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Online Community and Voluntary Service Collaboration System

BY

Kairu Angela Wanjiru 11JCS001

Supervisor

Dr. Collins Oduor PhD

UNITED STATES INTERNATIONAL UNIVERSITY-AFRICA
SCHOOL OF SCIENCE AND TECHNOLOGY
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This final project report is submitted in partial fulfillment of the requirements of the Applied Information Technology (APT)

Declaration

I declare that this is my original work through my own effort and that it has not been presented in any form for academic or any other reason, to the best of my knowledge. Contributions to this work by any other person or literature have been duly cited.

Student

Name: Kairu Angela Wanjiru   Reg No: 656995

Signature…Kairu Angela Wanjiru……   Date………..…1/28/2021………………

Supervisor

I confirm that this research project report was carried out by the student under my supervision

Signature…………………….   Date…………………

Dr Collins Oduor PhD

Assistant Professor-Information Systems,

School of Science and Technology

UNITED STATES INTERNATIONAL UNIVERSITY-AFRICA

Acknowledgement

I would like to first and foremost appreciate the gift of life, health and stability that has enabled me to get as far as I have. I would also like to acknowledge the financial, emotional and moral support that I have been receiving from my parents, lecturers and colleagues over my academic journey. In general, I appreciate all the effort that has been put into my project and my academic operations in totality by all parties.

Definition of central terms

Volunteer - a person that offers to take part in an enterprise or task for free.

- working for an organization or performing a task without pay.

Beneficiary - a person that derives advantage or benefit from something

Stakeholder - a person with an interest or concern in something, especially a business.

Population - a group of individuals with common characteristics from which a sample is drawn

Sampling - the process of taking samples of something (e.g; a population) for analysis

Analysis - a detailed examination of the structure of an element or object.

Demographics - the distribution of characteristics across a target audience or population.

Monotony - a lack of variety and interest usually as a result of tedious repetition and routine.

Application - computing software designed to carry out a specific task on a system

Non-profit organization - a firm that is granted tax-exempt status by the National Revenue Authority because it provides public and social benefit as it works towards a cause.

Module - a subpart of a system/program or a software component that has one or more routines

Deployment - the collective set of activities that make a software system available for use.

Validate - to check or prove the validity or accuracy of an entity on a system or environment.

Abstract

Volunteering is offering applicable resources towards a particular cause without expecting anything in return usually in industries like; Education, Health, Youth Development, Conservation among others. In most western countries, there are established facilities and institutions operating under social services, growth and development chains and conservation fronts in the service industry to facilitate volunteer work. They also have application software deployed for volunteer work unlike in Kenya that has no applications for the same.

The problems this project aims to solve pertain; the limited number of volunteers enrolled in non-profit organizations, the lack of awareness of opportunities among volunteers, the limited participation in activities by volunteers in one organization and the difficulty in finding new volunteer opportunities while using old methods of search. The objective of the project is thus to; employ the waterfall system development methodology in its appropriate stages to design and develop an online voluntary and community service collaboration application with posting, date selection, chat space and geolocation features while doing research to find out the challenges of the old methods and the benefits of the proposed system to solve the problems discussed.

A descriptive research study was done via online surveys with a 100% response rate and a higher response rate from female participants. The majority of the respondents were between 19 and 24 years of age and 46 out of the 50 respondents live in Nairobi as required. Based on the study, there are more established volunteers than non-volunteers. Respondents experience challenges like; irrelevance, exclusiveness, time wastage, loss of flyers, insufficient information, having to wait for new events, monotony of the same venues and monotony of the same tasks while working with old methods of finding new volunteer opportunities and they recommend the implementation of the proposed system as they expect benefits such as; inclusion of variety, chatting feature, time saving and collaboration.

I would recommend that the system be deployed in Nairobi and in other areas in the future as its features and functionalities work to facilitate the planning, finding and execution of volunteer work better than the old methods. The system can be improved by integrating features that can help deliver its full functionality to more users and other features that allow users to follow each other as users will have preferences and they would want to follow other users that share content that is relevant to their interests.

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List of Abbreviations

USIU - United States International University

VCSCA - Voluntary and Community Service Collaboration Application

NGO - Non-Governmental Organization (a non-profit organization)

USA - United States of America

KWS - Kenya Wildlife Services

VSO - Voluntary Services Overseas

SDG - Sustainable Development Goals

DFD - Data Flow Diagram

ERD - Entity Relationship Diagram

UI - User Interface

ADMIN - Administrator

APP - Application

Copyright

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This project is based on the ideology, theory and execution of an idea based on applying technology in the solution of a societal problem in the service industry under voluntary and community service activities. The proposed system; An online Volunteer and Community Service Collaboration System is intended to mitigate the challenges experienced by volunteers and non-profit organizations.

1.1 Background of the study

By definition, volunteering means offering your time, labor and other applicable resources towards a particular cause without expecting something in return. It could also mean working for an organization without being paid. Similarly, community service is based on the same concept but mostly geared towards giving back to one's community. Volunteer work can be done as an initiative by an individual or group of individuals towards a greater cause. Some people individually or as a group volunteer in their nearby children homes to clean or conduct maintenance for free. This can be considered as volunteer work and community service as well.

For those that volunteer in organizations, it is usually in non-profit organizations working towards a worthy cause. These organizations get volunteers and work to manage them as they continue to conduct their usual day-to-day operations. Volunteer work and community service activities are often directed to industries and sectors such as; Education, Health Care, Youth Development, Sports and Social & Human Services. Organizations and teams often generate programs that help guide and direct them on how to go about their activities. It is a well respected and appreciated sector under the service industry as it is reliant on the good will of well wishers and selfless people all over the world and the country.

In the United States of America, the social services sector has volunteering activities conducted with a mission of making a difference in people's lives by helping to provide social services to individuals, families and the community in general. The states have programs that offer both a chance to make a difference and an experience to learn. They often roll out programs with descriptions that people would find attractive like having a person travel to parts of the US while enjoying the experience even as they do volunteer work. The USA has volunteer programs in;

Animal Safety, HealthCare, Education, Environment, Arts and many others. They offer the programs widely and attract volunteers from all over the country and the world to enroll and embark on the journey of changing lives, the environment and more.

With the number of natural calamities that strike and affect Japan, volunteer work is highly valued, needed and encouraged. They have very many charities and Associations geared towards recovery from such occurrences and towards the continuity and growth of their community in general. The main areas of focus are; Education, Child Care, Care for the 'Disabled', Mental Health, Physical Health and many more. Sweden is also a country that highly upholds volunteer work so much that they make offers to bring in volunteers from other countries for free while attracting them with the promise of a great travelling experience alongside that of changing lives. Common volunteer activities include; Backpacker Hostel Work, Eco Projects and Environmental Conservation, Animal Care, Teaching and Education work, Organic Farm help among others.

In Africa, a lot of volunteer work is geared towards; Social and Human service, Refugee Help, Health Care, Environmental Conservation, Education, Food and Nutrition and Awareness. Egypt is one of the countries that focuses its volunteer work on these sectors. Many volunteer activities are centered in big cities like Cairo and Alexandria. The country is often a part of international programs and activities. They welcome foreigners to volunteer but prefer that they be independent and capable of fending for themselves. Mauritius is also a country in Africa that values and appreciates volunteer work in the sectors mentioned and more so in conservation projects especially for marine life as it is surrounded by the Indian Ocean's waters. It also has programs that are rolled out like in the other countries discussed.

In Kenya, the implementation of volunteer work and community service activities is similar to that of the other countries discussed. Many organizations exist in Kenya that are founded on volunteer work. Examples are; Volunteer HQ, VSO International and the United Nations Volunteer Programme. The main sectors of focus are; Education, Youth Development, Environment and Wildlife Conservation, Social and Human Services HealthCare among others. The non-profit organizations developed for volunteer work and community service take in volunteers and work with them based on the programs they have. There are other organizations that have volunteer work offered and encouraged as part of their key operations to help sustain their objectives. Examples include; Maasai Mara and the Kenya Wildlife Service(KWS).

1.2 Problem Statement

- **Limited number of volunteers in non-profit organizations** - The voluntary and community service sector has challenges and with getting a large enough number of volunteers in different organizations
- **Lack of awareness of service opportunities among volunteers**- Most volunteers are unaware of the volunteer work, programs and organizations available in their regions even though they are willing to participate and volunteer in many projects
- **Limited participation in volunteer activities by volunteers** - many volunteers are members of a particular organization and often work on projects within the programs of that organization and they can miss out on other varied opportunities offered and conducted in other organizations or groups.
- **Difficulty in finding new volunteer opportunities while using old methods of searching for them** - When volunteers opt to search for new opportunities on their own, they often volunteer to participate in events or initiatives advertised on flyers, web search for new opportunities or join organizations that facilitate volunteer work. These methods are often unsatisfactory as they may be unreliable or monotonous.

1.3 Project Objectives

1.3.1 Overall Goal

To design and develop an online voluntary and community service collaboration application.

1.3.2 Systems design and development objectives

- Profile, upload and posting feature
- Date selection feature
- Chat space feature
- Liking feature

1.3.3 Specific Research Objectives

1.3.3.1 To find out the traditional challenges with web searching, flyer distribution and organization membership approaches.

1.3.3.2 To determine the benefits of the online voluntary and community service collaboration system

1.4 Project Questions

What are the traditional challenges with the web searching and organization membership system?

What are the benefits of the online voluntary and community service collaboration system?

1.5 Scope of the Project

The online voluntary and community service collaboration system will be developed as a mobile application that will focus on volunteer work and community service in the local community specifically in Nairobi county to support charity and community service activities in the area. Volunteers can log onto the platform and get vast information on available programs. They can enroll and participate based on their interests and convenience.

Non-profit organizations and small volunteer groups can create profiles and generate awareness of programs or small events and activities that they have so volunteers have options to choose from. As they generate posts on new events and activities, they can pin locations of specific areas where the activities will take place. In terms of collaboration, the chatting section will allow volunteers to interact with each other and with the small groups and organizations. The stakeholders include; non-profit organizations, individual volunteers and group volunteers.

1.6 Limitations of the study

Challenges and Risks vs Mitigation
- The potential for losing some or all the work done because of hardware or software failure or breakdown - Having 2-3 backups and an alternative computer to fall back on in case of failure.
- The risk of the app and its features not being satisfactory - Making sure all features and functionalities meet the highlighted objectives as well as the needs of the intended clientele.
- The possibility of struggling to implement certain features - Having points of reference like the IT community on the internet, colleagues, and lecturers.

● Potential struggle with time-keeping and management - Having a clear outline and schedule for my activities.

1.7 Significance of the study

This paper is relevant to

● Sustainable Development Goal no.8, specifically to ;

  – **"Promote Sustained, Inclusive And Sustainable Economic Growth, Full And Productive Employment And Decent Work For AlL "**

  – This can be achieved by committing more volunteers to teaching programs and education based projects aimed at enabling members of the community and equipping them with skills

● Sustainable Development Goal no.15, specifically to ;

  – **"Protect, Restore And Promote Sustainable Use Of Terrestrial Ecosystems, Sustainably Manage Forests, Combat Desertification, And Halt And Reverse Land Degradation And Halt Biodiversity Loss "**

  – This can be achieved by committing more volunteers to preservation projects aimed at conserving the environment and life on land.

  – It can be executed through tree planting, garbage collection and recycling, creating awareness and other activities. This can be achieved best through the generation of synergy and collaboration among volunteers in the community.

<h1 align="center">CHAPTER TWO : LITERATURE REVIEW</h1>

2.0 Introduction

In the service industry, technology-based solutions have been developed to assist workers in different sectors of the industry in activities; event scheduling, strategic decision-making, performance management, market positioning and many others. In the volunteer service sector, specifically on the volunteer side, technology-based solutions exist mostly in the form of web applications where they look for their next commitments and a fair number of mobile applications for the same purpose. Mobile applications similar to the proposed system modelled for Kenya however are rather few.

2.1 Analysis, comparison and criticism of existing projects with an assessment of strengths and weaknesses of existing projects

2.1.1 System One

Name_Golden Volunteer Opportunities_ **Country**__USA__

This is a volunteer work opportunity mobile application that allows users to explore generous works, nonprofit jobs, and volunteer opportunities while giving a provision for fun. The best features and advantages of this application include; the presentation of an appealing interface, ease of navigation for users, it allows volunteers to give ratings, volunteers can filter results and users can share results outside the app. The disadvantages and demerits of the application include; inability to communicate directly on the app, it does not work in some countries, some users complain about crashing and some features do not work for some users.

Website link: [Golden | Find and manage volunteer opportunities (goldenvolunteer.com)](goldenvolunteer.com)

GooglePlay Link: Golden Volunteer Opportunities - Apps on Google Play

2.1.2 System Two

Name_Join The Cause:Volunteer Opportunities_ **Country**_India_

This is a volunteer work opportunity mobile application based in Hyderabad, Chennai and Bangalore that facilitates interaction between non-profit organizations and volunteers. The best

features and advantages of this application include; a straightforward and easy to navigate interface, a simple and appealing interface, it has an accurate location feature and it allows organizations to post events directly. The disadvantages and demerits of the application include; the absence of a direct communication feature, it only has 3 cities even though it is in a large country and opportunities and events only show up in one city; Hyderabad.

Website link: Non-existent

GooglePlay Link: [Join The Cause:Volunteer Opportunities - Apps on Google Play](#)

2.1.3 System Three

Name_Gudppl_ **Country**_Sri Lanka-Asia_

This is a volunteer work opportunity mobile application focused on helping users to interact and work towards making a meaningful impact in the community. The best features and advantages of this application include; an appealing interface, a recently added feature, a recently joined feature, a result filtering feature and an invitation feature. The disadvantages and demerits of the application include; the limitation of users to login with either their gmail or facebook account which some users may not have and the fact that signing in with one's gmail gives them access to several pieces of information and this may not sit well with some users.

Website link: [gudppl](#)

GooglePlay Link: [gudppl - Apps on Google Play](#)

2.1.4 Summary of comparison of the systems

Features	Golden Volunteer Opportunities (USA)	Join The Cause:Volunteer Opportunities (India)	Gudppl (Sri Lanka-Asia)
Cost	Low	Low	Low
Easy to Install	✓	✓	✓
Easy to use	✓	X	✓

Efficient Database	✓	X	✓
Good Security	✓	✓	X
Vulnerability assessment	✓	X	X

Table 2.1: *Systems Comparison*

2.2 Literature review on based on the specific research objectives

2.2.1 challenges of the manual web searching, flyer distribution and organization membership approaches

- **Searching the web for opportunities is time consuming** - A volunteer spends a lot of time trying to find the program, activity or organization that they would like to be a part of. They have to go through vast results to find opportunities that suit them.

- **Information provided on a flyer is often brief and shallow** - A volunteer that wants to participate in volunteer work does not get extensive and updated information about an organization and its programs or activities from a flyer as the information on it is usually a summary of the full description.

- **Being a member of one non-profit organization or group is limiting** - A volunteer joining an organization to participate in volunteer work is limited to the activities done in that organization alone. This is often because they are unaware of other sources of opportunities so they decide to stick to an organization that guarantees them but this can bring a sense of monotony.

- **Some non-profit organization websites may not get enough traction while others do not have online presence** - The organizations have to work hard to generate awareness and attract volunteers but their websites and social media platforms can only gain traction if they come up within the first search results. This is a challenge for small volunteer groups because of the lack of resources to support that function.

- **Web searches may not bring forth every viable option or result that exists** - Volunteers can search online for opportunities but the search results if not filtered and specified may

not bring forth every opportunity that is fitting for that volunteer. Some opportunities are not posted on the web and therefore volunteers can be limited.

- **Most web search results are only of individual organizations and events** - The results generated on most search engines are of websites of individual non-profit organizations and individual volunteer events rather. A volunteer therefore has to open multiple links to go through the programs and details under each one.

- **Flyers distributed by non-profit organizations to people can get lost or damaged** - Volunteers given flyers can lose them as they go about their day or as time goes by and they thus lack a point of reference in the future. It is an inefficient method considering a large percentage of the population has a mobile phone.

- **Distribution of flyers is not based on targeted marketing** - A non-profit organization or volunteer group distributing flyers to the public might end up giving them to unwilling members of the community who are not interested in volunteer work instead of having volunteer opportunities advertised to the intended audience.

2.2.2 Benefits of the online voluntary and community service collaboration system systems

- **Time saving because of consolidation** - A volunteer spends a little time trying to find the program, activity or organization that they would like to be a part of. They have a feed that is frequently updated and loaded with information about new opportunities and users browse for activities they would like to participate in faster.

- **Vast information and descriptions of organizations and via profiles** - A volunteer can go through the profiles of registered organizations or other users and get enough information about them, their base and their activities as they search for their preferences on the application.

- **Generation of awareness of opportunities** - A volunteer can surf the application discovering available opportunities and activities being advertised and announced within the various sectors as uploads are made regularly by multiple organizations and groups thus updating them on new and upcoming events.

- **Direct communication between/among organizations and volunteers is enabled**- The chat feature of the proposed application will allow volunteers to make enquiries directly to

the organizations and it also allows organizations to follow up with volunteers or to reach out to them conveniently.

- **Consolidation of non-profit organizations and available opportunities** - Volunteers do not have to go online to search for individual organizations or events while visiting multiple links as the application will have many organizations registers and events featured on the platform.
- **Volunteer work information can be accessed conveniently** - Volunteers can access information about community service and volunteer work easily and at any time. They can go to the application on their phone whenever they need to and browse for new opportunities,
- **Non-profit organizations can market opportunities directly to the intended market** - A non-profit organization or volunteer group is able to reach out to existing volunteers and potential volunteers directly on a platform designed to attract them specifically. They therefore have an easier time getting to interact with them and attract them.
- **Users can find opportunities in sectors of interest as the feed is filtered on that basis** - Volunteers using the app can find volunteer opportunities within various sectors like; education, health, conservation and health and they can therefore find information and activities relevant to them and their interests.

2.3 Conclusion

In addition to delivering a solution to volunteers and non-profit organizations, I would like to implement solutions that correct flaws in existing applications such as those featured above. For instance; I would like to include an interactive feature for chatting, easy navigation, a 'talking' interface that is appealing and a location feature that allows groups to specify exact locations of their headquarters and events.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

In this chapter, the areas covered include; the locality of the project, the project beneficiaries and target clientele, methodologies of research and implementation, sampling, data collection, data analysis and the system's test plan.

3.1 Locality of the project and Beneficiaries to the project

The online voluntary and community service collaboration system will be deployed locally in Nairobi county to facilitate collaboration, volunteer work and community service in the community. Beneficiaries of the project include; the service industry, the general public, non-profit organizations or small volunteer groups as they can generate awareness and recruit more volunteers, volunteers as they are able to take up various programs and volunteers easily and the community of Nairobi .

3.2 Research Design approach

I will apply a descriptive research approach that is a theory-based research method that gives insights to a research topic on the basis of data that is collected, analyzed and presented. Based on the type of information gathered, I will conduct qualitative research using various types of data collection and sub-categories of qualitative research methodology like; content analysis of textual information. Also, I will do case study research and secondary research based on existing and past information on events within the service industry.

3.3 Population of the study (Target group) and Sampling method

In my research study, the population of focus is based in Nairobi county which has about 4,397,073 residents. It is centered on a precise group of both potential and established volunteers. The population is based in Nairobi County. The sampling method will be a non-probability method based on convenience i.e; working with individuals that I can easily access and voluntary response i.e; individuals voluntarily giving information via the surveys. From the target population, I will gather information from about 50 varied and willing participants who fit the characteristics of the whole population and whose participation matches the nature of the study.

3.4 Data collection methods and Primary Data collection methods

3.4.1 Primary Data collection methods

Online questionnaires

I would like to collect fresh and new data from various individuals through surveys because of convenience considering the fact that I am handing out online surveys. The questionnaire will be administered as a google form with close-ended questions for convenience and to avoid the errors that come with open-ended questions. It will be a cross-sectional type of survey research since the study is over a single and short period.

3.4.2 Secondary data collection methods

The greater percentage of secondary data that I will collect will be from the internet on various publications like; reports, blogs, journals, case studies and visual materials among others. The information collected on the basis of currency, relevance and accuracy. Considering someone else has consolidated the information I will use, this method of data collection will save me time.

3.5 Data analysis methods

Considering the data collected is qualitative in nature, most of the analysis will be based on my own interpretation and perceptions therefore I have to be unbiased. To achieve that, I will use summarized data and graphical representations generated by the google forms system. Also, I will employ qualitative methods of analysis like; thematic analysis and content analysis to interpret data collected from the surveys and from secondary sources as well.

3.6 System analysis and design methods

My approach of choice is waterfall system development methodology. It is a development approach that was vastly implemented as the first model in the early days of software engineering. Its name describes the flow of activities undertaken during development. The whole development process is divided into main stages or phases and the output of a phase becomes the input of the next phase. At different phases of the overall development process, I will perform different sets of tasks to achieve the goals of each stage. These stages include;

1. **Requirement Gathering and analysis** - With an analysis of my project situation, I have identified key details, obtained relevant background information and I have all hardware components and software applications that I require for the development of this system.

   Output: A list of the requirements - in this case; a Laptop, Android Studio software, a Firebase Database Project setup, a Flash disk, Cloud-based storage and a Mobile phone.

2. **System Design** - In addition to acquiring all my requirements, I will develop designs of my system's architecture (back and front ends) to guide me on how I will develop the systems with the use of all the equipment/requirements I have. The designs and sketches are where I define my product and how it will appear with integrated features.

   Output: Sketches and System Design diagrams e.g:- Use case diagram, ERD diagram

3. **Implementation** - With the system architecture and supporting sub-system diagrams, I can bring the visual representations to life by developing each highlighted system feature and focusing on the main sub-parts of the system that I call 'my modules' as I apply modularity and testing of each system sub-part in a process known as Unit Testing.

   Output: Several tested modules representing functional parts of the whole system - Profile creation activity, Post creation activity, Chat activity e.t.c

4. **Integration and Testing** - I will integrate the developed and tested modules from the implementation stage into the full system and after this integration, I will test to ensure the modules are well implemented and that they perform the intended unified function.

   Output: A fully functional system - The consolidated Volunteer and Community Service Collaboration App tested for functionality on a mobile phone.

5. **Deployment of the system** - With the completion of this project and with a functional application at hand, I can deploy it to potential/existing volunteers that I know of, a volunteer service organization, or I can publish it on Google PlayStore for it to reach an even wider market through all the appropriate procedures.

   Output: A publication of The Volunteer and Community Service Collaboration App

6. **Maintenance** - After deploying the system, I will continue to modify it with new features and implementations as I develop new ideas. Also as new needs and challenges arise I will need to revisit the system and make modifications. To avoid any major problems, I will continuously look at my system to make sure it works in the best way and to ensure it is adaptable.

   Output: System update launches

3.7 Testing plan for the system

Considering the fact that I will be implementing the waterfall software development methodology, testing will be a key element and function in the development of my system as I conduct unit tests after each module I set up is completed. At the end, I will conduct a full system test on the end product of my development. The unit testing function is key as I make corrections on individual modules thus easing the debugging process of the whole consolidated system. Below is an overall plan of how I will conduct tests on and for my system:

Module	Required input or feature	Ensured/Tested functionality
New Registration	User given name and password	Validation check for ensuring the correct credentials are given
User Login	User logs in with an existing set of credentials	Validation check for ensuring the correct credentials are given
User Type Selection	A user selects whether to sign up as an organization or as a volunteer	Presentation of the right layouts and features to the right kind of user
Activity Selection	User chooses to either chat or go through their feed	Presentation of working chatting and uploading features
Profile Creation	A user can create a profile for details and awareness creation	A working profile creation feature for users to add information about themselves
Event and Program Posting	A user can upload details of an event and post it for others to see	Provision of a save, retrieve and display functionality

Date Selection	A user is able to set a date for the event they are announcing	Providing a working date selection feature
Location Specification	A user can set the specific location for an event	Accurate map feature with precise location selection

Table 3.1: *System Test Plan*

3.8 Ethical clearance considerations

Permissions

With clearance from the school I can/should;

1. Collect information via questionnaires
2. Use data collected ethically.
3. Interpret data without prejudice or bias.
4. Maintain privacy where applicable.
5. Providing citations for secondary data.

CHAPTER FOUR: SYSTEMS ANALYSIS AND SYSTEM DESIGN

4.0 Introduction

To develop this system well enough to solve the pre-described challenges, I need to analyze and specify the way this system should function to achieve the objective. Therefore, this chapter covers non-functional and functional requirements as well as design models are described to guide the development of this system. It also covers the stakeholders and design constraints related to the system development process.

4.1 System Requirements

These requirements describe what the system should do and how it should respond to the actions of the user. They include;

4.1.1 Functional Requirements

1. The system will allow users to register and/or log in
2. The system will allow users to create a profile
3. The system will display events on users' feed
4. The system shall allow users to chat
5. The system shall allow users to set specific dates and locations for events
6. They system will allow users to upload and post material
7. The system will save all uploaded material to the database
8. The system will only give access to authorized users

4.1.2 Non - Functional Requirements

1. The system will have a register and log feature
2. The system will have a profile creation feature
3. The system will have a messaging feature
4. The system will have a post creation feature
5. The system will have a date selection feature
6. The system will have a validation feature
7. The system will be attached to an external database
8. The system will be viable on any android device

4.2 Stakeholders

The stakeholders of this system include; myself as the developer as well as non-profit organizations, individual volunteers and group volunteers that get registered on it and any other third parties that interact or are engaged with the system or project.

4.3 System Models

4.3.1 Systems Architecture

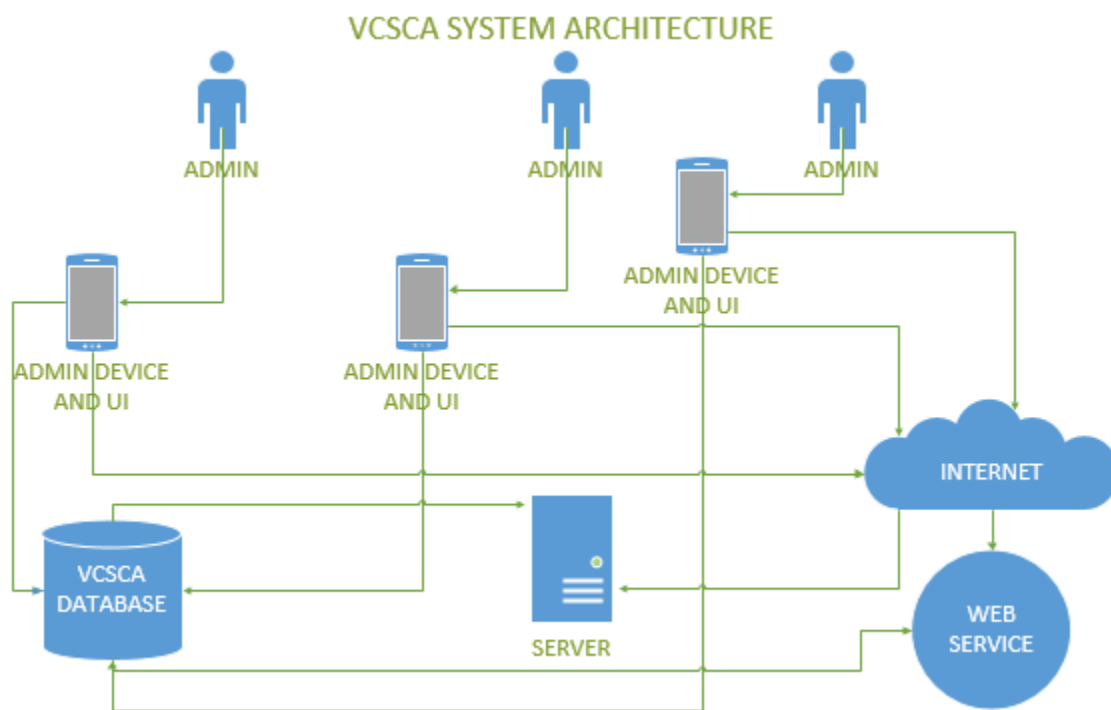This is the overall design of the system's layout on the basis of communication and functionality

Figure 4.1: *VCSCA System Architecture*

4.3.2 Use Case Diagram

The diagram below is a physical representation of what the system's graphical user interface is supposed to look like and what main functions are to be performed.
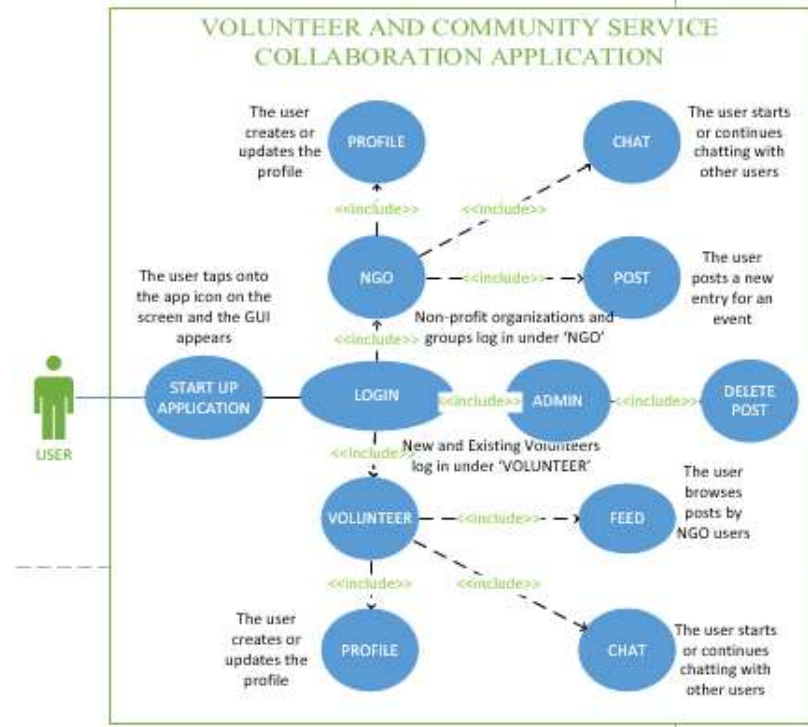
Figure 4.2: *VCSCA Use Case Diagram*

4.3.3 Flow chart
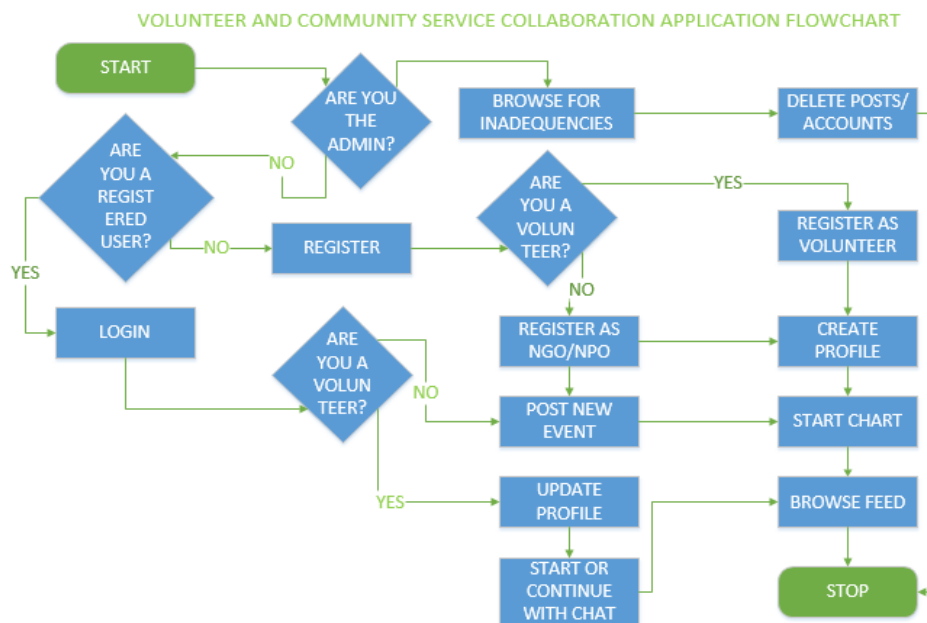
Figure 4.3: *VCSCA Flowchart*

4.3.4 Class Diagrams

Class diagram is a diagram that is meant to represent the 'static' view of a system. It is used to describe and visualize various aspects of a system while showing the sets of classes, interfaces and associations.
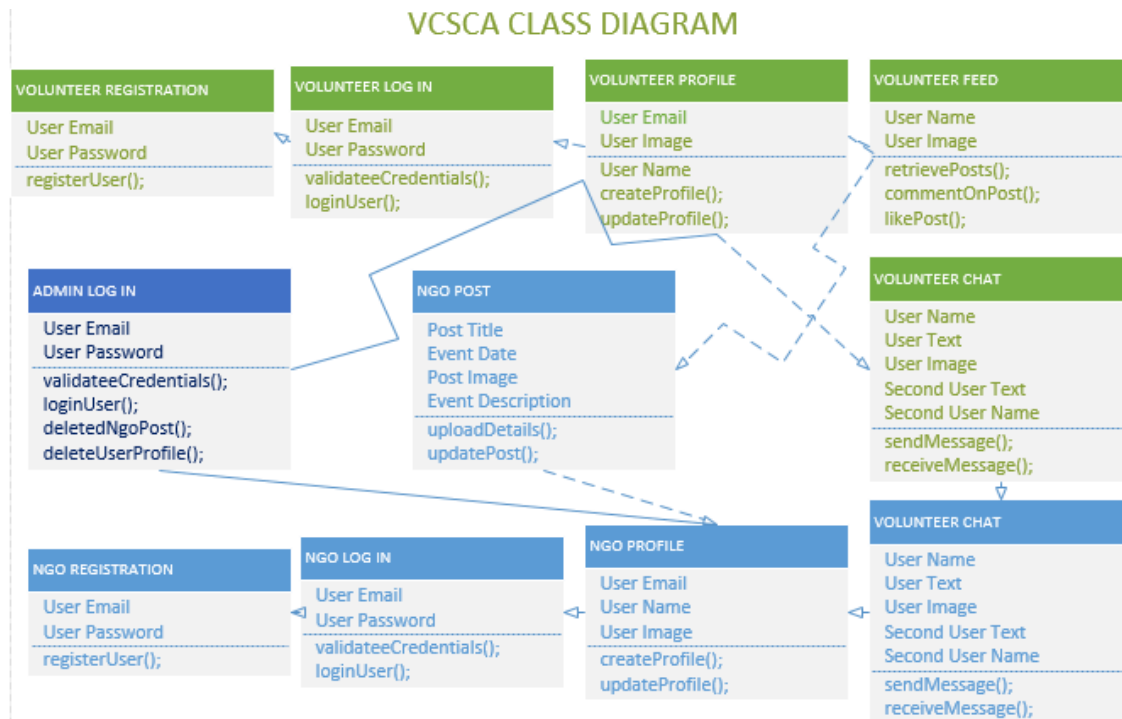

Figure 4.4: *VCSCA Class Diagram*

4.3.5 Data Flow Diagram

A data Flow diagram represents the flow of data through the information system and uses the top-down approach to design the representations.
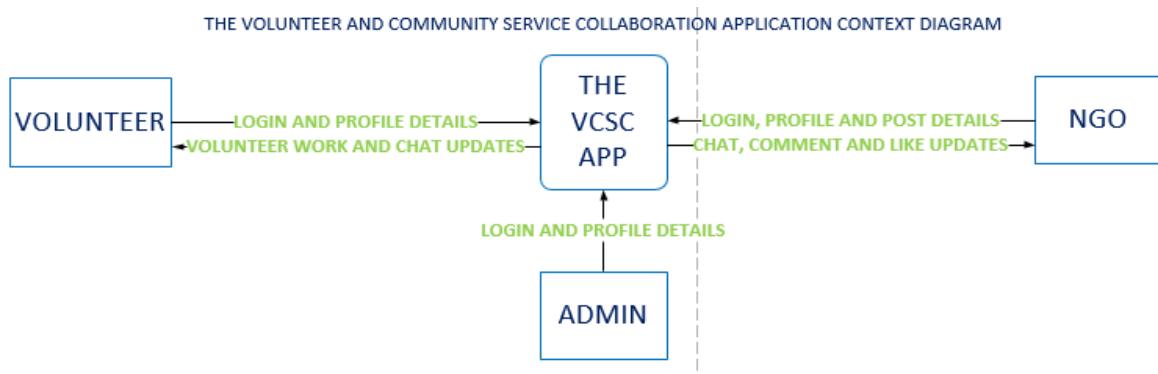
4.3.5.1 Context Diagram 0

THE VOLUNTEER AND COMMUNITY SERVICE COLLABORATION APPLICATION CONTEXT DIAGRAM

Figure 4.5: *VCSCA Context Diagram*

4.3.5.2 Level 1 Diagram

VCSCA LEVEL 1 DATA FLOW DIAGRAM
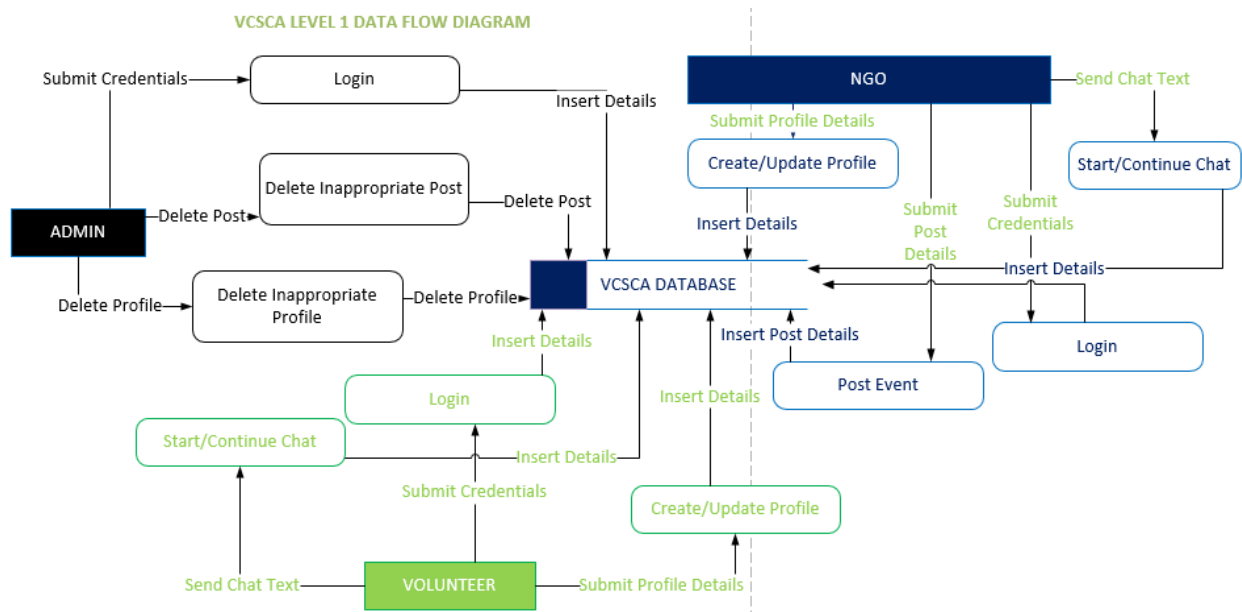
Figure 4.5: *VCSCA Level 1 Data Flow Diagram*
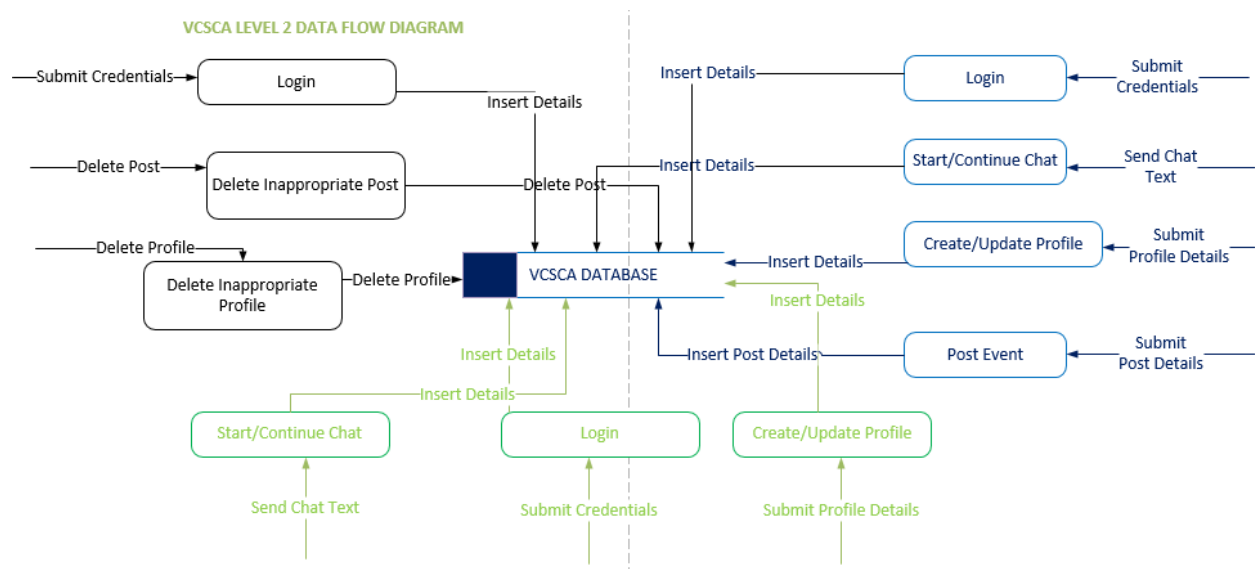
4.3.5.3 Level 2 Diagram

Figure 4.6: *VCSCA Level 2 Data Flow Diagram*

4.3.6 Entity Relationship Diagram

The diagram below is a basic representation of the simple database schema that will operate in the back end of this application. The diagram shows key entities within the system as well as relationships, conditions and dependencies between them.
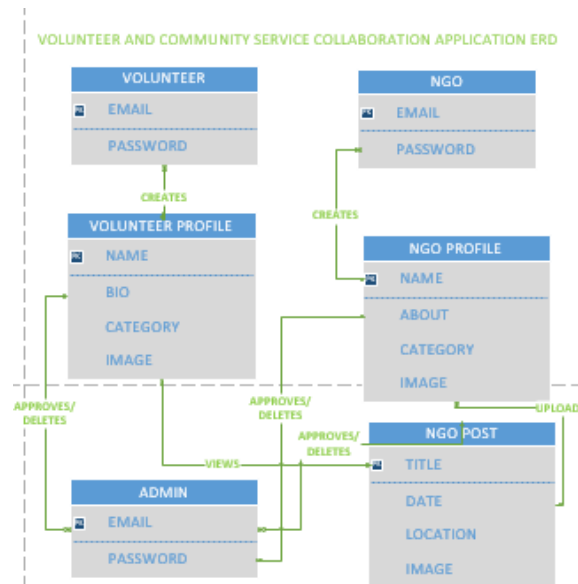

Figure 4.7: *VCSCA Entity Relationship Diagram*

4.3.7 Sequence Diagram

It represents the flow of messages within the system while giving a representation of communication lines sequentially in the system. It basically models interaction among objects.
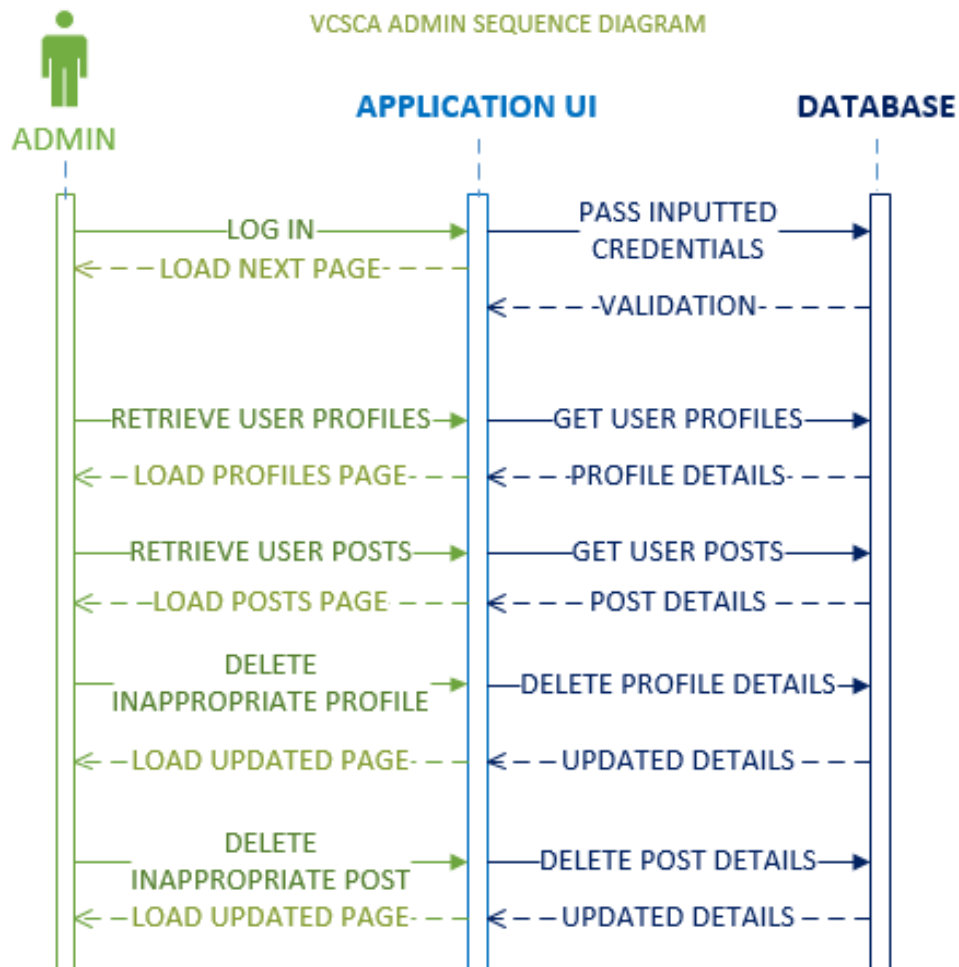
4.3.7.1 Admin Sequence Diagram

Figure 4.8: *VCSCA Admin Sequence Diagram*

4.3.7.2 User Sequence Diagram
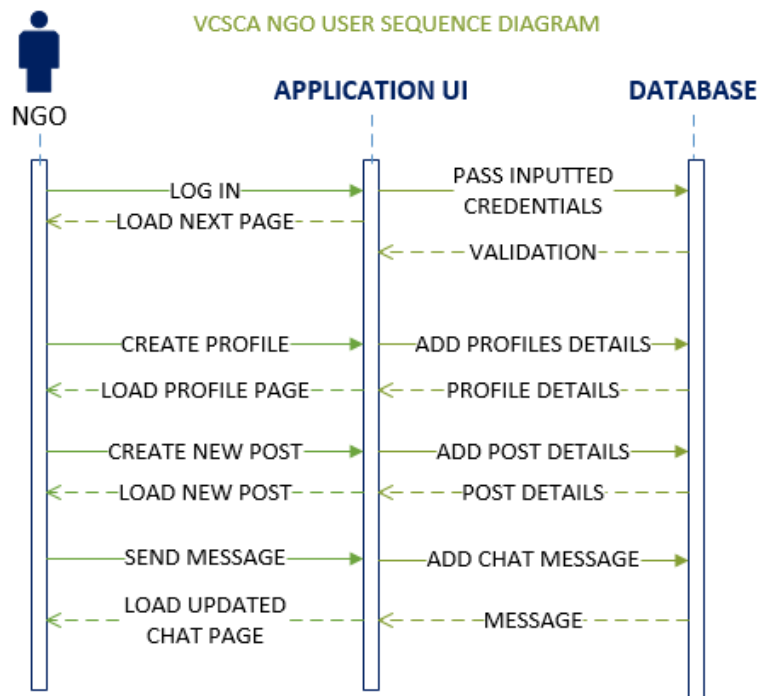

Figure 4.9: *VCSCA NGO User Sequence Diagram*
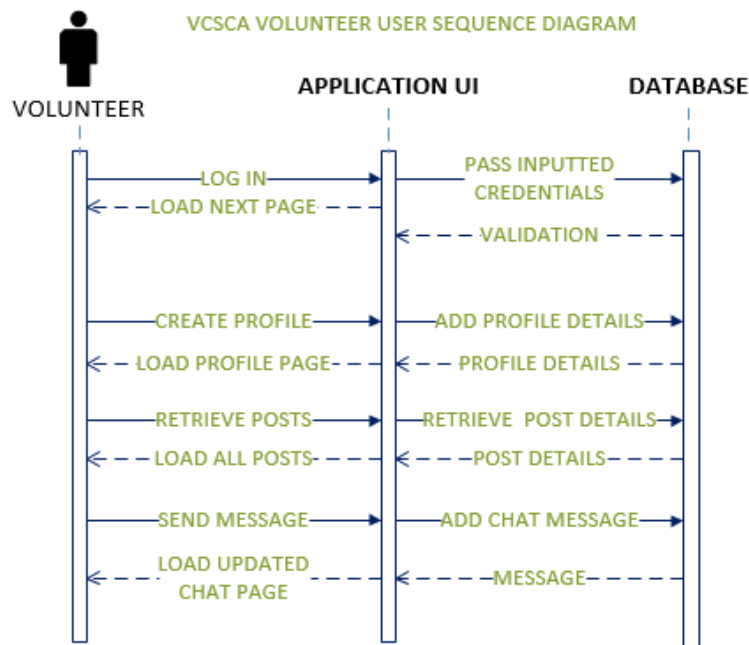

Figure 4.10: *VCSCA Volunteer User Sequence Diagram*

<div align="center">

CHAPTER FIVE: RESEARCH FINDINGS AND ANALYSIS

</div>

5.1 Response rate

This is based on the number of responses from participants. The questionnaire was distributed to fifty targeted individuals and I got the fifty as intended indicating a 100% response rate.

5.2 Demographics results

5.2.1 Distribution by Gender

The study's results indicated that a higher percentage of respondents on the basis of gender were female at 54% while the percentage of male respondents was at 46%. The pie chart below depicts the gender distribution of the respondents.
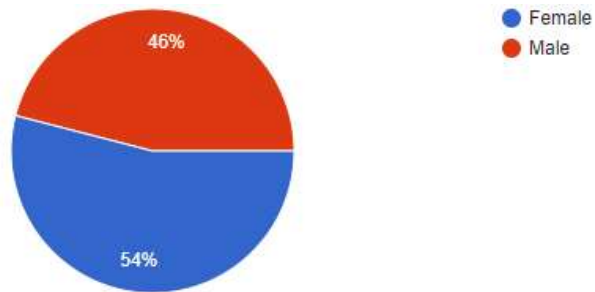

Figure 5.1: *Questionnaire Response Gender Distribution*
Source: *Author Data 2021*

5.2.2 Distribution by Age

The majority of the responses were from relatively young individuals. The study's age categories and their percentage distributions were; under 18 at 4%, 19-24 at 70%, 25-19 at 26%, and none being over 30. The distribution is better represented below
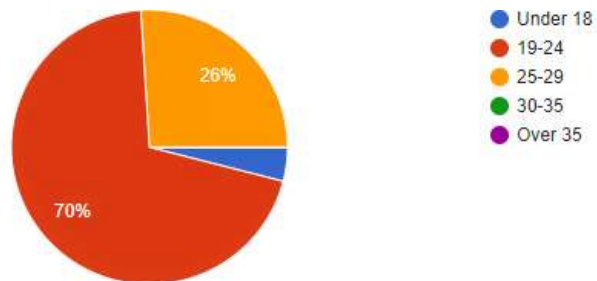

Figure 5.2: *Questionnaire Response Age Distribution*
Source: *Author Data 2021*

5.2.3 Distribution by Locality (If Participants live or work in or near Nairobi)

The study targeted individuals that live or work near or around Nairobi as the target population and 92% of the respondents matched the criteria. The 8% of them that do not are 4 out of 50 respondents and that is a relatively small number
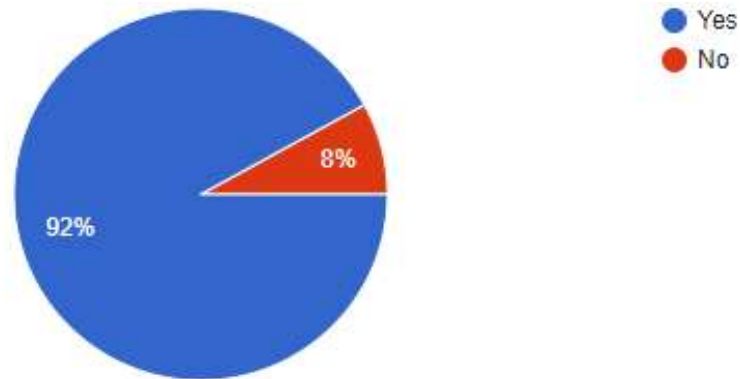

Figure 5.3: *Questionnaire Response Locality Distribution*
Source: Author Data 2021

5.2.4 Distribution by Participation (If Participants do volunteer work)

The study targeted both existing and potential volunteers and majority of the respondents happened to be existing/established volunteers at 72% of the sample. Those individuals that do not do volunteer work or community service were 28% of the sample. In translation, those that do volunteer work are 36 out of 50 respondents leaving us with 14 non-volunteers
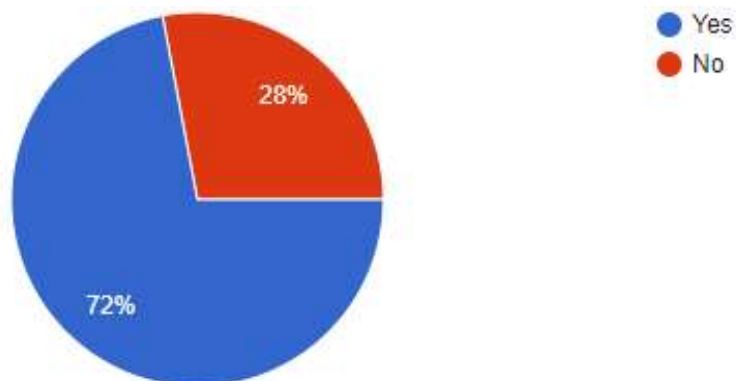

Figure 5.4: *Questionnaire Response Participation Distribution*
Source: Author Data 2021

5.3. Results on the Challenges with the web search method of finding new volunteer opportunities

On the basis of the study's research objectives, respondents were asked to select the challenges that they relate to most when searching for new volunteer opportunities on the web with 38.9% of them feeling that web results are usually of specific organizations rather than specific events, 47.2% of them feeling that web searching is time consuming, 52.8% of them feeling that web results are often exclusive and the majority of them at 55.6% feeling that web results are often irrelevant.
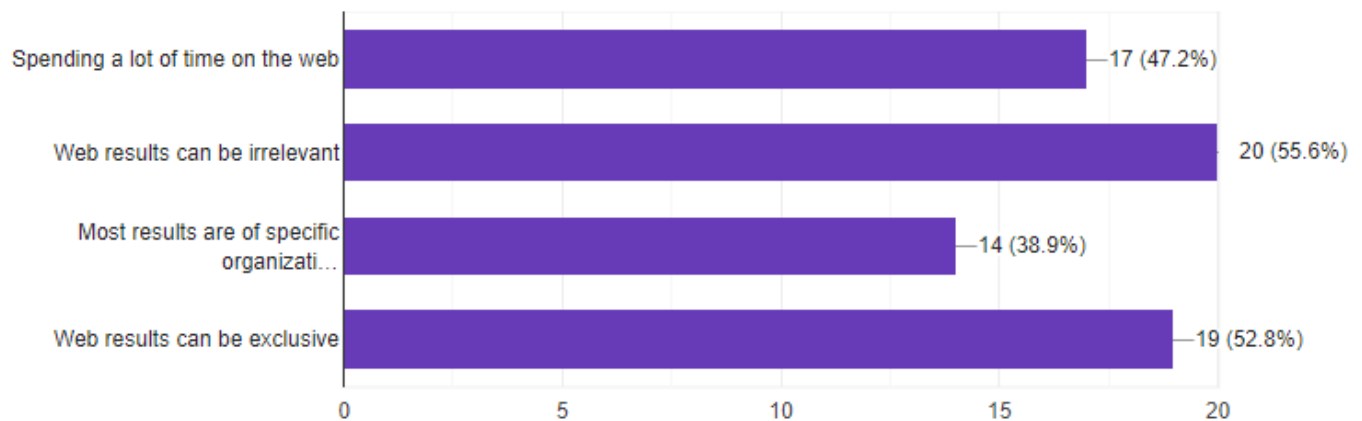
Figure 5.5: *Questionnaire Response On Web Search Challenges*
Source: Author Data 2021

5.4 Results on the Challenges with the flyer distribution method of finding new volunteer opportunities

Similarly to the above research question, respondents were asked to select the challenges that they relate to most when finding new volunteer opportunities via flyer and poster distribution. Majority of them at 66.1% feel that they often lose the flyers, 55.6% of them feel that the fact the flyers are distributed for one event at a time is a challenge, 58.2% of them also feel that flyers often have insufficient information on the event or program being advertised and finally, 16.7% of the respondents feel that sorting through multiple sets of flyers is a challenge.
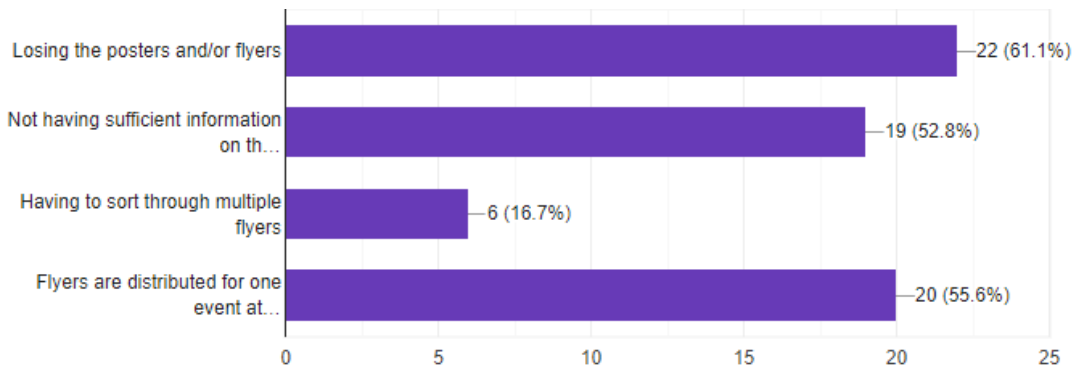
Figure 5.6: *Questionnaire Response On Flyer Distribution Challenges*

Source: Author Data 2021

5.5 Results on the Challenges with the organization membership method of finding new volunteer opportunities (doing volunteer work as a member of a single particular organization)

To finalize the challenges volunteers experience, respondents were asked to select the challenges that they relate to most when finding new volunteer opportunities as members of a single particular organization that has or searches for its own events. Majority of them at 77.8% feel that having to wait for events to show up within that organization is a challenge they face, 52.8% of them also feel that there is also the sense of monotony of always doing the same types of activities or participating in the same kinds of volunteer work programs and 38.9 % of them feel that being under a single organization gives them less exposure as they do their volunteer work.
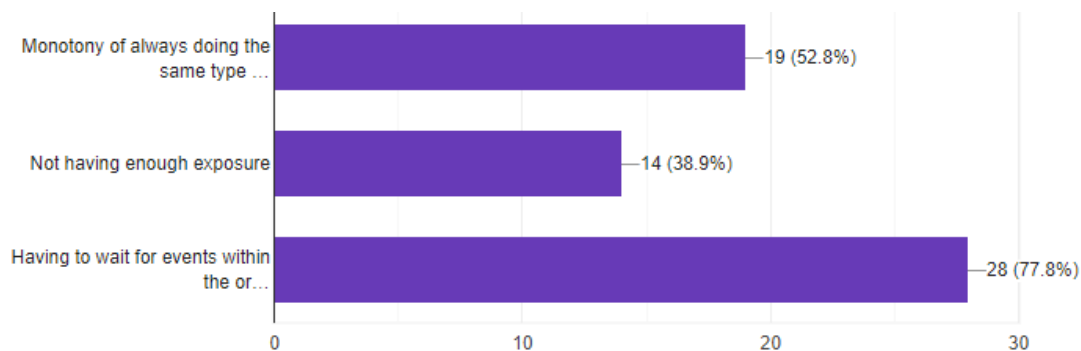

Figure 5.7: *Questionnaire Response On Organization Membership Challenges*

Source: Author Data 2021

5.6 Results on the Benefits of The Volunteer and Community Service Collaboration System

Respondents were also asked to select the benefits of the proposed system that they expect in the final product. The majority at 63.9% expect the system to allow inclusion of events in various fields, another 63.9% of them expect it to allow users to chat and get more information on events, 50% of them expect the app to bring organizations and volunteers together, 55.6% of them expect the system will help users save time finding new opportunities, 25% of them expect the inclusion of a variety of opportunities and 36.1% of them expect the inclusion of a variety of tasks.
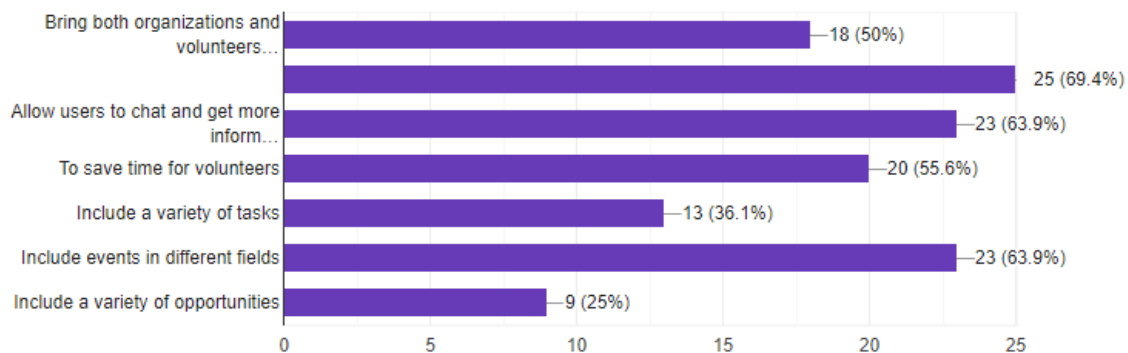
Figure 5.8: *Questionnaire Response On The VCSCA's benefits*
Source: *Author Data 2021*

5.7 Viability of The Project in Nairobi (If people recommend that it be implemented)

Respondents were asked if they would recommend the implementation of the proposed system in Nairobi county and 100% of them agreed thus giving potential viability to my project

Figure 5.9: *Questionnaire Response On Recommendation/Acceptance of the System*
Source: *Author Data 2021*

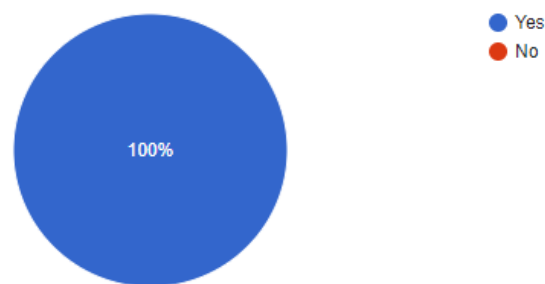# CHAPTER SIX: DISCUSSION CONCLUSION AND RECOMMENDATIONS

6.1 Discussion

The research study on volunteer work was done to gather information in relation to the research objectives relating to the viability of the proposed system and the challenges of working with the old systems. With a 100% response rate from participants, we can imply that volunteer work is a topic people relate to and are willing to discuss and based on the demographic results, females were more willing to participate in the study but not by much of a margin. This could mean that females are more willing and ready to participate in a study concerning volunteer work. The target respondents were those in the youth category and well enough majority of the respondents were between 19 and 24 years of age with none being over 30 showing the study's results were relevant to the initial objective of targeting the younger individuals.

The locality of the study was Nairobi county and the study remained relevant as 46 out of the 50 respondents live in Nairobi as required. The study targeted both existing and potential volunteers and the results of the study showed that there are more existing/established volunteers than non-volunteers. This might imply that these young people are more inclined to do volunteer work than not. To accommodate both sets of individuals, the study allowed established volunteers and non-volunteers to express their challenges.

With web searching, respondents related most to the challenges of having web searches being irrelevant, exclusive and time consuming. Challenges of flyer distribution that they related to most included; loss of flyers, having a flyer for one event at a time and insufficient information. Challenges of being members of a single organization were; having to wait for new events, monotony of the same venues and monotony of the same tasks. These results therefore validate the fact that web searching, flyer distribution and organization membership as old methods of finding new opportunities are inefficient as argued in chapter 2 of this paper.

Finally, to entirely declare the necessity of the proposed system and its viability, respondents highlighted the benefits that they would expect from the system. The most expected are; inclusion of variety, chatting feature, time saving and collaboration between volunteers and non-profit organizations.That and the fact that all respondents said they would recommend the implementation of this system in Nairobi shows that there is potential for successful deployment.

6.2 Conclusion

With the study's results, it can be concluded that having the proposed system; the voluntary and community service collaboration application will benefit existing volunteers, new/potential volunteers and the non-profit organizations as well. It will solve the challenges that are commonly experienced as the system delivers on the expectations of the benefits it will offer. It will serve as a replacement for the old methods of finding new volunteer opportunities (for volunteers) and finding new volunteers (for non-profit organizations). It is therefore a project with potential, market and viability.

6.3 Recommendations

The fact that a lot of volunteers are needed to help in efforts related to issues like; environmental conservation, wellbeing, unemployment, e.t.c. is already enough justification for having the proposed system deployed. It can be used by individual organizations to recruit new volunteers and update existing ones. Or it could be deployed as a system for all whereby all NGOs and volunteers that would like to sign up can meet on one platform and collaborate effectively.

I would recommend the latter as everyone is free to be a part of something greater than themselves and the system in itself with the features and functionalities that it has will help facilitate the planning and execution of volunteer work including; collaboration between NGOs when warranted, updates of various opportunities to volunteers and the recruitment of many more volunteers in comparison to what the older methods offer.

6.4 Future work

The current proposed system caters for individuals and groups in Nairobi county specifically that are participating in volunteer work. Future work would therefore be based on the mission of expanding the scope of the system and catering for individuals in multiple counties or ambitiously, the entire country.

That would involve integration of various features and tools to ensure the system can deliver its full functionality for many more users. Also, future work can be centered on allowing users to follow each other just to appreciate the fact that individual users will have preferences and they would want to follow other users that share content that is relevant to their interests.

CHAPTER SEVEN: IMPLEMENTATION (PROTOTYPE FRAMEWORK)

7.1 System Implementation

This is a description of the entire system development process from designing to building and deploying. The process is based on both front end and back end setup/development. Front end development is focused on appearance and the general appearance and functionality of the graphical user interface while the back end development is usually focused on data storage and retrieval that involves setting up a database schema.

7.2 Technologies Used

The project implemented various technologies to ensure the main objective and functional objectives were met. The technologies employed are broken down into subcategories below;

7.2.1 Hardware Platform

In the course of this project execution I worked with an Hp laptop and a backup toshiba laptop as my secondary backup alongside my 64 GB flash disk. The Hp laptop was the main platform used to build and configure the system and its specifications included; an Intel core i5, 2.50GHz processor, 4 GB RAM and Windows 10 operating system.

7.2.2 Programming Language

The Java programming language is what I used to program the application as I used Android Studio which supports android development while programming in Java. I wrote code in this language to implement all the features and functions needed for the proper development and running of this app. I chose to use this language because I am familiar with it and the IDE I am using has it as an option for it.

7.2.3 Programming Tools

The programming tools used for this project are:

- Android studio software
- Java language
- Google APIs

7.2.4 Software Platforms

Firebase Database

This is the cloud-base database that I used to set up the backend of my system as it is reliable, realtime, scalable and easy to use.

Microsoft office

In the documentation of my project I used microsoft office platforms like Project for the plan and schedule, Excel for tables, Powerpoint for presentations and Visio for graphical representations

Google forms and Google docs

I used google forms in the formulation and analysis breakdown of my questionnaire when doing my research study and I used google docs for the write up and back up of my project report

Operating system

This system was built and configured on a computer that operates under Windows 10

Android Studio programming software

This is the Integrated Development Environment specifically used for android development and it is what I used to develop the system. It has a good emulator, code templates, guides, a vast set of libraries and a good user interface.

7.3 Features of the Prototype

The following are the features of the prototype:

- The system allows users to register and/or log in
- The system allows users to create a profile
- The system displays events on users' feed
- The system allows users to chat
- The system allows users to set specific dates and locations for events
- They system allows users to upload and post material and uploads them to the database
- The system only gives access to authorized users

7.3.1 Technical Manual Screenshots

7.3.1.1 Profile, upload and posting feature

The users fill the provided fields with details and the upload button inputs data in the database and it is retrieved in the feed page
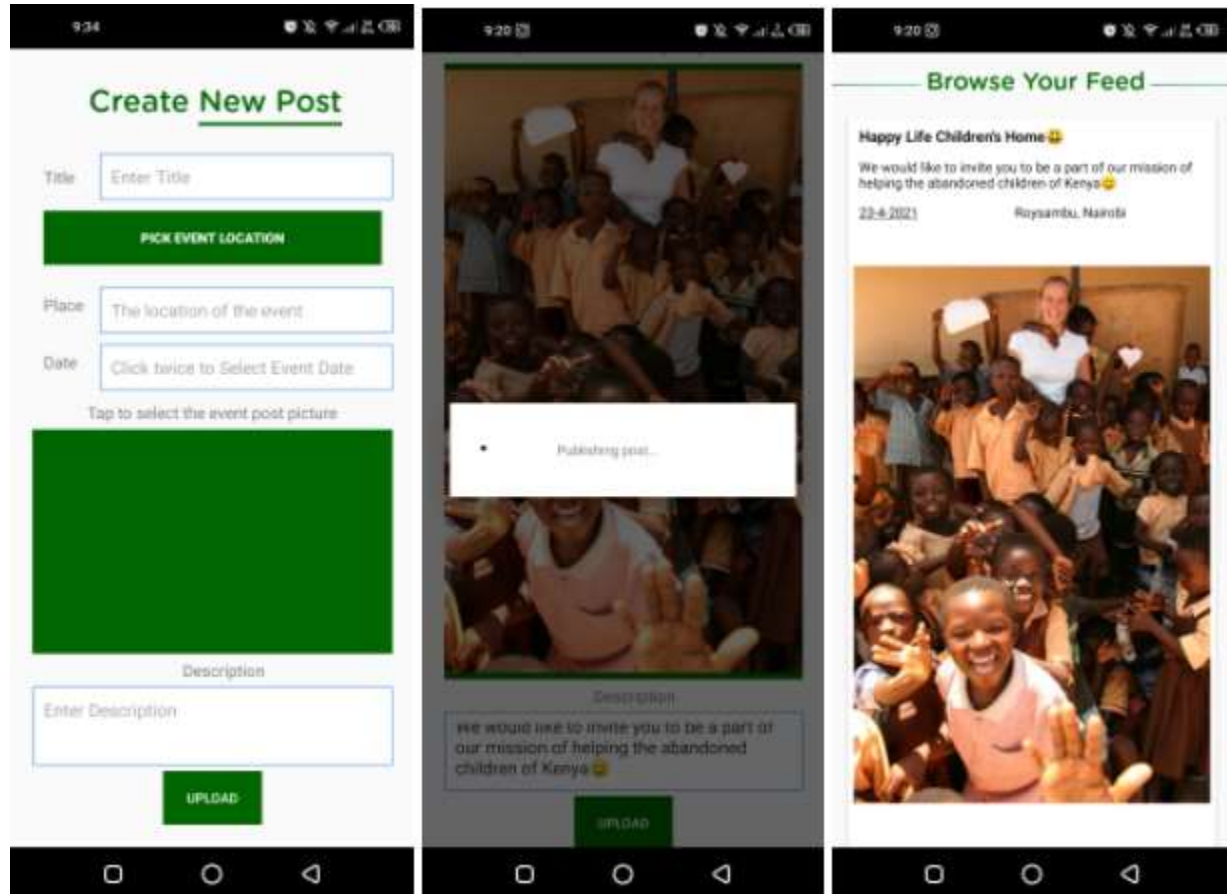

Figure 7.1: *VSCSA Technical manual post feature*

7.3.1.2 Date selection feature

The users can select dates for their volunteer events. Clicking once on the date field shows the date of that day and clicking twice shows the datepicker dialog and the date selected is displayed on the date field
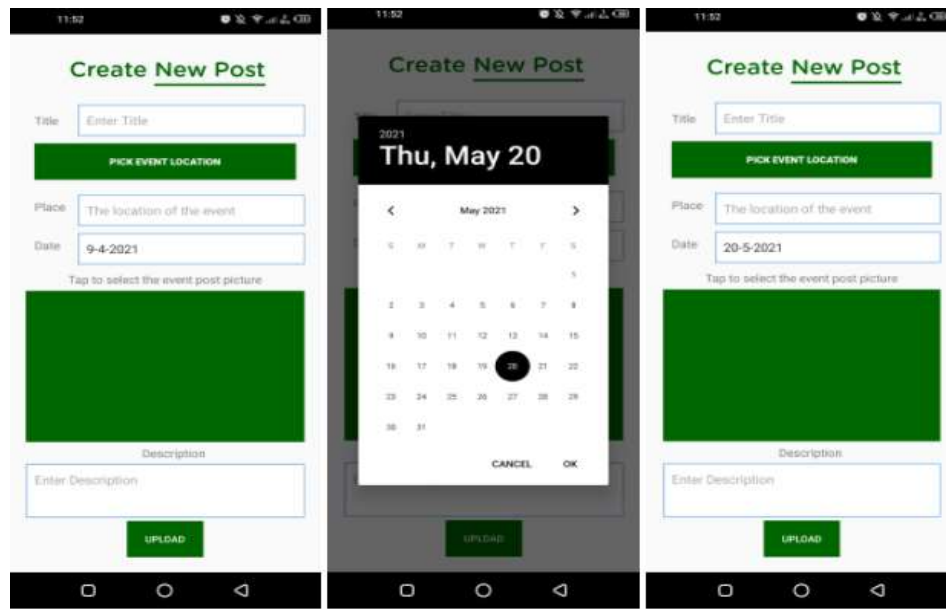
Figure 7.2: *VSCSA Technical manual date feature*

7.3.1.3 Chat space feature

The users can discover each other under the users' page and from the button, they can select the chat option and a chat space shows up where they can type out messages and exchange them
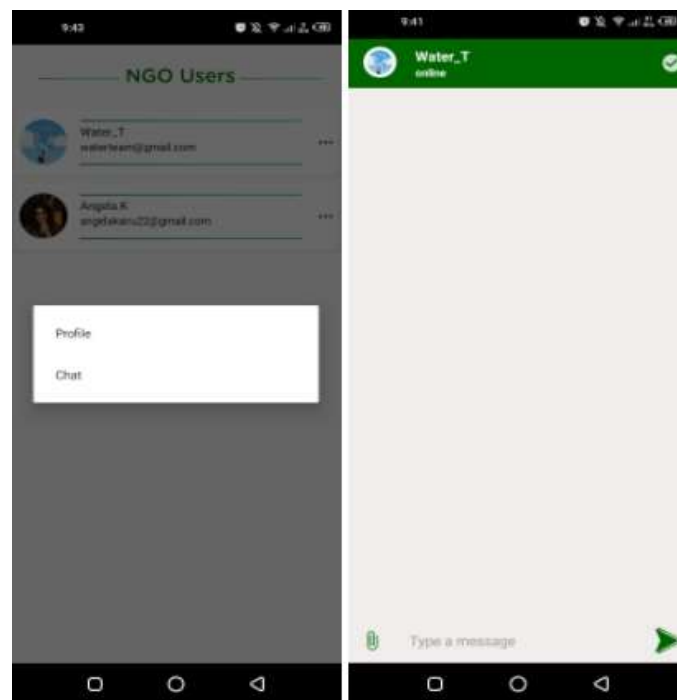

Figure 7.3: *VSCSA Technical manual chat feature*

7.3.1.4 Location feature

When creating a post, a user can set the location by typing it out in the location field or clicking on the 'Pick Event Location' button that opens a Google maps dialog and selecting a location.
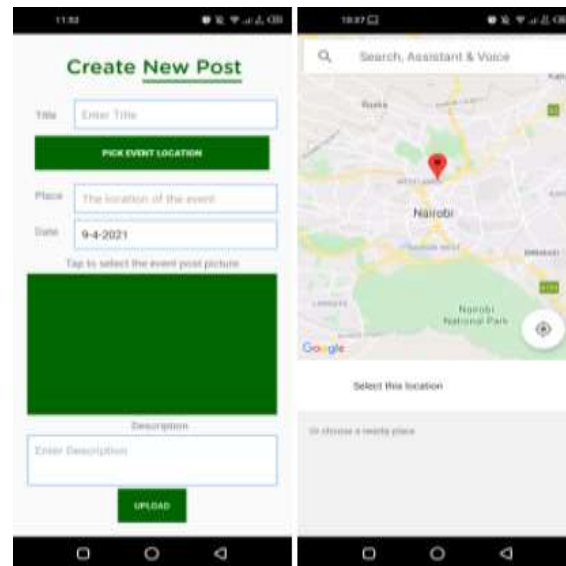

Figure 7.4: *VSCSA Technical manual location feature*

7.3.2 User Manual Screenshots

The images below are screenshots of the user interface with descriptions of the features and the steps to be followed to navigate through the system and use it
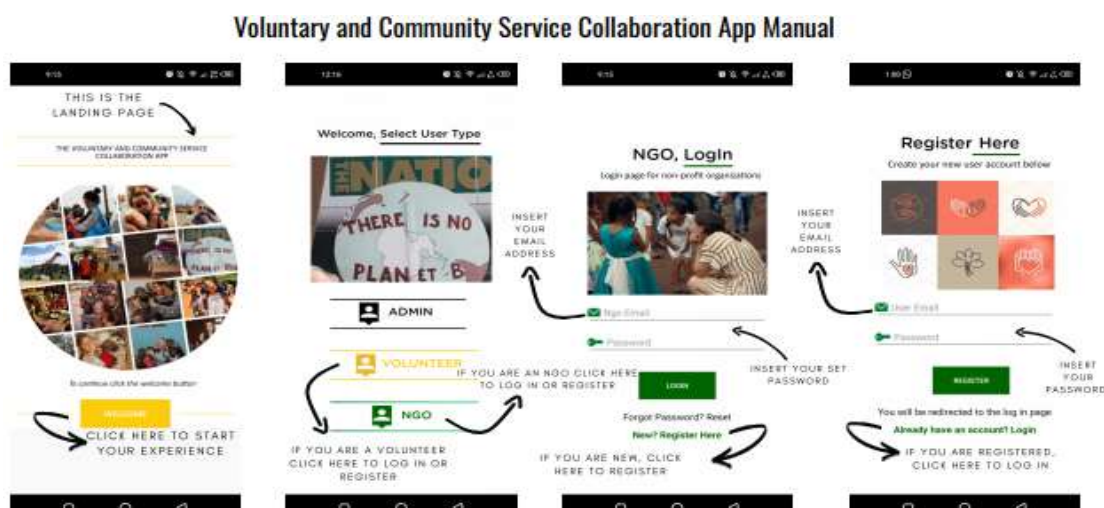

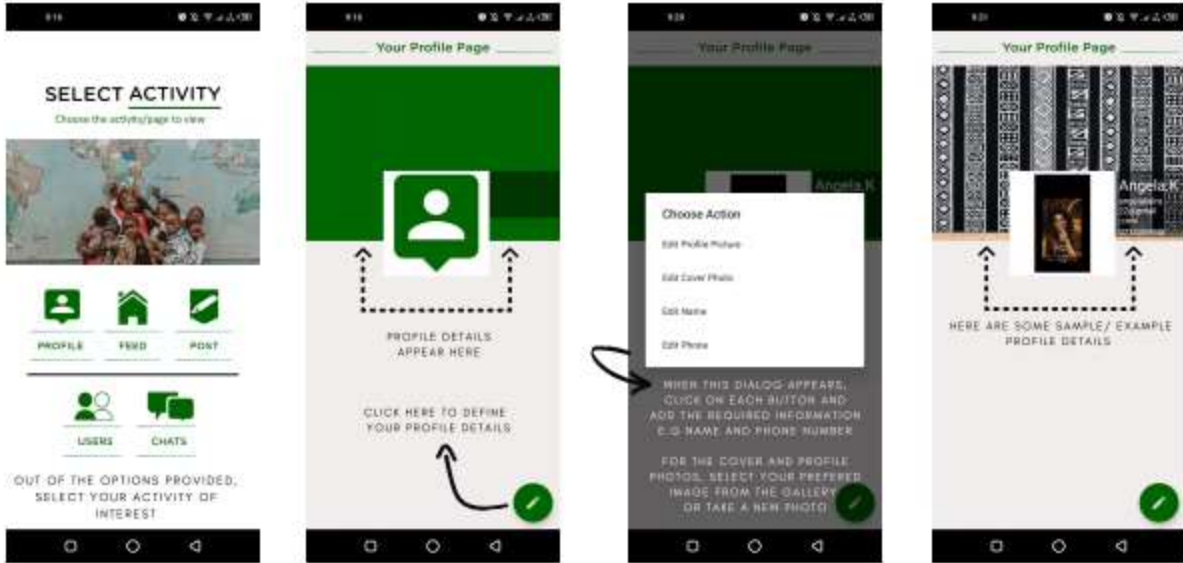**Figure 7.5:** *VSCSA User manual starting section*

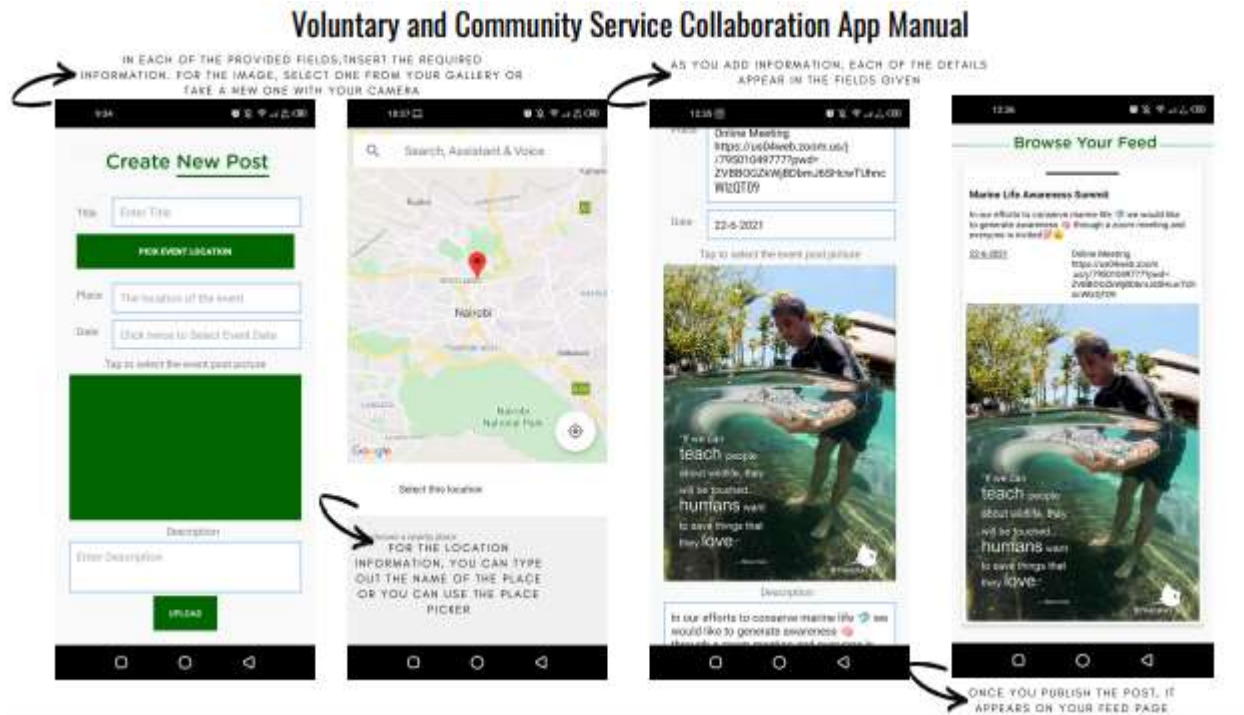**Figure 7.6:** *VSCSA User manual profile edit and update section*

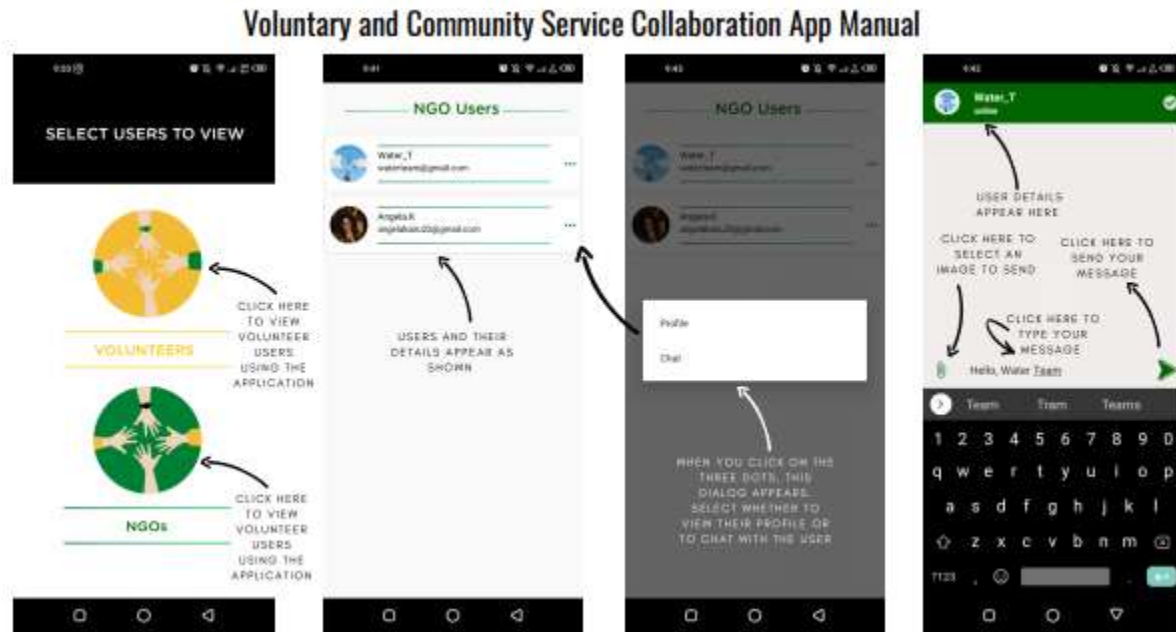**Figure 7.7:** *VSCSA User manual post feature section*

Figure 7.8: *VSCSA User manual user interaction and browse sections*

NOTE: The interface for volunteer users is the same and follows the same sequence. The difference is that volunteers do not share posts.

7.4 Database Management System

The database that is implemented in the development of this system is the firebase database. It is an external, cloud-based database linked to the android project. It is a platform developed by Google for creating mobile and web applications and it provides detailed documentation as well as cross-platform SDKs.

I chose it for the convenience and effectiveness that it offers. Setting up the connection between the IDE and the database is easy and straightforward with a project being created on each side and a connection being initiated from the IDE's end.

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9.0 Appendix

ONLINE VOLUNTEER AND COMMUNITY SERVICE COLLABORATION SYSTEM SURVEY FORM

Section 1 of 4 (For all participants)

What is your Gender?

   A. Female
   B. Male

In what age bracket do you fall?

   A. Under 18
   B. 19-24
   C. 25-29
   D. 30-35
   E. Above 35

Do you live or work in or around Nairobi county?

   A. Yes
   B. No

Do you do community service or volunteer work?

   A. Yes
   B. No

Section 2 of 4 (If 'yes' (You do volunteer work) - If you answered 'no' on the previous question, go to section 3)

Finding new volunteer opportunities can be challenging?

   A. Strongly Agree
   B. Agree
   C. Neither Agree nor Disagree
   D. Disagree

E. Strongly Disagree

What challenges have you experienced with web searching for new opportunities?

A. Spending a lot of time on the web
B. Web results can be irrelevant
C. Most results are of specific organizations' websites
D. Web results can be exclusive

What challenges have you experienced with group or single organizational programs? i.e; only doing volunteer work under one organization

A. Monotony of always doing the same type of work
B. Not having enough exposure
C. Having to wait for events within the organization

What challenges have you experienced with flyer distribution as a method of advertising new opportunities?

A. Losing the posters and/or flyers
B. Not having sufficient information on that paper
C. Having to sort through multiple flyers
D. Flyers are distributed for one event at a time

How would you expect the proposed system to benefit volunteers more than the flyer distribution, web search and organization membership methods?

A. Bring both organizations and volunteers together
B. Update volunteers on new opportunities
C. Allow users to chat and get more information
D. To save time for volunteers
E. Include a variety of tasks
F. Include events in different fields

Section 3 of 4 (If 'No' (You don't do volunteer work) - If you answered the 'yes' section, skip this and proceed to section 4)

You do not do volunteer work because you rarely hear of any opportunities

    A. Strongly Agree

    B. Agree

    C. Neither Agree nor Disagree

    D. Disagree

    E. Strongly Disagree

This system can motivate or help you start volunteer work

    A. Strongly Agree

    B. Agree

    C. Neither Agree nor Disagree

    D. Disagree

    E. Strongly Disagree

Which method would you prefer to use to find new opportunities when you start?

    A. Mobile Applications

    B. Posters and/or Flyers

    C. Web Searching

    D. Being a part of one organization that has its own events

Section 4 of 4 (Final Section for all)

Would you recommend having this system implemented in Nairobi?

    A. Yes

    B. No

Do you consent to the use of your response for research?

    A. Yes

    B. No

9.1 Questionnaire/Interview Schedule

Here is a small plan for the execution of tasks relating to my project research conducted via an online questionnaire.

Figure 9.1: *VSCSA Questionnaire schedule screenshot*

9.2 Work plan in Gantt Chart Format

To complete my project and system development process successfully and smoothly, I created a work plan in an effort to manage my time and my tasks. Using Microsoft project, I generated a plan with operations assigned to dates and time frames. I also used it to generate a visual representation of my plan in the form of a gantt chart. Below are screenshots of the same.
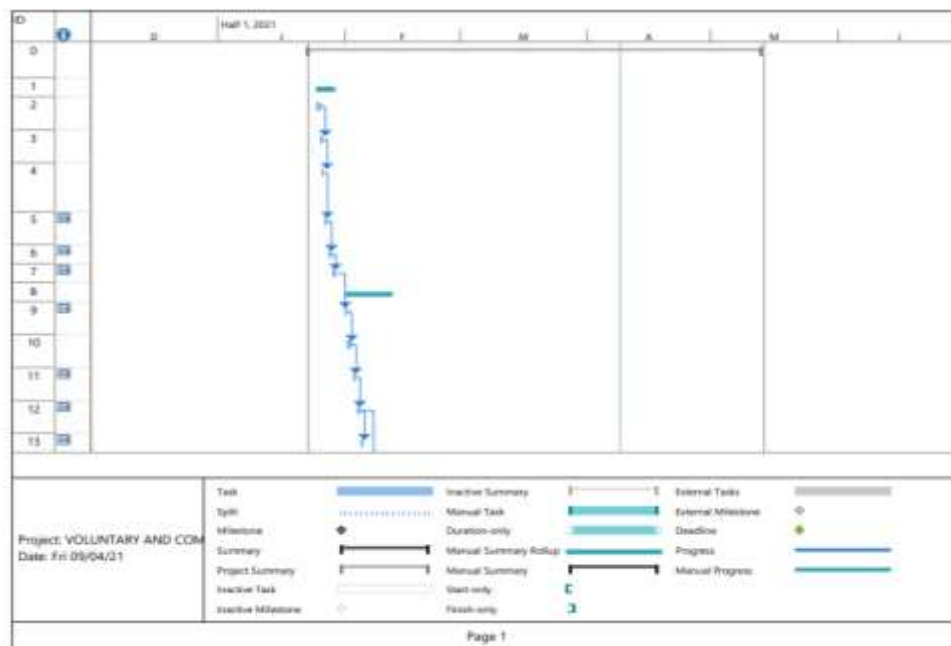

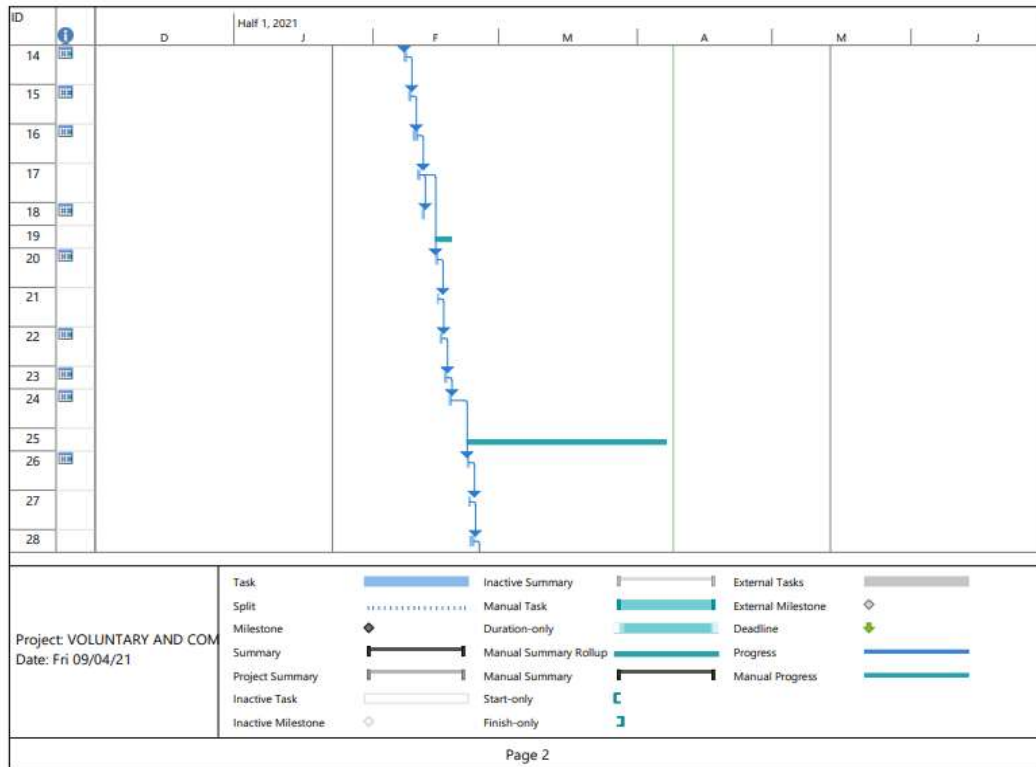**Figure 9.2.1:** *VSCSA work plan gantt chart part 1*
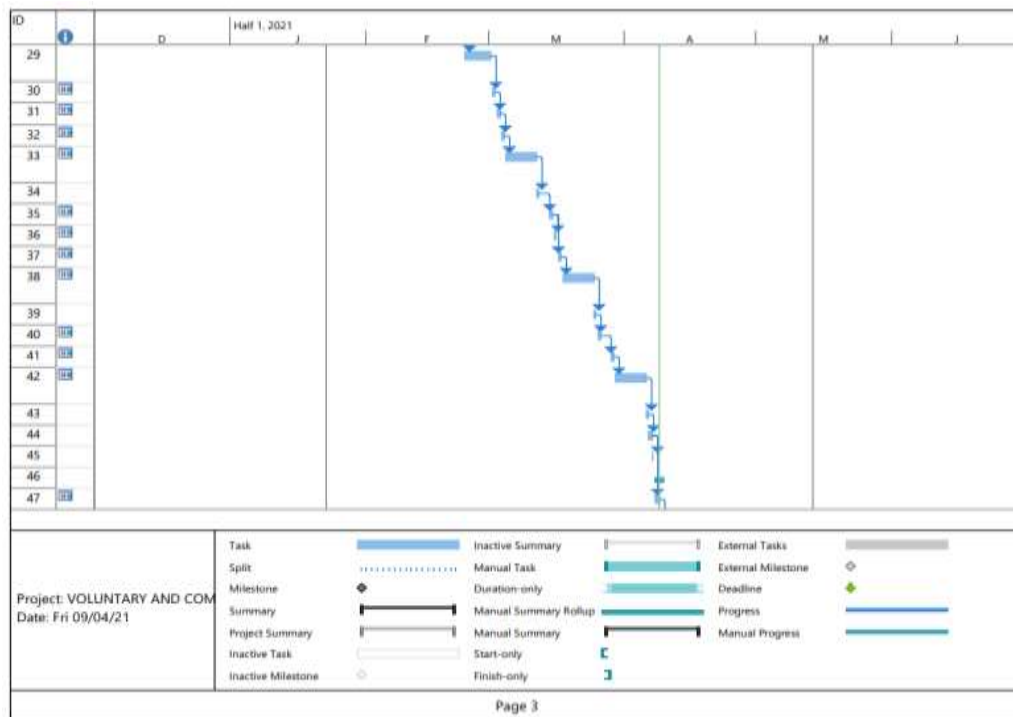
Figure 9.2.2: *VSCSA work plan gantt chart part 2*

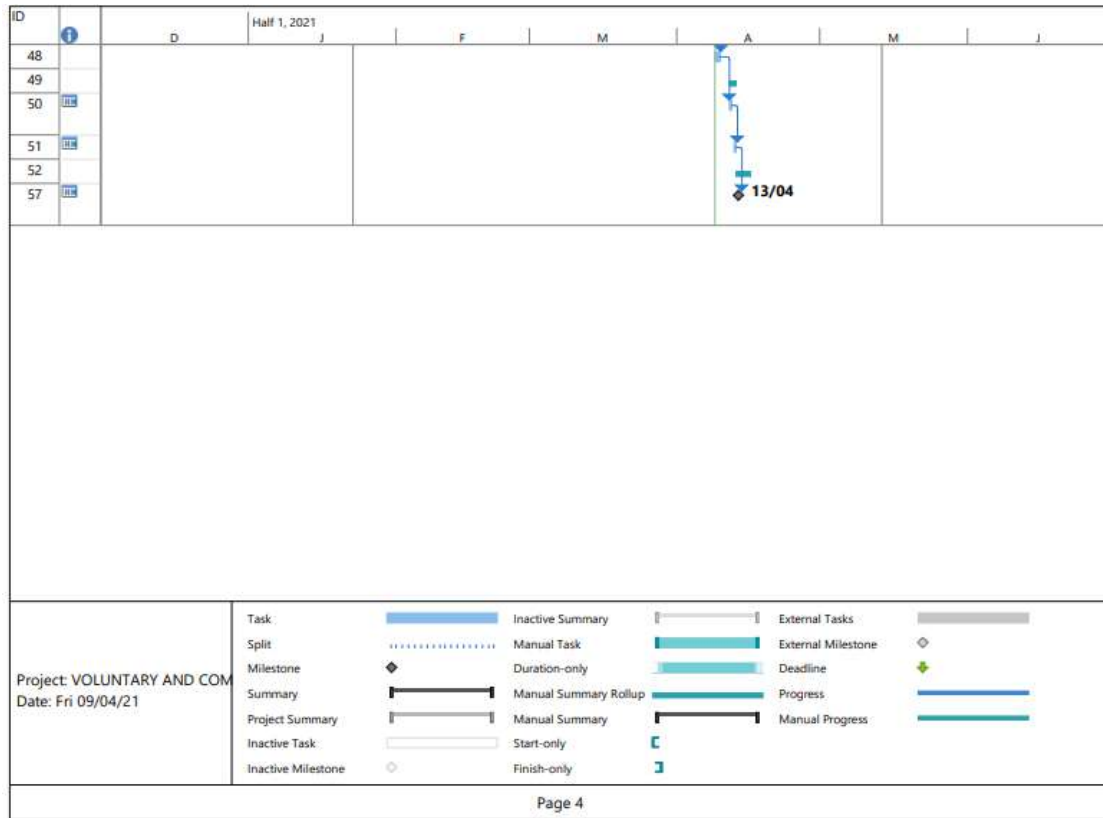**Figure 9.2.3:** *VSCSA work plan gantt chart part 3*

Figure 9.2.4: *VSCSA work plan gantt chart part 4*

9.3 Budget

In the planning and execution of tasks for full development of this project, I had several requirements and resources to procure and to facilitate this effort, I worked with a budget of about Kshs. 53,000 broken down in the diagram below.

ITEM	QUANTITY	PRICE PER ITEM	TOTAL COST
Laptop	1	Kshs.45,0000	Kshs.45,000
Mobile Phone	1	Kshs 16,000	Kshs.16,000
Android Studio Software	1	Free	Kshs.0
Flash Disk	1	Kshs.1000	Kshs.1000
TOTAL SUM	**4 Items**	**Kshs.53,000**	**Kshs.53,000**

Table 3.1: *VCSCA work plan budget*