RESQUIRE: DISASTER MANAGEMENT INFORMATION SYSTEM

FOR PDRRMO

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CHAPTER 1

INTRODUCTION

Situational Analysis

Climate change is a crucial topic of great significance in today's world. It refers to significant and lasting changes in average weather conditions over many years. These changes can include things like higher temperatures, increased rain or snow, or even drier conditions. The key difference between climate change and normal weather patterns is that climate change takes place over the long term, and its effects can be felt for a long time (Turrentine, 2021).

As the Earth's climate continues to evolve, the link between climate change and natural disasters becomes increasingly apparent. A natural disaster is a major event caused by Earth's natural processes that leads to significant environmental degradation and loss of life. Frequently preceded by a natural hazard, these events have become a paramount concern in today's world (Team Leverage Edu, 2023).

Furthermore, natural disasters, categorized into four types based on their underlying processes - Geological Disasters, Meteorological Disasters, Hydrological Disasters, and Biological Disasters - are formidable events that pose significant threats to human lives and the environment. Geological hazards, including earthquakes and volcanic eruptions, arise from the Earth's dynamic processes and can cause widespread devastation. Meteorological disasters, such as cyclones, hurricanes, and extreme temperatures, result from weather phenomena and bring about unpredictable and intense impacts.

Hydrological disasters, like floods and droughts, emerge from water-related processes and can disrupt communities, agriculture, and water resources. Biological disasters encompass infectious diseases that can rapidly spread, posing substantial risks to large populations (Team Leverage Edu, 2023).

Natural disasters pose significant threats to countries worldwide, and some regions are particularly vulnerable to their impact. The World Risk Index (2022) measures a country's exposure and vulnerability to natural hazards, and the results indicate that disaster risk hotspots are present in various regions. The Philippines, with a world risk index of 46.82 first in the world in risk among 193 countries worldwide.

According to Valmonte (2022), the Philippines is identified as vulnerable to disasters caused by extreme natural events, which include earthquakes, storms, or flooding. The Philippines faces extreme natural events due to its geographical location. The Philippines sits within the Pacific Ring of Fire, where its basin in the Pacific Ocean is prone to earthquakes and storms. Additionally, the region often experiences flooding due to heavy rains from the southwest monsoon and low-pressure areas. These events significantly impact livelihoods, causing damage and disruptions (Statista Research Department, 2022).

Furthermore, the government developed R.A. 10121 after seeing the necessity for a more comprehensive policy. The "Philippine Disaster Risk Reduction and Management Act of 2010," also known as Act 10121, was enacted on May 27. The law requires the government to "adopt a disaster risk reduction and management approach that is holistic, comprehensive, integrated, and proactive in lessening the socio-economic and

environmental impacts of disasters, including climate change, and promote the involvement and participation of all sectors and all stakeholders concerned at all levels, especially the local community." According to RA 10121, disaster risk reduction and management is the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies and policies and improve coping mechanisms to lessen the adverse effects of hazards and increase the risk of disaster.

Tulane University (2021) defined "disaster management" as effectively preparing for and responding to disasters. It involves strategically organizing resources to lessen the harm that disasters cause. It also involves a systematic approach to managing the responsibilities of disaster prevention, preparedness, response, and recovery.

Moreover, it is also asserted that disaster management is essential to survive in the case of a natural or a major man-made disaster and can be defined as the organizational aspects of emergency preparedness, response, and recovery to lessen the impact of a sudden disaster (Singh, 2021).

While Lamentillo (2022) reported that information and communications technologies (ICT) are precious in lessening the risks of natural hazards to communities. Government agencies and local government units can utilize them to anticipate the arrival of a typhoon, enforce evacuation measures, and strategically position assets and supplies for disaster response operations. Furthermore, a government agency like the DICT is actively involved in disaster response through initiatives such as the Government Emergency Communications System (GECS) Project, which includes the deployment of

rapidly deployable communication systems and automation of disaster reporting processes. Moreover, as the designated lead agency in the Emergency Telecommunications Cluster, the DICT is committed to strengthening ICT at both national and local levels, preparing for, responding to, and recovering from the impacts of disasters.

Fashina (2021) found that a functional management information system is essential to enhance interoperability within an organization and can lead to an integrative nature of information flow. It allows governments to generate, analyze, share, disseminate, and manipulate information easily.

The Province of Pangasinan is highly susceptible to typhoons and is vulnerable to natural disasters. Subingsubing (2023), Pangasinan is listed among the highest at-risk areas for damage from extreme weather based on the 2023 Gross Domestic Climate Risk. The province is listed as the most at-risk based on its aggregated damage ratio or the total damage to its built environment because of climate-induced disasters such as flooding and rising sea levels.

Disaster response efforts have been hindered by various factors, as highlighted by Srivastava. One significant challenge has been the poor intersectoral coordination which further exacerbates the problem, as different government agencies and stakeholders may not effectively collaborate and communicate during disaster response efforts. This lack of coordination can lead to duplication of efforts, delays in providing aid, and gaps in providing essential services to affected communities. Addressing these challenges and improving intersectoral coordination is crucial to enhancing disaster response and resilience in the future. Additionally, the DILG Preparedness Assessment Report and the

Asian Development Bank's observations further emphasize the need for stronger coordination among stakeholders, including PDRRMOs and MDRRMOs, to effectively manage disasters and reduce their impact on communities.

Moreover, MDRRMO-Binalonan is using Facebook pages, emails, and messaging platforms like Facebook Messenger group chats to communicate and collaborate with PDRRMO. However, the study of Imran et al. (2020), identifies challenges in utilizing social media during disasters and emergencies, including near-real-time information processing, and information overload. Therefore, the reliance on social media platforms may result in delayed or incomplete information reaching the intended recipients. Moreover, information shared through these channels may not be reliable or easily accessible when needed the most. There is a need for a centralized and reliable communication system to ensure that accurate and timely information is shared among the PDRRMO and MDRRMOs.

With the implementation of a system like ResQuire, these limitations can be overcome. ResQuire, as a web-based management information system, will provide a more efficient and practical approach to disaster management. The system will centralize communication channels, instant information sharing, and improve collaboration among the PDRRMO and MDRRMOs.

By addressing the limitations of traditional methods and manual processes, ResQuire will significantly enhance the capacity of the PDRRMO in disaster management. The system will improve communication, ensure accurate record-keeping, and enable informed decision-making. Ultimately, ResQuire will contribute to more effective and

efficient disaster preparedness, response, and recovery efforts, enhancing the overall resilience of Pangasinan in the face of disasters.

Statement of Objectives

This study aims to develop a Disaster Management Information System for PDRRMO to manage and respond to disasters in the province effectively.

In line with this, the project aims to achieve the following specific objectives:

1. Determine the process, forms, and policies of PDRRMO in terms of:

    a. Record Management

    b. Assistance Requests

    c. Scheduling

    d. Report Generation

2. Identify the functional and non-functional requirements for ResQuire.

3. Develop the ResQuire using SCRUM methodology, and

4. Evaluate the usability of ResQuire using a System Usability Scale (SUS).

Significance of the Project

The study aims to improve the interaction between the Municipal Disaster Risk Reduction and Management Office (MDRRMO) and Provincial Disaster Risk Reduction and Management Office (PDRRMO) regarding disaster management. Furthermore, the results of this study could be highly significant and beneficial for the following:

Province of Pangasinan. The province will benefit from implementing ResQuire, enabling informed decision-making and effective disaster response, with a priority on the wellbeing and health of its people. The system will facilitate efficient resource allocation, coordination, and timely actions, ensuring the safety and health of the population during disasters.

MDRRMOs and PDRRMO. The ResQuire will make communication between the offices easier to share resource information, pool resources, and allocate resources in a coordinated manner. The system makes it easier to request, track, and allocate resources, ensuring that they are distributed efficiently based on the needs and priorities of each municipality.

Researchers. This study will serve as a guide to identify the needs of the Municipal Disaster Risk Reduction Management Office (MDRRMO) and the processes involved in its operations.

Future Researchers. This could serve as a reference or related study for future research in related fields.

Scope and Limitations of the Project

The system will focus on facilitating efficient collaboration and resource sharing among Municipal Disaster Risk Reduction and Management Offices (MDRRMOs) within the province. Under this system, MDRRMOs will have the capability to request assistance from the Provincial Disaster Risk Reduction and Management Office (PDRRMO). Once the PDRRMO accepts the request, they will allocate personnel to assist the requesting MDRRMO with their equipment and expertise. This streamlined process ensures a more effective response to disaster situations.

Furthermore, the system will also enable MDRRMOs to request assistance from each other. This feature encourages neighboring MDRRMOs to collaborate and support one another in times of need. The enhanced coordination between MDRRMOs prevents duplication of efforts, optimizes resource allocation, and overall strengthens disaster response capabilities in the province. It fosters a culture of mutual aid and ensures that available resources are efficiently utilized during emergencies.

Both MDRRMOs and PDRRMO will have scheduling features. MDRRMOs will be able to create their activities schedule, viewable by the other MDRRMOs. PDRRMO will also be able to set a schedule of activities and it will be accessible for MDRRMOs to confirm their attendance. The system may even recommend alternative schedules in case of conflicting activities.

Additionally, the system will also allow the PDRRMO to efficiently disseminate memos and important documents to the MDRRMOs. This streamlined communication

process will enable the PDRRMO to share critical information, updates on protocols, guidelines, and other relevant materials related to disaster response.

Furthermore, the proposed system will enable MDRRMOS to generate situational reports and it will send to PDRRMO. These reports will be efficiently communicated, facilitating better decision-making and communication. Overall, this solution will aim to ensure better resource allocation, effective coordination, and improved disaster response outcomes.

The proposed system, however, will have limitations. The system will only be limited to the operations between the PDRRMO and MDRRMO. Training modules will not be included in the system, but the schedule of activities related to training will be accessible to the users.

Definition of Terms

To enhance understanding of the key concepts, the following terms will be explained to provide a clearer comprehension of their meanings:

Climate Change - Refers to the long-term alteration of temperature and typical weather patterns in a place. It is driven primarily by human activities, such as the burning of fossil fuels, deforestation, and industrial processes, which release greenhouse gases into the atmosphere and result in global warming.

Coordination - Coordination in disaster management means working together and organizing efforts between different groups, organizations, and resources to respond to

disasters effectively. It involves setting up ways to communicate, share important information, and collaborate.

Disaster Risk Reduction and Management (DRRM) - Refers to the systematic process of analyzing and managing the risks and vulnerabilities associated with disasters. It involves measures and actions to reduce the impacts of hazards, increase resilience, and promote sustainable development.

MDRRMO - Municipal Disaster Risk Reduction Management Office deals with disaster risk reduction and management. The department operates because disaster management initiatives can be classified as self-effort, mutual aid, or public assistance.

MIS – Management Information System is a system that provides management with the information they need to make decisions concerning operations for the organizations they oversee. The MIS collects and analyses data from multiple sources to provide information that matches the needs of its team members.

Natural Disaster - A natural disaster is a catastrophic event caused by natural processes, such as earthquakes, hurricanes, floods, or wildfires, resulting in significant damage and loss of life and property.

PDRRMO - Provincial Disaster Risk Reduction and Management Office- refers to the provincial government organization responsible for coordinating and implementing measures to mitigate and manage disasters and risks within the province. The PDRRMO is vital for disaster preparedness, response, and recovery operations, intending to protect people, infrastructure, and resources from the adverse effects of natural disasters and emergencies.

Record Management – Refers to the systematic and organized process of creating, collecting, storing, maintaining, and accessing records by an organization.

Report Generation - Refers to creating detailed documents that condense essential data about disaster planning, response, and management actions. These reports are based on data and provide comprehensive insights into various aspects of disaster-related activities.

Request Assistance - Refers to the act of seeking aid or support from relevant authorities, organizations, or individuals in times of need or emergency. It involves formally reaching out for help to address specific challenges, issues, or crises that may require specialized expertise, resources, or intervention.

Resource Allocation - In disaster management, resource allocation refers to assigning and distributing resources, such as personnel, equipment, and supplies, efficiently and strategically to address the needs and priorities during emergencies.

ResQuire ('Rescue and Inquire') – Ensure public safety, security, and health by responding to and resolving various emergencies, committed to strengthening emergency systems that serve as the initial point of contact with the emergency system and to promoting the information of quality, timely emergency services that are approachable to all.

Scheduling – Refers to the process of planning and organizing activities, events, tasks, or appointments within a specific timeframe. It involves creating a systematic timetable or calendar to allocate time and resources effectively, ensuring that activities are completed in a timely and orderly manner.

Web-based – It refers to software or applications that operate on web servers and can be accessed through a web browser. These applications use technologies that are specifically designed for the web environment.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Processes, Policies and Forms

Record Management

Kirvan (2023) defines records management as the process of overseeing and administering digital or paper records, regardless of their format. This includes activities related to the creation, receipt, maintenance, use, and disposal of records that document various business transactions. Records encompass a wide range of documents, such as contracts, memos, electronic files, emails, videos, and databases, which can be stored physically in boxes or file cabinets on-premises or off-site, as well as electronically on storage media or in the cloud. The primary objective of records management is to ensure that essential documentation remains accessible for both business operations and compliance audits, often using spreadsheets to track the location of records. It plays a crucial role as a key component of any comprehensive information governance plan for organizations.

Touray (2021) emphasizes the significance of records management in organizations, supported by the insights of various scholars. The paper highlights that records and information serve as the lifeblood of every organization and form the foundation on which decisions are made. Poor records management not only hinders organizational development but also results in inefficiencies and ineffectiveness in service delivery. Whether personal or official, records play a vital role in an organization's

functioning. Effective records management practices are crucial for the success of any organization, ensuring that the right records are available at the right time for efficient business operations. Proper records keeping is an essential component of virtually all business operations, promoting transparency and accountability.

Indeed Editorial Team (2022), discusses the records management in businesses, emphasizing its role in risk management and compliance. A records management system is defined as a record-keeping system used by companies to track, store, and organize their records, ensuring information governance, regulatory compliance, and risk management. The article presents two types of records management systems, namely paper records management systems and digital records management systems, highlighting their respective advantages and challenges. It further outlines the life cycle of records within the system, including creation, application, protection, and disposal. Additionally, the functions and benefits of a records management system are explored, such as legal protection, improved productivity, data retention policies, and cost-effectiveness. The article also draws a distinction between records management and document management, emphasizing the broader scope and dedicated software often associated with records management.

Assistance Request

Service request management, as described by ServiceNow (2023), is a crucial component of modern business operations. It involves the processes and tools used by organizations to address service requests from customers, employees, and vendors. These formal requests are essential for initiating pre-defined and agreed-upon service actions,

and they often involve procuring or requesting access to specific services that are already clearly defined in a service catalog. By effectively managing service requests, organizations can standardize service catalog requests, track ongoing requests, and ensure efficient and convenient fulfillment, thereby improving service delivery and customer satisfaction.

Ministry of Foreign Affairs (2023) highlights the importance of providing emergency assistance to disaster-affected countries and international organizations in response to large-scale disasters. Such disasters can overwhelm the capacity of affected nations to aid victims and protect their environment and assets due to resource and personnel constraints. To prevent further complexities and secondary disasters, swift international assistance becomes crucial. Japan has established a system of international emergency assistance, offering financial, personnel, and material support in response to requests from the governments of disaster-stricken countries or international organizations. This aid includes emergency grant assistance, which is directed either to the affected country's government or through international assistance organizations. The focus is on providing humanitarian aid to disaster victims, refugees, and displaced individuals, implementing it with efficiency through simplified procedures to address urgent needs.

Scheduling

An event schedule refers to the timetable and sequence of activities planned to take place during the relevant event period. As described by Law Insider (2023), it encompasses the organized timeline of events and tasks that need to be executed during the event. A scheduling system, as emphasized by Netra (2021), plays a crucial role in

managing projects by prioritizing tasks based on their importance and deadlines. This automated approach helps individuals and event organizers focus on critical tasks, reducing the likelihood of errors and the burden of manual tracking. By adopting a scheduling system, event planners can efficiently manage their events, ensuring seamless execution and successful outcomes.

Report Generation

FineReport (2021) defines report generation as the process of utilizing a tool to create reports primarily for business users. It involves creating a report definition, specifying what data to retrieve, where to obtain it, and how to present it. Automatic report generation and semi-automatic report generation are commonly used terms in this context, referring to the level of automation involved in the report creation process. While Excel has been widely used for generating reports, its limitations and complexities have prompted the search for more efficient solutions. Report generation extracts necessary data from databases, organizes it, and exports it into informative reports that offer valuable insights and support decision-making.

In the study by Indrė Jankutė-Carmaciu (2019), the importance of data reporting and its significance in various areas of life, such as business, finance, and commercial activities, is emphasized. Data reporting is closely linked to data analysis and plays a crucial role in decision-making processes. The study also highlights the essential skills required for data reporting analysts, including the ability to collate, process, analyze, correct, arrange, and report data accurately. Data is the foundation of any report, and its proper organization and presentation are vital for easy understanding and effective

management. Data reports serve multiple purposes, including accountability, management, and organization. They are used in academic research, scientific innovations, business transactions, census and tax records, business intelligence, and electoral processes, among others.

Functional and Non-functional Requirements

In software development, clear and well-defined requirements are essential for project success. AltexSoft (2021) emphasizes the importance of functional and non-functional requirements in achieving project goals. According to AltexSoft, functional requirements specify the specific features and functionalities that the system must possess, while non-functional requirements address the overall qualities and characteristics of the system. These requirements serve as a formal agreement between the client and the provider, mitigating financial risks and ensuring the project stays on schedule (AltexSoft, 2021).

Furthermore, Lopez (2022) highlights the crucial role of requirements in software and app development, serving as the foundation for meeting user needs and expectations. With clear and well-defined requirements, developers can create software that aligns with user requirements and expectations.

The gathering of user requirements assists in identifying the functional requirements of the system and ensures user satisfaction. Haughey (2021) asserts that requirements gathering is essential to project management and software development.

Hashim (2022) conducted a review paper to address the challenges in the management of electronic records (e-records) and the adoption of Electronic Records Management System to enhance their management, particularly in government sectors. The study identifies hindrance factors for Electronic Records Management System implementation based on previous literature, highlighting the lack of top management support and resistance to change by users of the system as major obstacles. Many government agencies worldwide have adopted Electronic Records Management Systems to improve e-records management, but implementation initiatives, especially in developing countries, have faced difficulties. The study provides valuable recommendations and best practices for managing electronic records in support of Electronic Records Management Systems in the government sector, benefiting records managers and organizations seeking to overcome challenges in Electronic Records Management System adoption.

Weerakoon, H.S.G.A. (2021) presents an event management system for academic conferences and workshops. The paper highlights the challenges faced during manual event handling, which is time-consuming and involves significant paperwork. To address these issues, the author develops a web-based application to automate event management processes, including publishing conference details, paper submissions, review assignments, email notifications, event scheduling, and online registration with payment options. The system aims to reduce costs, minimize paperwork, enhance efficiency, and save time, while also reducing human errors. The application is tested using various evaluation techniques, and user feedback is collected through questionnaires. The system utilizes Apache web server, CodeIgniter framework, and MySQL as the database

management system, offering a cost-effective solution for organizing conferences and workshops. Additionally, the development process includes quality assurance, user manuals, and demonstrations to improve system performance. This study provides valuable insights into the development and implementation of an automated event management system, enhancing the overall event organizing experience.

In the study of Calzon (2023), the concept of automated reporting emerges as a powerful management tool that revolutionizes the way professionals create and share organizational reports. By harnessing smart reporting tools and cutting-edge Business Intelligence (BI) technology, automated reports provide real-time data insights and visualizations, eliminating the need for cumbersome manual updates. Calzon highlights the significant benefits of this approach, emphasizing time and cost savings, allowing organizations to focus on strategic activities and improving decision-making processes. Moreover, the accessibility and transparency of autonomous insights foster a collaborative environment, enhancing overall productivity within the organization.

Development of the System

The system development process refers to using a set of methodical processes, activities, or phases to develop and implement a system (Griffin, 2022). Computer Hope (2022) states that system development is the overall process of designing, building, programming, and completing a product. This process applies to developing a computer, hardware device, or software program.

Scrum, a project management framework, facilitates collaboration on complex product and software development projects. Westland (2022) explains that the Scrum methodology emphasizes teamwork, accountability, and iterative progress toward a well-defined goal. It is part of the agile software development approach, drawing its name from the sport of rugby, where a scrum formation represents a coordinated effort towards quickly adopting strategies.

Moreover, May (2021) states that Scrum, initially used in software development, has proven helpful in diverse fields such as sales, research, marketing, and more. It has become one of the most widely used software development methodologies, continuously improving and enhancing its practices.

The effectiveness of Scrum in project management has been demonstrated in a case study conducted by Yeaton (2021). The study examines how a capstone team utilized the Scrum methodology, modeling specific project management processes throughout their project. The analysis of the project's velocity at different points suggests a correlation between asynchronous daily meetings and sprint reviews and improved velocity.

Grebić et al. (2021) present a paper aimed at revealing and studying the specifics of the Scrum framework from both theoretical and practical perspectives. The paper starts by explaining the basics of the agile approach, providing a foundation for understanding the Scrum framework and its origins. The focus then shifts to defining the role, significance, and structure of the Scrum framework, including Scrum roles, events, and artifacts unique to project management in Scrum. The authors emphasize the importance and responsibilities of each Scrum team member, the duration and purpose of Scrum

events, and the creation, updating, and refinement of Scrum artifacts. The paper aims to facilitate the application of Scrum in projects within the IT sector and other relevant fields. Research results on the application of Scrum and agile approaches in software development projects in the Republic of Serbia are also discussed, along with conclusions about the potential for further development and broader implementation of the Scrum framework in various types of projects.

In a study conducted by Indeed (2022), a scrum team is described as a group of collaborators, typically five to nine individuals, working together to complete projects and deliver products. The core scrum team includes a scrum master, a product owner, and a group of developers. The scrum master keeps the team on track and mentors them on Scrum concepts throughout the project. The product owner takes responsibility for developing high-value products. At the same time, the development team is responsible for creating a high-quality, potentially releasable finished product at the end of each sprint.

In line with these findings, the researcher recognizes the value of Scrum and intends to employ the Scrum methodology to develop the Resquire. Using Scrum, it will provide a high-quality system.

Usability Testing of the System

"Usability is a quality of use, which means it is defined or measured for a given context in which a system is operated. Thus, a system may provide good usability for experienced users but poor usability for beginners, or vice versa; or it may be easy to use if used sporadically but difficult to operate frequently" (Westland, 2022).

According to Tauma (2022), usability testing is a type of testing in which users are given new software or applications to use and test. The feedback gathered from the participants determines if the application is ready to be deployed and can be easily used by users. Usability testing is critical because it helps designers and developers uncover and fix issues to enhance the user experience.

Researchers will employ the System Usability Scale (SUS) as a valuable research tool to assess the usability of the proposed system. By utilizing the SUS, the researchers can identify specific areas for improvement and make informed decisions to enhance the user experience and ensure a more user-friendly and intuitive system design. Using this well-established research tool, the researchers can obtain valuable data that will inform the development and refinement of the Resquire, ultimately leading to more successful and satisfying user interaction.

Synthesis

The authors Kirvan, Touray, and Indeed Editorial Team emphasize the importance of effective record management for organizations, highlighting its role in information governance, risk management, and compliance. They stress that records serve as the lifeblood of an organization, and proper management is crucial for transparency and accountability. Hence, by implementing a record management practices, the proposed system will enable efficient tracking, storage, and retrieval of critical information, ensuring that all related data are appropriately documented and accessible when needed.

The concept of service request management is discussed by ServiceNow and Ministry of Foreign Affairs, highlighting its significance in addressing service requests efficiently, particularly in emergency assistance during disasters. The case study by Sasiprabha et al. demonstrates the benefits of implementing a service provider allocation and customer service request management system to enhance service delivery and customer satisfaction. However, the proposed system will not include customer satisfaction. Instead, it will focus on implementing a service request management system to enhance service delivery efficiency. The system will be designed to address assistance requests efficiently, particularly in emergency assistance during disasters.

Scheduling systems and event schedules are essential for organizing. Law Insider and Netra emphasize the significance of automated scheduling systems to prioritize tasks and reduce manual tracking and errors. Weerakoon presents an automated event management system for academic conferences and workshops, aiming to streamline processes, save time, and minimize paperwork. In line with the insights from Law Insider, Netra, and Weerakoon, the proposed system will adopt a scheduling system as a crucial component. The adoption of a scheduling system will significantly enhance the efficiency and effectiveness of the proposed system, ensuring that the PDRRMO and MDRRMOs can create and track schedule of activities and eliminate paperwork in scheduling various events or activities.

Report generation is discussed by FineReport and Indrė Jankutė-Carmaciu, highlighting its importance in decision-making processes and various fields like business, finance, and research. Automated reporting tools are recognized for providing real-time data insights and improving productivity. In line with the insights from FineReport and

Indrė Jankutė-Carmaciu, the proposed system will adopt an automated report generation feature as a key element. The adoption of report generation will significantly improve productivity, as it automates the process of generating reports, saving time and effort for PDRRMO and MDRRMOs.

As AltexSoft and Lopez stress the importance of clear and well-defined requirements, the proposed system should ensure that functional and non-functional requirements are thoroughly documented to achieve project success and meet user expectations. Drawing from Hashim's review paper on managing electronic records, the proposed system could incorporate Electronic Records Management Systems' (ERMS) aspects to efficiently record and manage disaster response data, including response personnel information and incident reports. Moreover, a study from Weerakoon's automated event management system, such as cost reduction and increased efficiency, can be applied to optimize scheduling in the proposed system. Similarly, Weerakoon's implemented an email notification, payment method, and online registration from the system. Email notification will be catered by the system to remind MDRRMOs for memorandums or important documents sent by the PDRRMO. The proposed system will not provide a registration for MDRRMOs, however, PDRRMO will be able to create an account for MDRRMOs. The payment method feature will not be included in the proposed system since there's no transaction that involves money. Moreover, the transformative benefits of Calzon's automated reporting tools, like real-time data insights and cost savings, can be leveraged to generate incident reports insights for more informed decision-making within the proposed system.

The authors May, Yeaton, Grebić et al., and Indeed Editorial Team discuss the Scrum methodology in software development and project management. Scrum is highlighted for its teamwork, accountability, and iterative progress towards project goals, with its effectiveness demonstrated in various fields. Therefore, the researcher will adopt the scrum to optimize the development and management of their project, resulting in successful outcomes.

In Tauma's 2022 study, usability testing is highlighted as a crucial method for evaluating software and applications. The System Usability Scale (SUS) will be used for this project in order to enable researchers to gather valuable feedback from users to assess the proposed system's usability within specific contexts.

In conclusion, the researcher will adopt a comprehensive approach that includes an effective record management system, assistance request, automated scheduling system, efficient report generation, the Scrum methodology, and the System Usability Scale (SUS).

Project Framework

The researchers will use the Input-Process-Output (IPO) model, which provides a general structure and guides the project's direction.

INPUT

┌─────────────────────────┐
│ 1. Process, forms, and │
│ policies of PDRRMO in   │
│ terms of: │
│   │
│ a. Record Management   │
│   │
│ b. Assistance Requests │
│   │
│ c. Scheduling   │
│   │
│ d. Report Generation   │
│   │
│ 2. Functional and Non- │
│ functional Requirements │
│ for ResQuire.   │
│   │
│   │
│ 3. Usability of the   │
│ ResQuire using System   │
│ Usability Scale (SUS). │
└─────────────────────────┘

PROCESS

SCRUM

a) Initiate

b) Plan and Estimate

c) Implement

d) Review and Retrospect

e) Release

OUTPUT

RESQUIRE: DISASTER MANAGEMENT INFORMATION SYSTEM FOR PDRRMO

Feedback

Figure 2.1: Input-Process-Output (IPO) Model

Figure 2.1 describes the project framework of the study, which has three areas: Input, Process, and Output. The inputs consist of the PDRRMO's processes, forms, and policies in terms of record management, assistance requests, scheduling, and report

generation. Additionally, the functional and non-functional requirements for the development of the ResQuire and the usability evaluation using the System Usability Scale (SUS) will be included. These inputs were processed through system development using Scrum methodology, which includes the following steps: a) Initiate, b) Plan and Estimate, c) Implement, d) Review and Retrospect, and e) Release. The output of this project is the ResQuire: Disaster Management Information System.

CHAPTER 3

METHODOLOGY

Project Design

In this study, both descriptive and developmental research approaches were utilized. The researchers used interviews as data-gathering tools for the descriptive design to identify the functional and non-functional requirements of the system. Additionally, survey questionnaires were employed as data-gathering tools for the descriptive design to evaluate the usability of the developed system. According to Hassan (2022), a descriptive research design is a method used to describe or document the characteristics, behaviors, attitudes, opinions, or perceptions of a group or population being studied. It focuses on providing a detailed and accurate representation of the data collected, which can be useful for generating hypotheses, exploring trends, and identifying patterns in the data.

Furthermore, in this study, developmental research was used for the design development and evaluate the system using the Scrum methodology. Scrum methodology helps ensure effective time management and assists developers in completing project tasks quickly and efficiently. Scrum procedures focus on a Scrum project's different activities and workflow. Scrum is divided into five phases: initiation, planning and estimation, implementation, review and retrospective, and release.
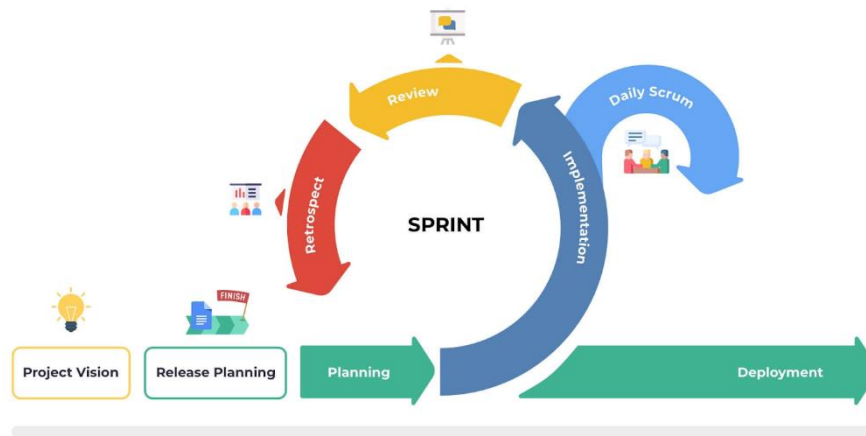
Figure 3.1: SCRUM Model

Initiate. The team's primary goal during the initiation phase is to establish a clear project vision and plan. They will define the purpose and desired outcomes of the system development. Identifying all project stakeholders is essential to consider their needs and requirements. Assigning team members to specific roles promotes effective collaboration. The researchers will function as a Scrum Team, with a Scrum Master facilitating using Scrum principles. In this phase, the team will create a project vision, develop a list of features and tasks (product backlog), and plan the project timeline and milestones.

Plan and Estimate. In this phase, developers carefully plan and design the system to meet users' needs. They create User Stories to capture the desired functionality and estimate the effort required for each task. The team commits to implementing the User Stories within a specific timeframe or sprint. They break down the User Stories into smaller tasks, prepare the necessary resources, and create the Sprint Backlog, which lists

the tasks for the upcoming sprint. This phase sets the stage for the actual development work and ensures that the system will effectively meet the users' requirements.

Implementation. In this phase, the developers shift their focus towards actively building and designing the proposed system. They will begin developing the software and implementing the necessary functionalities based on the user requirements. During this phase, it is essential to note that user requirements may evolve or change as the desired system quality becomes clearer. The developers will adapt and adjust accordingly to ensure the system meets the desired standards.

Review and Retrospect. This phase involves the developers thoroughly evaluating the working system to assess its efficiency and alignment with end-users' expectations. During this phase, the team will extensively test the system to identify any issues or bugs and ensure it functions as intended. They will also review the tasks performed during the sprint to verify that they align with the project's methodology and adhere to the defined sprint goals and timelines. This phase allows the team to reflect on their work, identify improvement areas, and gather end-user feedback.

Release. This phase marks the delivery of the final version of the system to the end users if it meets their requirements and expectations. Once the system is deemed ready for release, the developers will make it available for use by the intended users. This phase signifies a significant milestone in the project, as the system is officially handed over for operational use.

Population and Locale of the Study

The study will be conducted in the Province of Pangasinan, and the proposed system will be utilized in 44 Municipal Disaster Risk Reduction Management Offices across Pangasinan, as well as in the PDRRMO (Provincial Disaster Risk Reduction and Management Office). However, for testing purposes, the study will be conducted in both the PDRRMO and one of the municipalities, specifically in the municipality of Binalonan, where the MDRRMO- Binalonan's staff will be involved.

Respondents for this research study, as itemized in the following table.

Respondents	Objective No. 1	Objective No. 2	Objective No. 4
PDRRMO staff	1	2	2
MDRRMO-Binalonan staff	1	2	2
TOTAL	**2**	**4**	**4**

Table 3.2: Distribution of Respondents and End-users

For objective no. 1, the number of respondents assigned will be used to determine the process, forms, and policies in terms of record management, assistance requests, scheduling, and report generation. The respondents under this objective will be the PDRRMO staff and MDRRMO-Binalonan staff.

For objective no. 2, the number of respondents assigned will be used to determine the functional and non-functional requirements of the ResQuire. The respondents under this objective will be the PDRRMO staff and MDRRMO-Binalonan staff.

For objective no. 4, the number of respondents assigned will be utilized for the usability testing of the ResQuire. The respondents will be composed of the PDRRMO staff and MDRRMO-Binalonan staff.

Data Instrumentation

The data-gathering instruments that the researchers will use to collect the necessary information are as follows:

Interview Guide Questionnaire. The researchers will utilize interview guide questionnaire as the data-gathering instrument. The instrument used will be a guided questionnaire containing specific questions aimed at identifying the process, forms, and policies in terms of record management, assistance requests, scheduling, and report generation. Please refer to *Appendix A* for the interview questions used in the objective no.1.

Checklist Survey Questionnaire. The researchers will utilize a checklist survey questionnaire to determine the needs of the users for the system. Please refer to *Appendix B* for the checklist survey questionnaire used in the objective no.2.

Survey Questionnaire. The researchers will utilize a survey questionnaire based on the System Usability Scale (SUS). The SUS questionnaire consists of 10 general statements on a 5-point Likert scale, allowing the researchers to gather feedback and evaluate the perceived usability of the system. Please refer to *Appendix C* for the SUS questionnaire used in the objective no.4.

Data Analysis

The data analysis process for this study will involve three main objectives:

For objective no. 1, the researchers will utilize process flowcharts as a visual representation to illustrate the identified processes, forms, and policies in terms of record management, assistance requests, scheduling, and report generation.

For objective no. 2, the data from the checklist survey questionnaire will be interpreted using frequency count. Use-case diagrams will be used to document the features of the ResQuire.

For objective no. 4, the researchers will use the System Usability Scale (SUS) scoring to evaluate the usability of the ResQuire. The SUS is a widely used questionnaire to measure the perceived usability of a system. Participants will be asked to respond to 10 statements on a 5-point Likert Scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Once the survey responses are collected, the researchers will calculate the average score for each respondent and then compute the overall average score for the entire sample. The resulting average score will fall within the range of 1.00 to 5.00. To interpret the data, the Likert Scale will be utilized for usability testing, as shown in Table 3.3. Responses with an average score of 4.20 5.00 will be considered as "Strongly Agree" or "Agree," indicating that the system is usable and meets the user's needs.

Similarly, responses within the statistical range of 2.60 – 3.39 will be classified as "Moderately Agree," still indicating that the system is usable.

The Likert Scale below will be used for data interpretation:

Numerical Equivalent	Statistical Range	Descriptive Equivalent Rating	Descriptive Interpretation
5	4.20 – 5.00	Strongly Agree	Usable
4	3.40 – 4.19	Agree	Usable
3	2.60 – 3.39	Moderately Agree	Usable
2	1.80 – 2.59	Disagree	For Revision
1	1.00 – 1.79	Strongly Disagree	For Revision

Table 3.3: Likert Scale for Usability Testing

However, if the average score falls between 1.00 – 2.59, it will be labeled as "Disagree" or "Strongly Disagree." This suggests that the system needs revision and improvement to better meet the user's needs.

Proposed Implementation Plan

The "ResQuire: Disaster Management Information System for PDRRMO" is a web-based application for PDRRMO and MDRRMOs across Pangasinan. The system is being developed according to the identified functional and non-functional requirements. Furthermore, the system uses HTML, CSS, Bootstrap framework for the front end, PHP Laravel framework, and MySQL for the back-end database. The developers utilize Visual Studio Code and Sublime Text as the text editors for coding. After the completion of the initial prototype, the testing will be conducted at PDRRMO and MDRRMO-Binalonan. And after the system satisfies the user requirements, the system will be implemented, and easily accessible to any devices with browsers.

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                    ┌─────────────────────────────────────┐
                    │       Development of the System       │
                    └─────────────────────────────────────┘
                                     ↓
  ┌──────────┬──────────────┬──────────────┬──────────────────┐
  │  Design  │    Coding    │   Testing    │  Documentation   │
  └──────────┴──────────────┴──────────────┴──────────────────┘
                                     ↓
         ┌──────────────────────────────────────────┐
         │  Unit Testing, Integration Testing, Alpha, │
         │              and Beta Testing              │
         └──────────────────────────────────────────┘
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              ┌───────────────────────────────┐
              │          Pilot Testing          │
              └───────────────────────────────┘
                                     ↓
              ┌───────────────────────────────┐
              │        User Documentation       │
              └───────────────────────────────┘
                                     ↓
              ┌───────────────────────────────┐
              │          User Training          │
              └───────────────────────────────┘
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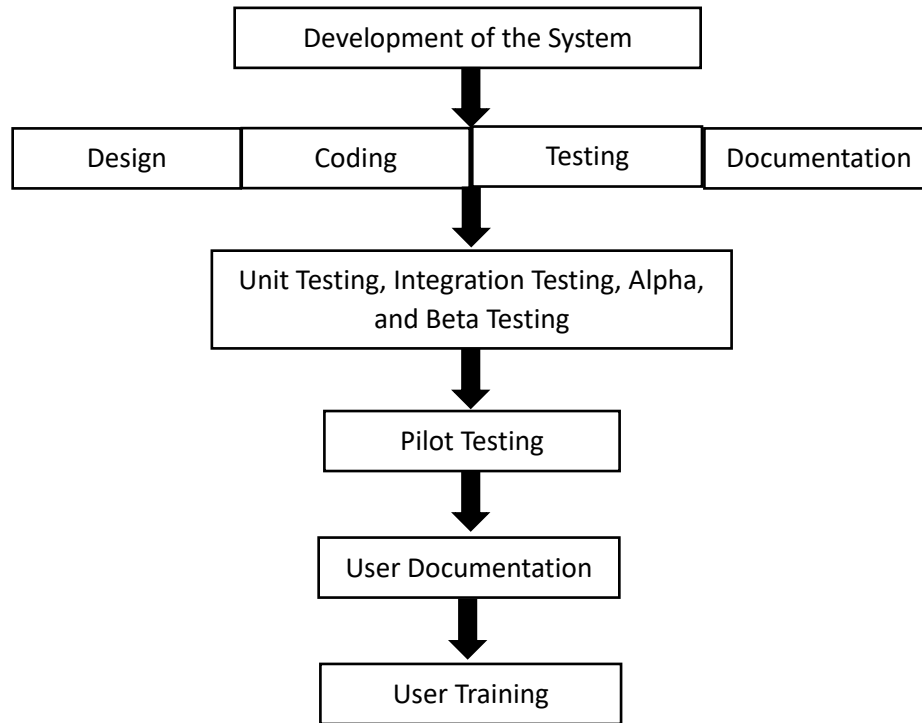
Figure 3.2: System Implementation

Development of the System. The developers are turning the specifications into design and starting the development of the project by making sure that they have proper guidelines in place about the code style and practices. The prototype will be presented to the PDRRMO and MDRRMO-Binalonan staff to source out comments, suggestions, and criticism regarding the design and for additional requirements. Those will be incorporated into the system until the users are satisfied. Continuous involvement is encouraged to come up with the specified design specification to be followed in the construction of the proposed system. Construction of the system started when the design specification was approved.

Unit Testing. The system developers have a responsibility to conduct unit testing to gain confidence in making changes and managing the code. They will test each part of

the system separately to check for any problems and isolate each unit to find, analyze, and fix any issues. This helps ensure the system works smoothly and efficiently.

Integration Testing. The developers will perform this by combining the modules in the system and testing it as a group to see if they are working just fine. With this, the developers might have detected errors integrating the modules to build the overall system and the developers can verify that their code is working with external dependencies correctly.

Alpha and Beta Testing. The alpha testing will be performed at the developer's site and the Beta Testing will be performed by the PDRRMO and MDRRMO-Binalonan staff.

Pilot Testing. It will be performed by the PDRRMO and MDRRMO-Binalonan staff to evaluate the feasibility, time, cost, risk, and performance of the system.

User Documentation. The developers will make a video to show people how to use the system. They will put it online so anyone can watch it and learn how to use the system easily.

User Training. The developers will help the user in operating the system in an efficient way. A manual was given to every user so they can understand the problem and solve it.

CHAPTER 4

RESULTS AND DISCUSSIONS

Process, Forms and Policies

  An interview guide questionnaire was crafted in order to identify the process, forms, and policies for the development of Resquire: Disaster Management Information System for PDRRMO. The results gathered and analyzed are presented below:

a. Record Management
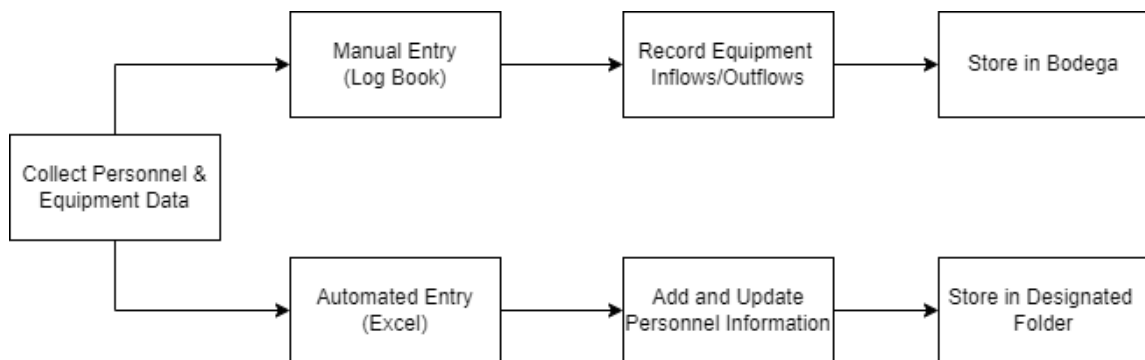
Figure 4.1: Process of Record Management

  As shown in Figure 4.1, in the record management process at PDRRMO, collecting equipment records are manually managed using logbooks. These records include details of equipment going in and out of storage. The personnel data is also managed manually in Excel spreadsheets. For the Policies on document retention, the PDRRMO has short-term and long-term document retention policies. Short-term documents are typically kept for around 3 years, while long-term documents are retained for 6-9 years, there is an office of archives at the provincial level. Each year, documents

are archived based on these retention policies. The SOP (Standard Operating Procedure) for document disposal and archiving is followed, with older documents archived and potentially disposed of. Procedures for disposal are handled by the archives.

b. Assistance Request
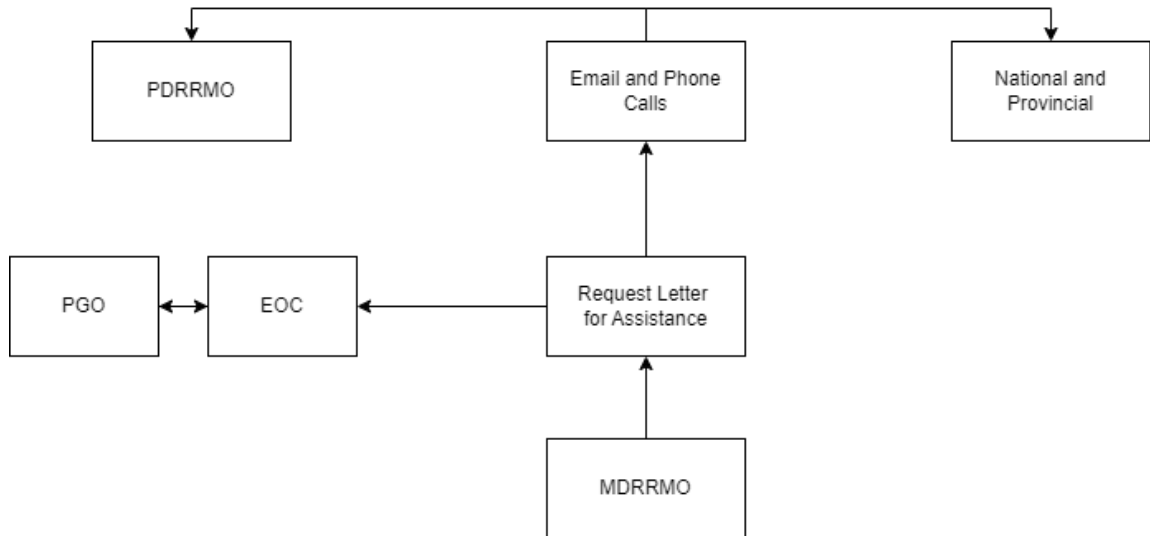
Figure 4.2: Process of Assistance Request

Figure 4.2 illustrates the assistance request process of PDRRMO. Requests for assistance are initiated through communication letters, typically via email, addressed to the Office of the Governor. The PDRRMO then routes these requests for processing. In some cases, verbal agreements may be made for immediate assistance, especially in urgent situations, but formal communication letters are generally required. The PDRRMO conducts follow-up calls and necessary backups to ensure that the requested assistance is provided promptly. The PDRRMO adheres to a Standard Operating Procedure (SOP) manual, which likely outlines the step-by-step processes for managing assistance requests and emergency responses.

c. Scheduling
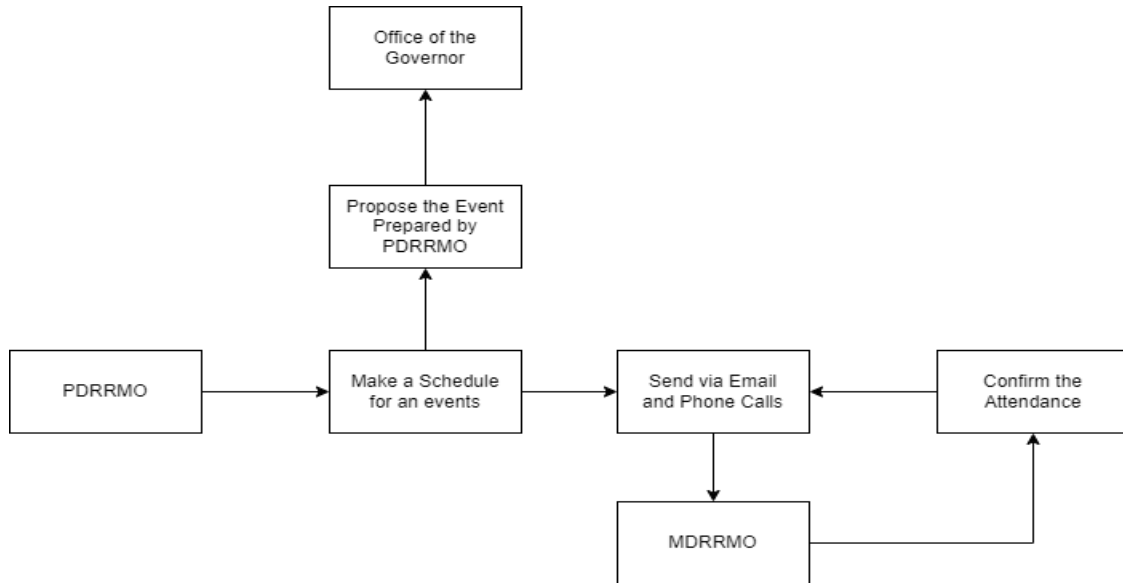
Figure 4.3: Process of Scheduling

As shown in Figure 4.3, the scheduling process at PDRRMO involves initiating and managing activity schedules through paper-based proposals. These proposals outline event details, objectives, and concepts. Once a project proposal receives approval from the Office of the Governor, the PDRRMO communicates it via email to MDRRMO officers. Confirmation of their attendance at scheduled activities is sought through phone calls and emails. Approved activities are added to a calendar, and invitation letters are distributed to relevant offices and stakeholders. Coordination with MDRRMOs is based on their relevance and involvement in specific activities, rather than coordinating every activity with them. When handling scheduling conflicts or date changes, the PDRRMO promptly notifies MDRRMOs through calls, utilizing a directory containing their contact numbers and hotlines. They reach out to the pertinent focal persons in MDRRMOs to ensure clear and timely communication.

d. Report Generation
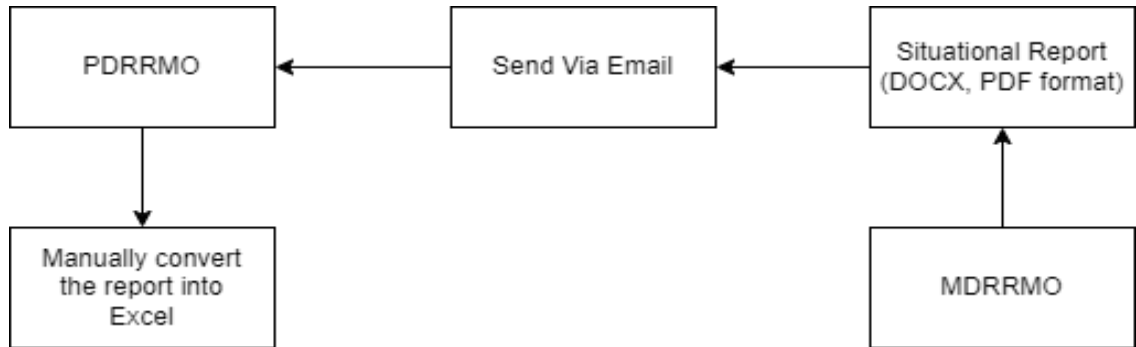
Figure 4.4: Process of Generating Reports

Figure 4.4 illustrates the process of generating reports by both PDRRMO and MDRRMO. The MDRRMO is responsible for generating situational reports, which are sent via email to PDRRMO in response to disaster incidents, such as typhoons. These situational reports serve as the primary means of documenting and reporting on the situation during and after a disaster. Specific report templates and formats are used, typically provided at the national level and cascading down to the regional and provincial levels. Various offices and agencies, including council members, the youth office, provincial agriculture, and engineering offices, may provide specialized templates for reporting on damage and resource utilization. Specific policies exist regarding the content of these reports.

Functional and Non-Functional Requirements

      A checklist survey questionnaire was crafted in order to identify the functional and non-functional requirements for the development of Resquire: Disaster Management Information System for PDRRMO. The results gathered and analyzed are presented below:

Table 4.1: Functional and Non-Functional Requirements of Resquire

Question	Frequency Count
1. Ability to record and manage disaster response resources such as equipment and personnel data.	4
2. Inventory feature to track available resources.	2
3. Resource availability transparency to promote collaboration and resource sharing across municipalities.	2
4. Receive and manage incoming assistance requests from MDRRMOs across the province.	4
5. Coordination and response to assistance requests from all municipalities.	4
6. Can create and manage of activity schedules.	4
7. PDRRMO can see the calendar of activities of all MDRRMOs across the province.	2
8. Recommendation of alternative schedules in case of conflicts.	4
9. Memo and document dissemination to all MDRRMOs across the province.	4

10. Ability to share critical information, updates, protocols, guidelines, and other relevant materials with all MDRRMOs.	4
11. Generate reports on disaster incidents, response activities, resource utilization, and relevant information at the provincial level.	4

In Table 4.3, several requirements received a rating of 4, indicating their high importance. These requirements include the ability to record and manage disaster response resources, receive and manage assistance requests, coordinate responses across municipalities, scheduling an event, disseminate essential information, and generate comprehensive reports at the provincial level. This emphasis on these functionalities underscores the system's critical role in enhancing disaster response efforts, promoting collaboration, and ensuring the efficient allocation of resources, which, in turn, contributes to more effective disaster management.

Development of Resquire using Scrum

The developers used Scrum methodology to track their progress throughout each phase and to maximize and minimize planning within the period given for the system development. To determine the most important component or design of the system, the developers used a checklist survey questionnaire to determine the system's functional and non-functional requirements. The developers also used a variety of data modeling and design techniques, such as use case diagrams and product backlogs.

Initial Phase

In this phase, the developers functioned as a Scrum Team consisting of a Scrum Master along with its members. The development team created a product backlog which guided them in the project completion.

Product backlog

The Table shows a product of backlog of the system. The tables include the making of questionnaires, database design, inserting of data, features, and the number of man-days. Man-days were estimated to have 100 days, whereas the development team has a range of 15 Man-days every 2 weeks.

Table 4.2: Product Backlog

Item No.	Task Name	Number of Man-days
1	Creating, proofreading, and checking of questionnaire's content	1
2	Printing of all questionnaire's after checking	0.25
3	Sending of physical questionnaires to the respondents	0.75
4	Retrieving of the physical questionnaires from the respondents	0.5
5	Monitoring and recording of results	2.5
6	Identify Entities and Attributes	1.5
7	Identify Relationships between entities	1.5
8	Creating ER Diagram	1.5
9	Creating log-in page for users	3
10	Creating user page for PDRRMO and MDRRMO	5
11	Adding PDRRMO user dashboard	2
12	Adding notifications	2
13	Adding memo sending and downloading	3.5
14	Memo Page	2
15	Creating assistance request function	9
16	Creating Scheduling function	10
17	Scheduling page	3
18	Organization Personnel page	1
19	Organization Personnel generation	3
20	Organization's account management page	1.5
21	PDRRMO personal account management	1.5
22	Inventory management	5
23	MDRRMO side dashboard	1

24	MDRRMO Scheduling	3
25	Memo page	3
26	MDRRMO assistance request page	9
27	MDRRMO personal account manager	0.5
28	Inventory management page	3
29	MDRRMO Personnel page	0.5
30	MDRRMO Personnel generation	1
31	Creating Situational report function	10
32	Situational report page for PDRRMO and MDRRMO	2
33	Creating Chat function	4

Plan and Estimate Phase

During this phase, the developers will begin to plan the development of the system to fulfill the end user requirements. This phase allows us developers to specify the system's intended outcomes via end user's input, creating current estimates, and creating necessary tasks and preparations for the finalization of our Product backlog. An example of this phase is represented in the use case diagram figure below.
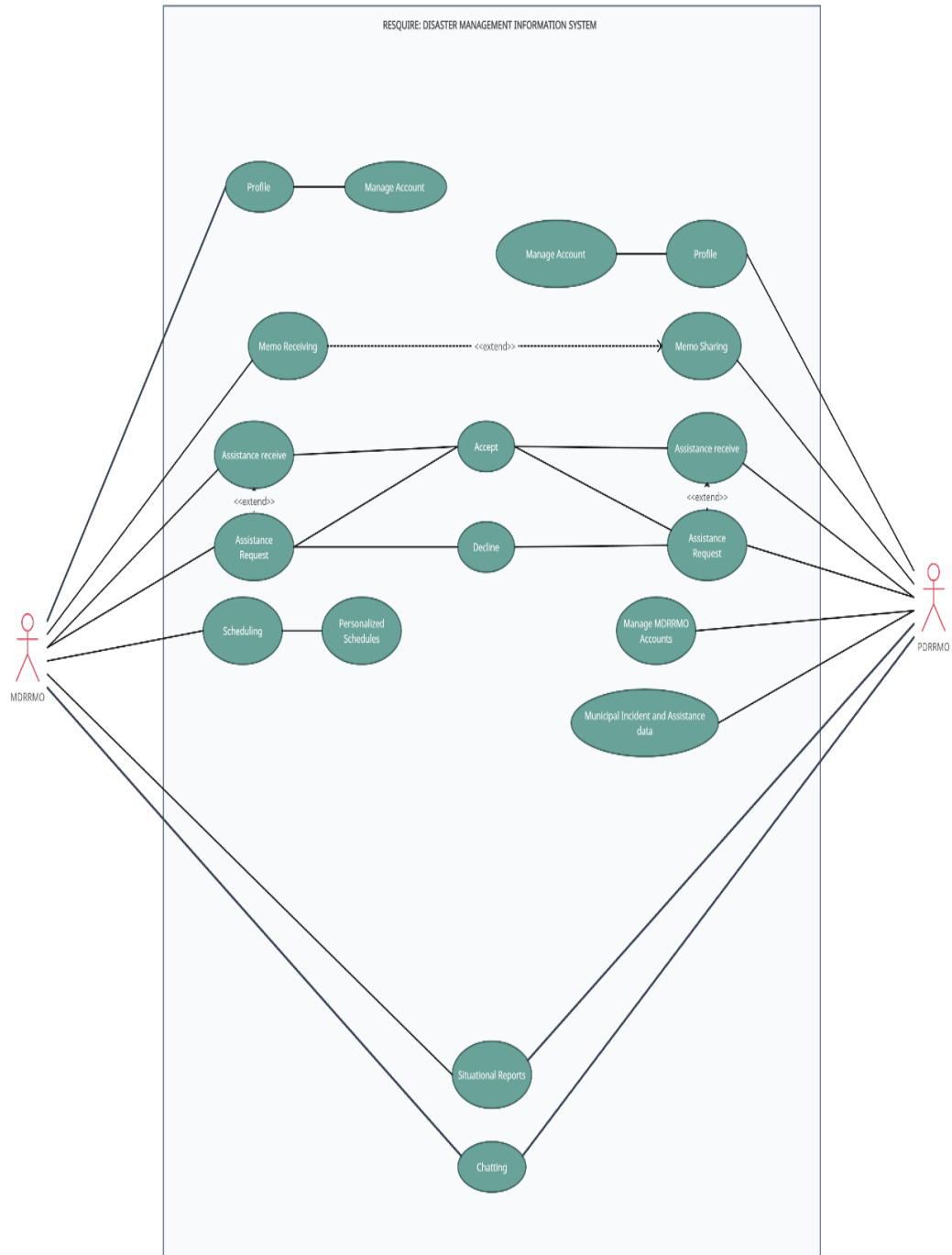
Figure 4.5: Use Case Diagram of Resquire: Disaster Management Information System

The use case diagram presented in figure 4.5 shows practical end goals of the system for what users can and cannot do, and the relations of each part of the system. The developed system is intended for the use of the PDRRMO, so in that case, the system will have two users, the MDRRMOs, and the PDRRMO.

A one-sided transaction with the situational reports can also be done by the MDRRMOs in which the PDRRMO can receive and archive, both parties also have access to assistance requesting whenever disasters or incidents occur and the PDRRMO or MDRRMO or shorthanded, they can send request to each other whenever they need assistance.

Both will have the ability to manage each other's personal account, but the PDRRMO has the admin privilege of managing the accounts of the multiple MDRRMO units in Pangasinan. Contrast to the PDRRMO who can create schedule of activities which can be accessed by the MDRRMOs and confirm their attendance.

All associated parties will have access to the system's chatting/messaging feature. Moreover, the PDRRMO can distribute memos within the system, ensuring prompt receipt by all MDRRMOs.

Implement Phase

In this phase, the developers will start the development of Resquire. In the development of the system Laravel Framework was used for the back end together with MySQL for the data management system. In the front end, HTML, JavaScript, CSS, and Bootstrap were utilized.

Review and Retrospect Phase

The usability testing was conducted by the developers through the involvement of the respondents (MDRRMO Heads and General Staff, and PDRRMO heads and General Staff). They were asked to use the system and they evaluated the system if it matched their expectations in terms of usability.

Release Phase

The researchers initially implemented the final version of the system to the end users. The series of screenshots below is the final interface of "Resquire: Disaster Management Information System".
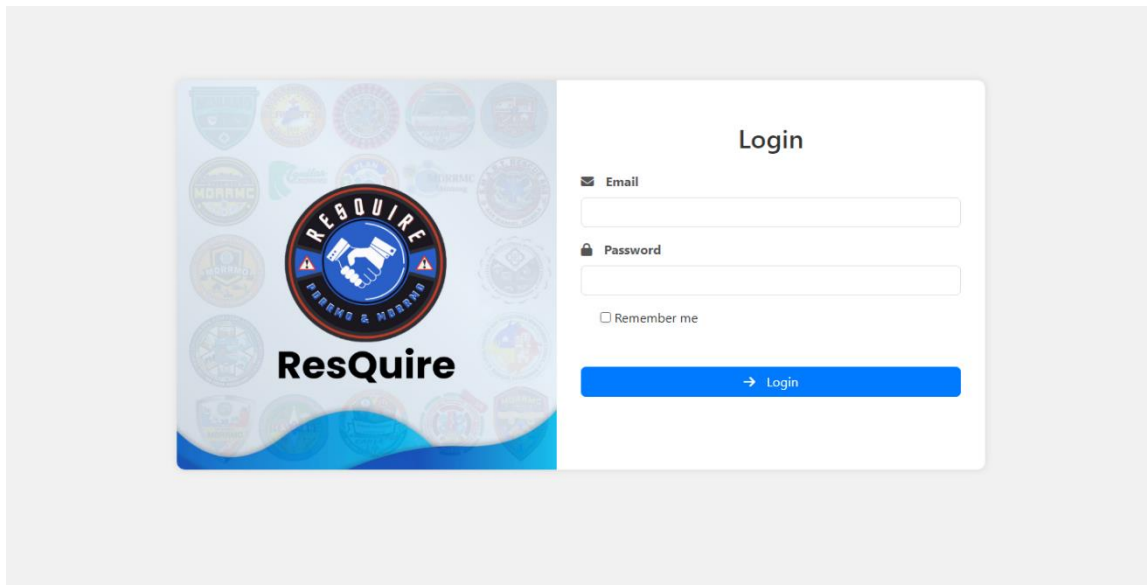
Plate 1. Log-in Page

Plate 1 displays the login form for the PDRRMO and the MDRRMO. Upon logging in, users will be redirected immediately to their respective dashboards.
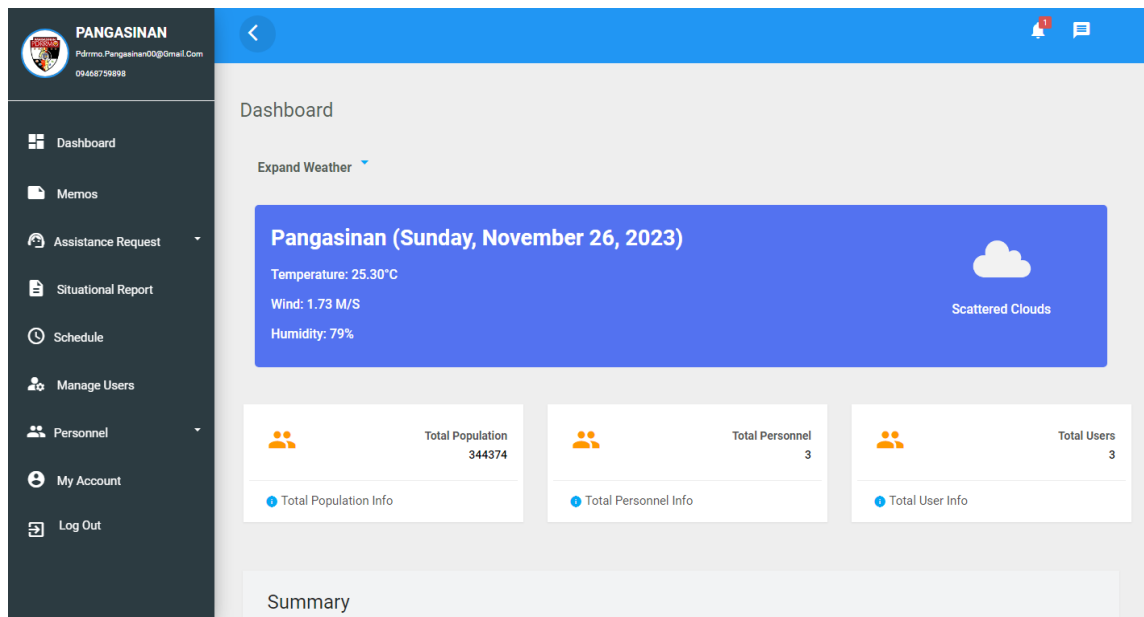
Plate 2. PDRRMO Dashboard Page

Plate 2 displays the dashboard page for the PDRRMO side. The dashboard showcases the current weather, recently calculated population of Pangasinan, the number of registered personnel in the PDRRMO, and the total number of users. Additionally, it provides an accumulative summary of current assistance requests received by the PDRRMO.
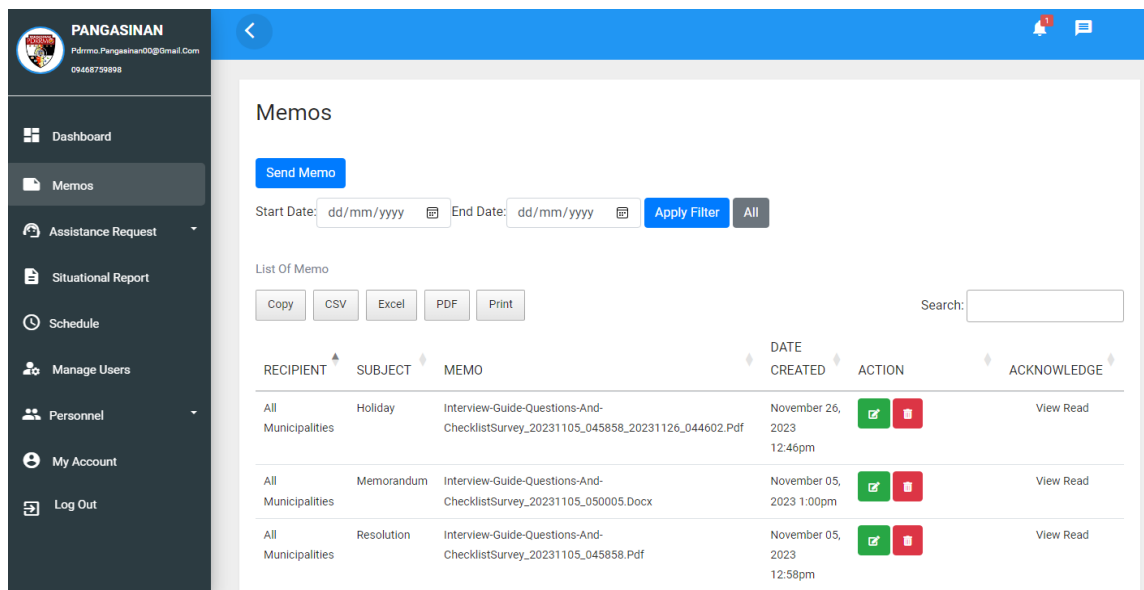
Plate 3. PDRRMO Memo Management and Sending Page

Plate 3 shows the management of the memos for the PDRRMO. On this page, they can send memos to the specified recipients (MDRRMOs), delete, and read existing ones. Additionally, they have the ability to convert the list into different formats, as shown in Plate 3. They can also search the list for a memo or filter it by start date and end date, as well as apply specific filters using the 'Apply Filter' button.

Plate 4. PDRRMO Situational report Management Page

Plate 4 displays the situational report management page. On this page, the PDRRMO can manage the situational reports sent by the MDRRMOs. They have the ability to filter specifics to find reports, read them, and export them as well.
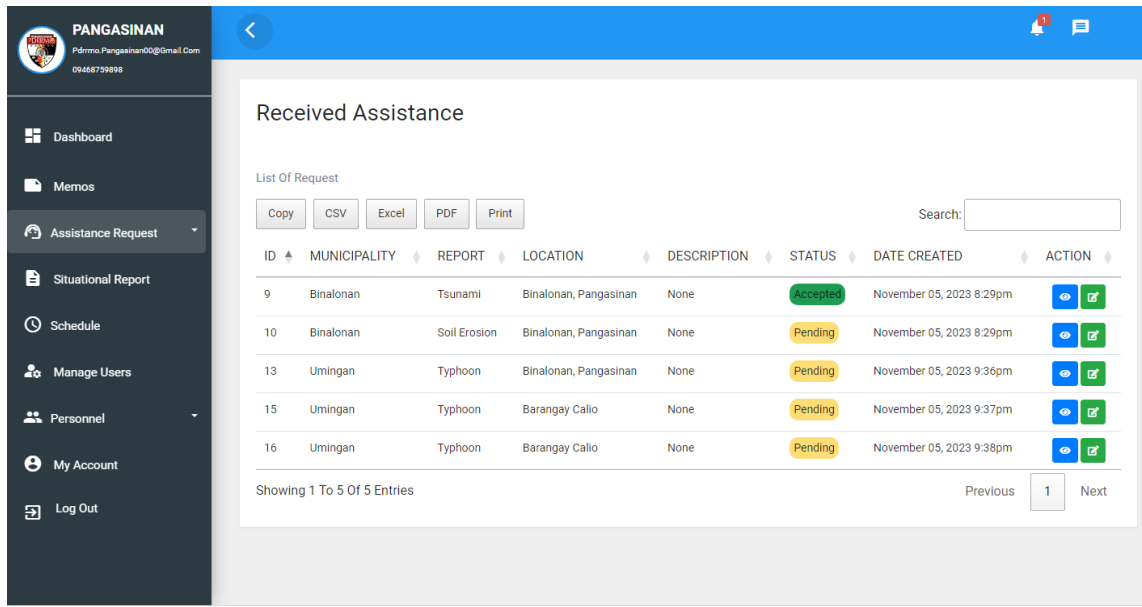
Plate 5. PDRRMO Assistance Request – Assistance Received Page

Plate 5 displays the assistance received page where PDRRMO can manage the list of requests from other municipalities. They can filter the list using the date range and search for a specific item in the provided search area.
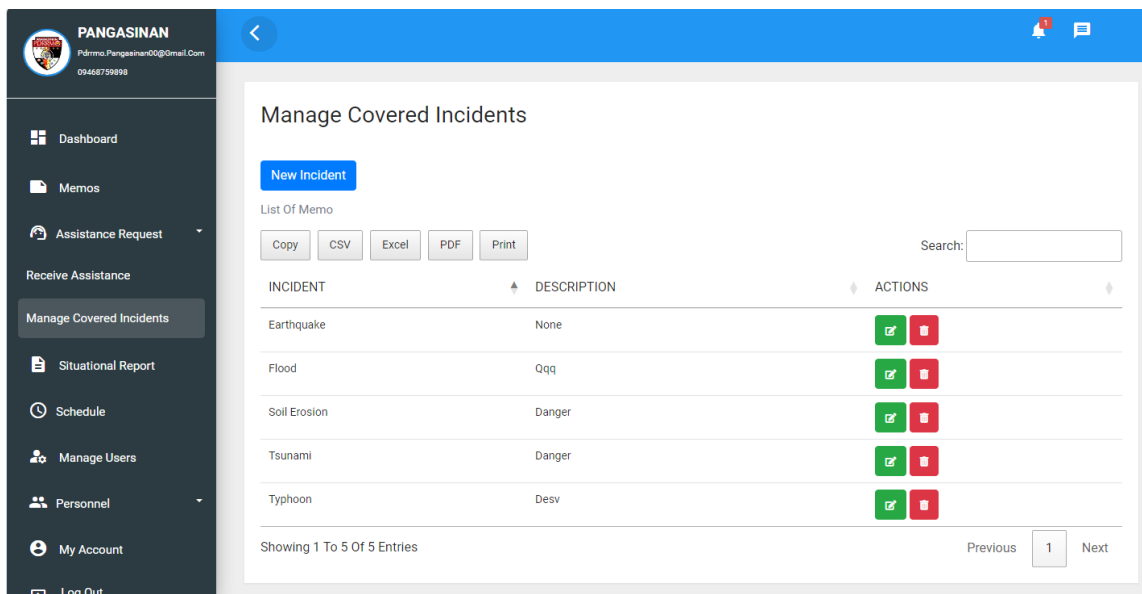
Plate 6. PDRRMO Assistance Request – Covered Incident Page

Plate 6 displays the Covered Incidents page where the PDRRMO can create categories and descriptions for incidents that have been covered and can be reported. They also have the option to filter the list using the date range and search for a specific item in the provided search area.
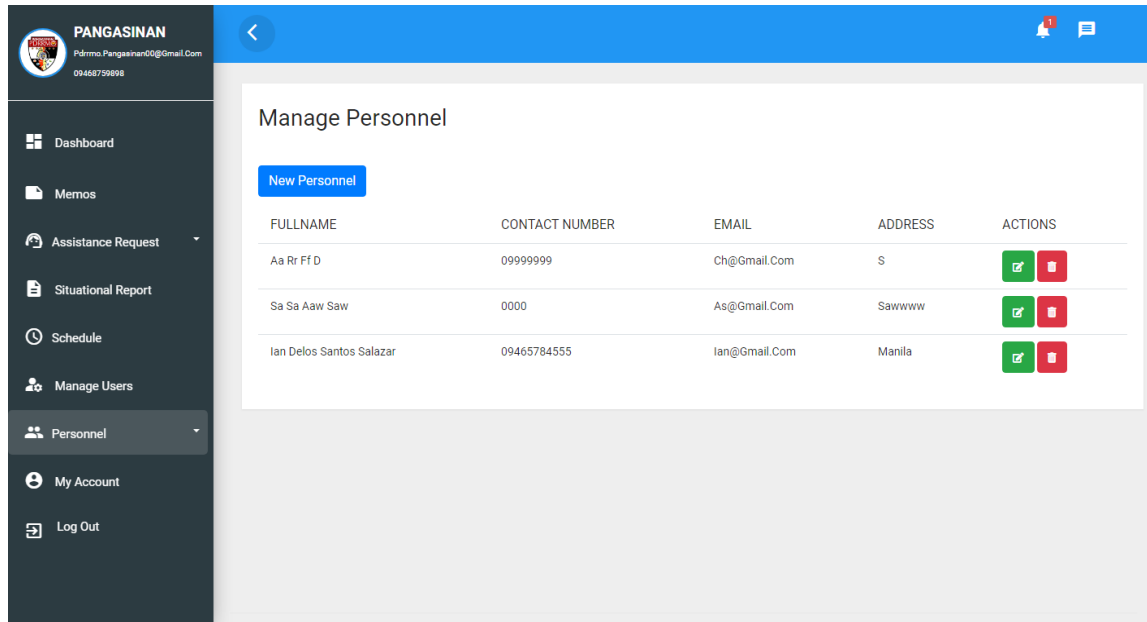
*Plate 7. PDRRMO Personnel Management Page*

Plate 7 displays the Personnel Management page, where the PDRRMO can manage their personnel records. They have the option to filter the list using the date range and search for a specific item in the provided search area.
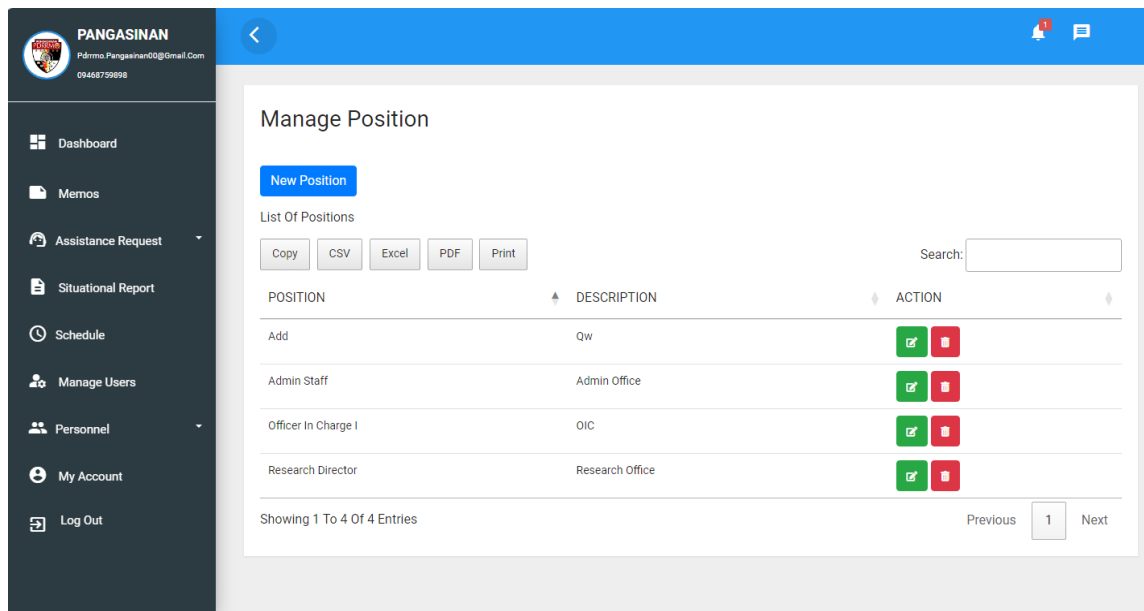
Plate 8. PDRRMO Personnel - Position Management Page

Plate 8 displays the Position Management page, where the PDRRMO can manage the positions involved in personnel records. They have the option to filter the list using the date range and search for a specific item in the provided search area.
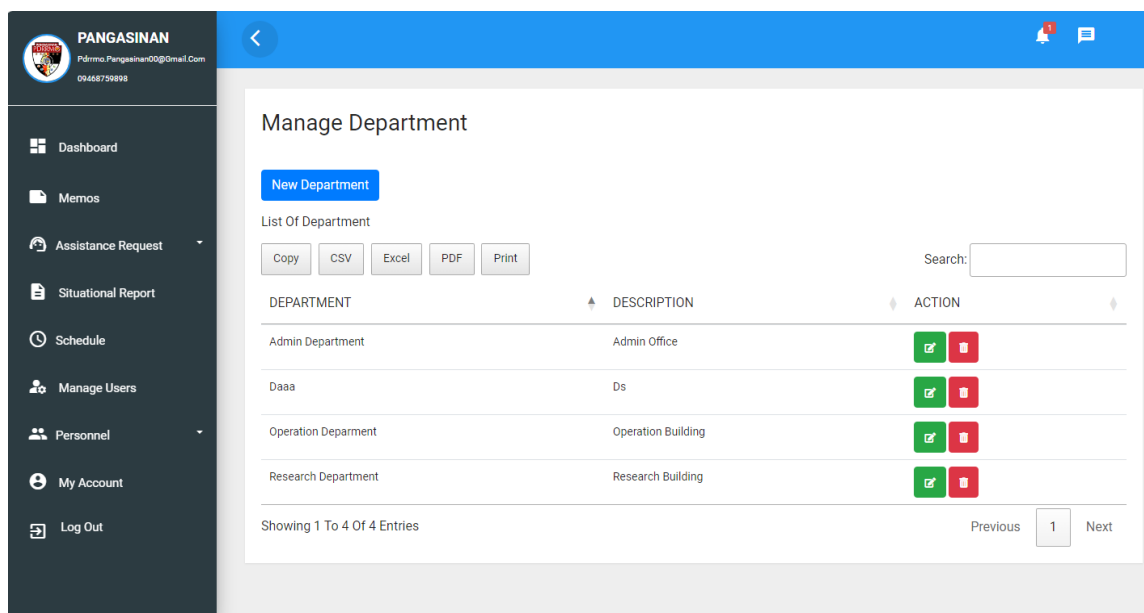

Plate 9. PDRRMO Personnel - Department Management Page

Plate 9 displays the Department Management page, where the PDRRMO can manage department records. They have the option to filter the list using the date range and search for a specific item in the provided search area.


Plate 10. PDRRMO My Account Page

Plate 10 displays the My Account page, where they can manage their details such as profile image, officer in-charge of the system, location, contact number, and many more.


Plate 11. PDRRMO Chat Page

Plate 11 displays the Users Chat page, where the PDRRMO can send messages to municipalities and share photos with each other.
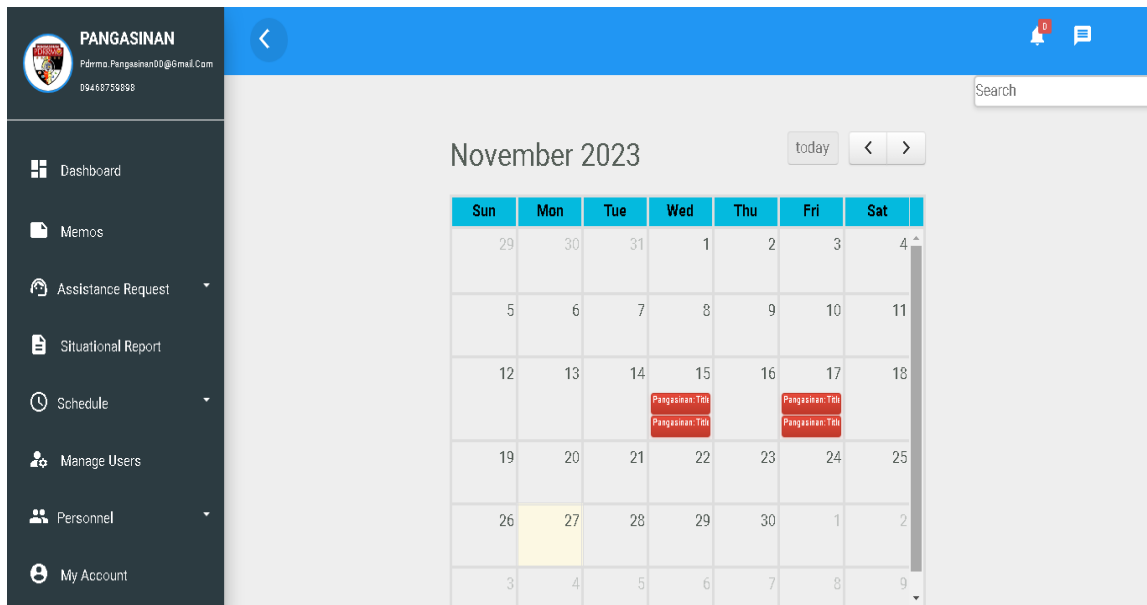

Plate 12. PDRRMO Schedule Management Page

Plate 12 displays the Schedule Management page, where the PDRRMO can manage events, and this schedule can be accessed by the MDRRMOs to confirm their attendance. The list of attendees for each event will be displayed on tables.
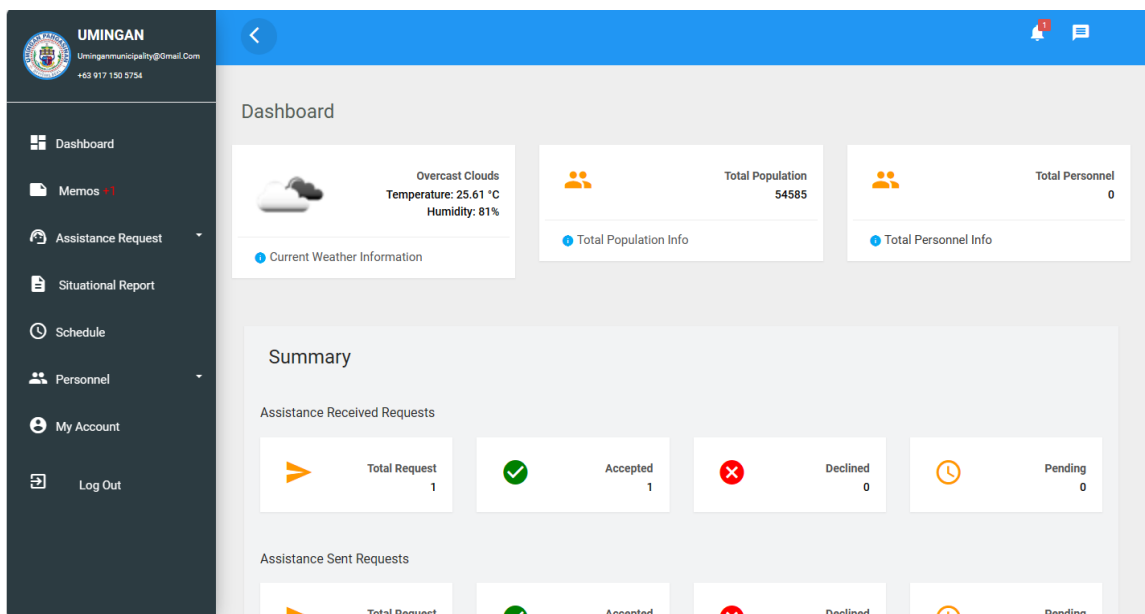

Plate 13. MDRRMO Dashboard Page

Plate 13 displays the dashboard of the MDRRMO. Here, you can see a summary of the requests under "Assistance Sent Requests" and "Assistance Received Requests," as well as the data frequency of incidents for their barangays and the total number of incidents that occurred from the requests they sent.


Plate 14. MDRRMO Memo Page

Plate 14 shows the MDRRMO's Memo Page. On this page, the MDRRMO is only allowed to view, export, and filter the list of memos sent by the PDRRMO.

Plate 15. MDRRMO Assistance Request - Requests Sent Page

Plate 15 shows the Requests Sent Page, where they can send a request to the PDRRMO or to other municipalities using the provided form. They have the option to filter the list using the date range. Updating and deleting options are also provided to efficiently manage the items.


Plate 16. MDRRMO Assistance Request - Requests Received Page

Plate 16 shows the Requests Received Page, where they can respond to the requests sent by other municipalities. They have the option to filter the list using the date range.


Plate 17. MDRRMO Situational Report Page

Plate 17 shows the Situational Report Page, where the MDRRMO user can search and view previous situational reports. They can also create new ones that will be sent to the PDRRMO.

Plate 18. MDRRMO Scheduling Page

Plate 18 shows the Scheduling Page, where the MDRRMO can view the schedule of activities set by the PDRRMO. Confirmation of attendance is also done by filling out the provided form. MDRRMO can also set their own schedules viewable only by them.
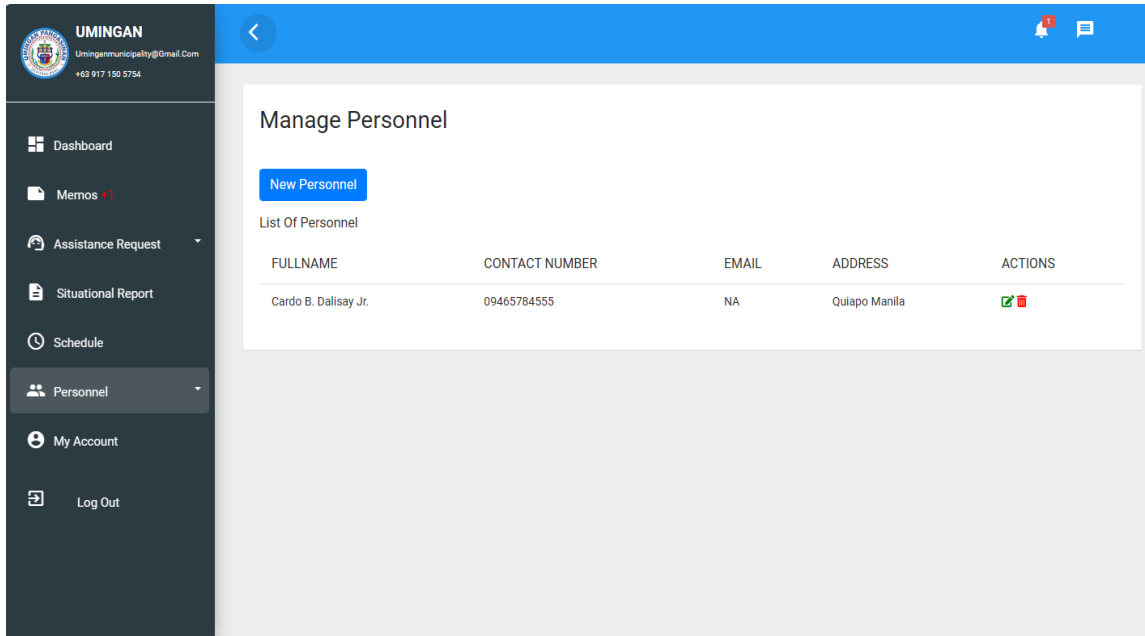
Plate 19. MDRRMO Personnel - Personnel Management Page

Plate 19 displays the Personnel Management page, where the MDRRMO can manage their personnel records.
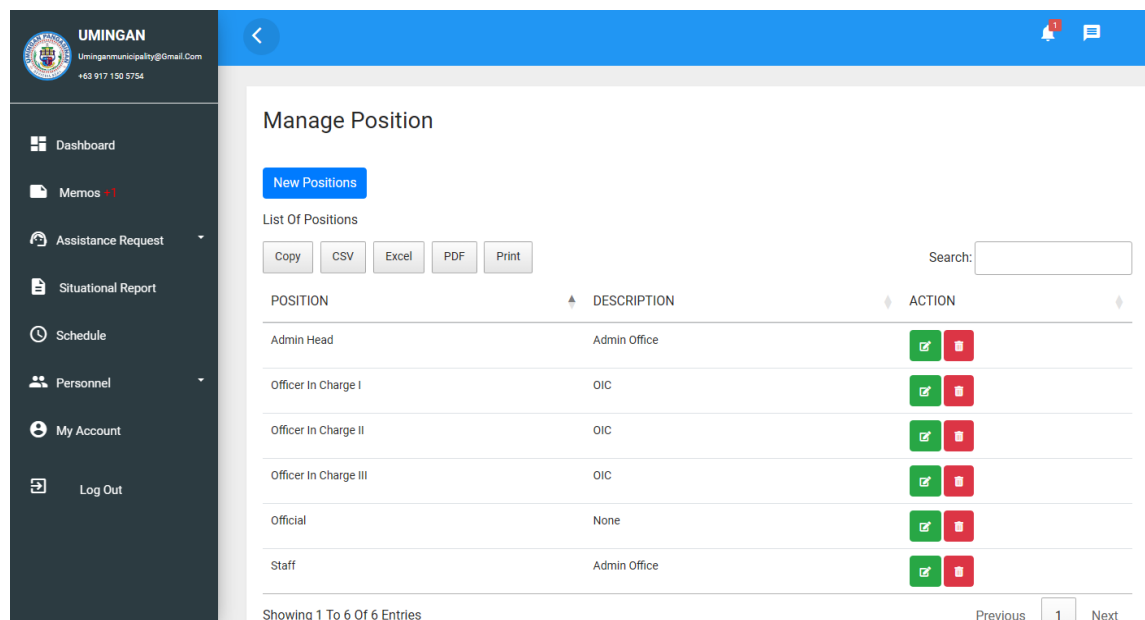
Plate 20. MDRRMO Personnel - Position Management Page

Plate 20 displays the Position Management page, where the MDRRMO can manage the positions involved in personnel records. They have the option to filter the list using the date range and search for a specific item in the provided search area.
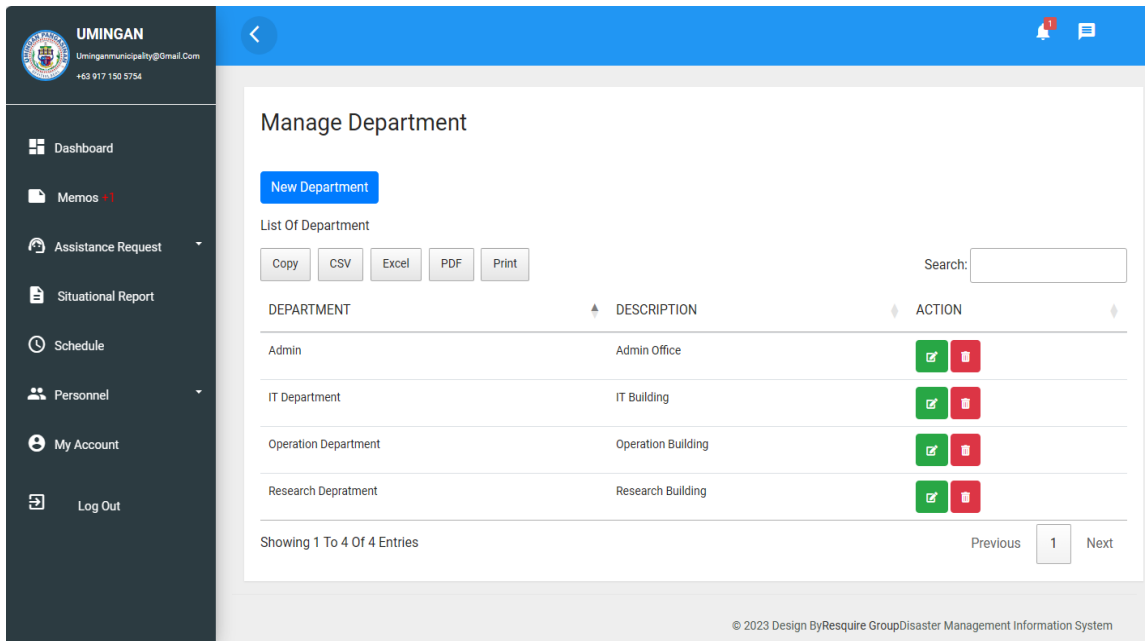
Plate 21. MDRRMO Personnel - Department Management Page

Plate 21 displays the Department Management page, where the MDRRMO can manage department records. They have the option to filter the list using the date range and search for a specific item in the provided search area.

Plate 22. MDRRMO My Account Page

Plate 22 displays the My Account page, where they can manage their details such as profile image, officer in-charge of the system, location, contact number, and many more.

Plate 23. MDRRMO Chat Page

Plate 23 displays the Users Chat page, where the MDRRMO can send messages to other municipalities and PDRRMO and share photos with each other.

Usability of Resquire: Disaster Management Information System for PDRRMO

A System Usability Scale (SUS) was used to test the usability of the developed system. The gathered results were analyzed and presented on Table 4.3.

Table 4.3: Likert Scale for Usability Testing

Item	Mean	Descriptive Equivalent Rating	Descriptive Interpretation
1. The layout and design of the system were visually appealing and user-friendly.	5	Strongly Agree	Usable
2. I found it easy to navigate between different features and sections of the system.	4.75	Agree	Usable
3. The terminology and language used in the system were clear and understandable.	4.5	Agree	Usable
4. The organization of information in the system was straightforward and intuitive	5	Strongly Agree	Usable
5. I felt confident using the system to accomplish my tasks.	4.75	Agree	Usable
6. The system provided helpful and informative error messages when needed.	4.75	Agree	Usable
7. The system provided sufficient feedback and confirmation for the actions I performed.	4.75	Agree	Usable
8. I found it easy to input and manipulate data within the system.	4.75	Agree	Usable
9. The system's search and filtering functionalities were effective in helping me find specific information.	5	Strongly Agree	Usable

10. Overall, I am satisfied with the usability of the system.	5	Strongly Agree	Usable
Weighed Mean	**4.825**	**Agree**	**Usable**

Table 4.2 shows the results of the conducted usability testing. Item no. 1, 4, 9, and 10 were rated with the highest mean of 5 with a descriptive equivalent rating of "Strongly Agree" and interpreted as "Usable", which shows that the respondents are very satisfied with the overall system. Item no. 2, 3, 5, 6, 7, and 8 were rated as average mean with a descriptive equivalent rating of "Agree", which shows that the respondents are balanced contented with the overall system.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The main objective of the study was to create a platform for PDRRMO and MDRRMOs in Pangasinan to help them in terms of communication and collaboration. The platform provides an efficient and effective manner by combining various features in a single platform such as dissemination of memos, requesting assistance, making schedule of activities with attendance confirmation, generating situational reports, and chat message.

To achieve these goals, the researchers determined the functional and non-functional requirements by administering a checklist survey questionnaire to respondents who will use the system.

To assess the system's usability, a survey questionnaire focusing on system's usefulness, information quality, and interface quality was used. The results of usability testing utilizing System Usability Scale (SUS) have an overall mean of 4.825 with the descriptive equivalent of "Agree" and interpreted as "Usable," indicating that the System is usable in terms of system usefulness, information quality, and interface quality.

Conclusion

Based on the analysis of the gathered information, the developers arrived at the following conclusion.

1. Determining functional and non-functional requirements and involving users in design processes can enhance system design quality, help meet user expectations, and can make the system more user-friendly.

2. Based on conducted usability testing using the System Usability Scale (SUS), the developed platform is concluded as Usable in terms of system usefulness, information quality, and interface quality.

Recommendations

Based on the results and conclusions made in the study, the following recommendations are hereby given:

1. The researchers recommend that future developers innovate and improve Resquire to enhance its utility and functionality. Specifically, they could enhance the chat feature by implementing live chat functionality and incorporating audio and video call capabilities.

2. Future developers may consider expanding user accounts, allowing multiple staff members from a municipality to have individual accounts. This approach would grant limited privileges to each account, providing a more flexible and secure access structure for municipality accounts.

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APPENDIX A

Interview Guide Questions for Identifying Process, Forms, and Policies of PDRRMO in

terms of Disaster Risk Reduction Management

Questions:

1. How do you communicate with MDRRMOs?

2. What challenges, if any, have been encountered in coordinating with the

   MDRRMOs?

3. Can you explain the process of recording and tracking incoming requests for

   assistance from MDRRMOs?

4. In requesting assistance, are there any needed forms or documents?

5. What information should the system capture when receiving assistance

   requests from MDRRMOs? How should the system notify and coordinate

   with the PDRRMO regarding these requests?

6. How do you keep your records?

7. What types of reports would you like the MDRRMOs to generate using the

   ResQuire system?

8. How should the system handle the submission of generated reports from

   MDRRMOs to the PDRRMO? Are there any specific validation or approval

   processes required?

9. Aside from requesting assistance, what are the things that MDRRMOs can do

   to communicate and collaborate with PDRRMO?

Checklist Survey Questions for Identifying Functional and Non-functional Requirements

for PDRRMO

If ResQuire were to be developed, the following are the features I would like to see:

(Check all that apply)

[ ] 1. Enable recording and management of the resources such as rescue equipments for disaster response:

[ ] 2. Allow recording and management of detailed specific incident reports, capturing the following information.

[ ] 3. Enable recording of incoming assistance requests from MDRRMOs and track their status and urgency.

[ ] 4. Provide an inventory feature to allow the PDRRMO to keep track of available resources for better resource allocation and utilization during preparation and disaster situations.

[ ] 5. Enable the MDDRMOs to create their schedule of activities, viewable by the PDRRMO, and allow the PDRRMO to create a calendar of activities viewable by all MDRRMOs.

[ ] 6. Provide the system with the capability to recommend alternative schedules in case of conflicting activities.

[ ] 7. Other features to be added: _____

Checklist Survey Questions for Identifying Functional and Non-functional Requirements

for MDRRMO-Binalonan

If ResQuire were to be developed, the following are the features I would like to see:

(Check all that apply)

[ ] 1. Allow submission of requests for assistance during preparation and disaster situations to the PDRRMO.

[ ] 2. Generate reports on disaster incidents, response activities, and resource utilization to aid in improving response efforts.

[ ] 3. Enable MDRRMO-Binalonan to create a schedule of activities and view the PDRRMO's calendar of activities for better coordination.

[ ] 4. Provide the system with the capability to recommend alternative schedules in case of conflicting activities.

[ ] 5. Other features to be added: _____

APPENDIX C

Survey Questionnaire for Usability Testing

I. Respondent Details:

Name (Optional): _____

Position: (__) Official

(__) Staff

II. Questionnaire

Directions: Rate the needed requirements of the system with the following parameters.

5 - Strongly Agree

4 - Agree

3 - Moderately Agree

2 - Disagree

1 -Strongly Disagree

Statement	1	2	3	4	5
The layout and design of the system were visually appealing and user-friendly.					
I found it easy to navigate between different features and sections of the system.					
The terminology and language used in the system were clear and understandable.					
The organization of information in the system was straightforward and intuitive.					
I felt confident using the system to accomplish my tasks.					
The system provided helpful and informative error messages when needed.					
The system provided sufficient feedback and confirmation for the actions I performed.					
I found it easy to input and manipulate data within the system.					
The system's search and filtering functionalities were effective in helping me find specific information.					
Overall, I am satisfied with the usability of the system.					

APPENDIX D

COMPUTATION OF IDENTIFYING FUNCTIONAL AND NON-FUNCTIONAL

REQUIREMENTS

Question	Respondents				Frequency Count
	1	2	3	4	
1. Ability to record and manage disaster response resources such as equipment and personnel data.	/	/	/	/	4
2. Inventory feature to track available resources.			/	/	2
3. Resource availability transparency to promote collaboration and resource sharing across municipalities.			/	/	2
4. Receive and manage incoming assistance requests from MDRRMOs across the province.	/	/	/	/	4
5. Coordination and response to assistance requests from all municipalities.	/	/	/	/	4
6. Can create and manage of activity schedules.			/	/	2
7. PDRRMO can see the calendar of activities of all MDRRMOs across the province.			/	/	2
8. Recommendation of alternative schedules in case of conflicts.			/	/	2
9. Memo and document dissemination to all MDRRMOs across the province.	/	/	/	/	4
10. Ability to share critical information, updates, protocols, guidelines, and other relevant materials with all MDRRMOs.	/	/	/	/	4
11. Generate reports on disaster incidents, response activities, resource utilization, and relevant information at the provincial level.	/	/	/	/	4

APPENDIX E

COMPUTATION OF USABILITY TESTING

	R1	R2	R3	R4	SUM	MEAN
Q1	5	5	5	5	20	5
Q2	5	5	5	4	19	4.75
Q3	4	5	5	5	19	4.75
Q4	5	5	5	5	20	5
Q5	5	5	5	4	19	4.75
Q6	4	5	5	5	19	4.75
Q7	5	5	5	4	19	4.75
Q8	5	5	5	4	19	4.75
Q9	5	5	5	5	20	5
Q10	5	5	5	5	20	5
				TOTAL	**48.5**	
			OVERALL WEIGHTED MEAN		**4.90**	