residents, and the elderly. This approach helps identify the diverse needs and preferences of users.

2.3 Ideate

Karlina and Indah [12] explain that the Ideate phase is a process of developing ideas by further elaborating on the needs identified in the Define phase, thereby generating various alternative solutions based on the problems that have been formulated. In this stage, the various needs identified during the Define process are organized into a set of features to be implemented in the development of the HaloRT app, such as a citizen reporting system, data management, communication tools, and the Senior Mode. This aims to serve as the foundation for designing a user experience that is appropriate, user-friendly, and inclusive.

2.4 Prototype

The Prototype phase is the process of translating the ideas generated during the Ideate phase into app features that users can test. This phase aims to identify errors early on and open up opportunities for developing better solutions [13], [14]. It begins with the creation of a low-fidelity wireframe as a basic, simple design framework, typically a black-and-white layout with a low level of detail. Next, the process continues with the development of a high-fidelity design that includes more complete details, such as the use of color, content, typography, and text within the application [9].

2.5 Test

The Test phase aims to evaluate the usability of the HaloRT high-fidelity design using the standardized System Usability Scale (SUS) questionnaire after respondents complete the task scenarios. Although this is the final phase of Design Thinking, the testing is iterative to allow for design improvements if interaction gaps are identified [14]. The testing involved 15 respondents who are active as residents or RT administrators, comprising 8 men and 7 women to balance social role perspectives. This sample size was selected based on early-stage prototype testing literature, which recommends 10–15 participants to obtain reliable SUS scores with high stability [15]. Additionally, to ensure demographic representation when testing the accessibility of the “Senior Mode,” respondents were classified into three age ranges, as shown in Table 1 below.

Table 1. Age Distribution of Respondents

Age	Number of Respondents
18 - 40	7 participants
41 - 59	5 participants
> 60	3 participants
Total	15 participants

3. Literature Review

3.1 User Interface (UI) and User Experience (UX)

User Interface (UI) refers to the visual elements of an application that users interact with, such as buttons, icons, colors, and layouts [12]. Meanwhile, User Experience (UX) refers to the user's experience when using the application, encompassing comfort, ease of use, and the effectiveness of the system [10]. UI and UX play a crucial role in improving the quality of digital services. In digital-based public services, suboptimal interface design can lead to low technology adoption rates among users [5]. Therefore, the development of the HaloRT application requires an interface design that is simple, intuitive, and easy to use for people of all ages.

3.2 Design Thinking Method

Design Thinking is a system development method that focuses on user needs through an iterative approach [8]. This method consists of the following stages: Empathize, Define, Ideate, Prototype, and Test [9]. Previous research has shown that Design Thinking is effective in the development of digital application UI/UX for improving the user experience [10].

3.3 System Usability Scale (SUS)

The System Usability Scale (SUS) is a usability evaluation method used to measure how easy a system is to use [15]. The SUS uses 10 questions on a 1-to-5 rating scale to assess

users' acceptance of an application. This method is considered effective and reliable for evaluating the user experience with mobile applications [16].

4. Results and Discussion

The application of the Design Thinking method in the design of the HaloRT app interface aims to identify real-world problems faced by residents, develop effective digital solutions, and foster innovation centered on user inclusivity. Through this method, the app design is ensured to be relevant and user-friendly for people of all ages. The following is a breakdown of the results from each stage:

4.1 Empathize

The Empathize phase involves gaining a deep understanding of and attention to users in order to fully grasp their needs and desires. During this phase, data was collected through observations and interviews with neighborhood association leaders and community representatives who frequently encounter challenges with reporting and administrative tasks. The evaluation of this process successfully identified various user issues, which are summarized in Table 2.

Table 2. User Issues

No	Problem	Description
1.	Unstructured reporting system	Incident reporting is still done through direct communication or WhatsApp without a clear record-keeping system.
2.	Lack of documentation	The reports submitted are not stored in a centralized system.
3.	Uneven dissemination of information	Information about neighborhood association activities has not been communicated to all residents.
4.	Administrative management is still done manually	Administrative management is still done manually.
5.	Accessibility challenges for the elderly	Older adults have difficulty using digital apps with complex interfaces.
6.	The lack of an integrated system	Reporting, communication, and administration are handled separately.

Based on these findings, it can be concluded that the current neighborhood environmental management system is not yet capable of optimally meeting users' needs, making it necessary to develop a digital solution that is more structured, integrated, and user-friendly.

4.2 Define

Based on the findings from the Empathize phase, the key challenges faced by users were identified. These problems include the lack of integration between resident reporting and administrative systems, the absence of structured documentation and report tracking mechanisms, and the low accessibility of digital systems capable of centrally integrating reporting, communication, and administrative functions, as well as being designed with the needs of users from various age groups in mind. To deepen our understanding of user needs, user personas were employed to describe the characteristics, needs, and challenges experienced by users.

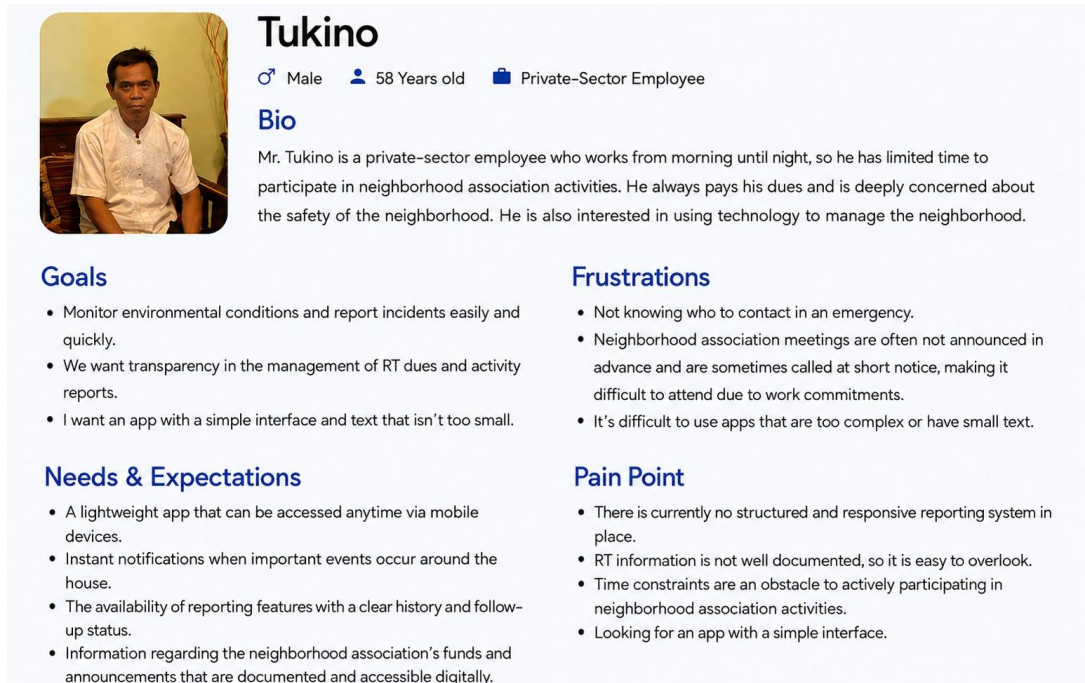


Figure 2. User Persona

Figure 2 shows the user personas used as the basis for the system interface design. These personas describe the characteristics, needs, and frustrations experienced by users in managing their Neighborhood Association (RT) environment, thereby serving as a reference for developing solutions that meet user needs. Thus, the user needs that have been identified form the basis for solution development during the Ideate phase to produce a system interface that aligns with user needs.

4.3 Ideate

The Ideate phase was conducted to develop solutions based on the user needs identified during the Define phase. The resulting solution is the HaloRT app, a digital system that integrates reporting, information dissemination, and administrative management into a single platform. The HaloRT application provides a reporting feature that allows residents to submit reports quickly and in a documented manner, a centralized information system for disseminating RT announcements and activities, as well as an elderly-friendly mode with a simple and user-friendly interface to improve accessibility for all users. Based on this digital solution, the HaloRT application's information architecture was designed to map the system's main menus, including Home, Finance, Report, Messages, and Account, as illustrated in Figure 3.

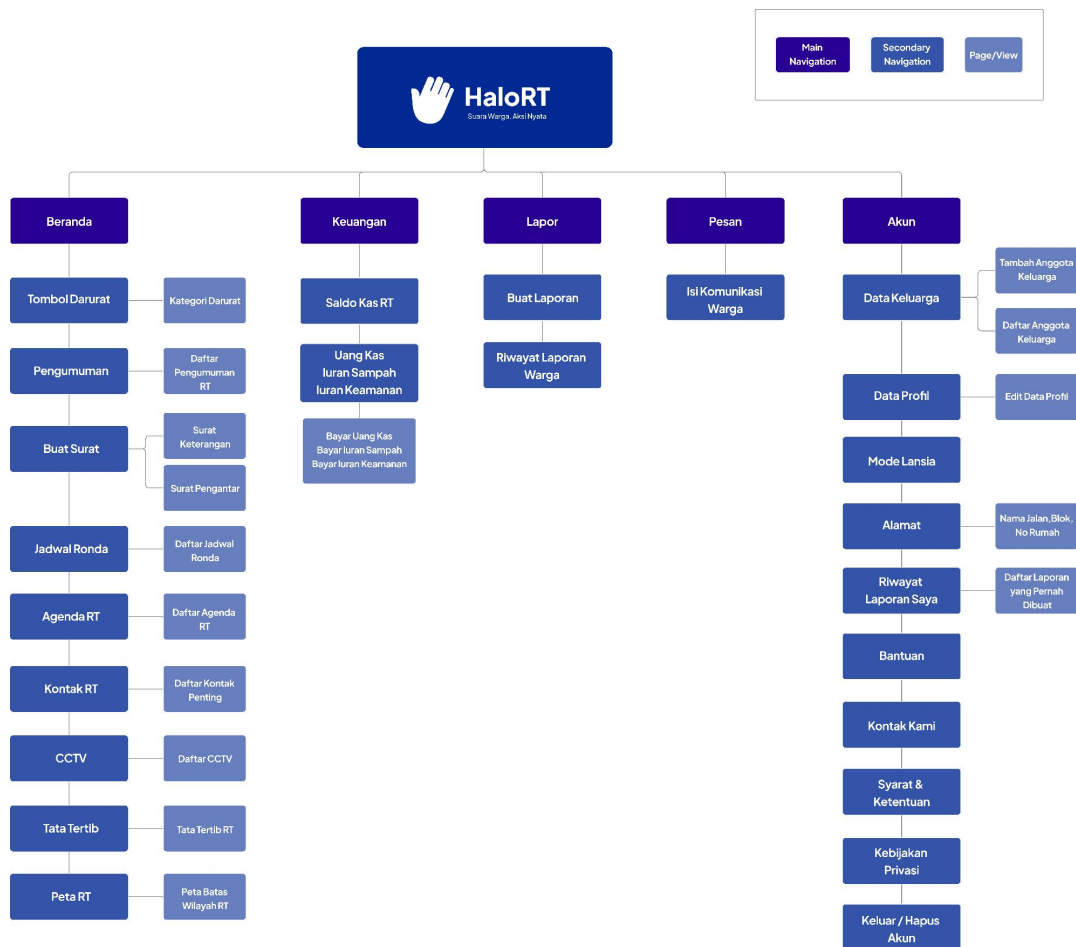


Figure 3. HaloRT Application Information Architecture

The menu structure in the architecture above is systematically designed based on a functional hierarchy to create an intuitive navigation flow. This well-organized structure ensures that users can quickly find the services they need without a complicated process, while also serving as the foundation for interface development during the prototype phase.

After defining the information architecture, the next step is to design the user flow—a visual representation of the user’s journey while using the system. The user flow design for the HaloRT app focuses on five main feature scenarios. First, the Emergency Button flow, which facilitates quick reporting of urgent incidents such as fires and theft. Second, the General Report flow for documenting non-emergency incidents such as resident complaints or streetlight outages. Third, the Senior Mode activation flow via the Account menu, which simplifies the interface by using larger font sizes. Fourth, the Create Letter workflow simplifies the bureaucracy of submitting administrative request letters to make it more practical. Fifth, the Fee Payment workflow in the Finance menu, where residents can review cash bill details and pay them digitally. Visualizations of these five interaction workflows are illustrated in Figure 4.

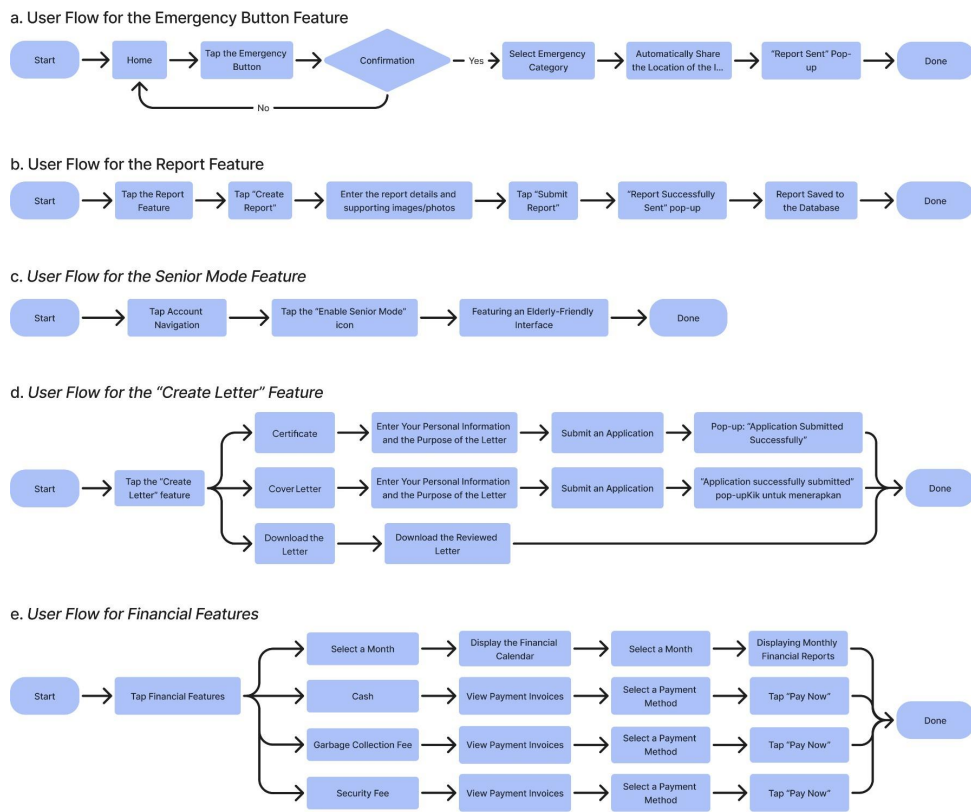


Figure 4. User Flow: 5 Key Features of the HaloRT App

Based on the user flow visualization above, the entire interaction flow has been deliberately designed to be as simple as possible. This approach was taken to minimize cognitive load and ensure ease of use across all age groups, particularly for older users.

4.4 Prototype

The Prototype phase was conducted to visualize the solution concepts formulated during the Ideate phase into a design for the HaloRT application interface. This process began with the exploration of design ideas to generate several interface alternatives as a foundation for developing the interface design. The results of this exploration are then developed into low-fidelity wireframes used to simply illustrate the layout structure and user interaction flow. This approach aims to streamline the design process before moving on to a more detailed development phase.

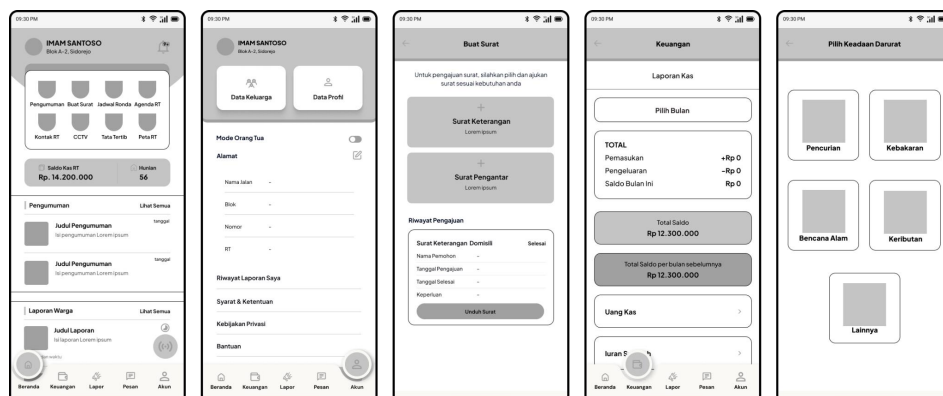


Figure 5. Low-Fidelity Wireframe: 5 Key Features of the HaloRT App

Figure 5 shows a low-fidelity wireframe design of the HaloRT application, illustrating the basic structure of the home, reporting, finance, letter creation, and account pages. The design is still a simple (black-and-white) layout that focuses on the arrangement of elements and navigation flow. Each page illustrates the main functions in general, such as feature access, report forms, information, cash management, and account settings, before being developed into a more detailed design.

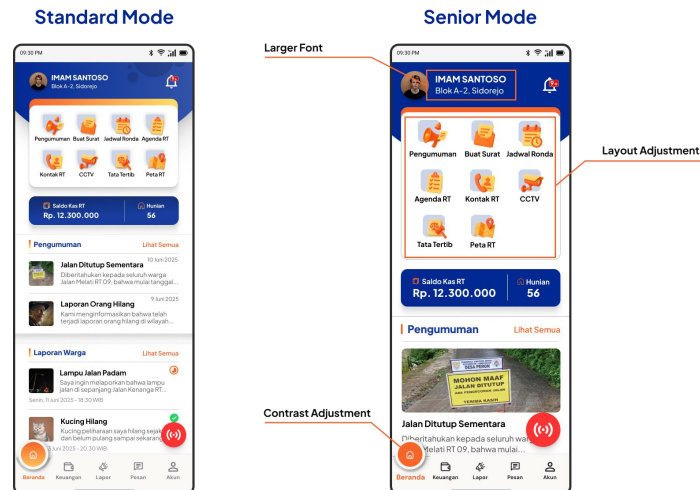


Figure 6. Comparison of the Standard Mode and Senior Mode Interfaces in the High-Fidelity Design of the HaloRT Application

Figure 6 shows a high-fidelity design visualization of the HaloRT app's home page, highlighting a direct comparison between the standard interface on the left and the Senior Mode interface on the right. The design at this stage was developed comprehensively, incorporating a color scheme, typographic hierarchy, and iconography. The novelty of the design's inclusivity is clearly evident in the implementation of Senior Mode. As indicated by the annotations in the figure, the adaptation of the interface for older users is achieved through a series of modifications to key visual elements. These modifications include enlarging the typography size, adjusting the layout of menu icons, and adjusting color contrast levels. This series of visual adjustments is specifically designed to reduce cognitive load and accommodate the accessibility limitations of older users, ensuring the app provides an inclusive and comfortable user experience for all residents.

4.5 Test

The Test phase focused on evaluating the usability of the HaloRT application interface using the System Usability Scale (SUS). In accordance with the demographic classifications outlined in the methodology section, this test involved 15 participants who were representative of various age groups and reflected a balanced gender distribution within the RT community. During the testing, respondents were instructed to complete five main task scenarios: making an emergency report, reporting general issues such as damage to RT facilities, accessing the latest announcements, paying dues or cash via the app, and switching the interface theme to senior-friendly mode. Table 3 displays the questions included in the questionnaire administered to the respondents.

Table 3. System Usability Scale (SUS) Questionnaire Data

No	Question	Score
1	I think I'll use this app again	1 - 5
2	I feel that this application system is too complicated	1 - 5
3	I find this app easy to use	1 - 5
4	I think I need help from someone else or a technician to be able to use this app	1 - 5

No	Question	Score
5	I feel that the features in this app are well integrated	1 - 5
6	I think there are a lot of inconsistencies in this app	1 - 5
7	I think most people will find this app easy to understand and learn quickly	1 - 5
8	I'm having trouble finding the key features in this app	1 - 5
9	I feel very confident when using this app	1 - 5
10	I need to get used to it before I start using this app	1 - 5

The SUS instrument consists of 10 items rated on a scale of 1 to 5. The questionnaire data was analyzed using the following standard SUS calculation formula:

- Odd statement: 1 point deducted from the score.
- Even statement: 5 minus the answer score.
- Final score: the total value of the ten statements is added up, then multiplied by 2.5.

This calculation procedure was applied to all participants involved. To determine the overall level of system acceptance, the SUS scores of each respondent were summed and then averaged based on the number of participants. The resulting average score was then mapped to the system's acceptability categories and rating scale, as shown in Figure 7 below [16].

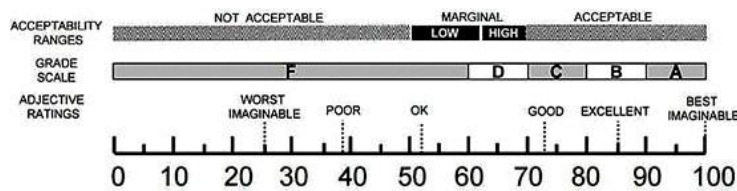


Figure 7. SUS Scoring Criteria

The following are the results of the HaloRT application testing questionnaire, which have been calculated in accordance with SUS testing requirements.

Table 4. SUS Score Calculation Results

Respo-ndents	Conversion Result										Total	SUS Score
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
R1	4	1	3	4	4	3	4	2	2	2	29	72,5
R2	4	3	3	2	3	3	3	3	3	0	27	67,5
R3	3	3	3	2	3	3	3	3	3	2	28	70
R4	3	2	2	3	3	2	2	3	2	1	23	57,5
R5	4	3	4	4	3	2	3	4	3	2	32	80
R6	3	3	4	2	2	1	2	1	2	1	21	52,5
R7	3	3	3	2	3	3	3	3	3	2	28	70
R8	4	2	2	1	2	1	2	1	2	0	17	42,5
R9	4	1	1	3	3	3	4	4	3	1	27	67,5
R10	4	4	3	1	3	3	4	1	3	2	28	70
R11	4	4	3	3	4	4	3	4	4	2	35	87,5
R12	4	4	4	4	4	3	4	4	4	3	38	95

Respo-ndents	Conversion Result										Total	SUS Score
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
R13	4	3	3	3	4	4	3	3	3	2	32	80
R14	4	3	4	2	4	4	4	3	3	4	35	87,5
R15	4	3	3	2	3	3	3	3	3	0	27	67,5
Average SUS Score												71,17

Based on the data in Table 4, the average SUS score was 71.17. This score indicates that the HaloRT application has a good level of usability, as it exceeds the standard SUS threshold of 68. This suggests that users generally find the system easy to use, understand the available features, and navigate the application effectively. Additionally, users' level of trust in the system is also positive, making the application suitable for use. Thus, the test results show that the developed application design has a good level of usability and has the potential to be further developed as a digital solution for RT environmental management.

5. Conclusion

Based on the results of the design and testing using the Design Thinking approach, the HaloRT application has proven to be an effective solution for integrated digital reporting and administrative management of Neighborhood Association (RT). The developed user interface design also supports accessibility for various user groups, including the elderly, thereby enhancing the inclusivity of its use. Usability evaluation results using the System Usability Scale (SUS) method on 15 respondents showed an average score of 71.17, which falls into the "good" category and exceeds the standard threshold. This indicates that the application is easy to use, understandable, and features clear navigation that is well-received by users. Thus, the proposed application design has the potential to be further developed as a digital solution for RT environmental management. Future research could develop the system to the stage of full application implementation and conduct testing on a broader user scale so that the application can be optimally adopted.

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