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EMERGENCY REPORTING APPLICATIONS FOR THE CITY OF MATI

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BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

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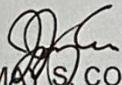
ACADEMIC INTEGRITY DECLARATION

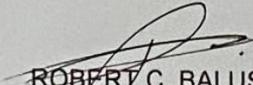
We, **ALFRED M. MANLUCOB**, **CLINT LAURENCE M. DUEÑAS**, **JESSA MAY S. CONDINO**, and **ROBERT C. BALUSCA** declare that this Capstone/Thesis is our original work. Most stipulations are presented herein and ours alone. Borrowed ideas are given due recognition and are appropriately acknowledged. This investigation was treated with utmost care to adhere to internationally known standards/policies on academic integrity to the best ability.

We attest further that this piece of academic requirements has not been submitted previously for academic credit in this or any other courses.


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Abstract

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Adviser: Mr. Dony C. Dongiapon

To preserve lives, emergency response is really essential. As a result, different groups in our community are tasked with handling different kinds of emergencies. However, the real issue was that emergency responders were not properly informed about the incidents to which they would be responding. Even yet, they are unaware of the incident, which results in no response. We developed the Emergency Reporting Application for Mati City (ERA) in order to address this critical problem. It is a mobile and web-based resilient form of emergency alert notification that helps citizens with any emergencies, accidents, or concerns that require immediate attention from the relevant government sector.. The system offers features that will make emergency reporting as easy and as fast as possible. The major features includes; Emergency Reporting through mobile application, Receiving and Storing emergency report a web application. In addition, this study aims to develop mobile apps for general users and web apps for concerned agencies/offices to receive emergency reports and register approved or accredited emergency volunteer – responders. The iterative methodology was used in this study to gather data for the project's feasibility. For the result, the developers successfully achieved minor major goals for the system, the system ended fully functional and reliable. In addition, to fully address and give solution to the problem the proponent established a system that delivers emergency reports ranging from fires to typhoon-related incidents, vehicular accidents with casualties, health-related concerns (e.g., an unidentified person suffering from a heart attack), community-related incidents and problems, and any other occurrences requiring an immediate response from the responsible agencies. One of Major recommendation for future system developers is to formulate a system that supports offline transactions, for it is very helpful in crucial instances where online transactions might not be available.

Keyword

Socioeconomic, resilient, empowered, disaster-prone areas, robust, emergency, mobile, and web-based

CHAPTER I

INTRODUCTION

1.1 Rationale of the Study

Accidents, human-induced calamities, and natural calamities are mostly happening in our surroundings nowadays. Thus, we have different government sectors that respond to such incidents. These happenings are inevitable and may cause severe damage and somehow death. These incidents may occur anytime and anywhere. Thus, being prepared for these emergencies is very crucial. After an incident occurs, a quick response should occur as soon as possible for minor damage and prevent the loss of lives.

Emergency reporting is a factor that is highly required in terms of accidents, human-induced calamities, and natural calamities. The ones responsible for these are those government agencies that can respond to different emergencies such as fires, car accidents, arms conflicts, and others. The agencies respond based on their capabilities and expertise; thus, these emergencies require high knowledge and experience. And there are also different means to inform these agencies that an incident occurred in a particular area that we can use to tell these agencies instantly.

The process of responding to emergencies was in good flow until there arose some problem that responders were not well informed about the information of the incident that they were going to respond to. Even somehow, they do not get informed about the incident, which leads to no response. This study would provide a system to fix this problem and solve this underlying issue. According to the most recent WHO data from 2018, road traffic accidents claimed the lives of 10,624 people in the Philippines, accounting for 1.74 percent of all deaths.

The Philippines ranks 118th globally, with an age-adjusted death rate of 11.40 per 100,000 people. In addition, these deaths are due to no response or late response to accidents by the government sectors due to less communication to the incident setting and involved persons (WORLD HEALTH ORGANIZATION, 2018).

Thus, this project has been formulated to solve current problems in responding to emergencies. Given that the City of Mati is a fast-growing city that is near the coasts and located in a low-lying area, making it vulnerable to a variety of natural and human-induced disasters. Thus, this application sets opportunities not just for the agencies of the government but as well to the whole community of Mati city to participate in terms of emergencies. Allowing everyone in the community to become part of the human power in emergencies. It will open the doors of being in charge to everyone. Everyone will be given a chance to help others by providing a user-friendly, organized, and reliable platform where everyone can call help 24/7 as soon as possible. This application will give the whole community of Mati City emergency preparedness.

1.2 Purpose and Project description

The primary purpose of this capstone is to help responders respond to an emergency by providing a system application that allows every ERA user to report an emergency to the ERA Server. It is to solve the current problem in which respondents are somehow misinformed about declared emergencies and even uninformed. In addition, another purpose of this is to ensure that emergency reports in Mati City should be redirected correctly to its respected agency with the help of public users, through the segregated buttons in the application that corresponds to a different type of emergency and different agencies that will handle a specific emergency.

The application can create reports based on the data that the users provide. It is also accompanied by a web application that analyzes the given data. If the information is

repeated or already exists, it can also store all the reports. The primary users of this system are divided into three, the general user or the public users, the agencies, and the volunteers.

1.3 Objective of the Study

The main objective of this BSIT project capstone was to create a mobile application and web-based application called "Emergency Reporting Applications for Mati City." Specifically, this study aimed to achieve the following;

- Develop mobile apps for general users to report emergencies, tap emergency survival tips information, and search evacuation areas. Here are the following types of emergencies;
 - Flash Flood
 - Vehicular Accident
 - Fire
 - Child and Women Abuse
 - Landslide
 - Earthquake
 - Kidnapping
 - Rubbery Illegal Position of fire Arms
 - Rape
 - Riot
- Develop web apps for concerned agencies/offices to receive emergency reports and register approved or accredited emergency volunteer – responders.
 - Provide an interface for registered emergency volunteers – responders.
 - Provide emergency hotline for different agencies.

1.4 Significance of the study

Before different disasters and accidents happen in our surroundings in our current environmental set-up, this paper will provide a system that will be significant to the community and the organizations that are responsible for responding to such incidents to react and take action as soon as possible. The critical issue with this study is that respondents to these incidents (e.g., fires, traffic accidents, and flash floods) are often notified too late after the incident has occurred. Furthermore, those who report the incident often provide conflicting details, leading to a late response to the incident. A communication failure may occur in the majority of extreme event scenarios which provoke loss of lives and properties (Lieser, P., et, al., 2017). Thus, this study is sought to help responders respond to an incident by providing a system application that allows every user to report an incident to different concerned government agencies. The system also gives opportunities to aspiring volunteers to become part of the human power based on their expertise by becoming a volunteer. Thus, the significance of this application is giving the whole community of Mati city to participate in saving the lives of one another and become a member of human power that will help inform the government agencies with regards to emergencies that will occur with the correct data and information.

1.5 Scope and Limitation

1.5.1 Scope

- Should include those agencies where rescue volunteers were available to become volunteers in the application.
- Emergency reported information includes the type of the emergency, current location, emergency location, documentation, time, and date.
- Volunteer - responder information includes the type of agency, full name, birth date, gender, and phone number.

- The emergency survival tips and information includes an earthquake guide, tsunami guide, fire guide, etc.
- Evacuation areas information includes the location, map, and pictures.
- The agencies included in the application are the PNP, CDRRMC, BFP, and VAWC.

1.5.2 Limitations

The system limitations are the following;

- The evacuation route is not included in the map.
- The user can only send the report to a specific agency.
- The agency can't give feedback to the user's phone number unless the user directly calls the agency through the contact from the app.
- The application will include only those agencies that will respond to the emergency.

1. 6 Conceptual Framework

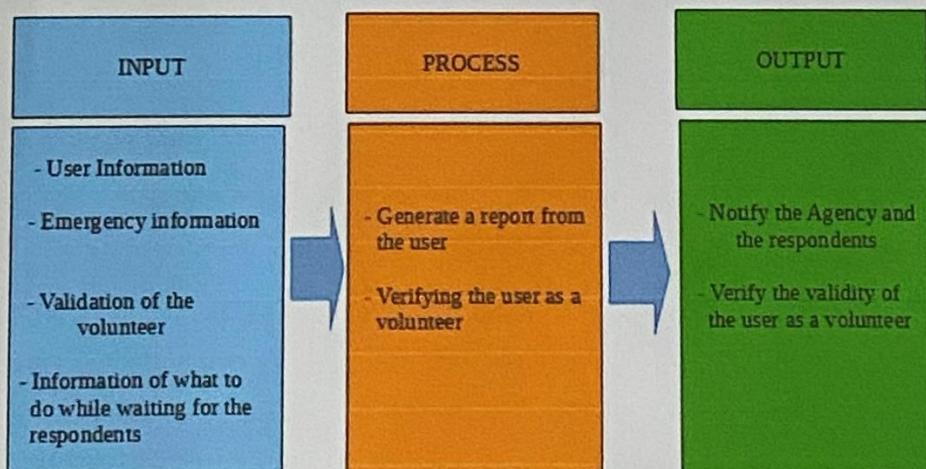


Figure 1. 1 Emergency Reporting Applications Framework

1.7 Definition of terms

The following words are defined by how they are used in this paper.

Emergencies. A type of emergency or incident occurs in a specific location.

Incidents. It is a severe event where injury or illness may occur in unexpected circumstances.

Man-Made Calamities. It is done by a human, which can cause harm or damage.

Natural Calamities. These significant events might be flash floods, earthquakes, hurricanes, etc.

Respondents. It is a rescue group that responds to an occurring problem such as natural calamities or unexpected events.

CHAPTER II

REVIEW OF RELATED LITERATURE

1.8 Technical Background

Details in designing and establishing the application and have been able to fulfill the system that would suit the objectives, the developers used the technological tool listed below.

1.8.1 XAMMP Control Panel

Apache friends developed a free and open-source cross-platform web-server solution stack package, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl Programming languages. This tool management offers to supervise the actions of individual components of XAMMP (apachefriends, 2015).

1.8.2 Visual Studio 2022

A tool for writing computer programs, websites, web applications, and web services (Computer Hope, 2019).

1.8.3 Visual Studio Code

A free Coding Editor that helps to code quickly (Visual Studio Code, 2022).

1.8.4 MySQL

An Oracle-backed open-source relational database management system (RDBMS) based on Structured Query Language (SQL). MySQL runs on virtually all platforms, including Linux, UNIX, and Windows. Although it can be used in many applications, MySQL is most often associated with web applications and online publishing (Moore, n.d.).

1.9 Related Literature

1.9.1 Mobile Phone

In 2011, a Singapore-based research firm from GfK reported that nine (9) out of ten (10) sold Smartphones in the Philippines are running on an Android-based. The increasing affordability of smartphones, particularly in developing markets where local smartphone manufacturers have made their way visible. It led the consumers to switch from their basic feature phones to own powerful smartphones (Monticilleo, 2012).

Most applications that users use are in their Smartphones are Social media applications. Nowadays, it is no longer used to keep in touch with friends, family, and colleagues. It has now been used in times of crisis. Citizen-side information generation and dissemination activities are increasingly vital in disaster preparation, warning response, and recovery. Since the public uses social media during emergency events, most emergency managers have also begun incorporating their use into their activities. A recent survey of members of the International Association of Emergency

Managers on the FirstResponder.gov found out that over 95% used Facebook or other social networks for day-to-day personal activities, about half used it in emergencies; and about 43% used Twitter to gather information from the public and to communicate with the public during emergencies (Hitlitz et al., 2012).

Thirty-eight percent of the world's total population owned an innovative device in 2018, and the smartphone penetration rate has continued climbing, reaching 46.5 percent in 2020. By 2025, it is forecast that almost 87 percent of all mobile users in the United States will own a smartphone, an increase from the 27 percent of mobile users in 2010 (O'Dea, 2021).

Smartphones are one of the most ubiquitous and widely used computers nowadays; because of their mobility and ease of use, users would incorporate their Smartphones into their everyday routines at work and home. Due to the increasing price of smartphones brought about by the entry of local manufacturers who can compete with well-known brands, smartphones are becoming more accessible to the general public in the country (Glen et al., 2016). Different government entities have employed information and communication technology (ICT) to encourage public engagement. Citizens may report urban incidents in their neighborhood to the local government via M-government or Mobile-Government. Citizens can utilize incident reporting systems to communicate with the local government in this context. Although most M-government applications are related to the urban environment, such as traffic congestion and parking availability in the town, they have also been deployed in rural regions (Triple 000, 2013).

Triple Zero (000) is an emergency hotline in Australia, like 911 in the Philippines. An application was created for Triple Zero that can run on different mobile application platforms. It has the following features such as 1.) gives the caller or user information on when to call Triple Zero, 2.) provides knowledge of who to contact in no emergencies, 3.) provides the user with their GPS coordinates to be read out to the emergency operator. The proposed system differs from Triple Zero because the user still needs to call the emergency services. While in i911, they have the leeway to type the help they need without making any calls. If the situation is urgent, the user may simply press the SOS button, which will initiate a call to 911. Another distinction between the two apps is that the Triple Zero App provides the user with their coordinates, given to the emergency operator.

1.9.2 Emergency

According to the World Health Organization (WHO), every year, the lives of approximately 1.3 million people are cut short due to a road traffic crash. Between 20 and 50 million more people suffer non-fatal injuries, with many incurring a disability due to their injury. More than 90% of road traffic death rates are the highest in Africa. In the Philippines, Philippine Statistics Authority (2021) reported that the number of deaths by month of occurrence and by the usual residence of the deceased of a total of 613,942, which the total number recorded in Davao Oriental is 3,325 and in the City of Mati (Capital) is a total of 866. Based on the historical death rate data in the Philippines, in 2019, the death rate was 5.900, which a growth rate was 1.180%. In 2020, the death rate was 5.968, with a growth rate of 1.150%, and as of 2021, the death rate recorded was 6.037, which was a 1.160% growth rate (Macrotrends, 2021).

In 2019, there were 3,704 civilian deaths and 16,600 injuries resulting in 1,291,500 fires. Moreover, 48 on-duty fire-fighters died – representing the first year that the annual death toll fell below 50. However, the number of fire-related death has decreased by half since 1977. The year 2019 marks the seventh consecutive increase from the record low number of deaths recorded by NFPA in 2012. The 2019 civilian fire death toll of 3,704 is 1% higher than the 3,655 total in 2018 and 30% higher than the record low number of deaths (2,855) in 2012. In the United States, the National Protection Association (NFPA) reported an estimated fire every 24 seconds. One civilian fire-related injury occurs every 32 minutes. One civilian fire-related death occurs every 142 minutes (Ahrens & Evarts, 2020).

1.9.3 Respondents

While supporting all sorts of reactions, emergency response and recovery staff must be aware of all possible threats. Emergency responders must have access to training and information that offers a basic and advanced understanding of the events they will be working on. All emergency stages, including pre-event, during, and after the event, should be prepared. Training, easy access to information, field assessments, and equipment availability should all be part of the pre-event planning process. In front of the occurrence, safety management information should be offered to reduce the number of potential deaths, injuries, and illnesses, but guidance should be provided throughout the reaction (NIOSH, 2018).

As the people on the front lines of health, first respondents play a vital role in preparing for, responding to, and recovering from disasters. EMS personnel, fire-fighters, and other first responders are often first on the scene. They are critical in getting the people the care they need when disaster strikes, whether a major natural disaster, like Hurricane Sandy, or a small local event (Public Health Emergency, 2018).

The Science and Technology Directorate, S&T's First Responder capability program, provides technical assistance and develops innovative solutions to the most pressing challenges faced by first responders, emergency managers, and incident commanders as they respond to hazardous situations. The program strengthens the abilities of our communities to protect the homeland and respond to disasters. The S&T collaborates with all first responder disciplines: the law enforcement fire services, emergency medical services, emergency management officials, and innovators and industry to develop capabilities that make the first

responder safer, improve communication tool security and effectiveness, enhance data and information sharing during a daily, emergency or joint operations. They also promote and sustain partnerships with responder and responder organizations across the nation, help investigate cybercrime and cases involving digital evidence, and secure the 911 emergency call system from cyber-attacks.

2.0 Related Systems

2.0.1 Emergency Situation Responder: An efficient accident response app

(Emergency Situation Responder) ESR follows the MVC Architecture and has three separate layers: User Interface, Logic Operations, and Database. When the user presses the SOS Buttons, three actions are triggered which are: an alert is sent out to all the users of the system within a predefined distance radius, a signal is sent out to the Emergency Services and Security of the Workspace, the emergency contacts of the user are also notified of the incident if the user opts for it (Rane et al., 2020).



Figure 2. 1 a sample page from Emergency Situation Responder, Application SOS button (Rane, Parekh, Sanghvi & Shankamani, 2020).

The Emergency Situation Responders' features are the following:

- The user signs in to the system using his employee identification number and the Google sign. The user must enter all the essential details like emergency contact numbers, medical history, and blood group (Rane et al., 2020).
- When the user logs in to the system, the user's location is retrieved and stored in the database; the site is updated at frequent intervals to minimize the error in proximity tracing (Rane et al., 2020).
- The home screen of the mobile application displays an SOS Button, which can be used in case of an emergency to send an SOS request. A User Profile section ensures that the user's details are mutable and can be updated by the user as needed (Rane et al., 2020).
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- After clicking the SOS Button, the user can also see the nearest first-aid center in the industry and get the walking distance to that place if the user can walk to the center himself (Rane et al., 2020).
- The app also displays different basic first-aid procedures if professional help is not available immediately (Rane et al., 2020).

2.0.2 AppLERT: A Mobile Application for Incident and Disaster Notification for Metro Manila

The AppLERT was built using Android SDK and Laravel with ReactJS. The app was eventually installed in a Debian 8 for testing running in a Cherry Mobile Flare S4 ANDROID OS VERSION Lollipop. The smartphone was selected primarily because of its GPS capability. On the other hand, the web application was programmed using Laravel and ReactJS. It utilizes the Goggle Map API for the visualization of the map. Initial testing revealed it could determine the correct location of the User (Fabito et al., 2016).



Figure 2. 2 is a sample page from AppLERT (Fabito, Balahadia, & Cabatiao, 2016).

The AppLERT features are the following:

- a.) Send Report Module - allows users to send a report to the command center of any disaster in their area (Fabito et al., 2016).
- b.) Send Rescue Module - give way for proper authorities to be deployed immediately to the scene. The user will send a report of the set, which includes the type of the disaster, the description of the incident, an optional picture/s of the scene, and the location's address (based on GPS data) (Fabito et al., 2016).

- c.) Send Location Module - allows registered family members to receive the user's location based on GPS Data (Fabito et al., 2016).

2.0.3 A Mobile-Based Emergency Reporting Application for the Philippine National Police Emergency Hotline 911: A Case for the Development of i911

The i911 mobile application is composed of two systems. The first is the mobile application which the general public can use. Registration is a requirement when using the application. The user's basic personal information will be stored in a database that can be accessed by the dispatcher when a call is made. The user's mobile number will serve as its unique ID number in the system (Edillo et al., 2017).

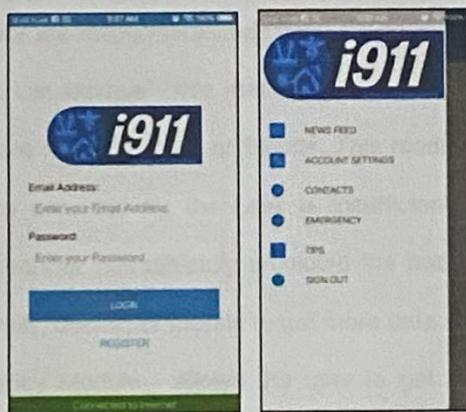


Figure 2. 3 a sample page from A Mobile-Based Emergency Reporting Application for the Philippine National Police Emergency Hotline 911 (Edillo, Garotte, etc., 2017)

The Mobile Based Emergency Reporting Application for the Philippine National Police Emergency Hotline 911 features are the following:

- a.) Registration and Login Module - the first screen that appears when you first use the system is the Registration and Login Screen. The Registration includes the

basic information of the user. The responder should pull the data out once a message is sent. The mobile number of the user will serve as the unique user ID. That eliminates the time spent gathering basic information from the user. The Home screen appears once the user has successfully registered and signed in (Edillo et al., 2017).

- b.) Home Module - the Home module includes newsfeeds that work similarly to Facebook. The newsfeeds include the report sent by other users (e.g., Road Accidents, Fire, etc.). The newsfeeds (highest priority) also have messages sent by those in their contacts. This module also allows the user to modify their Basic Personal Account. Data includes medical data of the user, which can be very helpful for the responders when help is a need (Edillo et al., 2017).
- c.) Contact List Module - this module allows the user to save the numbers of their immediate family, doctor, or friends. This module can help the responders when the data provided by the user is insufficient. When the user unintentionally disconnects or has difficulty providing the needed data, the dispatcher can call their family, doctor, or friends to get more data (Edillo et al., 2017).
- d.) Emergency Module - allows the user to get help from 911. It consists of two buttons, the SOS and the Help Button. The SOS Button is used for urgent help. Upon clicking this button, the user can select the specific type of help (e.g., ambulance, fire, police, etc.). Only the user's geolocation is sent and tagged if no option is selected. The responder may call the user to validate the emergency (Edillo et al., 2017).
- e.) Tips Module - provides the users with helpful tips on what to do during an emergency. The information provided is maintained by the web application administrator (Edillo et al., 2017).

f.) Web Application - The web application is for the disposal of the dispatcher (Edillo et al., 2017).

2.0.4 Designing Mobile Applications for Emergency Response: Citizens Acting as Human Sensors

The researcher had three main issues, the sending of short-term notifications of small-scale events, developed and promoted by official emergency organizations or giant enterprises, and used in actual use cases for enhancing citizen participation. The researchers aim to identify the main characteristics and limitations of this work. The analysis focuses mainly on bringing to light the kind of interaction, the functionalities, the content that can be shared, and the recipient of the message (Romano et al., 2016).

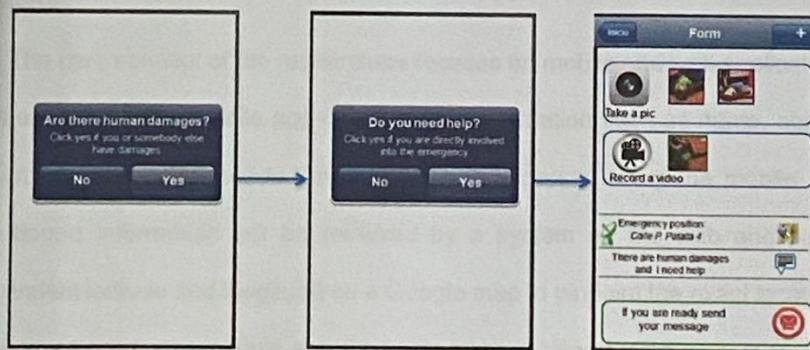


Figure 2. 4 a sample redesign page from Designing Mobile Applications for Emergency Response: Citizens Acting as Human Sensors (Romano, Onorati, etc., 2016).

The redesign application features are the following:

- The user profile is preregistered into the system while the application automatically retrieves her position. The users can just send the message without adding other

information (Romano et al., 2016). The users' position is retrieved and displayed to the users and can be modified on a map (Romano et al., 2016).

- Photos are previously taken in a certain period (e.g., a few minutes before) are preloaded into the application considering that they are probably related to the particular circumstance. The users would add them to the notification (Romano et al., 2016).
- The quality of the mobile network is evaluated, and, in case it is not good, users are recommended to avoid multimedia data and insert just a textual message. Finally, the application alerts the users when the system receives their message and when an operator endorses an emergency operation (Romano et al., 2016).

2.0.5 Mobile Emergency Response Application Using Geolocation for Command Centers

The core concept of the researchers focuses on mobile and web applications. The primary goal of the mobile app is to provide information such as name, age, type of emergency response needed, and location of a person using the mobile app. The mentioned information will be retrieved by a system on the web and plotted the equivalent latitude and longitude on a Google map to pinpoint the exact location of the person who uses the mobile app. The researchers also studied various technologies focusing on computer engineering (De Guzman et al., 2014).

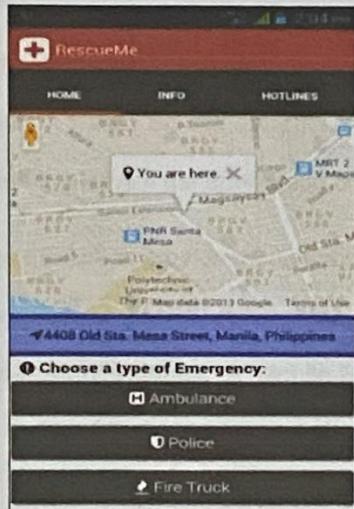


Figure 2. 5 a sample home page from Mobile Emergency Response Application Using Geolocation for Command Centers (Guzman J., Guzman R.C. & Ado R., 2014).

The Mobile Emergency Response Application Using Geological for Command Centers has the feature to detect the user's current position through geolocation. The user can navigate three tabs: home, info, and hotlines. The home tab contains the user's current location that is displayed on the map. Geographical points are converted into human-readable addresses. Three emergency buttons are present: ambulance, police, and fire truck. The info tab contains details like the user's name, age, and mobile number. They need to input once, and it will save the data, but then they can edit if necessary. The hotlines tab contains other emergency hotlines. Since the application is internet-dependent because of the geolocation, the emergency numbers are pre-dialed, enabling the user to call for an emergency even without an internet (De Guzman et al., 2014).

2.1 Synthesis

About the systems mentioned above related to the designed project, there are many ways to develop a system based on the emergency response application. Also, there is more software that can implement the application base.

The i911 used the tips module to provide the users with helpful tips on what to do during an emergency. The administrator of the web application maintains the information provided. Among the other related systems, A Mobile-Based Emergency Reporting Application for the Philippine National Police Emergency Hotline 911 is one of the systems that consist of a tips module and a contact module.

Based on the presented related systems above, the i911 is the closest system to our project because the modules' objectives were almost identical, especially the tip and contact list module.

CHAPTER III

MATERIALS AND METHODOLOGY

2.2 Software Methodology

This capstone proposal used the “Iterative Methodology” to guide the software development life cycle. It was mainly focused on small chunks of the project’s development and enhanced it to evolve as the final software. The iterative begins in a smaller set of implementations based on the objectives of the software.

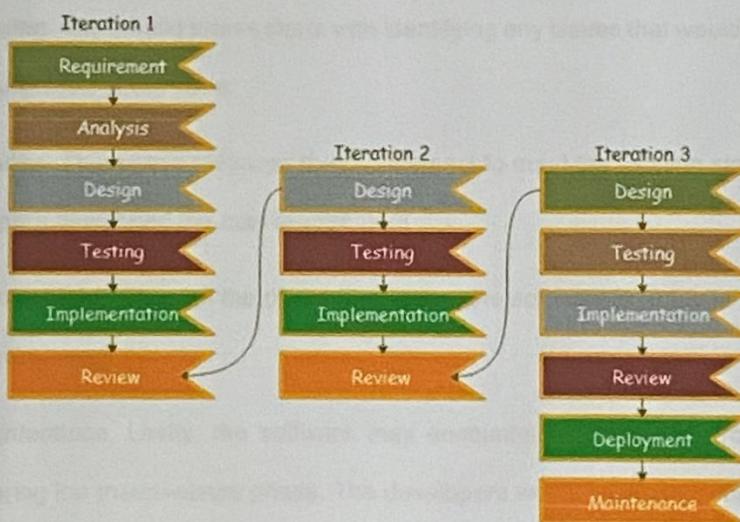


Figure 3. 1 Iterative Development Life Cycle (Javatpoint, n.d.).

In figure 3.1, the first version of the software contains some of the specifications. If there is needed to modify the software, then a new iteration is created. In comparison, the model requirement phase was the part of generating one version of each iteration.

Requirement Phase. In software development, the entire development cycle was repeated iteratively. This step was done to gather and study to work further in the iterations.

Design Phase. After gathering the requirements, the design phase starts. The designs were done correctly to avoid errors and provided the most optimal output.

Implement or Development Phase. After the developers decide on the design, the developers would implement the code with predefined metrics and coding standards.

Testing. The testing phase starts with identifying any issues that would arise during the implementation of the code.

Review. This phase reviewed the requirement to meet the existing standards, and the developers developed the new requirement.

Deployment. When all the phases are done, the software is ready to deploy to its working environment.

Maintenance. Lastly, the software may encounter some bugs, errors, or news updates during the maintenance phase. The developers would fix these issues.

2.3 Requirement Analysis

2.3.1 Documentation of the Current System

Emergency Reporting Application reacts to and drives to emergencies. This application would serve at the forefront during an emergency. It also gives guides to the person who reported the incidents on what to do while waiting for the rescuers or to the responders and muster the emergency rescue efforts of different agencies (i.e., Philippine National Police, Fire Department, Provincial Hospital, St. Camillus, etc.) during emergencies or calamities. It gathers data and arranges a

diversity of records and reports. The ERA consists of a Web server and smartphone where network mode uses the internet to send a report and upload photos or videos to the agency and automatically adopt the reporter's location.

2.4 Requirement Documentation

2.4.1 System Architecture

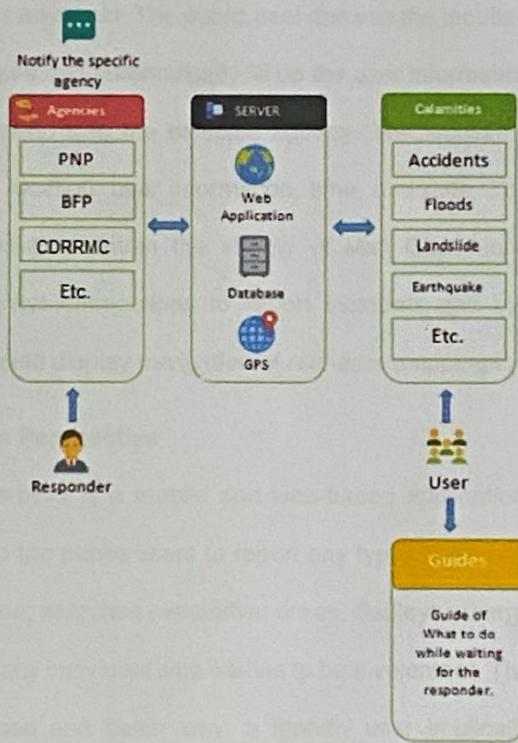


Figure 3. 2 Architecture of Emergency Reporting Applications

Figure 3.2 shows the application flow in both web and mobile apps, which served as an assistant to the users. This application comprises guidelines for a user and choosing the type of the unprecedented crisis. It redirected to the server to receive the reported

incidents in different agencies. Then the overseer would respond to the reported incidents by relaying in the given location.

2.4.2 Requirement Specification

The project is expected to help the public users and the specific agency. It is a mobile app that runnable on android devices and is supported by a website that serves as an admin. The public user can use the mobile app to report incidents and other crises that automatically fill up the user information to report the tragedy and directly send it to the selected agency. The website receives the reported incident with location, user information, time, and date. The reporting process is based on real-time within the vicinity of Mati City. Moreover, the application requires internet connections to report incidents and view reports. Also, the application could display navigation of real-time mapping/location.

2.4.3 System Perspective

The project is a mobile and web-based application. The app intends to provide aid to the public users to report any types of emergencies, gives survival tips information, searches evacuation areas, displays emergency hotline numbers, and offers to any individual who wishes to be a volunteer. This project is developed in an advanced and better way, a friendly user application software. With an internet connection, the mobile application could send pictures as pieces of evidence that the incident happened and avoid deceptions or scams. Moreover, the mobile application can be used offline with the purpose that it was displaying any agency's hotline number.

2.4.4 System Features

The researchers included various system features to allow users to interact with the application and the web-based platform while being used and ensured that it met its goals.

2.4.4.1 Mobile Applications

As it offers interaction with the regular user, this feature may be utilized as a user interface. It serves as the reporting of the current emergency to the agency or the administrator.

2.4.4.2 Web Application

As it offers interaction with the admin user, this feature may be utilized as an admin user interface. It serves as a receiver of the incoming reports on the emergency. It notifies the agents or the volunteers to proceed to the emergency site or location to help with the situation.

2.4.4.3 User Classes and Characteristics

The mobile application users are those people who always encounter emergencies, especially those places that are vulnerable or prone to accidents and those volunteers that are registered to the agency. The web-based application is for those who monitor the incoming reports in 24hrs and notify the volunteer of the emergency.

2.4.4.4 Operating environment

The project was developed using platforms and technologies by the researchers.

2.4.4.5 User Documentation

The researchers have produced a user manual for the program, which will assist users in understanding and navigating the application.

2.4.4.6 Safety Requirements

The developer ensured that the devices did not include any risky or doubtful material that they developed in two distinct apps for two different users, such as public users and agency owners when designing this app. The database's secret information is secure using this strategy.

2.4.4.7 Software Quality Attributes

The Emergency Reporting Application (ERA) has the following capabilities to ensure that the application is good and satisfactory to use in terms of the following.

2.4.4.8 reliability

The developer guaranteed that the application would not crash when performing the features planned when building the project. Before releasing the program, the researchers thoroughly tested it. The program was tested to see if it had all the necessary features. The program was further tested with the aid of a specific user for any issues.

2.4.4.9 Efficiency

The developers looked at various sources to ensure the application's efficiency when designing the project.

2.5 Design

2.5.1 Use Case Diagram

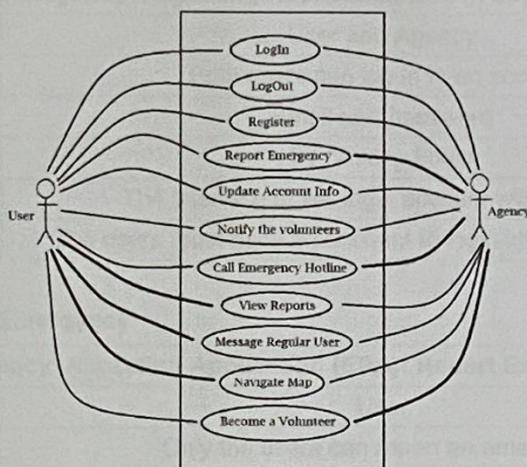


Figure 3. 3 the process of the system that provides the user with how to navigate.

This use case diagram defined features accordingly to what the system has. Whereas creating an account, logging in, and other features are accessible in the app.

2.5.2 Use Case Descriptions

It displayed the descriptions of the Use Case Diagram that the developers were using.

Table 3. 1 Create Account

Emergency Reporting Application (ERA): Create An Account	
Actors	User and Agency
Description	Both users can create an account using their personal information
Data	Users' basic information like name, address, email, etc.
Stimulus	By clicking Sign-in
Response	The interface of Create account will be shown

Comments	The users must have an account to login into the application
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Table 3. 2 Login

Emergency Reporting Application (ERA): Login	
Actors	User and Agency
Description	Both users can log in to an account
Data	Email and password
Stimulus	By clicking Login
Response	The interface of the login account will be shown
Comments	The users must have an account to login into the application

Table 3. 3 Report Emergency

Emergency Reporting Application (ERA): Report Emergency	
Actors	User
Description	Only the users can report an emergency
Data	It includes Type of Emergency, Current location, etc.
Stimulus	By clicking Submit Report
Response	The interface for submitting a report will be shown
Comments	The Time and Date of the report are automatically registered to the database

Table 3. 4 Update Account Information

Emergency Reporting Application (ERA): Update Account Info	
Actors	User and Agency
Description	The user can update the information
Stimulus	Clicked by the type of user
Response	Update the information
Comments	The users must have an account to update the information

Table 3. 5 Notify Volunteers

Emergency Reporting Application (ERA): Notify the Volunteers	
Actors	User
Description	The volunteer can receive a notification about an emergency
Data	Type of emergency, location, etc.

Stimulus	Clicked by the type of user
Response	Notify the volunteers about the emergency
Comments	Users must have the account to apply to become a volunteer and receive updates

Table 3. 6 Emergency Hotline

Emergency Reporting Application (ERA): Call Emergency Hotline	
Actors	User
Description	Only the user can directly call the emergency hotline. The call will be recorded on the mobile application
Data	Name and Number
Stimulus	Clicked by the type of user
Response	The interface of the Call Page will be shown
Comments	The users must have an account to login into the application

Table 3. 7 View Reports

Emergency Reporting Application (ERA): View Reports	
Actors	Agency
Description	The specific type of agency can view emergency report
Data	Type of emergency, Location, etc.
Stimulus	Clicked by the type of agency
Response	The table interface on the web-based application will be shown
Comments	The agency must have an account to login into the application

Table 3. 8 Message User

Emergency Reporting Application (ERA): Message User	
Actors	Agency
Description	Only the Agency can directly give feedback to the regular user regarding the response to the reports.
Data	Status of the emergency
Stimulus	Clicked by the type of agency
Response	The feedback from the agency is sent to the user who reports the emergency
Comments	The agency must have an account to give a response to the user

Table 3. 9 Navigate Map

Emergency Reporting Application (ERA): Navigate Map	
Actors	User
Description	Only the mobile application user can view the navigation map
Stimulus	Clicked by the type of user
Response	The interface of the navigation map will be shown
Comments	The users must have an account to view the navigation map

Table 3. 10 Become Volunteer

Emergency Reporting Application (ERA): Become a Volunteer	
Actors	User
Description	Only the users can apply to become a volunteer
Data	Name, Gender, Address, etc.
Stimulus	Clicked by the type of user
Response	The interface of becoming a volunteer will be shown
Comments	The users must have an account first before applying to become a volunteer.

2.5.3 Development and Testing

The system was created by gathering information from reputable online sources on creating this application platform. The developers used tools to design the application's interface and functionality, and they used the prototype process to build the system. The developers used Waterfall to divide the tasks among the team members.

The system was evaluated by completing field tests such as reporting an emergency to the agency, phoning the emergency hotline, and replying to a reporter's report. These were appropriate and in a field where the software was

designed for the system to be used. Developers may receive fresh suggestions on enhancing the application due to this.

2.5.4 Data Analysis Plan

The researchers used Weighted Arithmetic means to analyze the data gathered. It was used to calculate the average replies for each of the five (5) alternatives in each of the evaluation's five (5) items, namely, 1 (Strongly Disagree), 2 (Disagree), 3 (Undecided), 4 (Agree) 5 (Strongly Agree). The respondents' answers on the survey may produce the Likers scale.

The points that used:

Strongly agree	5 points
Agree	4 points
Undecided	3 points
Disagree	2 points
Strongly disagree	1 point

2.5.5 Entity Relationship Diagram

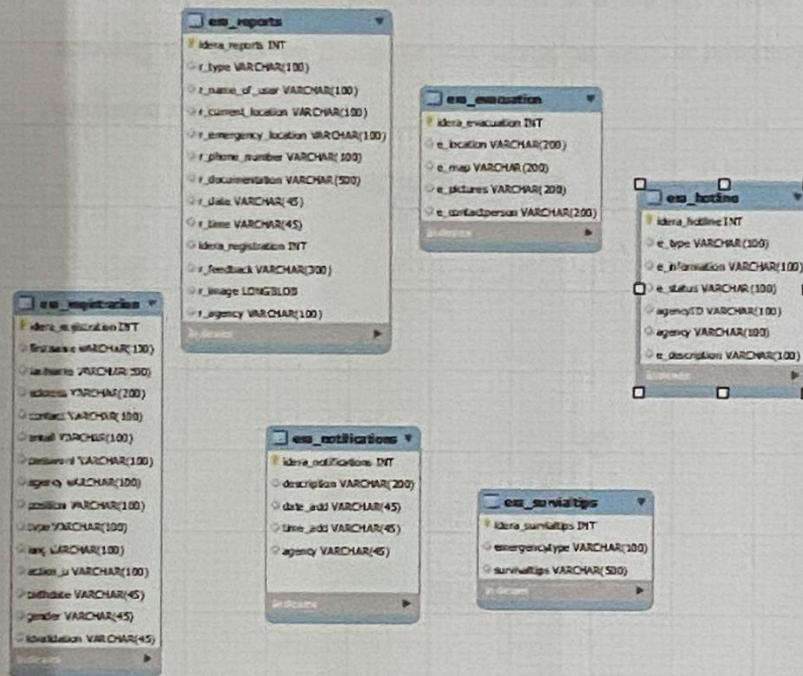


Figure 3. 4 Entity Relationship Diagram of ERA

Figure 3.4 is designed to appoint the classes and attributes for each respected type of environment to create the ERA database. At the same time, we have a different class corresponding to each menu in the application and assigned the given attribute. The attribute stands for the text field, buttons, and other types to fill the necessary information.

2.5.6 Graphic User Interface (GUI) Design

This would appear to be the viable mock-up plan arranged by the designers for the framework to be created.

2.5.7 Mobile GUI Design

The figure below was intended for creating the mobile application by following the Mock-up Designed that would be used in reporting incidents and viewing a report.

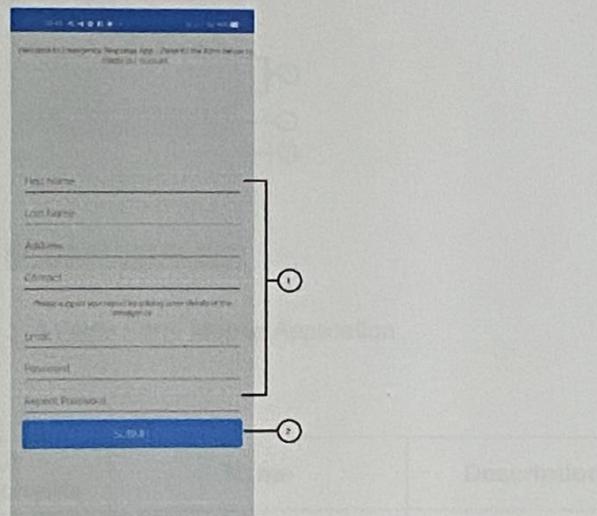


Figure 3. 5 Register Form Mobile Application

Table 3. 11 Register Form

No.	UI Components	Name	Description
1.	Text	Text Fields	Allows users to input their personal information.
2.	Button	Create Button	Allows users to register for the application.

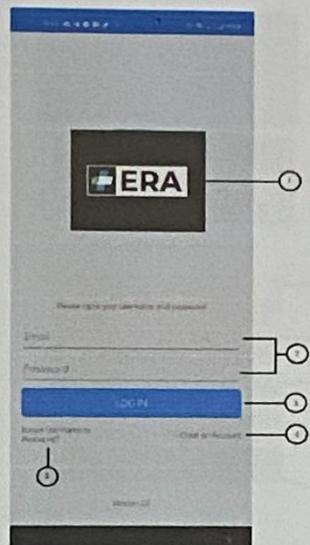


Figure 3. 6 Login Form Mobile Application

Table 3. 12 Login Form

No.	UI Components	Name	Description
1.	Logo	Application Logo	Logo and title of the Application.
2.	Text	Text Fields	Allows users to input their Username and Password.
3.	Button 1	Login Button	Allows users to log in to the app.
4.	Button 2	Create Account Button	Allows users to create an account for the application.
5.	Button 3	Forgot Password Button	It redirects to the users' recovery interface

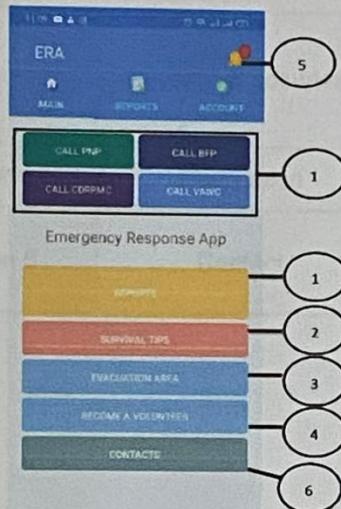


Figure 3. 7 Emergency Hotline Buttons with User Menu Buttons

Table 3. 13 Emergency Hotline Buttons

No.	UI Components	Name	Description
1.	Button	Emergency Hotline Buttons	Able users to dial hotlines of different agencies

Table 3. 14 User Menu Buttons

No.	UI Components	Name	Description
1.	Button 1	Report Emergency	Allows users to report incidents.
2.	Button 2	Survival Tips	Allows users to read the survival tips
3.	Button 3	Evacuation Area	Allows users to view the navigation map to know the evacuation area

4.	Button 4	Become a Volunteer	Allows users to become volunteers in a specific type of agency.
5.	Button 5	Notification	It notifies the user
6.	Button 6	Contact	Allows users to view the list of emergency hotline

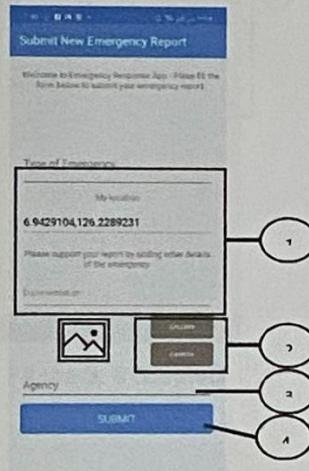


Figure 3. 8 Report an Emergency Interface

Table 3. 15 Report an Emergency Interface

No.	UI Components	Name	Description
1.	Text and Button	Information	Allow users to input the important information about the incident.
2.	Button 1	Upload File or Capture	Allow users to upload a picture for a particular incident or capture.
3.	Text	Dropdown	Allow users to choose the type of agency.

4.	Button 3	Submit	Allow users to send the report.
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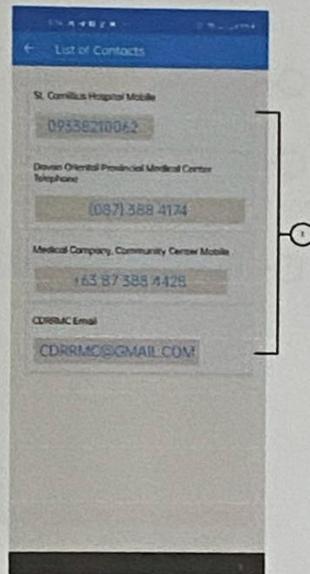


Figure 3. 9 Contact

Table 3. 16 Contact

No.	UI Components	Name	Description
1.	Text/Button	Agencies Contact List	Allows users to select a certain Agency Hotline.

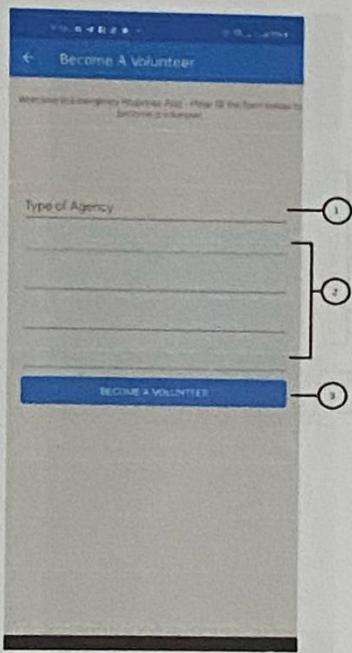


Figure 3. 10 Become a Volunteer Interface

Table 3. 17 Become a Volunteer Form

No.	UI Components	Name	Description
1.	Dropdown	Type of Agency	Allows users to choose what agency to apply
2.	Text Field	User Information	Allows users to fill in the additional information
3.	Button	Submit	Allows users to submit the form.

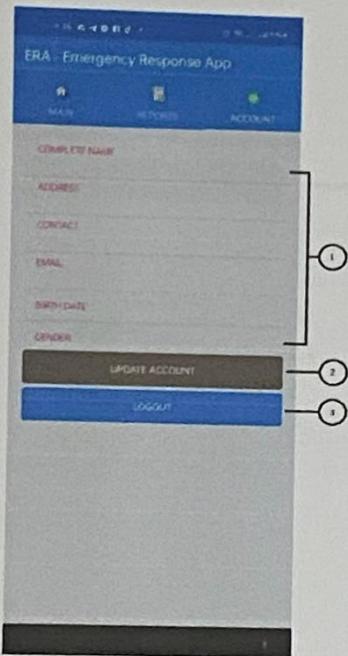


Figure 3. 11 Account Information Interface

Table 3. 18 Account Information

No.	UI Components	Name	Description
1.	Logo	Application Logo	Logo and title of the Application.
2.	Button	Menu Button	Allows users to view and edit personal information.

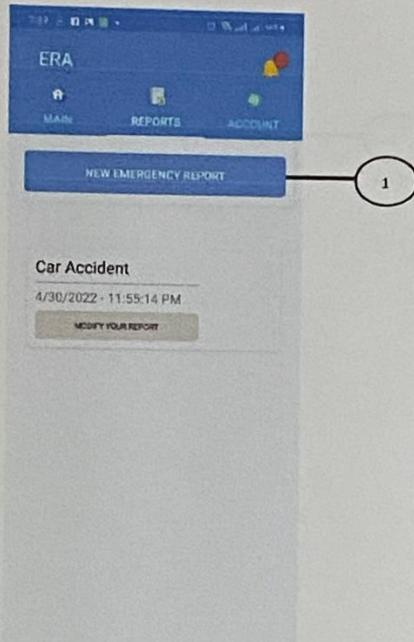


Figure 3. 12 New Emergency Reports

Table 3. 19 New Emergency Reports

No.	UI Components	Name	Description
1.	Button	New Reports	Allows volunteer users to view reports.

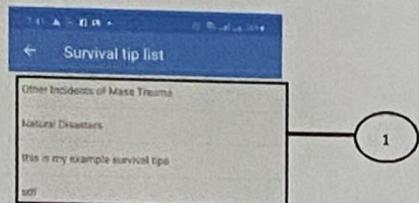


Figure 3. 13 Survival Tips Interface

Table 3. 20 Survival Tips

No.	UI Components	Name	Description
1.	Text/Button	Survival Tips	Allows users to read the survival tips.

2.6 Web GUI Design

The figure is intended for creating the web application by following the Mock-up.

Design is used for reporting incidents and viewing a report.

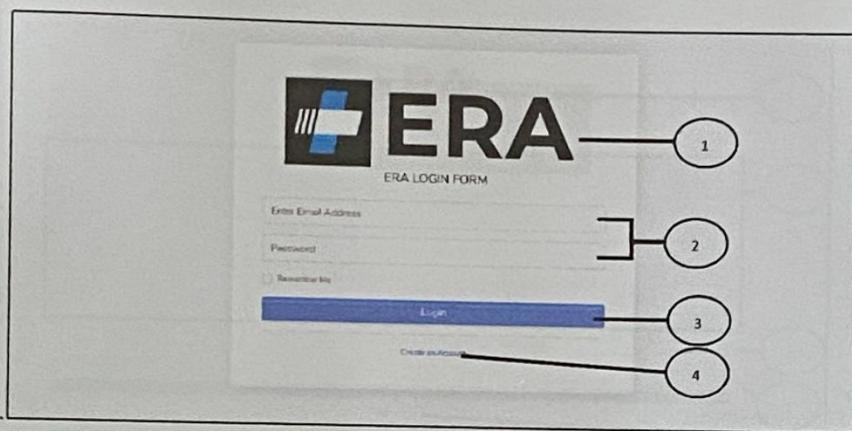


Figure 3. 14 Login Form

Table 3. 21 Login Form

No.	UI Components	Name	Description
1.	Logo	Application Logo	Logo and title of the Application.
2.	Text	Text Fields	Allows users to input their Personal Information.
3.	Button 1	Login Button	Allows users to log in to the application
4.	Button 2	Registration Button	Allows users to create an account for the application

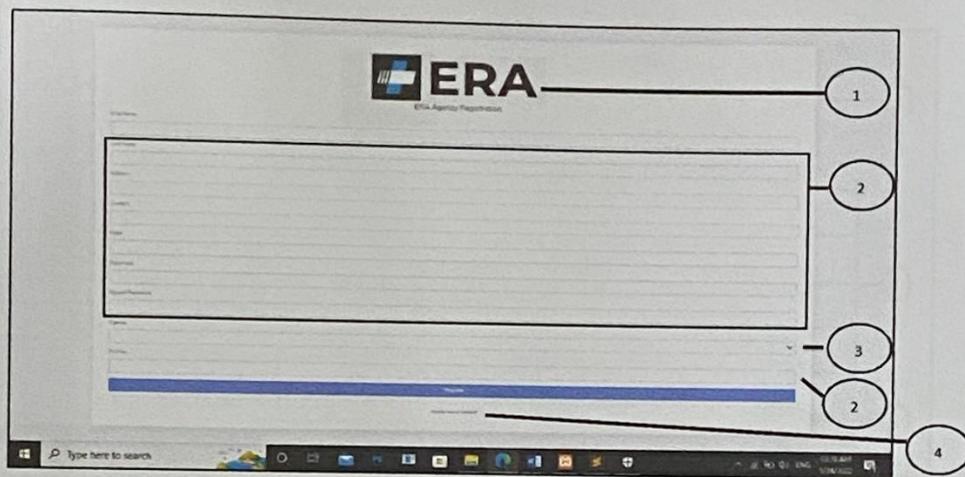


Figure 3. 15 Agency Registration Form

Table 3. 22 Agency Registration Form

No.	UI Components	Name	Description
1.	Logo	Application Logo	Logo and title of the Application.
2.	Text	Text Fields	Allows the admin to input their Personal Information.
3.	Drop Down Button	Type of Agency	Allows the agency to choose the type of agency they are
4.	Button	Return Button	Allows users to return to the login page.

The screenshot shows a registration form titled "ERA Volunteer Registration". At the top left is the ERA logo. To its right is the title "ERA Volunteer Registration". Below the title are several input fields: "First Name", "Last Name", "Email", "Phone", "Address", "City", "State", "Zip", and "Agency". A large blue "Register" button is at the bottom. Five numbered circles (1 through 5) with leader lines point to these elements: 1 points to the ERA logo; 2 points to the "Address" field; 3 points to the "Register" button; 4 points to the "Agency" field; and 5 points to the "Already have an account?" link.

Figure 3. 16 Volunteer Registration Form

Table 3. 23 Volunteer's Registration Form

No.	UI Components	Name	Description
1.	Logo	Application Logo	Logo and the Title of the Application
2.	Text Field	Data	It allows users to enter text
3.	Dropdown Button	Agency	Let the users choose from a various number of items
4.	Button	Register	The inputted data is submitted and stored in a database
5.	Button	Already have an account	The user will proceed to the login form

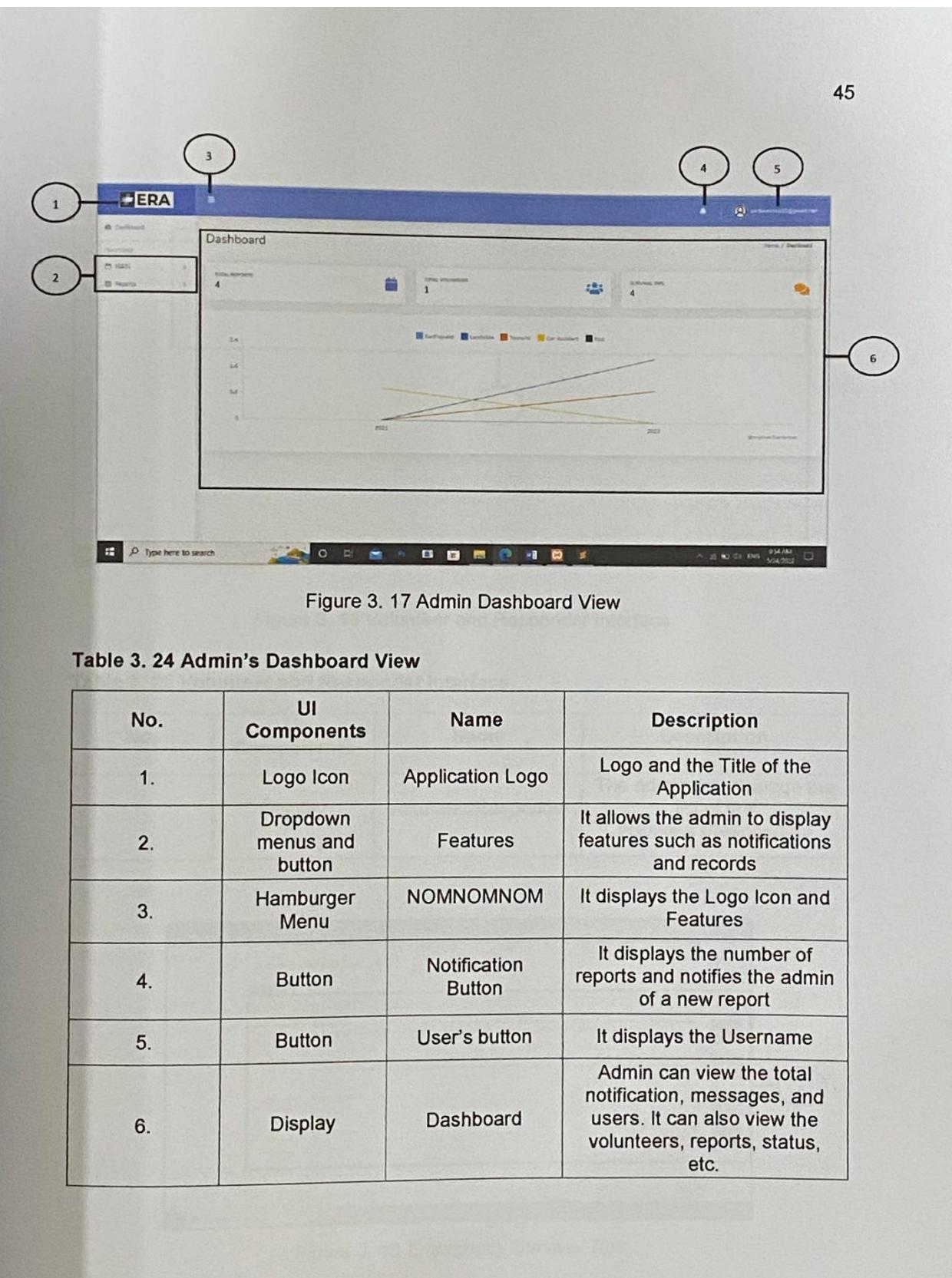


Figure 3. 17 Admin Dashboard View

Table 3. 24 Admin's Dashboard View

No.	UI Components	Name	Description
1.	Logo Icon	Application Logo	Logo and the Title of the Application
2.	Dropdown menus and button	Features	It allows the admin to display features such as notifications and records
3.	Hamburger Menu	NOMNOMNOM	It displays the Logo Icon and Features
4.	Button	Notification Button	It displays the number of reports and notifies the admin of a new report
5.	Button	User's button	It displays the Username
6.	Display	Dashboard	Admin can view the total notification, messages, and users. It can also view the volunteers, reports, status, etc.

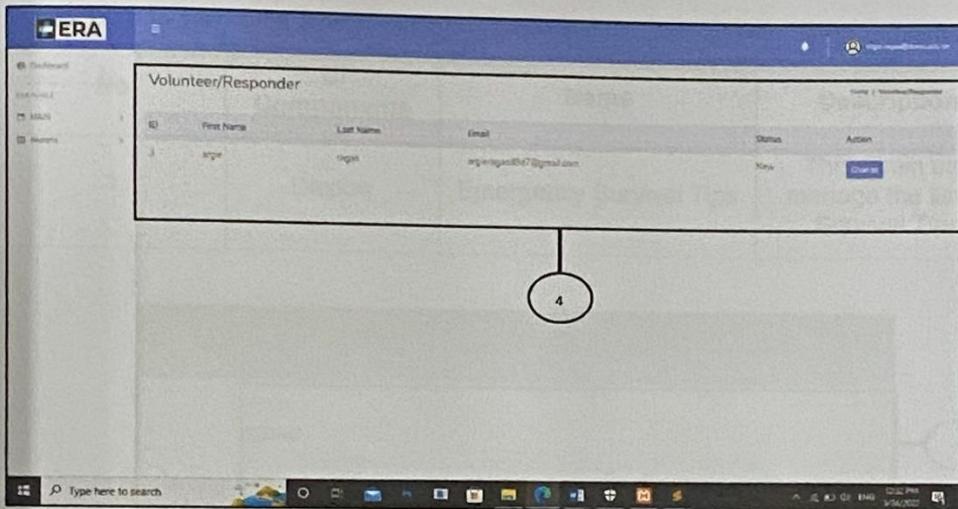


Figure 3. 18 Volunteer and Responder Interface

Table 3. 25 Volunteer and Responder Interface

No.	UI Components	Name	Description
1.	Display	Volunteer/Responder	The admin can manage the list of the volunteers/responders

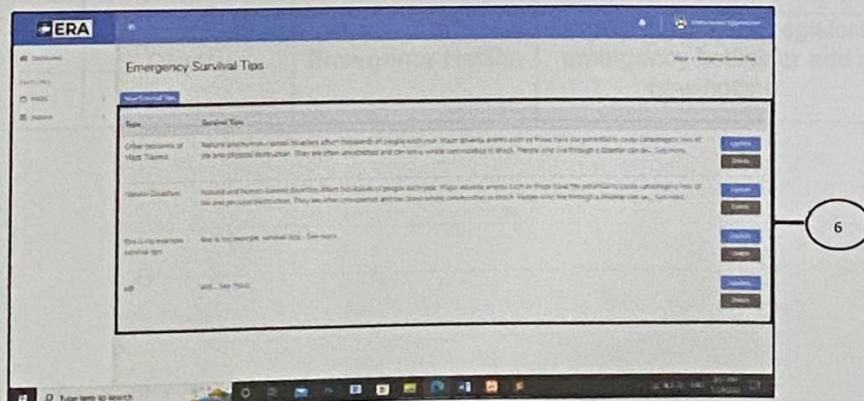
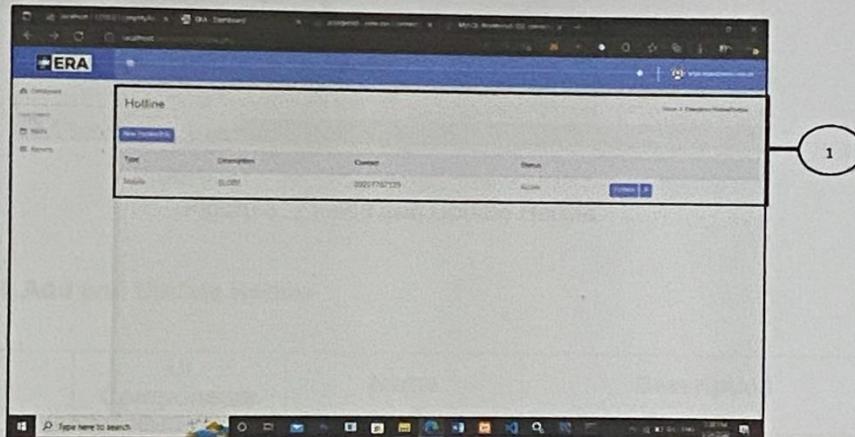


Figure 3. 19 Emergency Survival Tips

Table 3. 26 Emergency Survival Tips Interface

No.	UI Components	Name	Description
1.	Display	Emergency Survival Tips	The admin can manage the list of Survival Tips

**Figure 3. 20 Hotline Dashboard****Table 3. 27 Hotline Dashboard**

No.	UI Components	Name	Description
1.	Display	Emergency Hotline	Display the list of a registered emergency hotline or add a new hotline.

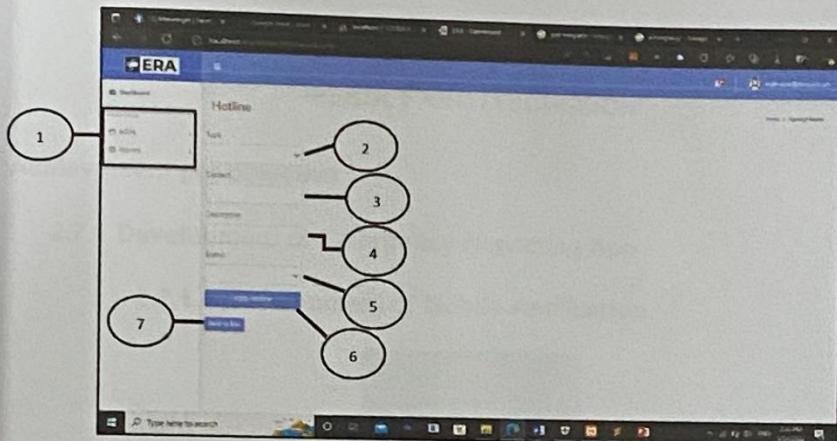


Figure 3. 21 Add and Update Hotline

Table 3. 28 Add and Update Hotline

No.	UI Components	Name	Description
1.	Drop Down 1	Display	The admin can manage the list of Survival Tips
2.	Drop Down 2	Type	The admin can select the type of connection to contact the emergency hotline
3.	Text	Contact	Contact number, email, user creates an account or reports an emergency and telephone
4.	Text	Description	Basic information about the emergency hotline
5.	Dropdown 3	Status	The admin can select if the hotline is active or not active.
6.	Button 1	Add Hotline	Allows the admin to add the emergency hotline to the server
7.	Button 2	Back to List	Allows the admin to return to the list of emergency hotlines

CHAPTER IV

RESULT AND DISCUSSION

2.7 Achievement per objective

2.7.1 Development of Emergency Reporting App

2.7.1.1 Development of Mobile Application

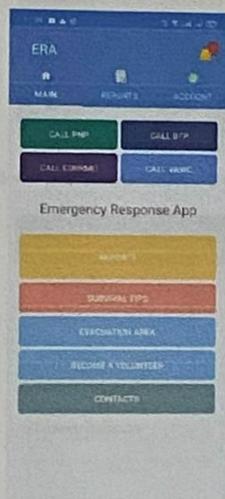


Figure 4. 1 ERA Home Menu

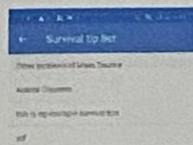


Figure 4. 2 Survival Tip List

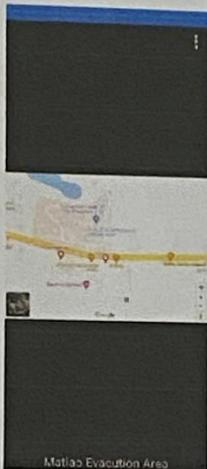


Figure 4. 3 Evacuation Area Map

Submit New Emergency Report

Welcome to Emergency Response App. Please fill the form below to submit your emergency report.

Type of Emergency

My Incidence
6.9429104,126.2289231

Please add more details of the emergency

Documentation

Agency

SUBMIT

Figure 4. 4 Emergency Report Interface

The developers successfully achieved the project's initial goal, allowing users to report emergencies and receive survival tips information via a mobile application.

2.7.1.2 Development of Web Application

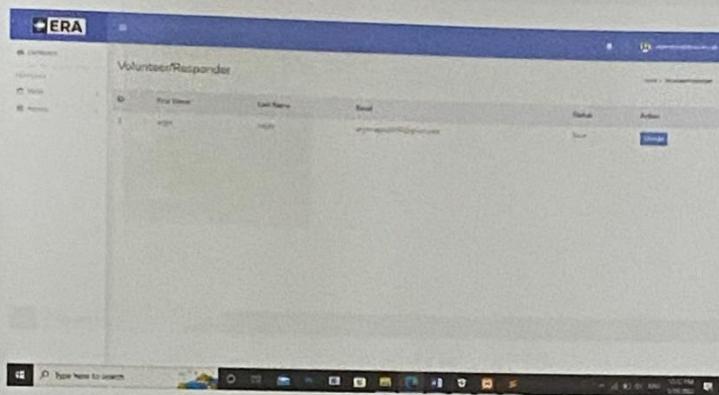


Figure 4. 5 List of Volunteers Web Interface

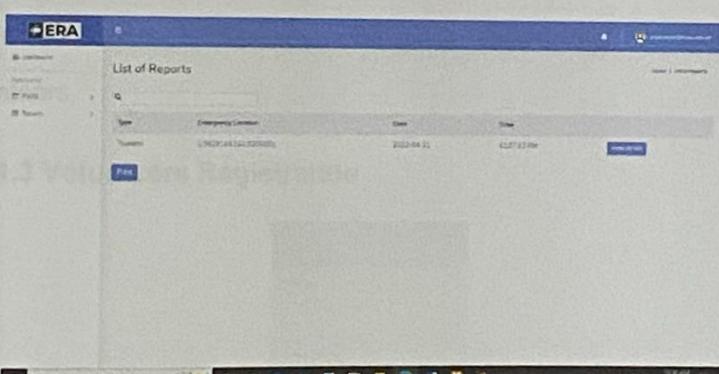


Figure 4. 6 List of Reports Web Interface

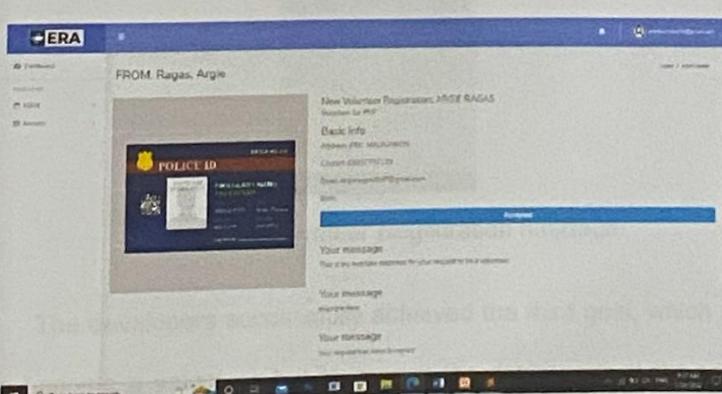


Figure 4. 7 Alert Center

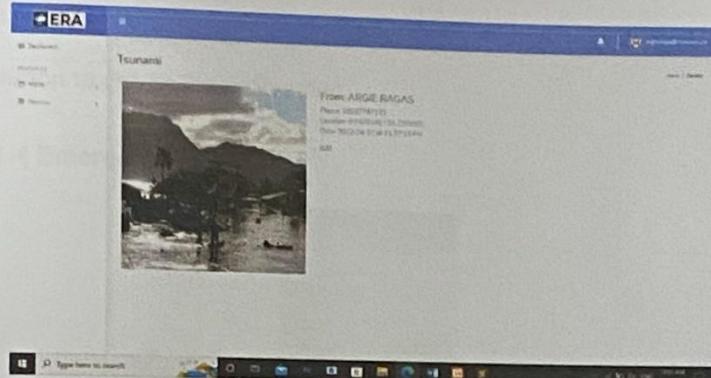


Figure 4. 8 Report Details

The developers successfully achieved the project's second goal: to let the agencies receive emergency notifications and accept or deny registering volunteers.

2.7.1.3 Volunteers Registration

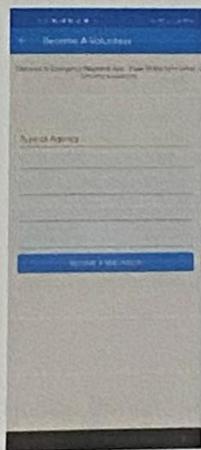


Figure 4. 9 Volunteer Registration Interface

The developers successfully achieved the third goal, which was to let the users become a volunteer but to access the dashboard of the volunteer via a mobile app. The user should become a successful volunteer when the agency

acknowledges and accepts the applicant as a volunteer to their agency by pressing the button to get on the notification.

2.7.1.4 Emergency Hotline

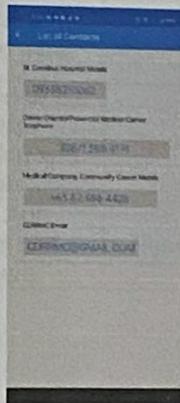


Figure 4. 10 Contact List

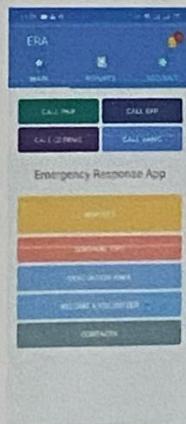


Figure 4. 11 Hotline Buttons in Home Menu

The developers successfully achieved the last goal, which was to let the users view the emergency hotlines on different agencies (PNP, BFP, NDRRMC, VACW).

2.7.2 Implementation Plan

Table 4. 1 Implementation Plan

STRATEGY	ACTIVITY	PERSONS INVOLVES	DURATION
Approval from the selected user	Letter for the selected user	Researchers, user	1 Day
System Installation	Installation of the Mobile Application and Web	Researcher, user	5 minutes
Information Distribution	Mobile App., Manual and Posters	Researcher, user	1 Day

CHAPTER V

SUMMARY, CONCLUSION, AND RECOMMENDATION

2.8 Summary

ERA, an online emergency reporting application, was created throughout the development process. Some of the relevant research and publications were also difficult since the developers found several comparable systems and attempted to figure out what aspects the other methods did not have that the developers should utilize. The developers hoped that by using this emergency reporting app, the concerned agencies and respondents would be able to save lives and shorten the time it took to respond to an emergency. This project may be of great help to assist the concerned agency in compiling reports on incidents or emergencies in the City of Mati.

The main objective of this project is to create a mobile application and web-based application called Emergency Reporting Applications for Mati City. With the Help of MySQL, PHP, Postman, and Git. The developers conducted testing and evaluation to verify the system's functionality, reliability, usability, efficiency, and portability.

2.9 Conclusion

One of the challenging parts of developing the mobile system is that when the User creates an account or reports an emergency, the mobile application automatically closes. So far, this technical problem has been addressed by the researchers accordingly. The developers concluded that through this Mobile Application, even an ordinary citizen who

lives in the City of Mati could also help by reporting an emergency to an agency that is responsible for responding.

3.0 Recommendation

The application was created following its objectives and scope and adhered to limitations. However, the developers could not construct a faultless program due to time and resource restrictions. Following the respondent's trial of the application, several provided candid feedback. Those are a response to the responders' suggestions, which the developers feel would significantly improve and enrich the ERA.

- Enhancement of the design and interface of the applications
- Having an offline transaction with the agency.
- Sound alarm to the specific agency if there are any incoming emergency reports.
- The agency can give feedback to the user who reported the emergency.
- Add Severity on the side of agencies
- Viewers page for the infographic part

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- ✓ Computer Literate (MS Office Word, Excel, Ppt, Publisher)
- ✓ Web Design
- ✓ Interpersonal Skills
- ✓ Video Editing

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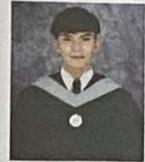
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