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Design Thinking for Kami Peduli Website to Mobilize Community Disaster Response

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ABSTRACT

Central Sulawesi, particularly Palu City, is a disaster-prone area with communities lacking sufficient knowledge and preparation for natural disaster risks. This study aims to develop a sustainable digital platform that enhances community preparedness through a user-friendly and engaging website design. By applying the Design Thinking method, the platform integrates sustainable digital innovation to provide essential information on disaster-prone areas, volunteer opportunities, and donation channels. The platform's design prioritizes efficient use of digital resources to minimize environmental impact, supporting long-term resilience and community mobilization. Utilizing both qualitative and quantitative approaches, data was gathered through questionnaires and interviews with PMI staff, volunteers, and the public. The Design Thinking stages: Empathize, Define, Ideate, Prototype, and Test, were employed to create a responsive and effective user experience. SEQ testing results revealed an average usability score of 4.25, highlighting the platform's ease of use. This project contributes to sustainable innovation in disaster preparedness by leveraging digital resources to empower communities in Central Sulawesi.

1. INTRODUCTION

Central Sulawesi, particularly Palu City, frequently experiences natural disasters due to its location along the Palu Koro Fault [1]. According to the official Central Sulawesi BPBD website, Central Sulawesi Province ranks among Indonesia's most disaster-prone areas, facing a range of natural, non-natural, and social disasters. Commonly encountered natural disasters in this region include geological and hydrometeorological events, which have long-lasting impacts on local communities.

The internet, as a powerful and ever-evolving tool, functions like a bridge connecting individuals worldwide, providing vast access to information and opportunities for creativity. As a borderless gateway, the internet is integral to daily life and holds significant potential for disaster preparedness and response [2]. Information technology, increasingly essential, plays a reliable role in facilitating timely information sharing, particularly in disaster scenarios. As of January 2022, Indonesia has the fourth largest population of internet users globally, with 204.7 million people connected online, emphasizing the vast potential for digital solutions within the country [3].

Despite the widespread availability and convenience of digital technology, many community members still lack awareness and understanding of disaster risks, and certain organizations, like PMI Sigi, have yet to

fully integrate digital solutions. Currently, information about PMI Sigi primarily circulates through news, social channels, and manual processes, without a dedicated digital system to manage volunteer data and registrations.

Given these circumstances, this study proposes a comprehensive digital platform, "Kami Cares", designed using the Design Thinking methodology. A well-structured website is crucial in the digital age, offering a sustainable, scalable solution for engaging and mobilizing communities. By centralizing disaster information, volunteer registration, and donation capabilities, this platform aims to streamline disaster preparedness efforts, thereby enhancing visibility, credibility, and the public reach of essential services [4]. Furthermore, the platform intends to address community needs by enabling easy access to crucial information on disaster-prone areas, volunteer opportunities, and donation options [5].

In this digital context, User Interface (UI) and User Experience (UX) play pivotal roles in ensuring platform success [6]. While UI encompasses the visual elements and layout that users see and interact with, UX focuses on the ease, comfort, and satisfaction derived from using a product [7]. For an application to be successful, its design must go beyond mere functionality, incorporating an optimal experience that resonates with user needs. Good UX is the foundational structure that enables seamless interaction, while an intuitive, consistent UI enhances the platform's appeal and accessibility [8]. UX encompasses the user's overall experience and satisfaction with a platform, shaping perceptions and engagement levels [9].

Design Thinking facilitates an in depth understanding of target users by systematically addressing existing challenges, questioning assumptions, and analyzing impact [10]. Further underscores Design Thinking as a robust method, enabling design teams to develop effective, user centered solutions [11]. Originally structured in three stages, Design Thinking has evolved into a five stage process Empathize, Define, Ideate, Prototype, and Test allowing for a comprehensive understanding of users and the creation of more innovative and effective solutions [12].

This study aims to analyze and refine the Kami Cares website design, focusing on the user interface and user experience. The goal is to develop a sustainable digital solution tailored to user needs, facilitating disaster preparedness and supporting developers and decision-makers in ongoing platform enhancement.

2. METHODOLOGY

In this research, both quantitative and qualitative methods are applied, with the Design Thinking method guiding the design process. Data were collected through questionnaires and interview sessions with PMI staff, volunteers, and the general public in Central Sulawesi. The quantitative approach collects numerical data and statistical analysis to explain the phenomena being studied, while the qualitative approach offers a naturalistic perspective, helping researchers understand the phenomena through the personal experiences and contextual insights of the participants [13]. This dual-method approach enhances the depth and reliability of findings, providing a holistic understanding of user needs and experiences.

The Design Thinking method serves as an iterative framework that centers on the user's perspective to address problems and foster innovation. This approach allows researchers to engage in a cycle of understanding users, challenging initial assumptions, and defining problems to uncover alternative solutions that may not be evident in the early stages [14]. Following the stages shown in Figure 1 Empathize, Define, Ideate, Prototype, and Test Design Thinking enables a sustainable and user centered design process. Each stage is structured to refine the platform while aligning it with sustainable disaster preparedness and resource efficiency [15].

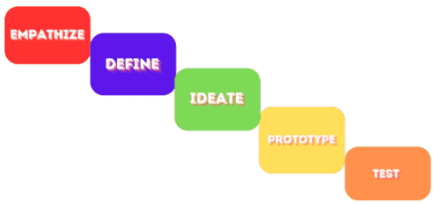

Figure 1. Steps in Design Thinking

2.1. Empathize

Level Empathize is the first stage in Design Thinking Method. This stage requires an analysis of a problem that the user is aware of and of course a search for the right solution will be carried out [16]. The empathize process provides a strong foundation for research by providing a deep understanding of stakeholder problems and needs. This understanding is then used to formulate appropriate problem statements and develop effective, stakeholder centered solutions. The results of the empathy process are data that is rich in information about stakeholder problems and needs. This data is then transformed into a problem statement that is clear, focused, and focuses on stakeholder needs and expectations. This problem statement serves as a guide for researchers in carrying out research and answering the questions asked [17].

2.2. Define

Level Define reap the rewards of Empathize, namely a deep understanding of users and their problems. Through careful analysis and definition, several crucial core problems are identified, becoming a compass to guide the development of targeted and effective solutions [18]. Define is a crucial process in research that involves evaluation and in depth understanding of various knowledge obtained through in depth understanding. The main goal of determining is to formulate a clear and focused problem formulation, which is the main point of view or concern in the research [19].

2.3. Ideate

At the level Ideate namely to provide a solution to the problems that have been identified. This crucial stage focuses on exploring innovative ideas to overcome existing problems, by considering user needs as the main foundation in designing an effective interface [20]. The ideate process is an intensive editing of ideas (brainstorming) with the aim of collecting as many ideas as possible regarding solutions to the problems faced. The ideate process not only focuses on alternatives to current problems, but also anticipates possible problems in the future by generating solution and innovative ideas. This is done by exploring various scenarios and considering various factors that may influence the success of the solution [21].

2.4. Prototype

The concepts of ideas generated at the Ideate stage are converted into real interface displays and can be executed at this stage [22]. Armed with data collected from the three previous stages, researchers will develop a design that suits the needs and problems that have been identified [23]. At stage prototype it transforms abstract ideas into interactive prototypes that can be used and tested by users. Prototype low-fidelity created with a focus on basic functionality, whereas prototype high-fidelity made with more complete details and a more realistic appearance. Both types of prototypes help designers to gain valuable feedback from users and refine the application design before implementation [24].

2.5. Test

The next stage is testing the new interface which has been designed involving 16 PMI staff, 10 members of the general public and volunteers as potential users and participants. Participants will provide an objective assessment of the interface appearance, ease of use, and overall interaction experience. This stage involves evaluating the prepared prototype to assess user satisfaction and identify areas of improvement. Evaluation is carried out using the easy single question (SEQ) method.

3. RESULT AND DISCUSSION

This section presents the findings from the development of the Kami Peduli platform's UI/UX design, aimed at enhancing community preparedness for natural disasters. Each stage in the Design Thinking process from Empathize to Test is discussed to illustrate how each step contributes to creating a solution centered on user needs and sustainability principles. The findings also include SEQ testing results to evaluate user experience, as well as the solution ideas generated based on needs analysis, idea prioritization, and the development of initial prototypes.

3.1. Empathize

The Empathize stage provided insights into user needs, specifically their challenges in accessing

timely disaster information and the importance of an engaging platform to raise awareness. Interviews with PMI staff and the general public revealed a strong interest in a platform that could sustainably support disaster preparedness efforts by centralizing critical information. This stage informed the foundation of user centered design elements that address both practical and sustainable disaster management needs.

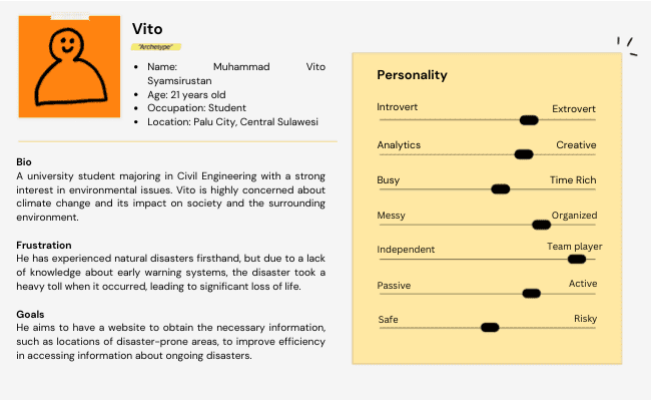

Figure 2. User Persona General Public

The user persona of Vito, as shown in Figure 2 above, represents the target audience for the Kami Peduli platform, which was developed using the Design Thinking approach to enhance UI/UX and raise awareness about natural disasters. His profile underscores the importance of accessible, user centered website design for delivering timely information on disaster prone areas, volunteer opportunities, and essential resources. By focusing on real user needs and frustrations such as Vito's desire for an efficient, informative platform the Kami Peduli website aims to strengthen community preparedness and increase awareness of natural disasters through intuitive design and engaging user experiences.

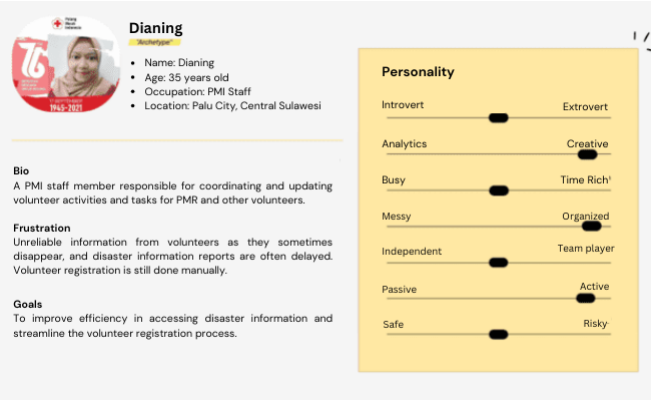

Figure 3. User Persona PMI Central Sulawesi Staff

The user persona of Dianing, shown in Figure 3, illustrates the needs of PMI staff responsible for coordinating volunteers and updating disaster information. This profile highlights the challenges faced in accessing timely information and ensuring an efficient volunteer registration process. It underscores the importance of a digital platform that can support the smooth management of volunteers and the effective dissemination of disaster information.

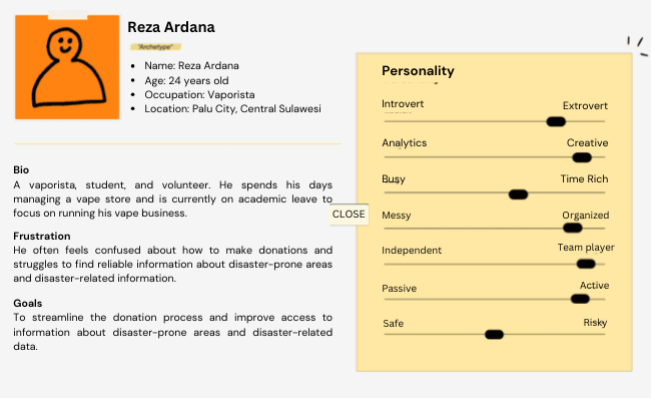

Figure 4. User Persona Volunteer

The user persona of Reza Ardana, shown in Figure 4, illustrates the profile of a young entrepreneur and volunteer eager to contribute to disaster preparedness efforts. His profile highlights the need for a simplified donation process and easier access to information about disaster-prone areas. Reza often struggles to find reliable information, underscoring the importance of a platform that can efficiently provide information and support donation efforts.

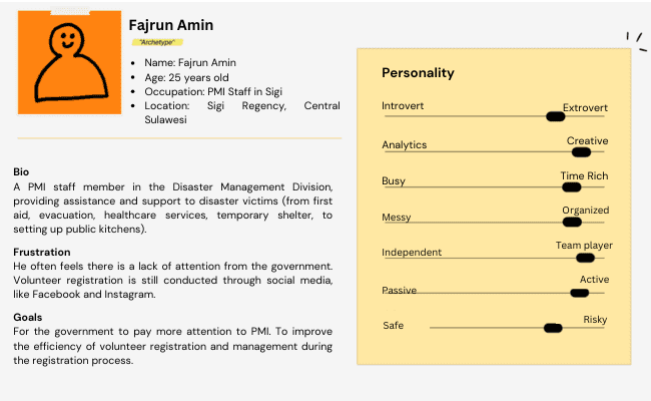

Figure 5. User Persona PMI Sigi staff

The user persona of Fajrun Amin, shown in Figure 5, illustrates a dedicated PMI staff member in the Disaster Management Division, focused on providing aid to disaster victims. His profile highlights the need for greater government attention and a more efficient volunteer registration process. Fajrun often feels that the registration process is too manual and reliant on social media, underscoring the importance of a digital platform to support effective volunteer management.

To address the needs identified through Fajrun's profile and other user personas, a quantitative questionnaire was carried out regarding user experience. This assessment covered aspects such as convenience, navigation, layout, functionality, and the quality of information provided. The questionnaire also evaluated user satisfaction with design elements, including colors, fonts, page layout, interface consistency, and suggestions for improvement [25].

3.2. Define

In the Define phase, pain points related to user access and information clarity were identified. By focusing on sustainable solutions, these pain points guided the development of features that minimize environmental impact, such as digital documentation of volunteer registrations and donation records. These elements not only provide accessible resources but also reduce dependency on printed materials, supporting a sustainable approach to disaster preparedness [26].

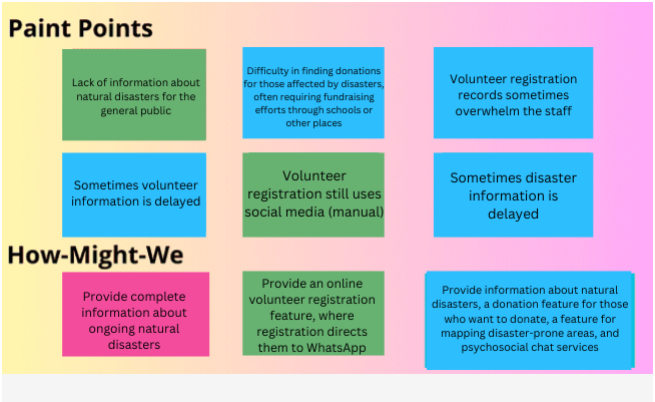

Figure 6. Pain Points and How Might We (HMW)

As shown in Figure 6, the ”Pain Points and How Might We” analysis highlights user challenges, like delays in volunteer information and disaster data access, with solutions such as comprehensive disaster info, online volunteer registration, and a donation feature to improve disaster preparedness.

3.3. SEQ Testing Results and Variations in User Experience

The SEQ testing results showed an average usability score of 4.25 across 11 tasks, indicating general ease of use. However, variations were noted, particularly with Task 7, which received a lower score than other tasks [27]. This suggests potential challenges in specific interface elements, such as navigation or visibility, which may need refinement to ensure a consistent user experience across all tasks. Addressing these areas could enhance usability, ensuring that each feature aligns with user expectations and contributes to a smooth interaction flow.

3.3.1. Solution Idea

From the process of forming How Might We (HMW), solution ideas were found for each identified problem category. The resulting solution ideas are shown in Figure 7. Based on the needs analysis conducted previously, several solution concepts were generated from the identified problems and needs. In the previous phase, four needs were identified, which have now been developed into six solution ideas.

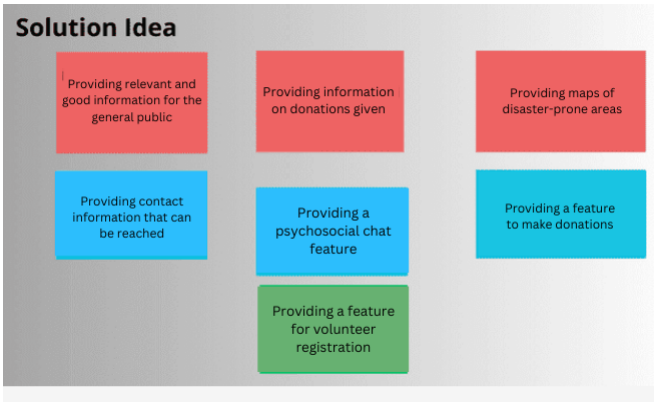

Figure 7. Pain Points and How Might We (HMW)

3.3.2. Priorization Idea

Determining ideas is prioritized to determine the sequence of execution of ideas that will be implemented first in the mockup design solution development process. The feature prioritization process is carried out by considering user value and the effort required to make it happen. Prioritization is not only based on user difficulty and value, but also input from interviews. Ideas are categorized based on user value and effort into

two groups: high and low. Determining user value and effort is carried out through brainstorming sessions with a team of designers and developers [28].

3.3.3. Low-Fedelity

Innovative ideas for our Peduli Website were realized in visual format using a low-fidelity initial design framework using Figma software to speed up the process of creating an arrangement of elements in the design. Low-fidelity refers to wireframes that focus on the basic elements of a user interface [29]. Some examples of user interfaces and user experiences produced in the Ideate phase are shown in the following figures. Before finalizing the actual interface layout, this mockup design was consulted first with the development team to avoid significant changes.

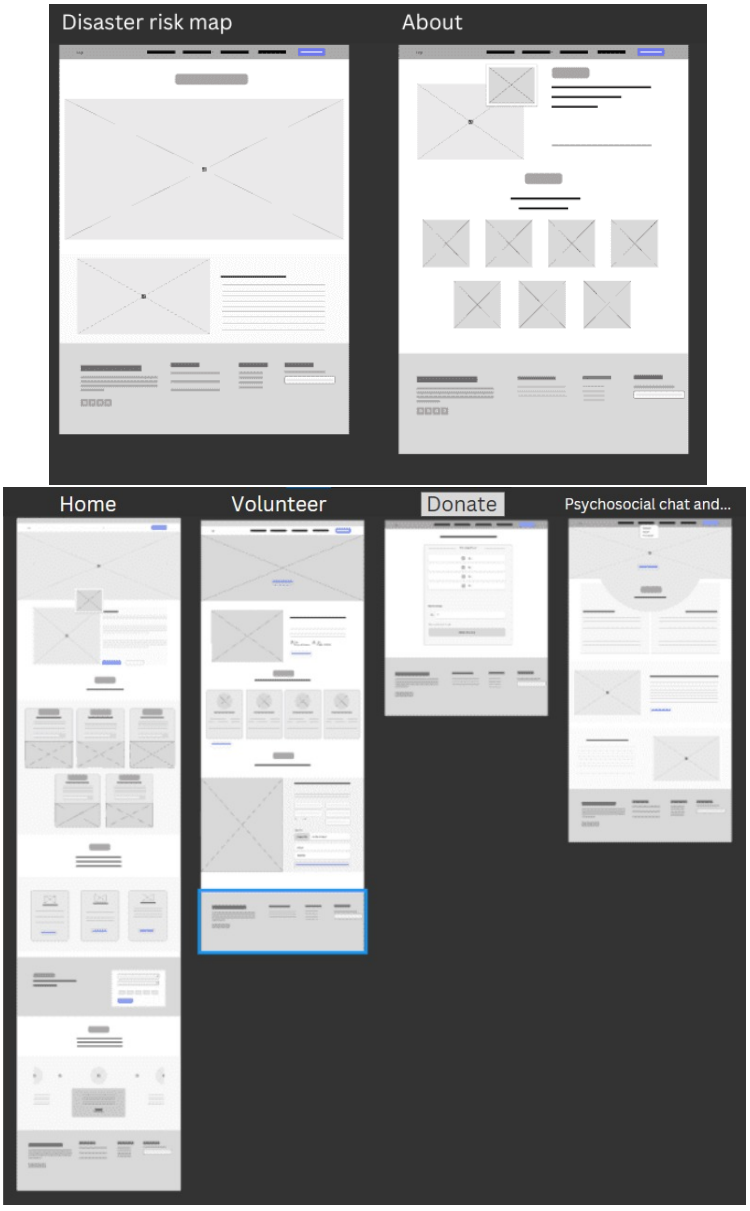

Figure 8. Low-fi Planning Results

Based on Figure 8, various elements will be further detailed in the high-fidelity design. These elements include disaster information on the home page, volunteer details and registration options, donation information and procedures, psychosocial chat features, and data on disaster-prone areas [30].

3.4. Prototype Design and Sustainable Impact

The platform's design emphasizes sustainable practices by prioritizing digital resources for volunteer mobilization and information sharing, reducing physical resource use. This digital approach supports sustainability by minimizing waste and enabling efficient information dissemination. The focus on sustainable design in this prototype development contributes to both environmental impact reduction and long-term usability, positioning the platform as a scalable resource in disaster-prone areas.

3.4.1. Prototype Design and Sustainable Impact

A mockup is a detailed and realistic visual simulation used to illustrate a product or design concept. It acts as a visual prototype, presenting an initial image of the product as if it were finished, complete with appealing visual effects. The UI mockup design for the "We Care" website is ready to be presented, featuring an integrated composition of colors, images/illustrations, layout, and text. In the design planning phase, mockups were created for 10 menu pages.

The following are the results of 6 UI menus, including the Main Page (or Homepage/Landing Page), Volunteer Registration Page, Donation Page, Psychosocial Chat Menu, Successful Registration Notification Page, and Successful Donation Notification Page. Additional menus include the "Contact Us" menu, Map Menu, "About Us" menu, and Login Menu.

All mockups and prototypes were created using Figma software. Below are some images of the UI design results from Figma.

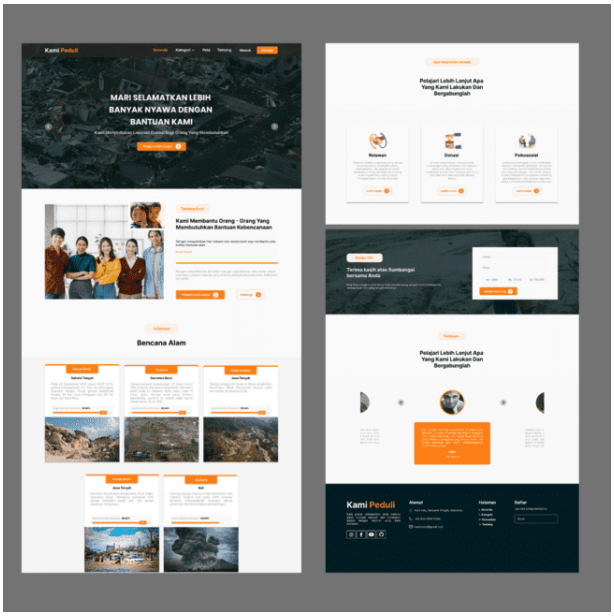

Figure 9. Results of Mockup Design for the Main Page

The design display in Figure 9 illustrates the layout of the landing page, which serves as an introduction to the Kami Peduli platform. This page provides users with crucial information on ongoing natural disasters, allowing them to stay updated on current events. It also highlights the main features of the platform, including options for registering as a volunteer, making donations, and accessing the psychosocial chat service. These features are designed to encourage user participation and facilitate community support during disaster situations, making the platform a comprehensive tool for disaster response and recovery.

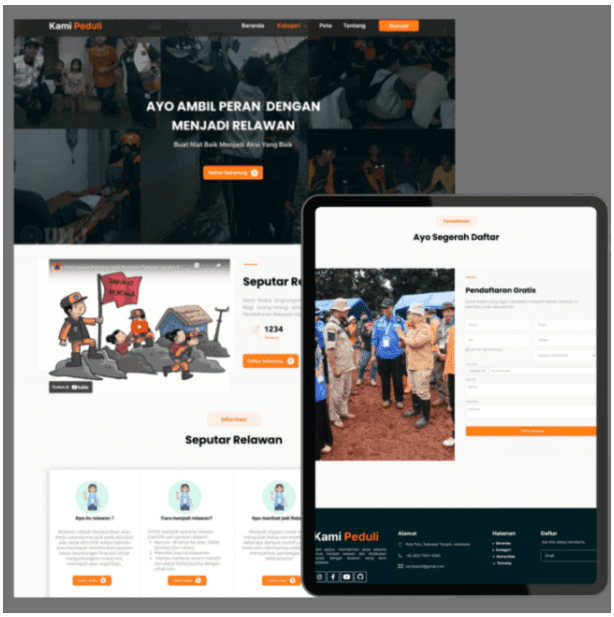

Figure 10. Design Draft Results: Volunteer Page Mockups

The design display in Figure 10 is a volunteer page design which contains information about volunteers, namely how to become a volunteer, what a volunteer is and what the benefits of being a volunteer are. Then there are videos about volunteering that can be watched and there is also a feature to register to become a volunteer. Of course, to make it easier for the general public and staff to register and manage volunteers.

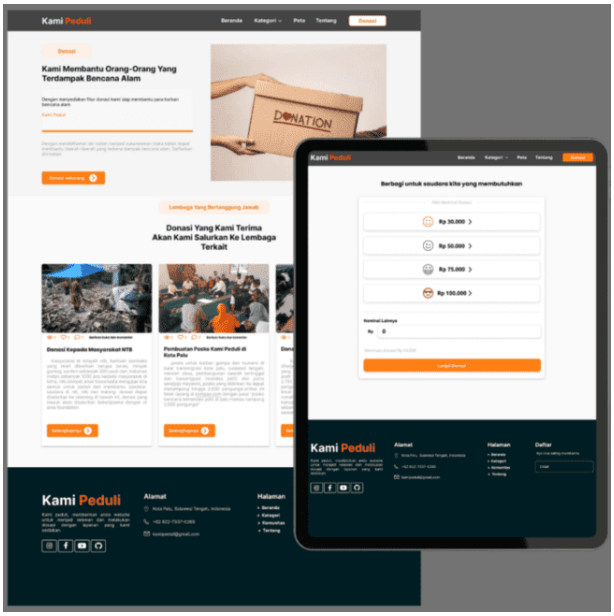

Figure 11. Design Draft Results Mock Up Donation Page

Design view mock up in figure 11 is the donation page design, which contains information about areas or places affected by natural disasters and in need of donations, then there is a page for making donations to the general public who want to help areas affected by disasters.

Figure 12. Design Results Mock Up Psychosocial Page

Design view mock up Figure 12 shows the psychosocial page design, which contains information about what psychosocial, disaster and psychosocial are, the importance of discussing disasters and psychosocial support. Then there is the design of a psychosocial chat service for the general public who have been traumatized by the impact of natural disasters.

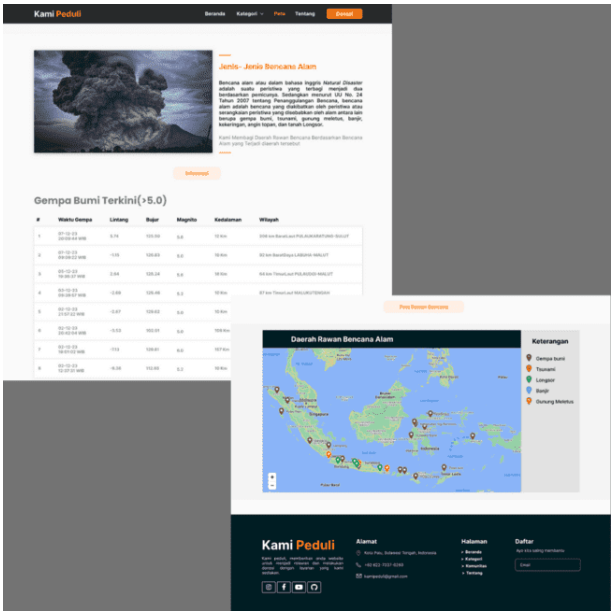

Figure 13. Design Results Mockup Page

The design view mockup in Figure 13 displays a map page that contains information on types of natural disasters, the latest earthquake data, and a map of disasterprone areas. This page enables the general public to access up to date earthquake information and view areas frequently affected by natural disasters. Further details can be seen in Figure 13.

The next step is to visualize the We Care website design through creation prototype interactive. Prototype This will be tested on target users to get feedback. Consisting of 130 clickable mockups, prototype This

gives an idea of how the website will work once it is developed. Manufacturing prototype done by implementing Figma software and options prototype inside it. Below is a picture of the activity prototype What is done is shown in Figure 14.

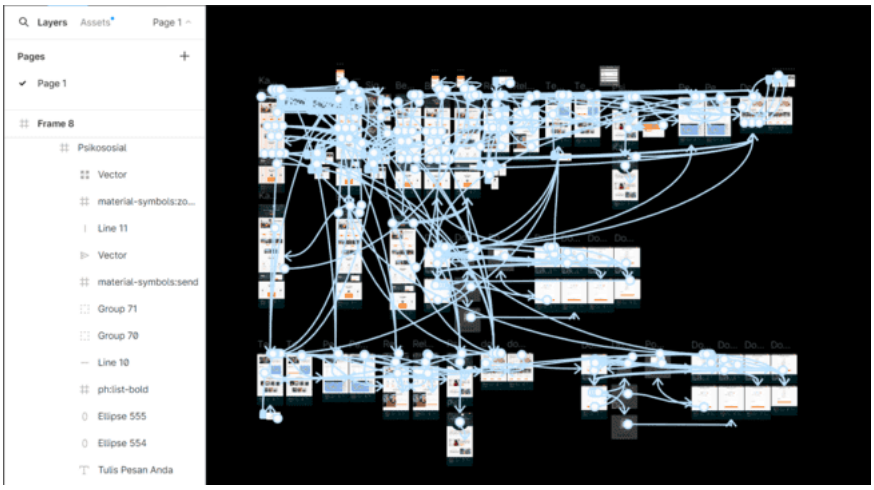

Figure 14. Activity Prototyping Using Figma Software

3.5. Testing

In this phase, testing the solution design that has been prepared on target users, namely participants consisting of PMI staff and the general public. Testing is carried out through direct interviews and sending results prototype via the link provided online. The purpose of this test is to evaluate the level of readability and ease of use of the design that has been created. The testing method used is SEQ which involves participants trying out prototype designs. The following are the results of the test data after prototype tested, which are recorded in Table 1.

Table 1. Single Question Evaluation Results (SEQ)

Respondent	**Task**										
	1	2	3	4	5	6	7	8	9	10	11
1	5	4	4	5	5	5	5	5	3	5	5
2	4	5	4	4	4	4	4	4	5	5	4
3	3	5	5	5	5	5	5	5	5	5	4
4	3	3	3	5	3	5	2	5	3	3	3
5	4	4	4	4	4	4	4	4	4	4	4
6	4	4	4	4	4	4	4	4	4	4	4
7	3	4	4	4	4	5	5	5	5	5	4
8	5	4	5	4	5	4	5	4	5	4	5
9	5	4	5	4	5	5	5	5	4	5	5
10	4	4	4	4	4	4	4	4	4	4	4
11	4	4	4	4	5	5	5	4	5	4	4
12	4	4	5	3	3	4	5	3	5	4	4
13	5	4	4	5	5	4	5	4	4	4	4
14	4	4	4	5	5	4	5	4	5	5	4

Table 2. Continuation of Single Question Evaluation Results (SEQ)

15	5	5	5	4	4	5	4	5	5	5	5
16	5	4	4	4	4	4	4	5	4	4	5
17	4	4	5	5	4	4	5	5	4	5	5
18	5	5	4	5	5	5	4	5	4	4	5
19	4	4	5	4	4	5	5	4	4	4	5
20	4	2	4	5	4	3	5	4	5	4	5
Average	4.55	4.1	4.3	4.5	4.25	4.45	4.05	4.25	4.1	4.2	4.2

4. MANAGERIAL IMPLICATIONS

The suggestions that can be given for further development regarding the UI/UX design of the We Care website are that continuing the design to a mobile design will increase the innovative value of the system and make it more suitable to the needs of many users. Because from this design process a UI/UX design is produced website, prototype, and evaluate the design only.

5. CONCLUSION

In conclusion, this study successfully developed the Kami Cares website prototype, emphasizing UI/UX design to improve disaster preparedness for communities in Central Sulawesi. Using the Design Thinking method, the platform was tailored to user needs by offering accessible information on disaster-prone areas, volunteer opportunities, and donation options. The usability test, which yielded an average SEQ score of 4.25, demonstrates that the interface is both user-friendly and well-received by participants.

The platform addresses immediate disaster awareness needs while promoting sustainable practices by minimizing physical resource reliance. By consolidating disaster information and volunteer coordination in a digital format, Kami Cares supports community engagement and resource efficiency, aligning with sustainable digital innovation principles.

Looking forward, future enhancements could incorporate advanced technologies like IoT for real-time monitoring and AI for predictive analysis, elevating the platform's functionality. These advancements would make Kami Cares an adaptable, sustainable tool for disaster preparedness in Indonesia, highlighting the potential of digital platforms in advancing disaster management solutions.

6. DECLARATIONS

6.1. About Authors

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6.2. Author Contributions

Conceptualization: RN, SA, MY, and YA; Methodology: RN, SA, MY, and YA; Software: RN, SA, MY, and YA; Validation: RN, SA, MY, and YA; Formal Analysis: RN, SA, MY, and YA; Investigation: RN, SA, MY, and YA; Resources: RN, SA, MY, and YA; Data Curation: RN, SA, MY, and YA; Writing Original Draft Preparation: RN, SA, MY, and YA; Writing Review and Editing: RN, SA, MY, and YA; Visualization: RN, SA, MY, and YA; All authors, RN, SA, MY, and YA, have read and agreed to the published version of the manuscript.

6.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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The authors received no financial support for the research, authorship, and/or publication of this article.

6.5. Declaration of Conflicting Interest
The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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