# Guardian In Your Pocket:An Android-Based Emergency App For Barangay 66 Tondo, Manila

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**TABLE OF CONTENTS**

# CHAPTER 1

# Introduction

## Background of the Study

Emergencies can strike anytime and anywhere.In recent years, the demand for efficient emergency response systems has grown significantly, particularly in densely populated areas like Barangay 66 Tondo, Manila. Traditional emergency response methods, often reliant on phone calls and physical location identification, can be slow and ineffective in critical situations. Mobile technology offers a promising solution to bridge this gap by providing a platform for immediate emergency response. A study by Mior Suffian et al. (2018) investigated the use of mobile phones for personal safety and found that emergency push notification applications can significantly improve response times by alerting bystanders and emergency personnel in real-time.

Another study by Reyes and Urtal (2019) focused on the development of a mobile emergency application for a specific region in the Philippines. Their research highlighted the importance of tailoring such applications to local contexts, considering factors like emergency service numbers and prevalent types of emergencies. Furthermore, a capstone project by Bautista et al. (2018) designed a mobile application that combined emergency service contact with first-aid information.

These studies provide a strong foundation for developing a mobile emergency application for Barangay 66 Tondo, Manila. By leveraging the capabilities of mobile

technology, this project has the potential to enhance emergency response efficiency, improve public safety, and empower residents to play a more active role in their community's well-being.

**Project Context**

Emergency service plays a significant role in a community’s needs. Every disaster or accident, whether it is man-made or not, needs the community’s assistance and help. It protects the community, maintains order, provides shelter for those who need it, evacuates individuals when necessary, and restores normalcy as quickly as possible. Emergency response is significant in aiding and saving people during a crisis. Although calling for help from the emergency hotlines somehow people don’t know, it takes them to post, shout, and panic before contacting the services. That is why having responsibility is most important during a crisis. Despite its significance, there are always issues with services when people don't know about hotlines in general.

On the other hand, emergencies like bleeding and breaking bones can somehow be treated alone or with someone if they know first aid, but most in the community don't have the knowledge to do so. Some people may not realize the importance of knowing first aid, may not be aware of the potential benefits of learning it, or somehow don't. Many people lead busy lives and may feel that they do not have the time to attend a first-aid training course. In addition, some first-aid training courses can be expensive, which may deter people from enrolling in them. Today, it is important to acknowledge these barriers and encourage the community to learn first aid to save lives in emergency situations. Most people in the community handle different emergency

situations that need help, but most of them are not knowledgeable enough about doing first aid. In addition, in time, days, minutes, or months, a disaster may come, and most of the people in the community are not well aware of the barangay's shelter location, or they do not know how to be prepared during and after a disaster. Many circumstances may occur in a community that is not well aware of emergency hotlines, first aid, and even being prepared for disasters. Most of them are related to the issue of barangay 66, which will be the main focus of the researchers' system.

Within the community of Barangay 66, an emergency application is very important. Providing simpler ways to get in touch with police, fire departments, ambulance services, and other pertinent services is the goal of this design. Resources and information on safety are also provided. The app can offer information on local evacuation centers as well as instructional materials and instructions on how to administer first aid in different situations.

A series of problems arise when calling emergency services due to both community and emergency respondents. First, some of the people in the community don't know the contacts of emergency hotlines; it takes them time and effort to know the contact information of emergency hotlines. Second, the emergency respondent may come late upon arrival due to unexpected events, and the person who needs help doesn't have familiarity with doing first aid. Third, people in the community may not know where the shelters provided by Barangay 66 are when a disaster comes. In an effort to gain insight into these problems, the researcher proposed an emergency application in which both the community of Barangay 66 and the emergency respondents alike will benefit. This system will provide direct call information for

emergency hotlines, making it easier for people in the community to access them. The community of Barangay 66 will be the ones to use the application, and upon using it, they were well-oriented.

**Purpose and Description**

The purpose of the "Guardian in Your Pocket: Brgy. 66 Emergency App" is to provide residents of Barangay 66 with a reliable and efficient tool for accessing emergency services and support during times of crisis. By leveraging modern technology, the app aims to enhance community safety, reduce response times, and foster a sense of security among residents.

Description: The "Guardian in Your Pocket: Brgy. 66 Emergency App" is a user-friendly mobile application tailored to meet the unique emergency needs of Barangay 66 and its neighboring areas. Through its intuitive interface, users can swiftly request assistance with the touch of a button, alerting local emergency services to their exact location in real-time.

**Conceptual Framework**

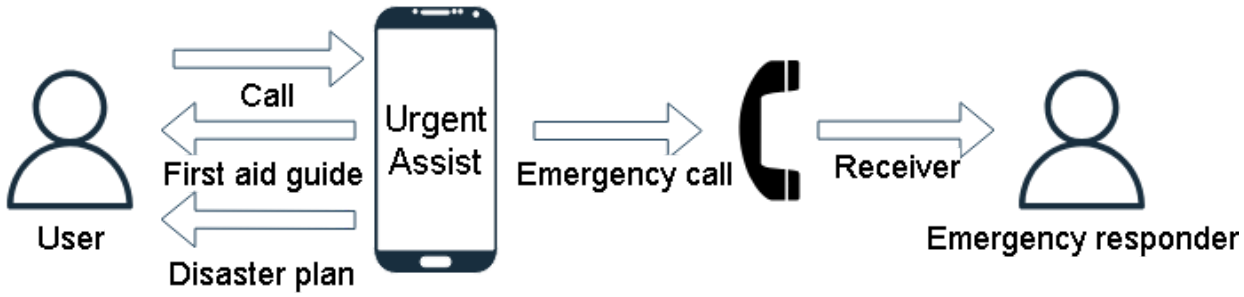

**Figure 1.** *Developed System*

Figure 1 illustrates the conceptual framework for the emergency application and how a user interacts with a mobile application to manage emergency circumstances. The software allows users to make calls, view a first aid guide, and follow an emergency plan. When a user places an emergency call, the app connects them to an emergency receiver, who is in charge of giving immediate aid or sending emergency services.

## Objectives

This study aims to evaluate the efficiency and effects of an emergency application in Barangay 66 Tondo, Manila. The primary goal of this project is to benefit the citizens of Barangay 66 by offering them resources and safety information in addition to a simpler method of contacting emergency services. The software can provide details about nearby evacuation facilities, educational resources, and guidelines for providing first aid in various circumstances they need.

1. To develop a software system with the following features:

**For Citizens**

1.1. To provide limited first aid using Guardian in Your Pocket: Brgy. 66 Emergency App, where citizens can search the guidelines on how to do the first aid in case of an emergency.

1.2. To develop an easier way to get in touch with emergency services to provide a convenient way for citizens to call emergency services in just one click.

1.3. To create details about nearby evacuation facilities and guidelines for disaster preparedness so that they can be fully informed about potential disasters.

**Significance of the Study**

This capstone project aims to develop an emergency mobile application specifically for Barangay 66. The application will serve as a vital tool for residents to report emergencies and request assistance from barangay officials and first responders. Developing a user-friendly and effective emergency application can hold significant value for various stakeholders:

**Citizens**. The application can empower individuals to quickly connect with emergency services during critical moments. It can also provide access to first-aid instructions, potentially improving outcomes before professional help arrives.

**Emergency Responders**. Faster response times facilitated by the application can lead to more efficient resource allocation and potentially save lives.

**Policymakers.** Studying user behavior and application effectiveness can inform the development of future emergency response protocols and public awareness campaigns.

**Future Researchers.** Act as a cornerstone offering insights, data, and a framework that can be expanded upon. They can contribute to the continuous improvement and innovation of emergency applications, ultimately enhancing public safety and emergency response efficiency.

This emergency mobile application has the potential to significantly improve the safety and well-being of residents in Barangay 66 Tondo Manila. By providing a more efficient and effective way to communicate and respond to emergencies, this project can make a real difference in the community.

## Scope and Limitation of the Study

This study aspires on developing, implementing, and evaluating an app to improve emergency response and public safety. The app enables phone calls during disasters, provides guidance on handling emergencies such as wound care and high blood pressure management, and offers critical first aid advice. Researchers will analyze the app's user interface, technological framework, security, and privacy measures, ensuring data protection and regulatory compliance. User adoption rates, demographics, and feedback will be collected through surveys and usability testing. Integration with existing emergency response systems and real-world effectiveness will be assessed through pilot tests.

## Definition of Terms

To Facilitate the understanding of this study, different terms are defined herein:

**Ubiquity** - refers to the widespread presence or availability of smartphones. The phrase "leveraging the ubiquity of smartphones" suggests that the Guardian in Your Pocket app takes advantage of the fact that smartphones are widely used and accessible within Barangay 66 and its surrounding areas

**Normalcy** - in research refers to the establishment of a baseline or typical condition within the Barangay 66 community in Tondo, Manila. This baseline encompasses the standard practices and procedures related to emergency response, including the

utilization of the Guardian in Your Pocket: Brgy. 66 Emergency App and adherence to first aid guidelines.

**Constraints** - refer to limitations or factors that may restrict the scope, methodology, or generalizability of the research conducted in Barangay 66 Tondo, Manila. These constraints include the specific geographic location of the study area, which may impact the applicability of findings to other communities, as well as the limited availability or adequacy of first aid guidelines provided by the Guardian in Your Pocket: Brgy. 66 Emergency App.

**Pilot Test** - refers to a preliminary trial or small-scale implementation of the emergency response app within a limited context or subset of the target population. This trial serves as a testing phase to assess the functionality, usability, and effectiveness of the app before full-scale deployment.

**Leveraging** - refers to the strategic utilization or exploitation of the widespread availability and usage of smartphones to maximize the effectiveness and impact of the Guardian in Your Pocket: Brgy. 66 Emergency App in enhancing emergency response mechanisms within Barangay 66 and its neighboring areas.

# CHAPTER 2

## Review of Related Literature

Emergency situations require fast and efficient responses. Mobile technology offers a great opportunity to bridge the gap between those in need of help and emergency services. This research project explores the development of an emergency application. To understand the existing landscape and inform our design choices, a review of relevant literature is essential.

The World Health Organization (WHO) defines a disaster as an unplanned incident that may overwhelm hospital and regional resources. As a result, Puryear et al. (2020) noted that emergency response must be coordinated at both the regional and national levels. They also stated that caring for the population's basic necessities is a top priority, as well as lowering the fatality rate. They further note the necessity of preparedness, coordination, and prioritizing in effective disaster response.

Divya et al. (2023) investigates the creation of a mobile application aimed at improving access to emergency services. The authors examine many current systems that help in medical and emergency circumstances by monitoring user health data, keeping medical records, and delivering hospital information. The suggested application provides a unified solution by allowing users to easily call emergency services such as family members, ambulances, police, and fire stations with a single click, while also

providing an online pharmacy service. The study wanted to point out the need of a single approach for facilitating access to numerous emergency services, providing timely and coordinated responses during critical situations.

According to a study written by Quazi Maliha Masud et.al. (2022), it describes an Android app called ”GoFearless”. According to them, users feel safe with this app while traveling and help from dangerous situations, so they can feel brave while making their daily commute. It is an Android software and has features like instant alerting the user’s position, trusted contacts etc. The system has three emergency trigger buttons (Panic, Cautious, and Update). Moreover, some added features like location of nearby police station, one-tap access to a national crisis line, recording phenomena for future reference are also there.

Ramirez et al. (2022) presented their research “Sagip Pinoy”, a web and mobile-based Philippine emergency quick response platform. This study created and built an application for locating the nearest emergency units. It can convey location information to emergency units and raise an alarm to at least five nearby emergency teams.

According to Chang, Wu, and Lin (2022), they take a more technical approach in their article. They detail the development process of a multifunctional emergency app designed for public use. Following the development phase, they evaluate the app's technical performance, how well users accept it, and how well it integrates with existing emergency response infrastructure. This research provides valuable insights into the creation and implementation of successful emergency apps.

According to a study written by Martinez et al. (2021), it investigated the user experience and usability of emergency alert apps. They focus on design features that make these apps more engaging and effective during critical situations. By understanding how users interact with these apps and what design elements work best, developers can create apps that are more user-friendly and ultimately more helpful in emergencies.

According to Becker et al. (2020), emergency medical care programs must significantly consider public awareness aspects in order to establish a framework that allows for quick access to emergency services. An emergency application containing listings of emergency hotlines does little to help the public's lack of knowledge about who to call. The statement stated that even if the emergency application isn't a huge assistance, it still has a good contribution to make.

According to Smith, Johnson, and Lee (2020) it provides a comprehensive overview of various mobile applications designed for emergency response. They assess these apps based on their functionalities, which include features like reporting emergencies, receiving alerts, and accessing resources. The review also examines how usable these apps are and the impact they have on overall emergency management practices.

According to the study entitled "Call for Help: A Mobile Emergency Application Based in Cavite" by Reyes & Urtal (2019), it explores the development of a mobile application specifically designed for Cavite, Philippines. The said application aims to

improve emergency preparedness and response within the Cavite community by providing individuals with a convenient and efficient way to seek help in an emergency.

Brown, Williams, and Garcia (2019) conducted a systematic review specifically on smartphone apps used in emergency medical care. Their research focuses on evaluating the accuracy and reliability of these apps, along with user satisfaction. The aim is to understand how well these apps function and how satisfied users are with them. This can inform recommendations for integrating these apps effectively into emergency response systems.

According to the capstone project entitled "Locator Interface for Emergency (L.I.F.E.)" (2019), it delves into the design of an emergency application's locator interface, a critical component for directing emergency response teams. By analyzing this project document, you can gain valuable insights into integrating location services and ensuring accurate user location identification within your application.

Al-khafajiy et al. (2019) conducted a research named "Smart hospital emergency system" to investigate the integration of sophisticated technologies into hospital emergency systems in order to improve efficiency and patient care. This statement shows how important it is to integrate modern technology into hospital emergency systems to improve patient care and operational efficiency, allowing for more effective emergency responses.

Dar, Shah, Shahid, and Naseem's (2018) work "Fog Computing based Automated Accident Detection and Emergency Response System using Android Smartphone" investigates a system that uses fog computing to improve accident

detection and emergency response using Android cell phones. Related research topics include fog computing, automated accident detection, emergency response systems, and smartphone-based solutions.

Khan et al. (2018) conducted research to reduce emergency service response time in situations such as traffic accidents or emergencies. They used the smartphone's built-in sensors to detect and report automobile accidents to the nearest emergency service. This may support the idea of how crucial emergency applications are, employing smartphone sensors and real-time location monitoring to shorten reaction times in situations.

Bachmann et al.'s (2015) research "Emergency Preparedness and Disaster Response: There's An App for That" investigates numerous mobile applications aimed to improve emergency preparedness and disaster response. The report emphasizes the importance of mobile applications in giving immediate information, easing communication, and boosting cooperation during an emergency.

Jadhav et al. (n.d.) conducted a study on an emergency management system that used an Android application. The goal of this research is to provide emergency services at the accidental location encountered or witnessed by the user with a single button press. According to Jadhad et al, having an emergency application can deliver quick emergency services, which may be essential in life-threatening situations.

The review of existing literature on emergency mobile applications reveals a growing field with significant potential to improve response times and outcomes in emergency situations. The findings from this study of related literature will be used to

guide the development of a new emergency app customized particularly to the needs of Barangay 66. This software must be user-friendly, accessible, and successful in keeping citizens safe and informed in the case of an emergency.

# Chapter 3

# Methodology and Design

## Technical Background

The Guardian in Your Pocket: An Emergency App for Barangay 66 Tondo, Manila is an application that can be helpful to the community of Barangay 66 Tondo, Manila. This application tool can be used efficiently and effectively to have easier access to emergency services such as fire, police, and ambulance services, as well as pertinent safety materials such as first aid manuals and disaster preparedness, including local evacuation centers.

The proponents had gathered a quantitative approach to investigate the needs of the community of Barangay 66 Tondo, Manila, and discussed the potential technological approaches in case of emergency. The researchers are currently conducting a survey study to create the application while the investigation is still in development.

The Guardian in Your Pocket: An Emergency App for Barangay 66 Tondo, Manila is a software application that aims to inform the authorities in the event of an emergency

and to centralize the requirements of the community. These are some of the technical terms that are being used in the project: PHP, JavaScript, PHPMyAdmin.

**Methodology**

The researchers used a quantitative approach method in which the questionnaire acts as the primary data collection tool, adding essential information obtained through interviews and communication with the community of barangay 66 Tondo, Manila. This approach was selected because it provides the most effective means of obtaining the data and information regarding community needs for The Emergency App, which will enable the researchers to complete their study. In addition, this approach would let the researchers create software that would address the issues faced by the residents of Barangay 66 in Tondo, Manila, who are not well-versed in emergency services, first aid, disaster planning, or the locations of the closest evacuation facilities.

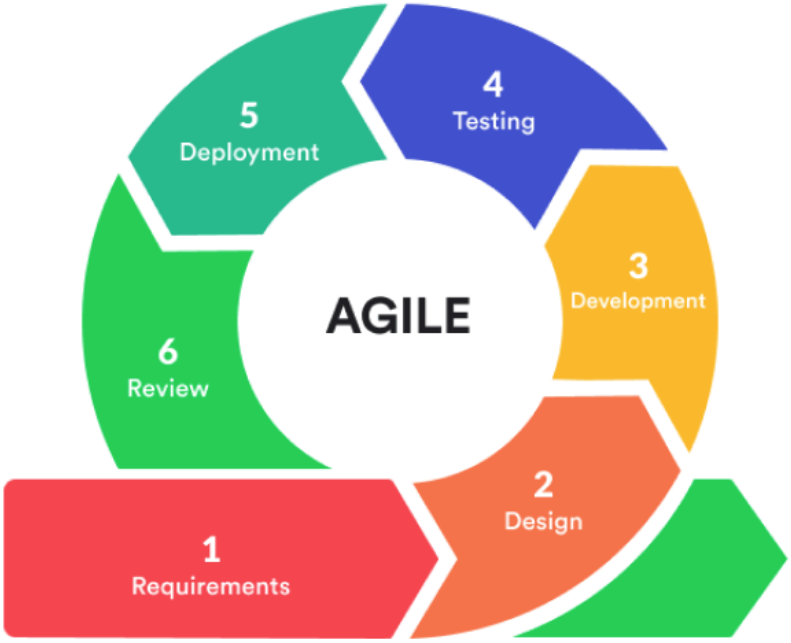


**Figure 3.1 Agile System Development Model**

In Figure 3.1, it shows the researchers initiating the **planning phase** by conducting detailed conversations with the barangay head of Barangay 66 Tondo, Manila. These were crucial for a comprehensive understanding of the emergency application. The process of identifying possible problems and setting clear goals for the new application.

In the **design phase**, the researchers focus on determining the application's framework to meet the barangay's needs for efficiency and the effects of an emergency application on the citizens. The researchers created a user-friendly interface and established well-known manuals and preparedness.

Throughout the **development phase**, the application system was created using Agile programming approaches. characteristics like simpler access to emergency services and relevant safety resources like first aid manuals and disaster planning, which include nearby evacuation centers, are especially important.

A **critical phase**, the testing phase involved thorough examinations of the application to identify and address any software flaws. Ensuring the application satisfied the Barangay's requirements for emergency, performance, and consistency was essential.

In the **deployment phase**, the researchers implemented the emergency application at Barangay 66 Tondo, Manila, allowing the barangay staff and citizens of Barangay 66 to compare it to the usual contact with the emergency services and safety procedures.

The **review phase** is to obtain user feedback and direct any necessary application improvements in response to this feedback. The application's adaptability and response to the barangay's shifting demands were guaranteed by this iterative procedure.

At last, the development of an emergency application for Barangay 66 Tondo, Manila, that was customized to the unique requirements of the barangay improved emergency services as a result of this strategy; pertinent safety resources, such as first aid manuals and disaster preparation that includes local evacuation centers, are particularly crucial.

## Approaches and Techniques

### Requirement Analysis

The researchers must comprehend better understand and pinpoint the central issues, needs, and requirements of the Barangay. The developed application "An Android-Based Emergency App For Barangay 66 Tondo, Manila " is an Application to provide residents with a reliable and efficient tool for accessing emergency services and support during times of crisis. The following requirements were needed to complete the plan successfully:

-To create a user-friendly system that efficiently assists users in navigating and understanding its functions.

-To provide a button or emergency contact list offer personal safety assurance, empowering individuals to seek help swiftly in incident situations.

-To provide a streamlined interface for residents to quickly access emergency services like police, fire department, and medical assistance.

-To provide pinpoint of the user's location during emergencies, facilitating faster dispatch of emergency responders and improving accuracy in locating those in need of assistance.

-To provide resources and information on emergency preparedness measures, safety tips, and guidelines specific to Barangay 66, Tondo, Manila.

**Population Sample Size and Sampling Techniques**

**Population**

Barangay 66 Tondo, Manila, has a total population of 2,956 residents. To ensure that the study for the capstone project "Guardian In Your Pocket: An Android-Based Emergency App" is both reliable and representative. We need to determine an appropriate sample size using standard statistical methods and considering a confidence level of 95% and a margin of error of 5%.

**Sample Size**

A sample size of approximately 385 residents will be required for this study. This sample size is sufficient to provide a statistically reliable representative of the target population, making the study's findings and insights generalizable and credible. With 385 users, the project can capture a wide range of user experiences and behaviors,

providing a full understanding of the app's usability, functionality, and effectiveness across demographics.

**Sampling Techniques**

The researchers selected stratified random sampling as their sampling technique. This strategy was adopted to guarantee that the sample accurately represents the barangay's different demographics and features. By stratifying the population based on key factors such as age, gender, and occupation, the researchers ensured that each subgroup was proportionally represented in the sample. This strategy increases the reliability and accuracy of the study's findings by capturing a wide variety of opinions and experiences. As a result, the data collected from the stratified random sample provides a more detailed and precise insight of the community's needs and behaviors, allowing for the creation of a more effective and inclusive emergency app designed for the specific context of Barangay 66 Tondo, Manila.

**Description of Respondents**

Residents of Barangay 66 Tondo, Manila, represent a wide range of people that answered the emergency application. The feedback is significant to the emergency application's usability and functioning because the respondents have a basic understanding of cell phones and mobile apps. Barangay 66 Tondo Manila residents are chosen to customize the program to the particular needs and problems of this locality.

**Research Instrument**

This study will use a survey questionnaire to collect quantitative data from people of Barangay 66 in Tondo Manila. The questionnaire will be developed to evaluate various important fields of the creation and implementation of "Guardian In Your Pocket," an Android-based emergency app. The questions will focus on demographics, emergency preparedness knowledge, smartphone usage, and resident responsiveness to a mobile emergency application. This information will be critical for understanding the intended user base, their needs, and technological capabilities.

The findings from the survey will directly inform the design features and functionalities of the app, ensuring it aligns with the community's specific requirements and promotes its successful adoption within Barangay 66 in Tondo Manila.

**Data Gathering Procedures**

A request letter was written to carry out the study. The researcher created a checklist of questions and will conduct the study in Barangay 66 Tondo, Manila. The researcher wants to use this survey to learn more about the needs of Barangay 66 Tondo, Manila, as well as the benefits of the survey approach. The value of the respondents' responses to the study will be explained to them by the researchers. In order for the respondents to complete the questionnaire fully aware of their role as the study's subject, the researcher will explain a few concepts to them. The researcher will also ask that they answer completely honestly.

**Statistical Treatment of Data**

1. Weighted Mean. The researchers use the method of weighted means to evaluate the perceptions of respondents about the system.

Formula: The formula for the weighted mean is:

$$W.\ M. = \sum wx / n$$

Wherein:

w = the number of evaluators who answered the item(s).

x = a value on the Likert scale

n = a sample size or the total number of observations involved in the study.

2. Percentage. The researchers use the method of percentage to determine the demographic profile of the evaluators.

Formula: The formula for percentage is:

$$P = f/n \times 100\ \%$$

Wherein:

P = a percentage

F = the frequency or number of respondents in the area

N = the total number of respondents that are included in the study.

3. Analysis of Variance. The researchers employed ANOVA to investigate if there are any significant differences in the percentage or proportion among various demographic groups.

Formula:

$$F = MST/MSE$$

F = ANOVA coefficient

MST = mean sum of squares due to treatment

MSE = mean sum of squares due to error

4. Likert Scale. The researchers used the Likert scale to treat the responses to the presented variables' questions, which were assessed and weighted as follows:

Table 3.1 Likert Scale

| **Score** | **Range** | **Verbal of Interpretation** |
|---|---|---|
| 5 | 4.20-5.00 | Strongly Agree (SA) |
| 4 | 3.40-4.19 | Agree (A) |
| 3 | 2.60-3.39 | Moderately Agree (MA) |
| 2 | 1.80-2.59 | Disagree (D) |

| | | |
|---|---|---|
| 1 | 1.00-1.79 | Strongly Disagree (SD) |

**System Requirements**

The system requirements for developing a system are classified into five categories: hardware, software, peopleware, network, and dataware.

**Hardware**

A high-performance PC suitable for Android Studio that includes an Intel i5/i7 processor or an equivalent, 500 GB SSD, and at least 8 GB of RAM is included in the hardware category. Other standard computer accessories include a mouse, keyboard, and monitor.

**Software**

The application will be developed using Android Studio, with the latest version being Android Studio Koala 2024.1.1, which includes the newest features and improvements for reliable app development (Android Studio Release Updates). To ensure compatibility and best performance, the development team will use Windows 11. The programming language to be utilized is Java, which is supported by Android Studio and provides comprehensive frameworks for developing dependable and efficient Android applications. In addition, the project will be using Android SDK tools and Gradle for project configuration, ensuring that the application seamlessly integrates and deployed on a variety of Android devices.

**Peopleware**

The peopleware category includes a UI designer and a mobile app developer to build the system.

**Network**

The network category requires broadband internet, which is necessary for system development as accessing the application and programming languages need an internet connection.

**Dataware**

The researchers created dataware to help with database visualization and to explain how the data was arranged and what to expect from the system using the database schema.

These specifications act as the fundamental key components around which successful and efficient software is built.