

CHAPTER I

INTRODUCTION

Background of the Study

Homes for the elderly are facilities that provide shelter and care for the elderly who have been abandoned, orphaned, or taken from their families due to abuse or neglect. These elderly people frequently lack basic necessities, including food, clothes, housing, and healthcare. As a result, people rely on charitable funds to satisfy their needs and improve their quality of life. Moreover, due to limited resources, a lack of knowledge, and competition from other charity organizations, many facilities for the elderly struggle to get continuous and sustainable support. Furthermore, potential donors may be discouraged from giving due to worries about the openness and accountability of orphanage donation processes.

The Sta. Ana-San Joaquin Bahay Ampunan Foundation is a legally recognized non-profit organization that was officially launched on November 14, 2004. This charitable foundation operates in accordance with the laws of the Republic of the Philippines. It provides a welcoming home for elderly individuals, regardless of their background. Within the nurturing environment of this facility, senior citizens can find peace of mind and enjoy the care and support of compassionate individuals. The foundation is dedicated to ensuring that the elderly residents receive the attention and respect they deserve.

Furthermore, The Sta Ana - San Joaquin Bahay Ampunan Foundation Inc. is an orphanage for elderly individuals who have lost contact with their family. This shelter is located at Brgy. Altura, Tanauan, Batangas. Because of the foundation's distant location and lack of public awareness, it is difficult for the specified orphanage for the elderly to raise finances for the foundation. To keep helping the foundation and the elderly people living there, the orphanage is in need of monetary donations.

To address these concerns, a more effective and efficient orphanage donation system that promotes openness, accountability, and sustainability is required. A system like this would not only assist Sta Ana- San Joaquin Bahay Ampunan Foundation Inc., but it would also allow people to have a significant and beneficial effect on the said foundation. Instead of going to the orphanage to donate funds, donors can simply visit the website and donate money there using payment gateways. This service authorizes credit card and online payments for transactions, so donors can avoid the hassle and make their donation in a more convenient, time saving, and secure manner. At the same time, this can help the orphanage address the needs of the elders because the donation process will be faster and more efficient to donors through the use of payment gateways, making them more engaged to donate on the said foundation. The donors will have the ability to download their donation receipt/slip to ensure transparency and strengthens the relationship between donors and organizations. In addition, analytic reports can provide real-time monitoring of donation activities to improve decision-making. In general,

using analytical reports can help a web-based donation system to optimize its performance, improve donor engagement, and increase donations. Customer Support/feed is also important to users/donors, to assist them with their concerns. Apart from that, by using Web APIs, it is possible to send data from one application directly to another. For example, details of donations from an online donation form can be sent directly to the donation system's database, speeding up the process and reducing errors in data entry. Overall, having Web APIs can simplify the processing, monitoring, and improvement of donations by providing direct connections to other systems and applications.

Objectives of the Study

The researchers generally aim to develop a system that will help the orphanage to have an effective donation system. The researchers specifically aim the following objectives:

1. To design and develop an effective and efficient web-based donation system that will allow donors to easily contribute to the organization's mission.
2. To implement a donation tracking and management feature that will enable the organization to monitor and properly record all donations made.
3. To create a user-friendly interface that will make it convenient for people to donate online, increasing the organization's accessibility and reach to potential donors.

4. To help the Sta. Ana-San Joaquin Bahay Ampunan Foundation Inc. raises more funds to support its programs, services, and elders.

Significance of the Study

The study on developing a web-based donation system using payment gateways and web APIs has several significant implications. The web-based donation system makes it easier for people to donate to the orphanage. They can make their donations from the comfort of their homes or offices without having to physically visit the orphanage. This convenience is likely to increase the number of people who will be willing to donate, thereby increasing the resources available to the orphanage.

Furthermore, this study about a web-based donation system for an elderly orphanage using payment gateways and web APIs can contribute to Sustainable Development Goals (SDG) 1 by alleviating poverty, building sustainable livelihoods, encouraging social responsibility, and increasing awareness about poverty and its impact on the elderly.

The use of payment gateways and web APIs will make the donation process more efficient and transparent. Donations will be processed in real-time, and donors will receive confirmation of their contributions. The orphanage staff will also be able to track and manage donations more effectively, reducing the risk of fraud and errors. Apart from that, it provides flexibility in the types of payments that can be accepted, allowing donors to contribute using various payment methods such as

online payments and bank transfers. This flexibility can increase the number of donors and the amount of funds collected.

By providing a convenient and accessible web-based donation system for people to donate, the system can increase the number of donors and the amount of funds collected. The use of payment gateways and web APIs can also increase flexibility in the types of payments that can be accepted. In addition, analytic reports can further enhance the value of the donation system. This information can help the orphanage optimize the donation system and increase the funds collected, ultimately improving the quality of life of its residents.

A web-based donation system using payment gateways and web APIs holds immense significance for future researchers who wish to develop similar systems for charitable organizations. The insights gained from this study can serve as a valuable resource for researchers in designing and implementing efficient and secure web-based donation systems. Furthermore, it sheds light on the challenges faced by organizations that rely on donations and how technology can help overcome these challenges. This study has the potential to inspire future research in the field of charitable giving and encourage researchers to explore new ways to enhance the services provided by Elder Care Alliance or other organizations that support the elderly.

Overall, a web-based donation system for elders orphanages using payment gateways and web APIs is a practical and impactful solution to address poverty and

other social issues related to elderly individuals. It provides an opportunity for individuals and organizations to make a positive impact in the community and contribute to a more caring and empathetic society.

Scope and Limitations of the Study

This study aims to develop a web-based donation system for Sta. Ana - San Joaquin Bahay Ampunan Foundation Inc. that includes the implementation of an efficient system for receiving donations from individuals and organizations who wish to contribute to the welfare of the elderly residents. Also, the system will cover the proper reports and tracking of all donations, as well as the issuance of acknowledgement receipts and periodic reports to donors.

Through the donation system, only cash contributions will be accepted. Food, medication, and clothes will not be accepted as physical donations. But the donor can specify whether the money provided to the orphanage will be used for services and programs. Furthermore, investment properties, stock, or other kinds of donations will be subject to separate negotiations and agreements between the donor and the foundation.

This web-based donation system's payment gateway is limited to paymongo. PayMongo is a Philippine payment gateway that serves businesses of all sizes. It provides a straightforward and seamless integration for online payments on websites and online stores. PayMongo accepts credit and debit card payments as well as digital wallets. Furthermore, paymongo is also PCI-DSS Level 1 certified, which is

the highest level of security certification in the payment card industry. This shows that PayMongo adheres to strict security requirements and conducts regular audits to protect cardholder data.

The donation system is not intended to cover the acceptance of conditional or restrictive donations, such as those requiring the foundation to offer specified services or items in exchange for the donation. The foundation can decide to accept or reject such donations based upon their compliance with the foundation's mission and values.

Lastly, anonymous donations will not apply to the system as the foundation values and accountability and openness in all of their funding activities. In addition, donors need to include their names and contact information in order for them to receive a receipt of recognition from the foundation.

Definition of Terms

This section aims to provide operational and conceptual definitions of key terms related to Web-Based Donation System, establishing a shared vocabulary by consulting relevant sources and industry standards.

Analytical Reports. A business report that assists you in evaluating your business decisions using data insights. Based on historical data and statistics, they offer predictive analysis for a specific issue. (Baltusevičius, 2020)

Digital Wallets. Is a financial transaction application that runs on any connected device. It securely stores your payment information and passwords in the cloud. (Kagan, 2023)

Donor. A person who donates something of value to a person or an organization, especially a charity.

Foundation. Is a residential institution, total institution or group home, devoted to the care of orphans and children/elders who, for various reasons, cannot be cared for by their biological families.

Orphaned. Elderly residents of communities who are socially and/or physically isolated and lack a known relative who can act as a surrogate or caregiver.

PayMongo. Is a payment gateway that allows businesses to easily accept online payments from their customers online via credit/debit card (straight/installment payments), Atome and BillEase (buy now, pay later), e-wallets, online banking, and over-the-counter. (Audrey, 2023)

Payment Gateways. The technology used by merchants to authenticate and securely transfer payment data between the various parties involved in the transaction process. Once the payment is approved or declined by the parties involved, the payment gateway sends back the relevant message to the merchant. (Fernando, 2021)

PCI-DSS. A group of security requirements known as the Payment Card Industry Data Security Standard (PCI DSS) was established in 2004 by American Express, Visa, MasterCard, Discover Financial Services, and JCB International. (Gravier, 2023)

Web APIs. As an API as the name suggests, it can be accessed over the web using the HTTP protocol. It is a framework that helps you to create and develop HTTP based RESTFUL services.

Web-Based. A software that is used over HTTP over a network connection as opposed to being stored in the device's memory. (Margaret Rouse, 2022)

Web-Based Donation System. A web page located on a nonprofit's website where donors have the opportunity to contribute funds to the organization's mission online.

CHAPTER 2

REVIEW OF RELATED STUDIES AND SYSTEMS

This chapter provides an overview of cited books and articles that are relevant to the present investigation. It is composed of related studies, both local and foreign, which contain facts and information on the research problem at hand. It also provides explanations and logical connections between previous research and the present work.

Technical Background

This section provides technical terms and ideas related to the Web-Based Donation System using Payment Gateways and Web APIs and provides a fundamental knowledge of the underlying technologies and concepts that enable the development and execution of the suggested solution

HTML

According to Lutkevich B. (2020), HTML (Hypertext Markup Language) is a text-based language used to describe the organization of material in an HTML file. The markup on a webpage instructs a web browser how to display text, images, and other types of multimedia. The World Wide Web Consortium (W3C) has made HTML a formal guideline, and most popular web browsers, including those for desktop and mobile devices, generally follow this proposal. The most recent version of the specification is HTML5. A particular syntax, file naming style, and set of tags

are utilized to generate an HTML file. The file is recognized as an HTML file by a document type declaration at the start of the file. For the file to be properly recognized by web servers, it must also be saved with the.html extension. Any text editor can edit HTML files, and web browsers can display them.

CSS

According to Arturas B. (2020), in 1996, the W3C (World Wide Web Consortium) created CSS for a very straightforward purpose. Tags that would aid in page formatting were not intended for the HTML element. Only the markup for the web page was expected to be written. When tags like were added to HTML in version 3.2, it generated a lot of problems for web developers. Rewriting the code was a time-consuming, difficult, and expensive procedure due to the variety of typefaces, colored backgrounds, and styles seen in web pages. In order to address this issue, W3C developed CSS. Although CSS isn't strictly required, you wouldn't want to visit a website that solely contains HTML elements because it would appear to be quite basic.

JavaScript

JavaScript is a text-based programming language that may be used on both the client and server sides. It regulates multimedia on web sites and makes them interactive. JavaScript gives developers the ability to execute a variety of tasks, such as adding motion to graphics or dynamically updating material on a page. In addition, The great majority of websites you visit let you interact with them thanks

to JavaScript. It's highly likely that JavaScript programming is what enables you to complete forms, look through maps, or register for events. (O'Grady, 2023)

MySQL

According to Chen & Liang (2020), Outstanding performance, accessibility, and durability have been lauded for MySQL, a free database run by Oracle. The software is open-source, so users are allowed to use and alter it as they see fit. In addition, MySQL is easily accessible and cost-free to get from the internet. It uses a client-server architecture and offers libraries for integration into other applications as well as standalone software for client-server networks. MySQL readily integrates with utility packages to make database administration simpler. In general, the MySQL server is managed by the MySQL client, which is installed on a computer.

Web API

A Web API is an excellent framework for exposing your data and services to a variety of devices. Furthermore, Web API is an open source platform that is ideal for developing REST-ful services using the .NET Framework. Unlike the WCF Rest service, it uses the full capabilities of HTTP (such as URIs, request/response headers, caching, versioning, and various content formats), and you don't need to declare any extra configuration settings for different devices. (Chauhan et al., 2022)

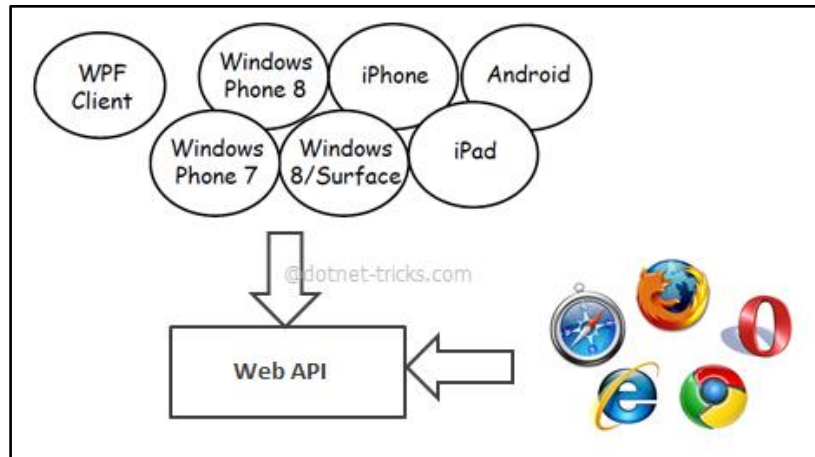


Figure 1. Web API Compatibilities

Today, a web-based application is insufficient to reach customers. People are quite sophisticated; they use iPhones, mobile phones, tablets, and other technology in their daily lives. These smartphones also feature a plethora of apps to make life easier. Actually, we are transitioning from the web to the world of apps. So, if you want to expose your service data to browsers and all of these modern device apps in a quick and easy manner, you should have an API that is compatible with browsers and all of these devices. (Chauhan et al., 2022)

Payment Gateways

The technology that merchants employ to receive debit or credit card payments from customers is known as a payment gateway. The word covers both the online shopping cart payment processing portals as well as the actual card-reading hardware present in real retail establishments. However, in recent years, payment gateways in physical stores have started to accept phone-based payments

through the use of QR codes or Near Field Communication (NFC) technology.
(Fernando et al., 2021)

Security

One of the most important advantages of using a payment gateway is that it boosts security for both the client and the business. All data transferred through the payment gateway is encrypted, which means it is highly secure and can only be accessed by the business and the customer. This safeguards both parties against credit card fraud and other security dangers. (Lee et al., 2022)

Flexibility

When it comes to receiving payments, a payment gateway gives your company more options. It enables you to take payments from a diverse set of clients in a number of methods. Payment gateways, for example, typically interface with several local banks, e-wallets, and international payment methods such as MasterCard and Visa. This implies you may keep expanding your business by collecting payments from new clients in novel ways. (Lee et al., 2022)

API Integration

Connecting to the payment gateway's APIs allows you to create bespoke checkout or payout flows. Customers do not need to be transferred to a third-party site if they commence the purchase on your company's website. On the back end of the payment gateway, the payment is processed. This may necessitate some

development resources, but your company will have complete control over your consumers' payment journey. (Lee et al., 2022)

Related Systems and Studies

According to (Hu & Zu, 2020) The information about charitable giving is asymmetric during the Covid-19 pandemic. The objective of our study is to build a contribution service system that is insured by blockchain-based technology in order to avoid this circumstance. We believe that approach can successfully cope with asymmetry and bursts while eliminating asymmetry. The qualities of blockchain might be extremely beneficial in the establishment of such a donation service system. We will first explore the literature on blockchain technology as well as previous studies on generous behavior, beginning by outlining the charitable contribution service system from the standpoint of demand. The design of a charitable contribution service system, concentrating on the three primary topics discovered throughout the study.

(Ismail et al., 2021) To address the issue of how to handle the trash of toddler-friendly equipment that has been adding to Indonesia's growing waste problem, the donation application of toddler equipment was created. The creation of this system has been modified to meet the requirements of the nearby orphanage. so that its use would be precise. Usability testing is one of the key tasks involved in building this system. The toddler equipment donation application will be put to the test in this study using a combination of the SUS technique for gauging usability and the Net

Promoter Score (NPS) approach for gauging user satisfaction and propensity to suggest the system to others.

(Kumar K et al., 2020) stated that an orphanage is a residential institution devoted to the care of orphan-children whose parents are unwilling or unable to take care of them. The problem of orphans is acute due to urbanization and industrialization. Need for each of the orphanages varies in different categories such as food, money, clothes, medicine. Most of the people would like to help the orphanages but the major problem is that they have any idea on how to approach these orphanages. We work to establish an interface between those who want to assist those in need, such as orphanages and old age homes, and volunteers. The managers of the orphanage can be contacted by volunteers for any assistance they can afford. Through online money payment or Internet banking services, people can make donations.

According to (Laguna E. 2019) As the percentage of older Filipinos grows in the coming years, Filipino families, the government, and society in general will face the issues of providing care and support to the elderly. The challenge is compounded by the fact that population aging, while occurring more slowly in the Philippines than in other Asian countries, occurs alongside other demographic phenomena such as declining fertility, longer life expectancy, increased female labor force participation, and internal and international migration, particularly of the

younger population. Aging is frequently connected with chronic morbidity, which may affect physical health and performance and lead to dependence on others.

(Ladero & Hernández 2022) Amidst the global crisis caused by the COVID-19 pandemic, including widespread confinement measures, the impact on the world's health, economy, and social fabric has been immense. However, this difficult situation has also spurred a remarkable wave of solidarity and corporate philanthropy, with many companies stepping up to contribute in unprecedented ways. Inditex, a leading multinational fashion company, has garnered particular attention for its swift and effective response, earning recognition as the top-ranked company for Corporate Social Responsibility during the lockdown. Through an analysis drawing from theories of Stakeholder, Legitimacy, and Ethics of Care, this paper explores Inditex's donation behavior as a case study, examining its impact on the company's reputation. Employing a desk research approach that draws on secondary data and a content analysis of press releases using ATLAS.ti software, this paper finds that effective corporate donation behavior can indeed enhance a company's reputation among its stakeholders.

(Chen et al., 2019) Donation-based crowdfunding has numerous unique properties when compared to traditional nonprofits. Which are the key elements influencing the intention to donate online among the many that impact potential donors before they acquire a contribution intention? The goal of this research is to look into the major potential factors of both time and monetary donations. This

study seeks to construct and develop an integrative framework to evaluate donation intention by combining the theory of planned action, norm activation theory, and social presence theory. The findings of the structural equation modeling, based on 350 valid questionnaire responses received from November 19 to December 19, 2018, indicate that the dependent variable of time donations is highly influenced by social presence, trust, and perceived behavioral control. Only the subjective norm has a negligible effect on the dependent variable of monetary donations. The study findings provide crowdfunding platform managers and fundraisers with practical guidance on the specific elements of donation.

(Shaheen E. et al., 2021) Charitable organizations often struggle to secure funding due to a lack of transparency, leaving donors unsure of whether their donations are being used for their intended purposes. This can lead to a loss of faith in charities and a reluctance to donate, creating significant challenges for fundraising efforts. To address this issue, researchers have proposed using Blockchain technology, a decentralized database that provides increased security, transparency, and lower funding costs by removing the need for intermediaries between donors and charities. The proposed model introduces new participants who oversee the donation process and ensures that all transactions can be tracked on the Blockchain. This system employs smart contracts to guarantee that donations are received as intended and reduces the risk of suspicious or terrorist financing. A user-friendly website has been created to facilitate the use of this system, which has been

successfully tested using Hyperledger composer. As a result, this new track donation model saves time, reduces costs, and increases the trust and confidence of donors in the charitable sector.

(Dhumal & Mahind 2022) Stated that anonymous donations are fairly frequent for organizations. Corruption is more likely in centralized financial services. There is a need to broaden resource distribution. This is possible with blockchain. It is a transparent, dispersed, and distributed technology that does not rely on a centralized control element. The system's primary goal is to eliminate corruption in institutions that legitimize people's dark money or govern resources. The system will be distinct, not owned or used by a single person or group, but rather shared by all users. We developed a blockchain-based Donation System to help organizations better manage their resources. The user can establish new campaigns, and others will be able to donate money to the organization in the form of ether. The proposed system transforms people into true resource owners, and it brings transparency to the entire Charity Donation System. Thus, with the usage of this blockchain system, the incorrect and unlawful use of money provided to organizations will be greatly decreased, and thus, corruption will be eliminated, alleviating problems in many nations.

(Modi V et al., 2022) The paper presents an innovative charity logistics platform that utilizes Blockchain technology through the Ethereum platform, targeting the logistics industry and public welfare sector that require high levels of

transparency and credibility. The platform leverages the open, transparent, and ubiquitous features of Blockchain technology, along with a unique Responsibility Relay System and Evaluation and Reporting Mechanism, to ensure the consistency and transparency of charity logistics data on the chain. Additionally, the paper introduces a model for evaluating material donations for social welfare using the maximum flow algorithm. After conducting four months of observation, the study concludes that the Blockchain platform significantly improves user confidence in the project, increases the system's cleanliness coefficient, and enhances the quality of donated materials, ultimately improving public welfare. The paper proposes that this Blockchain platform is a technical solution for maximizing social welfare and highlights keywords such as Data Security, Smart Contract, Charity Application, Algorithm AES, and Blockchain technology.

According to (Manso K. 2021) A growth in the number of children who require formal alternative care is being experienced by Sub-Saharan Africa. Orphanhood is one of the main factors that contribute to this. Although many orphans live with their extended families, privately-run orphanages that operate outside of government regulation and funding end up taking in many of them. These orphanages have to come up with their own mechanisms for financing since they lack government assistance and are the most expensive care option. However, there is relatively little evidence available regarding the funding sources of orphanages in sub-Saharan Africa. Based on literature from Ghana and other low-income

countries, the study investigates the funding of orphanages and its impact on orphans in Ghana. The literature indicates that most orphanages receive funding from donations by private organizations and individuals, mostly from developed countries. This funding system is generally unsustainable and has negative consequences for the social-emotional progress and rights of orphans living in orphanages, such as abuse, unnecessary institutionalization, and stigma. Policy and practice recommendations include increasing government subsidies to orphanages, regulating donations and volunteer work in orphanages, and supporting unlicensed orphanages in transitioning to providing family-strengthening services.

(Schröder et al., 2023) Prosocial behavior occurs in many societies through institutionalized forms mediated by organizations. These organizations serve as go-betweens for donors and recipients, and they frequently rely on time, money, or blood donations. A recent study used data from blood donation registers and surveys in the Netherlands to investigate whether compliance with these solicitations could be predicted by word-of-mouth recruitment and donation discussions. Donors who scored higher on a measure of talking about donations were found to be more likely to comply with solicitations, with a 2.9 percentage point increase in compliance for each unit increase in the measure. This relationship was found to be stronger for new donors. In Addition, The study emphasizes the importance of social networks and communication in the decision-making processes of donors, and it suggests that

organizations can improve the effectiveness of their solicitations by encouraging donor communication.

(Andres S. et al., 2021) Their study looks into the effect of campaign parameters on the success of donation-based crowdfunding (DCF) done online for charitable causes. Disclosure, imagery, updating, and spreadability are among the elements identified in prior research that may explain the effectiveness of online fundraising initiatives. To assess the explanatory ability of these characteristics, a quantitative study using logistic regression is performed on 360 all-or-nothing campaigns provided by organizations via an online platform. The findings show that campaign factors such as updating and spreadability have a substantial impact on campaign success. However, elements related to disclosure and images had no effect on campaign outcomes. According to the findings, the effectiveness of online campaigns is closely related to transparently providing and consistently updating key information that donors find useful. The findings have significance for the proper technological design and management of DCF campaigns done via digital media, particularly in engaging potential online funder groups. The study emphasizes the need for openness and accountability in online fundraising activities, which have received little attention in the DCF literature. More empirical research is required to understand the aspects that contribute to the transparency, accountability, and success of digitally marketed campaigns.

The analysis of Blanco & Pano (2019) talks about laws, policies, and institutions in the Philippines that safeguard the rights and promote the welfare of

orphaned children using synthesis and an integrative approach. The essay conducts an exploratory assessment of the possible and current implications of colonialism, imperialism, feudalism, and capitalism on child and youth welfare, as well as describing the situations and obstacles that Filipino children confront in the current policy context. To address these conditions and challenges, their article provides a synthesis of potential and ongoing policy-capacity solutions in orphan and youth care, such as implementing a strong social supporting structure for grandparents as primary caregivers, strengthening a mixed welfare system for orphan care, and enacting a national orphan policy.

The study by Singh et al. (2023) using blockchain technology, they propose an alternative method to track online donations. It is intended to be fair, trustworthy, and simple to use. Donors may see exactly where their money is going and how charity or individuals in need are using it. We use "smart contracts" to ensure that everything operates fairly and transparently. We also developed an unusual method to protect donated funds by depositing them in a separate account that only authorized individuals can access. When the money is spent, both the donor and the charity can see the transaction details. All of this is done on the Ethereum blockchain, which is a public, secure platform.

Stated by De Silva D. et al. (2023) any individual living in society must meet their own needs, and providing quality food is one of the most basic of those demands. However, in any community, there are many wealthy people who can meet their demands and some who cannot. In such situations, there are people who

want to help and people who want to be helped. Both sides required a reliable platform to meet their needs. The primary goal of this study is to examine government schools in Sri Lanka on a provincial level. Surveys are done to help examine data and reach conclusions. Surveys are done to help examine data and reach conclusions. It was also required to meet the criteria of having a stable, centralized, trustworthy platform where both parties could connect securely.

According to Zambrano A. et al. (2020) individuals with very low incomes and members of poor communities face unique challenges in managing their financial lives, owing to unpleasant unforeseen events and a lack of health and financial services. Savings and credit-based cooperation techniques are becoming an increasingly essential option for these communities to handle such issues and achieve some kind of financial stability. Because developing new cooperation techniques takes a significant amount of time and effort, computational tools for simulating and evaluating communities that use these financial cooperation schemes have recently been offered. In this article, we suggest a new collaboration approach based on donations distributed across community members based on the provided network topology, based on the theory that underpins these computational tools and theoretical conceptions of cooperation. We demonstrate how the proposed cooperation method, based on altruistic conduct, can potentially improve the community's robustness to unfavorable unforeseen events through mathematical and simulation assessments.

The study by Alzahrani et al. (2020) many people currently subsist on only one meal every day. It is a major concern, particularly in developing countries. On the other hand, a lot of food is wasted every day. Some poor people require clothing and vessels, whilst children require books and study equipment. The solution is to donate the remaining food to those in need, charities, and our unwanted items. For that to happen, we need some sort of forum. Any type of online platform, such as a website or web application, could be used. There are many people in Saudi Arabia that are able to make donations, as well as several Nongovernmental Organizations (NGOs) that assist the impoverished and needy people of Saudi Arabia. But the connectivity gap is not as clear as it should be. There must be a simple, quick, intuitive, and secure method of making such online donations so that people can donate with a single click. The goal of this project is to design and develop a web-based online charitable donation system. Where the philanthropic website will gather charitable donations (such as clothes, toys, and school supplies) and send them to children in need. The proposed strategy will provide volunteer opportunities for anyone who wants to help transport donations to poor people's homes for free. The suggested work was conceived and developed with the help of the Unified Modeling Language (UML), SQL Server for database implementation, and the ASP.net and Visual Basic programming languages.

Setiabudi & Widyadana (2019), in Indonesia, natural disasters happen frequently, and people who want to donate money to help often face difficulties. The Indonesian Red Cross is a reliable organization for distributing donations, but

there is currently no simple way for donors to transfer money. In order to address this problem, a study was done to examine what users would want from a mobile app that would make giving simpler and more safe. The study concentrated on elements including simplicity, efficiency, security, and information accessibility. According to the study, customers expected the app to offer reliable information, accessibility, and security. Additionally, services for volunteers and donors like safe payment gateways and a donation history should be included. The research resulted in the development of a mobile application with an efficient user-interface interaction.

A new trend of giving through technology has evolved as a result of technological advancement and heightened societal awareness. However, a drop in donation rates has been brought on by problems with corruption and concerns with confidence and transparency in donation systems. Establishing reputable organizations that people can rely on for donations is essential since social welfare cannot be exclusively dependent on the government. In order to increase donation process transparency and promote individual contributions, this study offers a personal donation system. Utilizing blockchain technology during the system's design provides safe and open operations. The system intends to use technology and blockchain to meaningfully address societal issues by taking into account important elements that affect people's decisions to give. (Seo A. et al., 2022).

Conceptual Framework

The researchers highlighted important input as well as synthesized research on existing donation processes and practices while drawing theoretical connections between them in order to address the identified need for a conceptual framework that would provide a practical, evidence-based tool for informing the effective design of the donation process. Figure 2 shows the outcome of the researchers' deductive reasoning or preliminary conclusion.

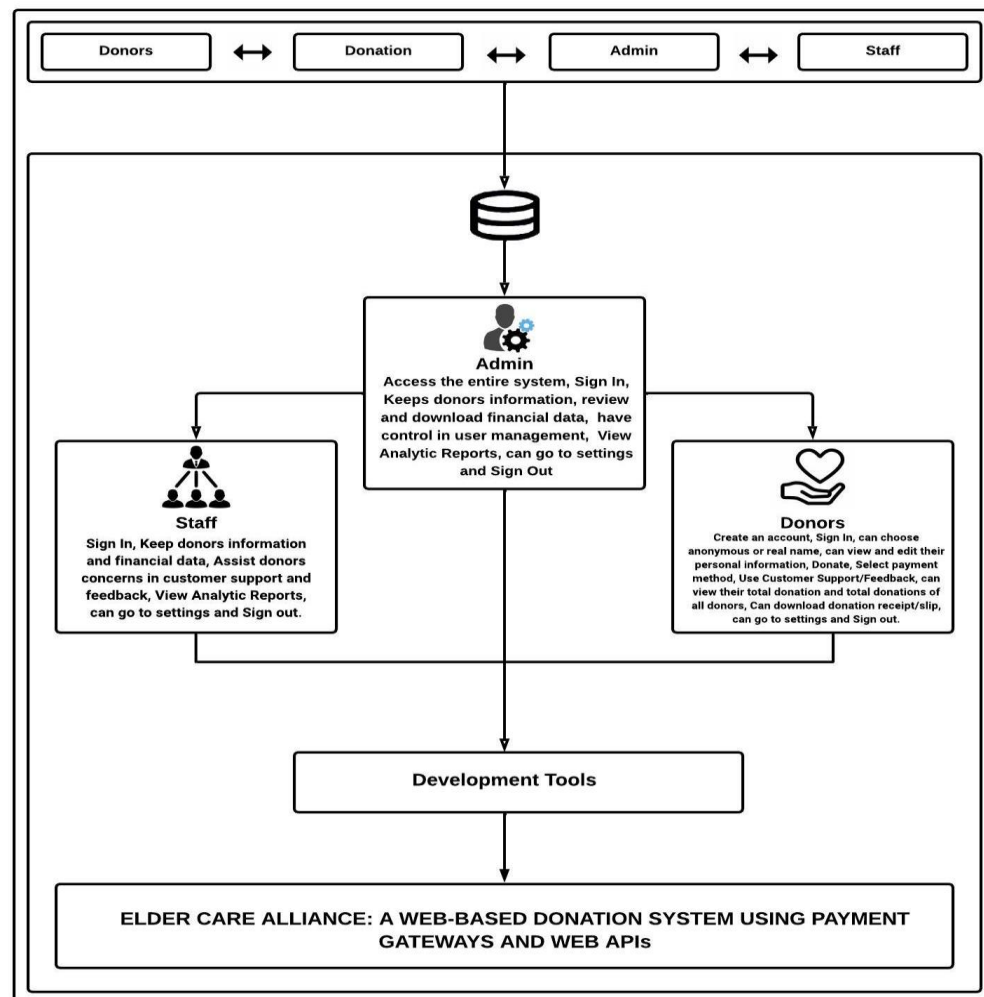


Figure 2. Conceptual Framework

CHAPTER III

DESIGN AND METHODOLOGY

Software Development Model

Software development models offer a structure for planning the software development process and dividing it into manageable stages or phases. As depicted in Figure 3. A method known as the agile development approach would be used to plan and create the web-based donations system.

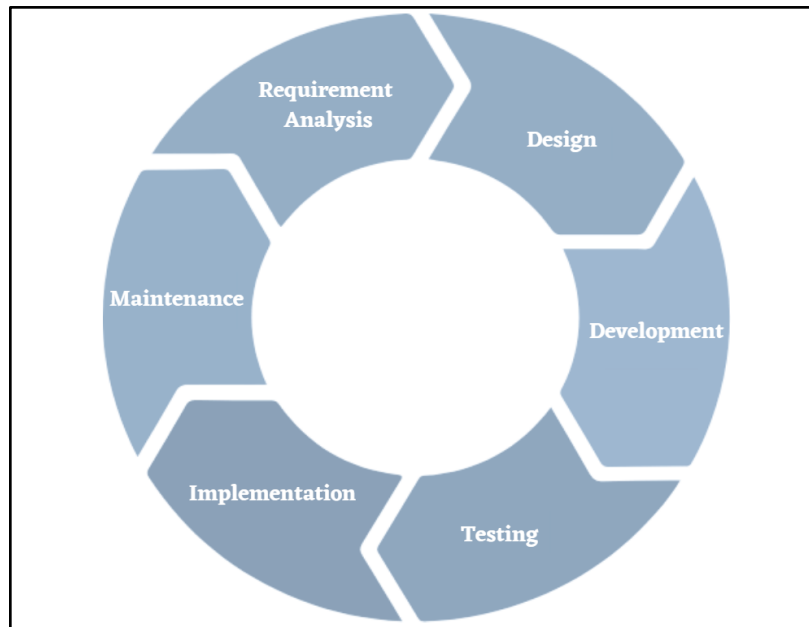


Figure 3. Agile Development Model

The study's supporters thought that Agile development was the best method to use, as it relies on continuous and frequent iterations that are delivered regularly, and can adapt quickly to the changing needs of the project or client. Therefore, the

phases and sub-processes used by the researchers during the study are presented below.

- a. **Analysis.** a phase that is considered the core of the project life cycle and involves creating documentation for the project plan. Some of the processes that are included in this phase are as follows:

Define project purpose and scope. The project's purpose, scope, objective, and significance were established through collaborative group discussions, where every team member contributed their ideas and insights. This collaborative effort ensured effective collaboration and improved interpersonal skills within the team. By engaging in open and active communication, the researcher successfully identified the project's key goals and objectives, providing a clear direction for the project's subsequent phases.

Stakeholder Engagement. To ensure that the project plan was practical and feasible, the researchers held consultations with all relevant stakeholders. The researchers considered these consultations critical to the system analysis process, as they provided valuable insights that could be used to inform subsequent procedures, such as data collection. By engaging in these consultations, the researchers were able to refine their project plan and ensure that it aligned with the stakeholders' needs and expectations, thereby increasing the project's chances of success.

Project Planning. The researchers successfully documented the project plan, which included details about the project's deliverables, costs, responsibilities, specifications, and schedule. In addition, the researchers developed a comprehensive set of plans that provided guidance for the project's implementation and closure phases.

- b. **Design.** The project's major deliverables, structure, success factors, and key features were all planned out during the second stage of project management. On the basis of the established objectives, the team first created the system's modules and user interfaces based on the requirements and functions of faculty users during the donation process. Then the owner, staff, and donors roles and responsibilities were added to these modules and interfaces. As part of this procedure, the following actions were suggested:

System Design. The conceptual design phase was regarded by the study's researchers as the most crucial step in the system development process. During this phase, the conceptual design was transformed into a physical design that accurately represented the necessary components required to address the issues that existed throughout the donation process. To achieve this, the researchers employed several tools and techniques, including Sequence diagram, Database diagram, and Use-Case Diagram, which were utilized to ensure that the physical design was comprehensive and effective.

The study's researchers invested a lot of time in designing the system. Their justification was that doing so would enable the execution of tasks like debugging, restructuring, and modifying particular software components to be done more effectively. Additionally, they agreed that well-designed software would improve functionality, lessen problems, and foster a close relationship between users and the system.

Requirements Analysis and Prototyping. The researchers conducted a thorough evaluation of various factors such as constraints, maintenance-related issues, and other relevant considerations to determine the appropriate components necessary for the successful execution of the project. Collaboration with stakeholders played a crucial role in identifying and addressing their needs and expectations. Additionally, the researchers worked diligently to comprehend the system and translate the user's requirements to ensure the successful implementation of innovative ideas developed in the earlier stages. Therefore, a requirements analysis was an essential part of this phase to ensure that the project's deliverables met the expectations of all parties involved.

- c. **Development.** At this stage, system construction takes place. Using automation tools to create working prototypes from process and data models, the researchers construct the actual system and write the code. In this process, the following techniques are employed:

Database Design. As this process entails designing, developing, implementing, and maintaining data management systems, the study's researchers determined what information should be processed and how the information's components relate to one another.

UI Design. All interactive and immersive elements of the user interface, including icons, buttons, spacing, color schemes, typography and responsive design, were taken into account during this phase. The advocates sought to develop an appealing user interface (UI) design for the donation system that offers an intuitive experience, promotes accessibility, usability, and efficiency without necessitating a lot of thought. Users were supposed to be seamlessly guided through the system interface by the design.

Coding. Implementing the system design is necessary to create a useful system. The study's authors transformed the client's program requirements into machine instructions that were then translated into specific programs during the programming phase. This step was crucial because processes were specified using computer languages before being converted into control specifications. In addition, the researchers made use of programming languages like HTML, JavaScript, PHP, and CSS.

- d. **Testing.** The researchers concentrated on increasing the client's value during this phase through enhanced system performance and quality while also enhancing the project team's effectiveness, operational costs and response time. The actions involved in this phase are as follows:

Quality Assurance. As the donation system involves satisfying the clients' needs and expectations in terms of functionality, design, reliability, longevity, and cost, the researchers assured that it would operate smoothly and in accordance with those needs and expectations.

Data Synchronization. To maintain system continuity, they synchronized information between two or more devices and ensured that changes made to one device were automatically updated on the others, the study's researchers placed great importance on data quality, consistency, and privacy.

Software Testing. Evaluating software involves more than just identifying and fixing bugs, in practical terms. The researchers behind the study took this approach a step further by assessing the software's reliability and optimizing its production process to ensure it met quality standards. They achieved this by customizing the software to improve its effectiveness and efficiency while maintaining compliance with relevant regulations.

- e. **Implementation.** The strategies used by the study's researchers in designing, testing, and deploying new code had a significant impact on how the software would respond to changes in client expectations and requirements. Furthermore, with each update, the researchers streamlined the process of building, testing, and deploying new code, allowing for quick adaptation to client demand and the regular introduction of new features to meet user needs.

- f. **Maintenance.** Regular monitoring is crucial for identifying and correcting errors in a system during its operating life and adapting it to changes in the working environment. To achieve this, the study's researchers conducted periodic reviews of the system to anticipate future needs, meet the scope of potential enhancements, ensure future functionality, and incorporate any other added functional characteristics. This allowed them to maintain the system's performance and usability over time. Future functionality and any additional functional characteristics can be obtained by doing the following:

Risk Management. According to the researchers, risk management is the most difficult aspect of system management. While it was impossible to predict the future with complete certainty, they believed that a simple and streamlined risk management process could help mitigate the project's uncertainties and reduce the occurrence or impact of associated risks. By implementing an effective risk management plan, they could not only prevent potential issues, but also learn from past mistakes and improve the chances of a successful project completion while minimizing the consequences of any risks that may arise.

Analysis of the Existing System

The Sta Ana - San Joaquin Bahay Ampunan Foundation Inc. is an orphanage for elderly people without families. This shelter is situated at Brgy. Altura, Tanauan, Batangas. Due to the foundation's location in a remote place and lack of public awareness, it is challenging for the mentioned orphanage for the elderly to raise

funds for the foundation. To keep helping the foundation and the elderly residents, the orphanage needs donations through monetary funds. Additionally, the orphanage faces difficulties when it comes to tracking the donation because they are manually tracking donations by using MS Excel.

In order to solve the problems mentioned, the researchers will create a web-based donation system using payment gateways. The system will make it easier for the orphanage to collect donations for the elderly. The donations collected by the orphanage for the elderly can be used to fund a variety of services, including food, clothing, and medicine, as well as programs planned exclusively for older residents. The previously mentioned donation system will include a dashboard that displays analytic reports relating to donors activity. This dashboard will be accessed by the staff and administration. To provide valuable insights and information to optimize their fundraising efforts, improve donor engagement, and enhance the effectiveness of their operations.

Fish Bone Analysis

The researchers performed a collaborative brainstorming session to produce the fishbone diagram shown in Figure 4. The objective was to compile a thorough list of potential problems or concerns with their web-based donation system using payment gateways and web APIs, and then logically and systematically classify them into categories. The researchers examined the data and deliberated on which causes were less likely in order to assure the accuracy and relevance of each category. They were able to use this technique to orderly explore a large range of

options and determine which areas needed the most work. A useful tool for detecting and resolving difficulties with the contribution system, the diagram was further improved by the team as they gathered more knowledge and understanding.

The researchers of the donation process identified four major types of elements that might be causing the current issue using fishbone analysis. The probable causes and effects for each of these categories—Methods, Technology, People and Materials—were thoroughly examined. The investigation revealed that the human component was the most important category that might be contributing to the problem. The researchers discovered that lack of a centralized donation system was the issue's most likely root cause.

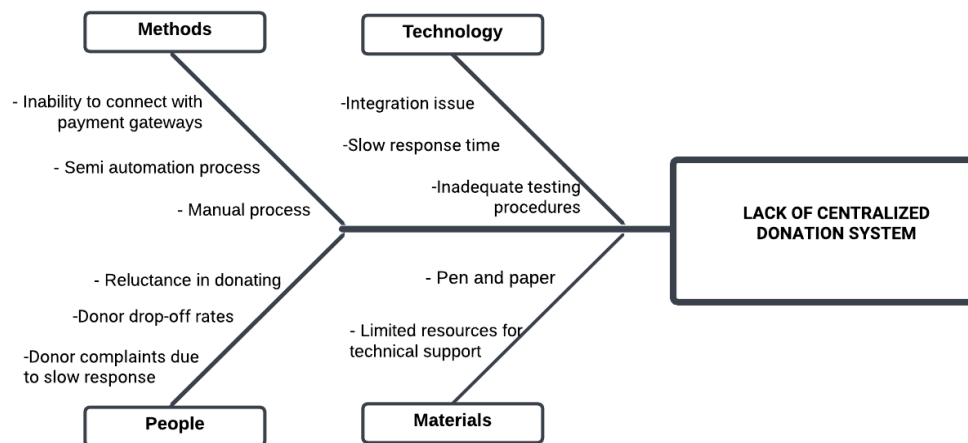


Figure 4. Fishbone Diagram

System Boundary

A key element is the identification and distinction of the components that belong to the system and those that are external to it. This process requires the creation of a system boundary, which is depicted in Figure 5.

The Elder Care Alliance: A Web-Based Donation System’s researchers built it to function well despite a variety of potential difficulties because it is intended to go through real donation procedures. Additionally, the researchers understood the importance of outside variables in the environment of the system.

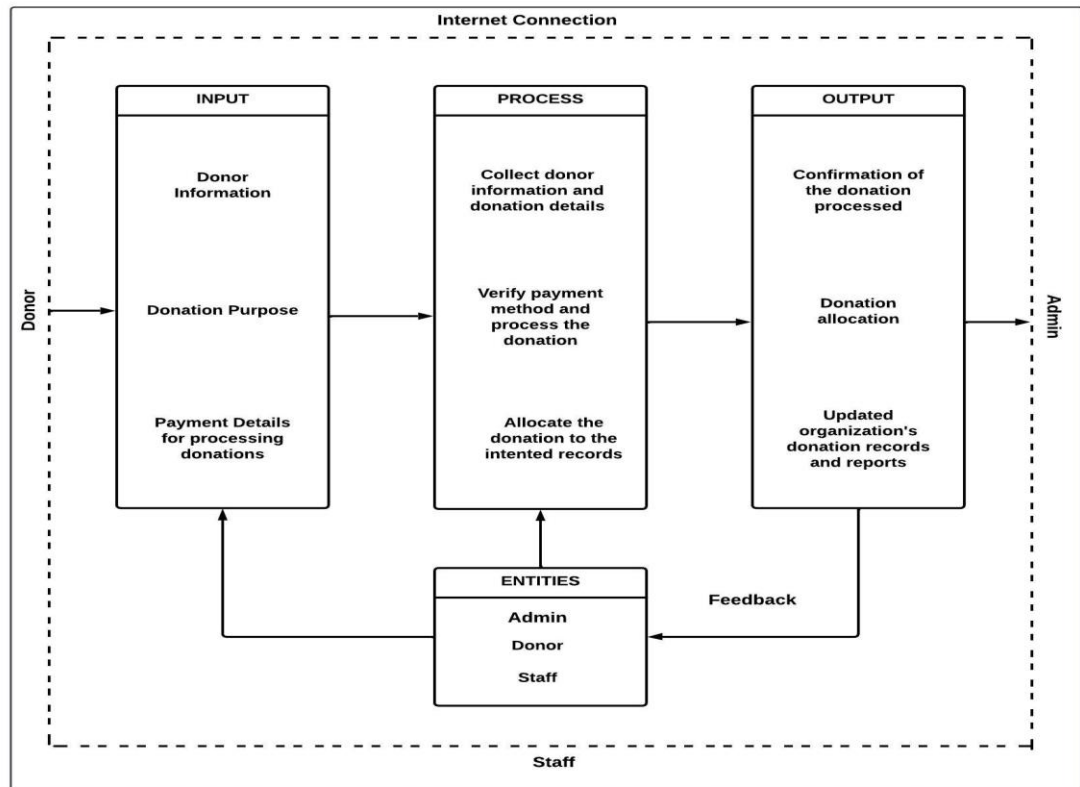


Figure 5. System Boundary

Hardware Requirements

The researchers of the system have outlined a range of hardware specifications to ensure optimal performance and engagement. These specifications include input and output devices, a hard disk drive, a processor, and memory. To meet the minimum requirements, an Intel Core i3 processor is sufficient. However, Dual Core or Third Generation Processors are highly recommended for better

efficiency. In terms of hard disk drive space, a minimum of 5GB is required but 20GB is preferred. As for memory, a minimum of 1GB DDR is required while the recommended amount is 120MB DDR or more.

Software Requirements Specification

In order to meet the exacting standards set by the donating system, the system's specifications for operations, data storage, and software requirements were broken down into functional and nonfunctional criteria. Additionally, the specifications also took into account the required programming languages as well as the user's level of familiarity and comfort with the system.

Software Requirements

The software requirements serve as a means of communicating users' expectations for the software product and describe the characteristics and functionalities of the target system. These requirements may be known or unknown, explicit or implicit, expected or unexpected from the client's point of view. The tech team is in charge of formulating the software needs, depending on the project. It is critical that everyone agrees on the project's scope, budget, and goals as non-technical coworkers, clients, and partners get engaged.

This element of the project describes the many tasks the suggested system must be able to do from the perspective of the user in order to guarantee the system's effectiveness and functionality.

The suggested operating systems for optimal performance are Windows 8 and 10, both available in 32-bit and 64-bit variations. For Mac operating systems, OS X 10.7 or newer and 64-bit versions are recommended. Similarly, Ubuntu, a 64-bit Linux distribution, is also advised. The recommended web browsers include Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari (2016 or later versions). To ensure that the donating system runs smoothly, MySQL (or MariaDB) version 10.4.18 is recommended as the database, along with software tools such as HTML, CSS, JavaScript, and PHP version 7.1.16.

Functional Requirements

This section's functional requirements outline the tasks and operations that the system must effectively carry out. It described the services and tasks that the system supported, to put it another way. The functional needs were directly influenced by the capabilities identified during the planning phase.

1. Admin

- 1.1. The admin shall be able to have the privilege to have an account within the system.
- 1.2. The admin shall be able to sign in into the system.
- 1.3. The admin shall be able to have the access to review the financial data and personal information of donors.
- 1.4. The admin shall be able to access the user management.

1.5. The admin shall be able to view the analytical reports of donations.

1.6. The admin shall be able to access the settings.

1.7. The admin shall be able to sign out in the system.

2. Staff

2.1. The staff shall be able to have the privilege to have an account within the system.

2.2. The staff shall be able to sign in into the system.

2.3. The staff shall be able to assist the concerns of donors in customer support/feedback.

2.4. The staff shall be able to have the access to review the financial data and personal information of donors.

2.5. The staff shall be able to view the analytical reports of donations.

2.6. The staff shall be able to access the allowed settings for them.

2.7. The staff shall be able to sign out in the system.

3. Donors

3.1. The donors shall be able to access the system.

3.2. The donors shall have the option of choosing whether to use their real names or remain anonymous when creating their accounts.

3.3. The donors shall be able to sign in into the system.

- 3.4. The donors shall be able to donate in the system using payment gateways.
- 3.5. The donors shall have the ability to download their donation receipt/slip.
- 3.6. The donors shall be able to access their personal information and change their password.
- 3.7. The donors shall be able to view the total of their donations and overall donations of donors.
- 3.8. The donors shall be able to access and use customer support/feedback for concerns.
- 3.9. The donors shall be able to access the allowed settings for them.
- 3.10. The donors shall be able to sign out of the system.

Non-Functional Requirements

The following are the non-functional requirements for the donation system, which describe how it should behave and are considered limitations on its behavior. Thus, the non-functional requirements of the donation system are listed below.

1. Accessibility

- 1.1. The system must guarantee that it can be accessed from any location with an Internet connection, provided the user has the necessary authorization to access it.

- 1.2. The system should be responsive and flexible enough to adapt to different devices, platforms, and network conditions. This may include using responsive design principles to ensure that the system can be easily accessed and used on mobile devices, as well as optimizing the system's performance to work under different network conditions.

2. Usability

- 2.1. The system shall perform well, it means that the features of a system are functioning well based on what a developer predicted.
- 2.2. To meet the needs of both users and administrators, the system must be easily accessible and have user-friendly interfaces.
- 2.3. When users return to the system after a period of inactivity, the system must allow them to quickly regain their proficiency.

3. Compatibility

- 3.1. The system shall operate in a range of devices with varying screen sizes and resolutions, as well as being compatible with different browsers and operating systems.
- 3.2. The system must determine whether or not the web application is compatible with all browser versions and validate its compatibility accordingly.

4. Security

- 4.1. The system shall use encryption to protect sensitive information, such as personal and financial data of donors and beneficiaries.
- 4.2. The system shall be designed and developed with secure coding practices to minimize the risk of vulnerabilities that could be exploited by attackers.
- 4.3. The system shall secure donors during the process of donating funds.

5. Reliability

- 5.1. The system should be designed to handle increasing volumes of traffic and donations.
- 5.2. The system should be optimized for performance to ensure that it can process donations quickly and efficiently.
- 5.3. The system should be designed to ensure high availability to minimize downtime and ensure that donors can access the system at all times.
- 5.4. The system's analytic reports should be generated in a timely manner to ensure that they can be used effectively.
- 5.5. The system's analytic reports should be designed to be easily interpretable by authorized users.

6. Accuracy

- 6.1. To prevent data entry errors, the system's user input controls should be implemented.
- 6.2. The system shall incorporate the correct data in order to generate accurate analytical reports.

7. Performance

- 7.1. The system should respond quickly to user requests to provide a good user experience.
- 7.2. The system should be able to handle increased traffic and load without a significant decrease in performance.
- 7.3. The system should be available to users at all times, with minimal downtime.

Constraints

The tables in the preceding sections address the software design constraints, and the ratings were arrived at by carefully weighing each option according to the familiarity and background of the proponent.

Table 1 lists the four server-side scripting tool options that the researchers considered, including CSS, JavaScript, PHP, and WordPress. PHP was chosen as the preferred on the server side scripting language due to their familiarity and expertise. PHP's supporters believe that because it can communicate with MySQL databases in addition to other options, it will be useful for creating dynamic and interactive web pages.

Table 1.***Server-Side Scripting Languages***

Design Constraints	CSS	JavaScript	PHP	WordPress
Accessibility	8	7	8	9
Usability	8	6	10	7
Compatibility	8	8	8	8
Security	9	8	8	8
Reliability	8	7	9	7
Accuracy	8	8	8	8
Performance	8	8	9	7

The researchers looked at three options for the database: MySQL, MS Access, and Oracle, which were compared based on how well they worked with PHP resources. In the end, MySQL was chosen by the researchers because it is a powerful database server for data retrieval, can run on any operating system, and supports a variety of development interfaces, including PHP.

Both MySQL and Oracle have a username and password, which makes them both more secure and reliable than MS Access. Additionally, unlike MS Access, which can only run on Windows, MySQL and Oracle can run on a variety of operating systems. Although Oracle has a lot of features, MySQL has its own

advantages and performs better functionally. Because of this, MySQL is regarded as the most popular database option.

Table 2.

Database

Design Constraints	MySQL	MS Access	Oracle
Accessibility	8	8	8
Usability	9	8	6
Compatibility	9	7	8
Security	9	7	9
Reliability	9	8	7
Accuracy	8	8	8
Performance	9	7	8

Table 3 lists the various image and text editors that are available, including Sublime Text, Visual Studio Code, and Adobe Photoshop. According to the supporters' experience with text editors, they discovered that despite NetBeans' ability to analyze codes, it runs too slowly. In contrast, Visual Studio Code has a quick source code editor that can be used right away. Additionally, it supports a large number of programming languages and continually helps its users be productive quickly with a number of features like syntax highlighting, bracket matching, auto-indentation, box selection, snippets, and more. By incorporating features like resizing, color correction, and HDR imaging, Adobe Photoshop, on the

other hand, produces better results. As a result of their prior knowledge, the researchers preferred Adobe Photoshop and Visual Studio Code.

Table 3.

Text and Image Editor

Design Constraints	NetBeans	VS Code	Photoshop
Accessibility	8	9	9
Usability	8	8	10
Compatibility	8	9	9
Security	8	9	8
Reliability	8	8	9
Accuracy	7	8	9
Performance	8	9	9

Three testing tools, WAMP, MAMP, and XAMPP, are shown in Table 4 as being appropriate for the developed system according to the researchers. Due to its simplicity and default inclusion of PHP error reporting, which would help with script debugging, XAMPP was preferred among the alternatives by the researchers. However, MAMP was neglected by the developers because it can only run on Mac OS X. Despite the similarities between WAMP and XAMPP, XAMPP offers a greater number of features.

Table 4.***Testing Tools***

Design Constraints	XAMPP	WAMP	MAMP
Accessibility	8	7	9
Usability	8	9	10
Compatibility	8	8	7
Security	8	9	8
Reliability	9	9	9
Accuracy	9	9	9
Performance	7	9	9

Multiple Designs

The Elder Care Alliance Web-Based Donation System is mostly composed of database-driven modules that store, display, and generate the reports and documents required by various user categories, such as admin, donors and staff. Four system modules—which are represented in a block diagram in Figure 6—were created for the certification system to support the various user categories.

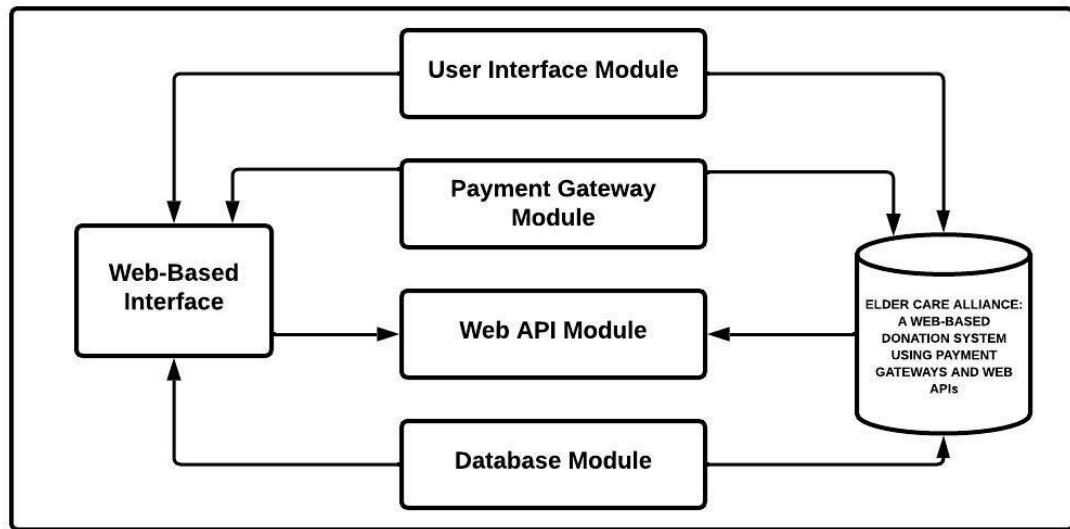


Figure 6. System Modules

The block diagram shows that the donation system is made up of four modules, each of which was developed and planned in accordance with the following functions:

1. *User Interface Module*: In this module, it is responsible for providing the front-end interface that allows donors to access the system and make donations. This module communicates with the Payment Gateway Module to process donations and with the Web API Module to retrieve relevant data such as donation history and receipts.
2. *Payment Gateway Module*: This module handles all payment transactions, securely processing donations made by users. It communicates with the User Interface Module to receive donation information and with the Database Module to store transaction records.

3. *Web API Module:* In this module, it provides an interface for the User Interface Module to communicate with external systems such as banking and tax systems. This module retrieves data from these external systems and provides it to the User Interface Module to display to donors.
4. *Database Module:* This module stores all data related to the donation system, including user account information, transaction records, and donation history. It communicates with the Payment Gateway Module and the Web API Module to store and retrieve relevant data.

Overall, the system module block diagram shows the main components of the Elder Care Alliance Web-Based Donation System and how they interact with each other to provide a seamless donation experience for users.

Security

Ensuring the security of the donation system was a major priority during its design phase, and as a result, the developers implemented various authentication and permission-based techniques using the RBAC (Role-Based Access Control) model. This pertains to the security architecture of the software system, which consists of roles, permissions, operations, and objects, as illustrated in Figure 7.

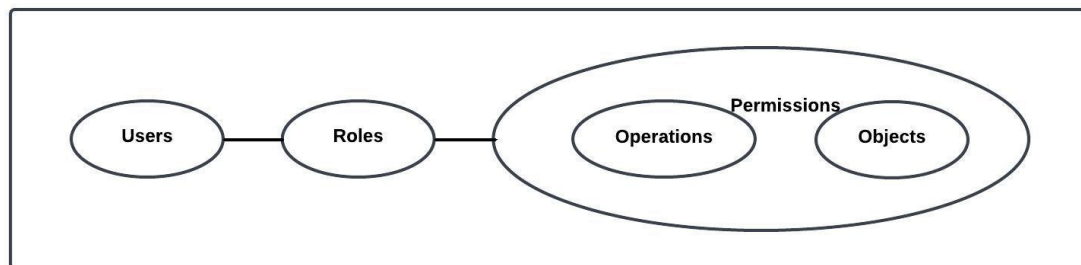


Figure 7. RBAC Component Schema

The security architecture of the donating system was also influenced by the Principle of Least Privilege (POLP). This concept of computer security entails limiting users' access permissions to only the minimum necessary resources required to perform their tasks. In the context of the Elder Care Alliance web-based donation system, this principle would be applied through the role-based security framework, which allows users to access the system based on their designated role, such as administrator, staff, or donor. The system's supporters believe that this approach is less prone to errors compared to granting approvals one-by-one, as it provides granular control and a manageable approach to access management. This can also reduce cybersecurity risk, protect sensitive data, and ensure that users can only access information and perform actions that are authorized for their specific role.

Trade-off

The paper tackles a significant issue of balancing trade-offs, which researchers highlight as essential to achieve competitive goals and allocate additional time and resources for enhancing performance. Additionally, the concept of halo effects is discussed, which refers to the cognitive biases that influence the decision-making of researchers based on their overall impression. As a result, Table 5 presents a list of design sets and their corresponding technological stack.

Table 5.
Multiple Technology Stacks

Design	Technology Stack
Design A	HTML, CSS, JavaScript, PHP, MySQL, XAMPP
Design B	WordPress
Design C	Python

The table in Design A showcases a range of open source products that can be utilized to establish the donation system. However, Design B recommends WordPress as a viable alternative due to its user-friendly interface and clear layout, which would significantly reduce formatting time. Meanwhile, Design C advocates for the use of Python as it is a flexible and adaptable programming language that its researchers describe as an all-rounder and one of the most widely used coding languages. Despite the advantages offered by all of these options, the researchers of the donation system ultimately chose Design A. This decision was informed by their knowledge of the various technological stacks suggested by the researchers of the different designs.

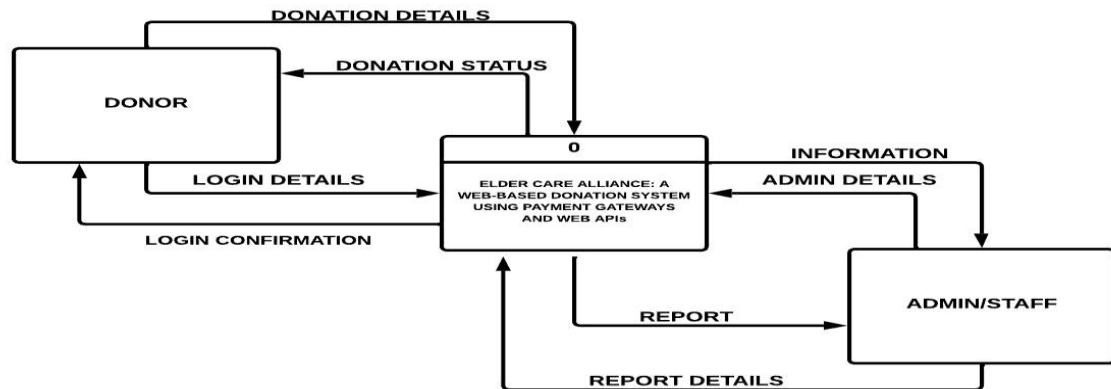
System Design/Architecture

Figure 7 visually depicts the complex journey of information within the donation system, employing a network of symbols to illustrate the interconnected functions and processes. It serves as a comprehensive guide, highlighting how data

is acquired, transformed, preserved, and disseminated both within the system and between its various components.

Figure 8. Context Diagram

Based on the context diagram in figure 8, Elder Care Alliance: A Web-Based Donation System refers to the system under consideration as a single high-level process. Also, the relationship that the system has with other external entities such as Admin, Staff and Donor are illustrated.



Link Architecture

Figure 8 provides an overview of the link architecture of the system, illustrating the specific roles and functions of different users, including the Admin, Staff, and Donor. This diagram will serve as the foundation for the development of the system's flow, outlining how data and information will be transmitted between different components and users of the system.

Moreover, the link architecture diagram depicts how the Admin will have access to and control over the system's various functionalities, while the Staff will

be responsible for managing the day-to-day operations of the system. The donor, on the other hand, will have the ability to interact with the system and make donations using a variety of payment gateways and web APIs.

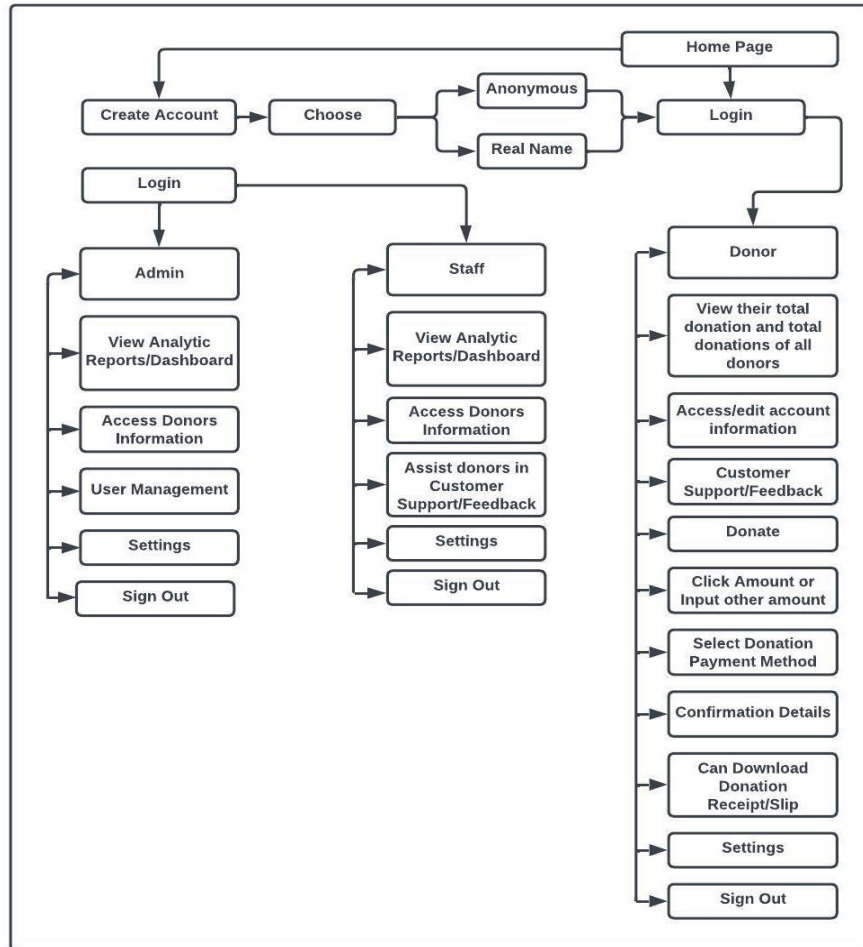


Figure 9. Link Architecture

Use Case

The Use Case diagram displays the distinct categories of users, namely Donors, Admin, and Staff, along with their corresponding use cases. Figure 10 showcases these interactions with the donation system, effectively depicting how users relate to the various use cases that they might come across.

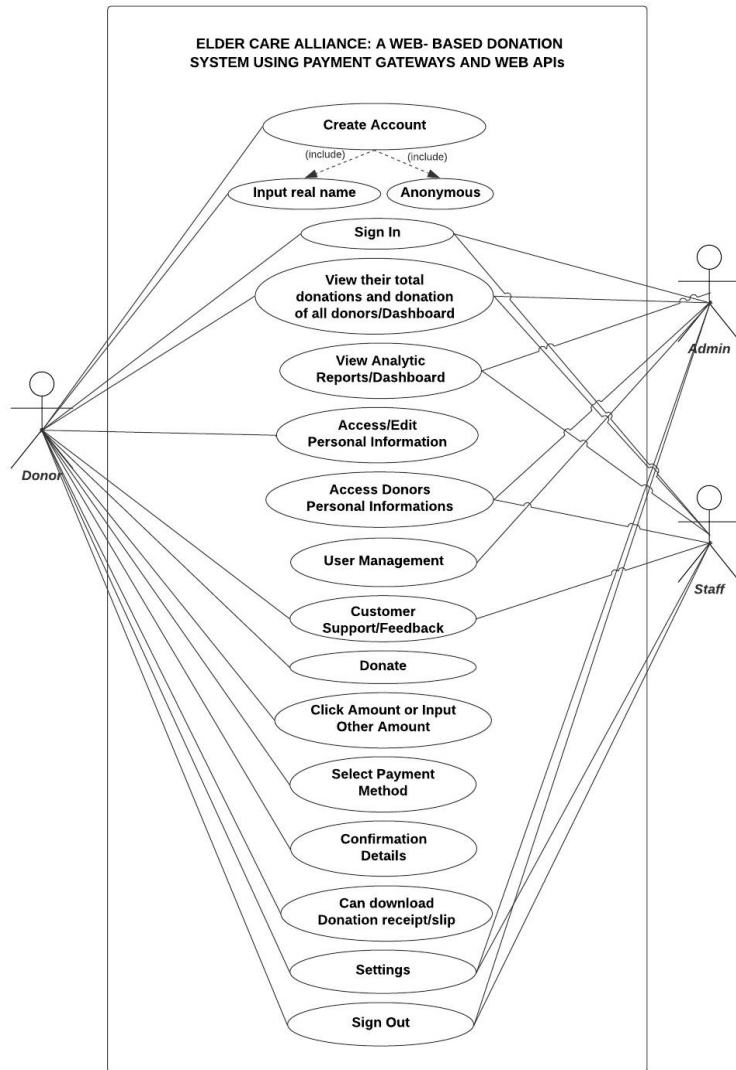


Figure 10. Use Case Diagram

Sequence Diagram

In this sequence diagram, the Donor initiates the donation process by making a donation through the Elder Care Alliance Web-Based System (1). The Payment Gateway verifies the payment information provided by the donor (2), authorizes and settles the payment with the bank (3), and notifies the Elder Care Alliance and Donor of the successful payment (4). The Notification Service sends a confirmation

email to the Donor (5). The Admin and Staff members can then view and manage donations through their respective dashboards (6, 7). The Staff member can also update donor records (8).

The sequence diagram in figure 11 shows the flow of interactions between the different components of the system, including the Donor, Elder Care Alliance Web-Based System, Payment Gateway, Notification Service, Admin Dashboard, and Staff Dashboard.

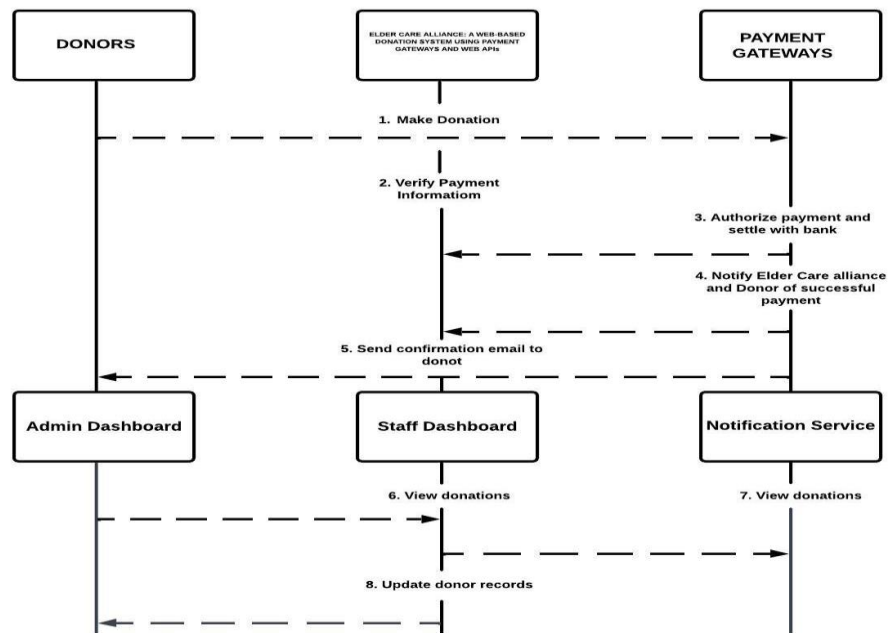


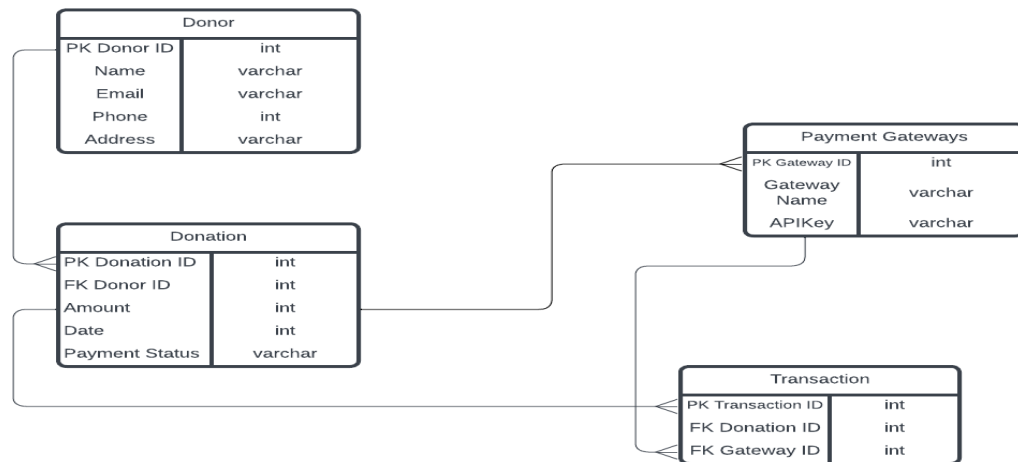
Figure 11. Sequence Diagram

Database Design

Figure 12 provides a detailed specification of the data that needs to be processed, along with information on how these data elements are interrelated. This serves as a blueprint for implementing the data in software applications. The

proponents were able to gain a better understanding of the database contents by using the Entity-Relationship (ER) diagram.

Figure 12. Entity Relationship Diagram



Graphical User Interface

As shown in figure 13, they will see the logo of Elder Care Alliance in the upper left corner, accompanied by the words "Sta. Ana - San Joaquin Bahay Ampunan Foundation Inc." Below the logo, the address of the orphanage is displayed. A "Donate Here" button is also visible on the page, which users can click on to make a donation. If the user is not a registered donor, they can click on "Sign up to donate" at the bottom of the page. Next to this, the website's words of encouragement will be displayed to persuade potential donors. In the upper right corner, the user will see "Home," which will redirect them to the landing page of the website. The "Sign in" option is available for Admins, Staff, and donors who have an account on the donation website. The "Contact Us" section contains the

organization's contact information. Lastly, the "About Us" section provides information about the orphanage's mission, vision, and history.

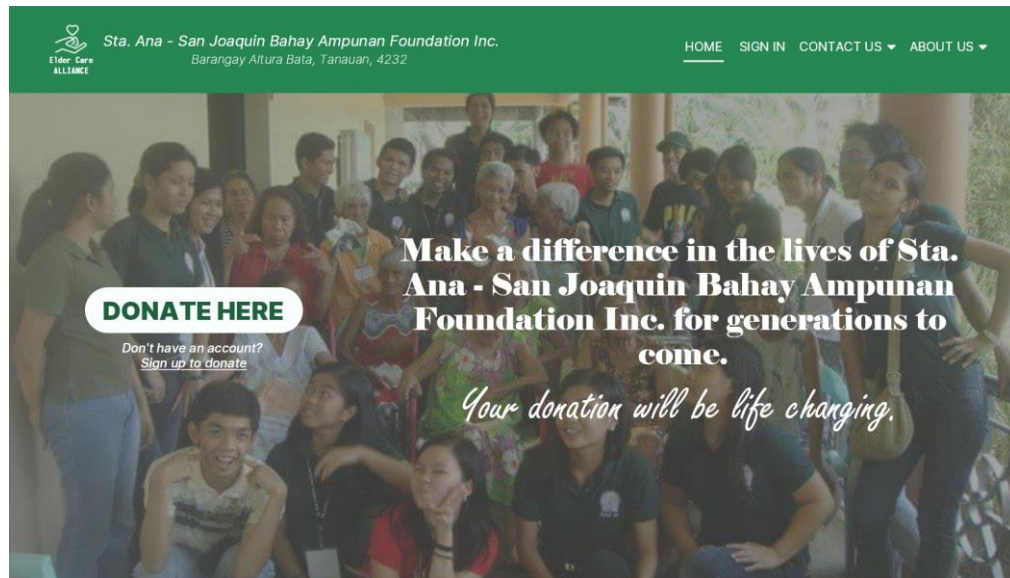
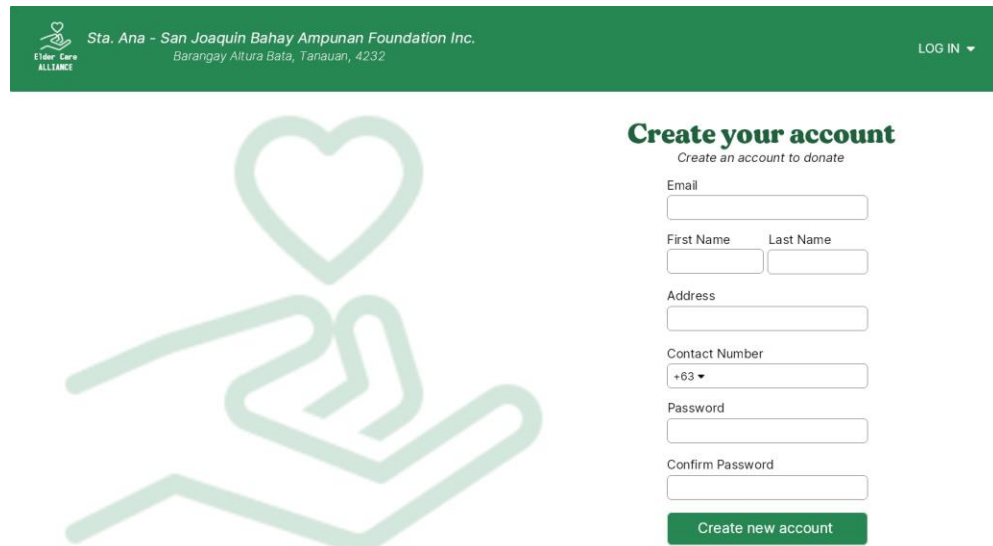



Figure 13. Landing/Home Page

In figure 14, the "Create Account Page" is shown where the user/donor can create an account in order to donate to the foundation, they will have the ability to choose whether they want to use their real name or stay anonymous. The user is required to provide their personal information such as email, first name, last name, address, contact number, and password. Otherwise, anonymous donors will only provide their email address and password. After filling out the necessary details, they can click the "Create new account" button to complete the registration process.



 **Sta. Ana - San Joaquin Bahay Ampunan Foundation Inc.**
Barangay Altura Bata, Tanauan, 4232

LOG IN ▾

Create your account

Create an account to donate

Email

First Name Last Name

Address

Contact Number

Password

Confirm Password

Create new account

Figure 14. Create Account Page

After the user completes the registration process, they can then access the "Sign In Page" shown in figure 15 where they can log in to their account by providing their email address or username and password. Once they have entered their details, they can click the "Sign In" button to access their account. If the user already has an account, they can click the "Sign in" button on the "Landing/Home Page" shown in Figure 12 to log in.

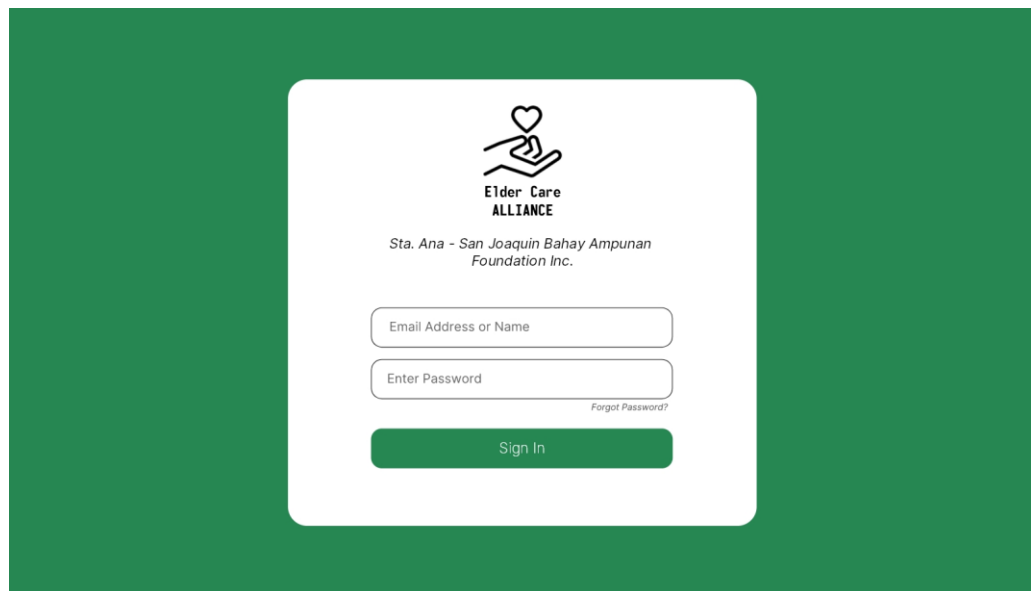
The image shows a sign-in page for the Elder Care Alliance. It features a green background with a white central box containing the login form. At the top of the white box is a logo consisting of a heart above two hands, with the text "Elder Care ALLIANCE" below it. Underneath the logo is the text "Sta. Ana - San Joaquin Bahay Ampunan Foundation Inc.". The login form includes two input fields: "Email Address or Name" and "Enter Password". Below the password field is a link that says "Forgot Password?". At the bottom of the form is a green "Sign In" button.

Figure 15. Sign in page

In figure 16, the "Donate Page" can be seen where the user/donor can make their donations. At the top, the "Services" and "Programs" can be seen where the donor can choose where they want to donate their funds. After that, they can select a fixed amount or enter the amount they want to donate. Then, they can check the box below if they want to make it a monthly donation or leave it as an automatic one-time donation only. At the bottom, the mode of payment can be selected so they can proceed with their donation. After that, they will be directed to fill up their bank account/online banking information for their donation to be processed.

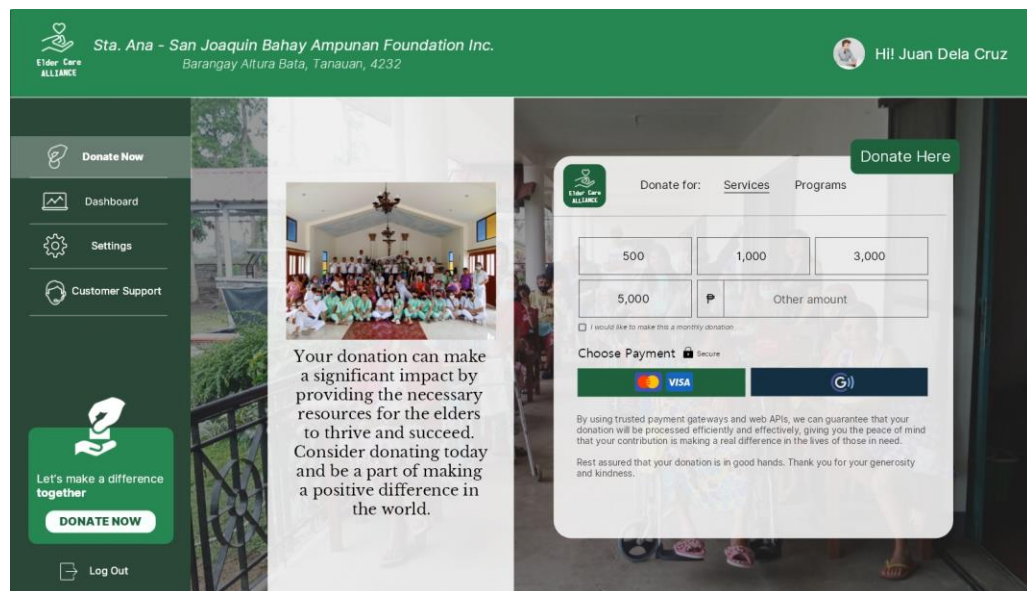


Figure 16. Donate Page

In figure 17, the "Dashboard Page - Donors" can be seen where the donor can view their total donation, as well as the total donation of all donors.

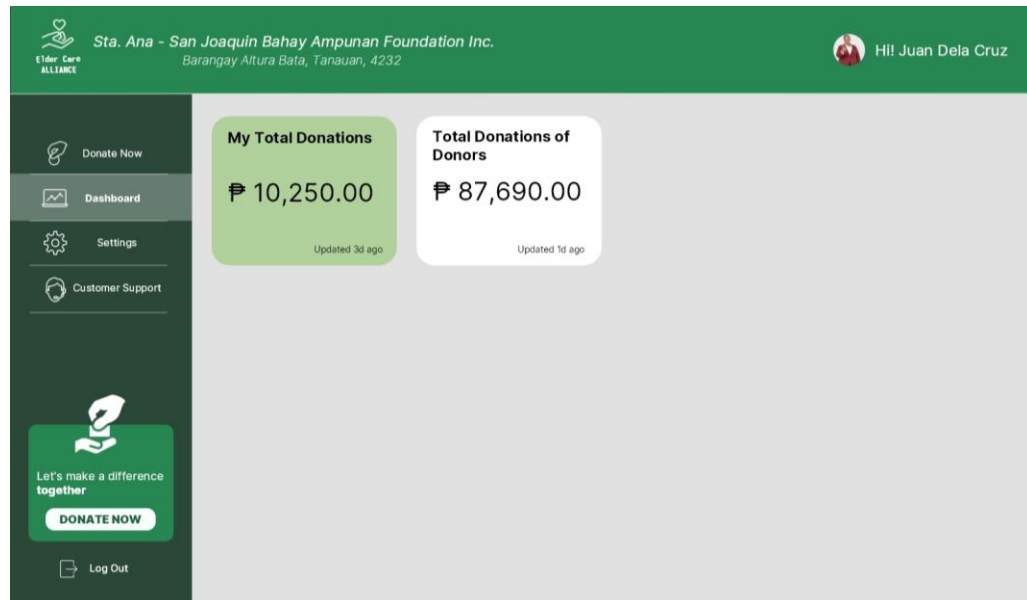


Figure 17. Dashboard Page - Donors

In figure 18, the "Analytic Reports Page - Admin" can be seen, where the admin can view the total donations of all donors in the foundation. The admin can also see how many donations have been received on the present day. The admin can also see the total number of donors and how many new donors the foundation has. The admin can view the total donated funds that have come in and out. In the donation analytics, the breakdown of donations for services and programs can be seen. The admin can also see who the top donors are, how many donations they have made, and when their last donation was. All of this information can help the admin make informed decisions and create effective strategies for the foundation.

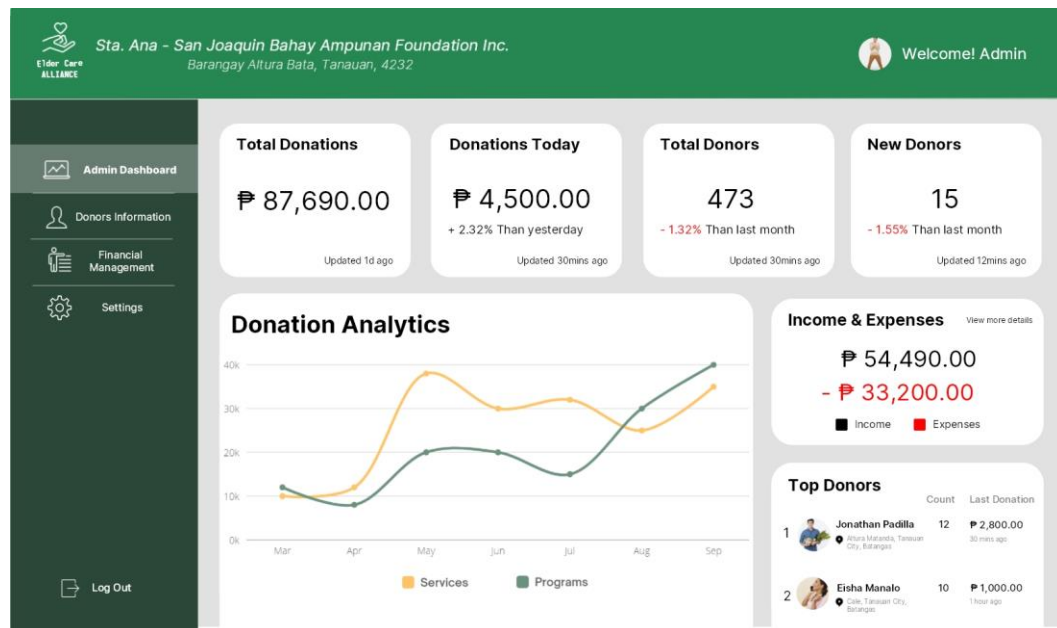


Figure 18. Analytic Reports Page - Admin

In figure 19, the "Analytic Reports Page - Staff" can be seen, where they can view the total donation of all donors to the foundation, as well as the number of donations that have arrived on the present day. The staff can also see the total number of donors and the number of new donors to the foundation. Similar to the admin, the staff can also see the donated funds that have entered and left. In the donation analytics, they can see the breakdown of donations for services and programs. The staff can also view the top donors, the number of their donation count, and when their last donation was made.

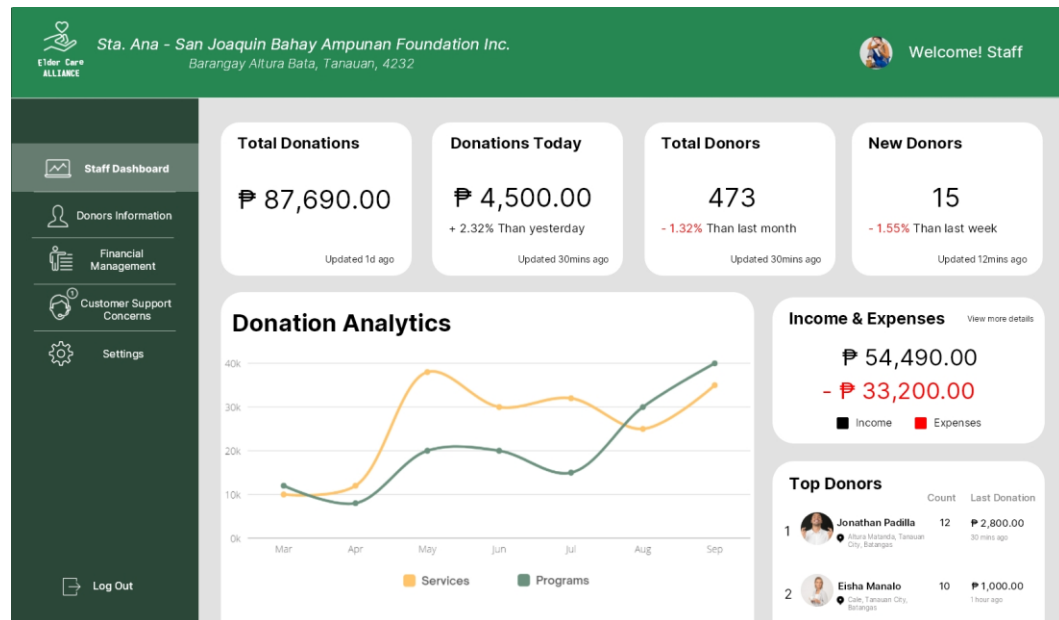


Figure 19. Analytic Reports Page - Staff

Below, you can see figure 20 where the "Customer Support Page" is located on the left side of the website, which donors can click on to communicate with the staff of the foundation regarding their concerns.

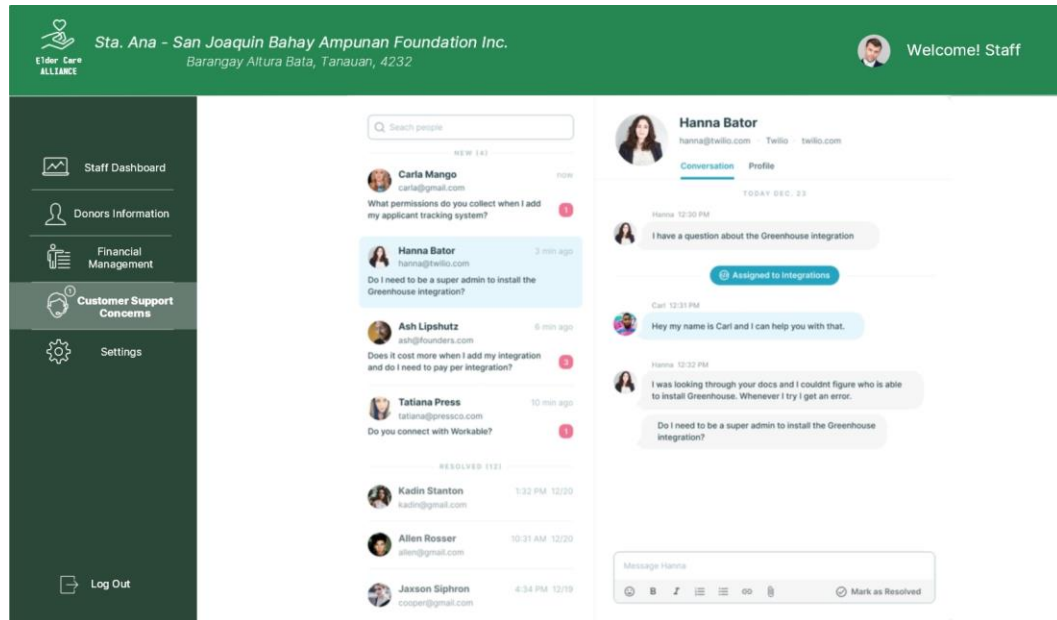


Figure 20. Customer Support Page

Software

For this research project, the Windows Operating System was chosen as the system software due to its ability to manage computer hardware and software resources, as well as provide common services for computer programs. The donation system will be compatible with any device running on Windows 7 or later as it serves as a mediator between the user and computer hardware, and can oversee the execution of different types of programs.

Moreover, JavaScript is known for its ability to create scripts that can be embedded in HTML sites, which is why it was chosen as the client-side scripting language. Its supporters believe that JavaScript offers various options for adding interesting components to an HTML page. On the other hand, PHP was chosen as the server-side scripting language as its supporters are knowledgeable in its manipulation and control. The decision to use PHP was based on its capacity to generate dynamic and interactive web pages that can communicate with MySQL databases.

Web Platform

The researchers considered Bootstrap as the web development platform for this study. The platform was chosen because it provides pre-built design templates for various interface components such as typography, forms, buttons, and navigation, all of which are based on CSS and JavaScript. Advocates of Bootstrap consider it to be a fast and cost-effective framework, which makes it an ideal choice for creating tailored layouts for the certification system using HTML. Both CSS and JavaScript are utilized by Bootstrap to create an aesthetically pleasing and interactive interface for the certification system.

Database

The Back-end Technology selected for this project was MySQL Server, not just for its ability to operate as a server in a client/server network, but also because it can operate as a stand-alone database directly on the client. Additionally, the user-

friendly features of MySQL Server and its scalability allow it to run effectively on a client with minimal resource utilization.

Subscription

Table 6 provides a comprehensive overview of the various Software as a Service (SaaS) options available to users who seek access to specific products or services. One important aspect to consider is the distinction between website domain and website hosting. The former refers to the unique address that appears in the user's browser address bar, while the latter is a subscription service that keeps the website available and accessible online.

To illustrate further, website hosting involves a server where the website's data and files are stored, allowing users to access the site whenever they want. On the other hand, the website domain is the URL that users type into their browsers to access the website. Choosing the right SaaS subscription for both website domain and hosting is crucial in ensuring the online presence of a website.

Table 6.

Subscription Fees

Software as a Service (SaaS)	Description	Estimated Cost
Website Domain	The unique name or address that identifies a website on the internet.	₱ 1,105

000webhost

This term subscription
would keep the website
accessible on the internet.

₱ 3,000

Total: ₱ 4,105

Testing

Since the quality model framework is a structured approach for evaluating the quality of a software product or system. It offers a set of characteristics, sub-characteristics, and metrics for measuring and assessing the quality of a software product or system. In particular, researchers have recognized ISO/IEC 25010 as a valuable framework for developing metrics relevant to the donation system, as it includes the eight quality attributes that are essential for any high-quality system or application to possess.

Testing Procedure

In the context of Elder Care Alliance's web-based donation system which involves payment gateways and web APIs, the researchers employed Agile Testing with the Agile testing quadrant as a basis. The researchers saw Figure 21 as a guide that divides the entire agile testing framework into four quadrants, as depicted.

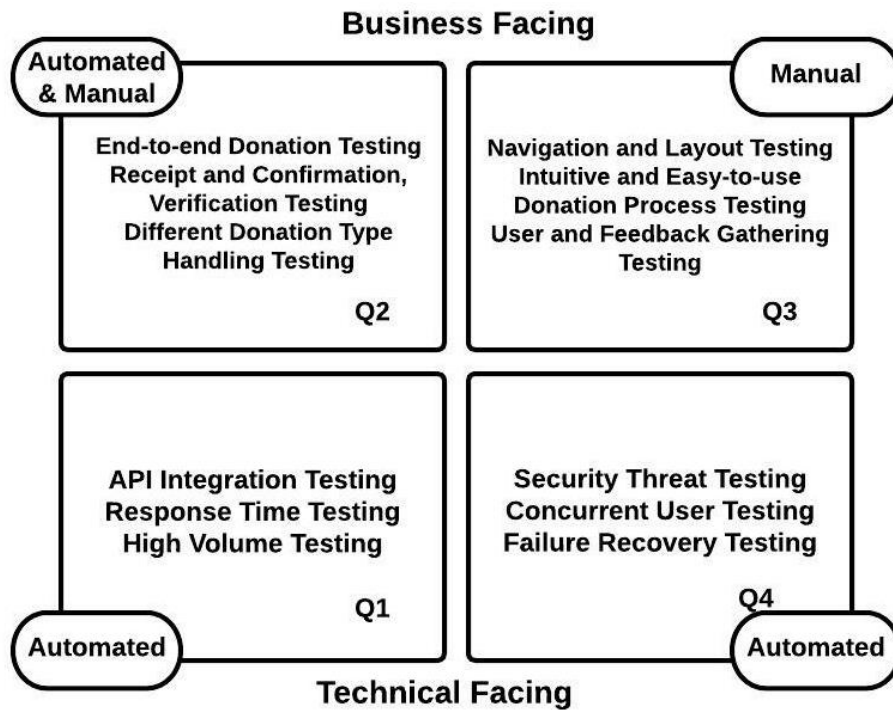


Figure 21. Agile Testing Quadrants

In relation to this, the working of each quadrant may be seen as under:

- A. **Agile Testing First Quadrant (Q1).** This quadrant focuses on tests that verify the technical aspects of the system. Examples might include testing the integration between the web application and payment gateway APIs, testing the response times of different API calls, and verifying that the system can handle a high volume of traffic.
- B. **Agile Testing Second Quadrant (Q2).** In this quadrant, the main focus was the tests that verify the system's functionality from a business or user perspective. Examples might include testing the donation process end-to-end, verifying that donors receive accurate receipts and confirmations, and

testing the system's ability to handle different types of donations (e.g., one-time vs. recurring).

C. Agile Testing Third Quadrant (Q3). This quadrant focuses on tests that verify the system's usability and user experience. Examples might include testing the navigation and layout of the web application, verifying that the donation process is intuitive and easy to use, and conducting user testing to gather feedback and insights.

D. Agile Testing Fourth Quadrant (Q4). In this quadrant, the main focus was the tests that verify the system's non-functional requirements, such as security, performance, and scalability. Examples might include testing the system's resilience to various security threats, verifying that the system can handle a large number of concurrent users, and testing the system's ability to recover from failures or outages.

To further elaborate, by using the Agile Testing Quadrants framework, Elder Care Alliance's development team can plan and execute a comprehensive testing strategy that covers all aspects of the web-based donation system. This can help ensure that the system meets the needs of its users and stakeholders, and provides a high-quality and reliable experience for donors and recipients alike.

Data Gathering

Primary sources of assessment information of a web-based donation system for an elder care alliance, a comprehensive approach is needed that involves several

steps. The first step is to identify the needs and goals of the elder care alliance, which can be done by interviewing key stakeholders within the organization and understanding their current donation processes. Researching similar donation systems used by other non-profit organizations can also provide valuable insights into best practices and strategies to consider. Once the needs and goals are established, user and technical requirements should be gathered. User requirements could be gathered through survey, focus groups, or one-on-one interviews, while technical requirements could be gathered by consulting with IT staff and identifying necessary integrations with payment gateways and web APIs. Designing a user-friendly interface that encourages and facilitates donations is also important, and this step could involve wireframing, prototyping, and user testing. Finally, planning for data collection and analysis is crucial to measure the success of the donation system. This could involve identifying what data needs to be collected, such as donation amounts, analytic reports, overall donors, and user feedbacks, and planning for how this data will be collected, stored, and analyzed. Testing and iterating the system with user feedback and input should also be done to ensure the system meets the needs of the elder care alliance and its users.

Deployment

The researchers have produced a guide on how to implement the donation system for the Sta Ana-San Joaquin Bahay Ampunan Foundation Inc. The guide contains a variety of activities, which are listed in Table 7. The phases that are

advised for each activity are shaded in black, and the phases that can still be performed but may come with risks are colored in gray.

Table 7.

Deployment Process Activities

Activities	Development	Testing	Deployment	Maintenance
<u>DP 1:</u> Finalize the development of system				
<u>DP 2:</u> Conduct user acceptance testing				
<u>DP 3:</u> Deploy the system to a staging environment				
<u>DP 4:</u> Finalize server infrastructure and hosting configuration				
<u>DP 5:</u> Develop a backup and disaster recovery plan				
<u>DP 6:</u> Perform security testing and implement necessary security measures				
DP 7: Installation				
DP 7.1: Integrate the payment gateway and web APIs into the system				
DP 7.2: Deploy the				

system to the production environment				
DP 7.3: Perform final testing and quality assurance checks before launch.				
DP 7.4: Conduct a soft launch to a small group of users to identify and fix any issues				
DP 8: Launching				
DP 8.1: Launch the donation system to the public				
DP 8.2: Monitor system performance and user feedback after launch				
DP 8.3: Conduct regular maintenance and updates				

Maintenance

The researchers will perform maintenance activities to restore normal operating conditions after detecting any anomalies. Table 8 shows the different types of maintenance that will be conducted by the researchers at specific time intervals. These maintenance types listed in the table are also intended to address any detected anomalies and bring the system back to normal operation.

Table 8.***Maintenance Plan***

System	Maintenance Type	Time Interval	Assigned Proponent
Elder Care Alliance: A Web-Based Donation System using Payment Gateways and Web APIs	Adaptive	Monthly	Kristhelmae H. Magsombol
	Corrective	Weekly	Carl Jan C. Buquiz
	Preventive	Quarterly	All Proponents
	Perfective	Monthly	Charlotte Anne M. Mangubat

The original environment in which the software was developed, including the operating system, donation process and rubrics, and external characteristics, is likely to change over time. To address this, the software developers incorporated adaptive maintenance, which allows the software to be modified to accommodate changes in its external environment. Corrective maintenance is also available to correct any software errors.

Furthermore, as users interact with the software, they may discover new functions that would be useful. To include these new functions, perfective maintenance is used to extend the software beyond its original functional requirements.

Software re-engineering, also known as preventive maintenance, is required in order for the software to be able to continue meeting the needs of its end-users because software can deteriorate over time as a result of changes. Making

adjustments to computer programs as part of preventive maintenance makes them easier to fix, modify, and improve.

It is significant to note that only about 20% of all maintenance work is devoted to correcting errors, with the remaining 80% concentrated on modifying current systems to changes in their external environments, implementing user-requested enhancements, and reengineering applications for use.

Risk Management

In project management, risks are hypothetical events that, if they materialize, can be categorized as problems that demand efficient resolution. In order to keep a project on track and achieve its objectives, it is crucial to identify, assess, and respond to any risks that materialize throughout the course of the project. To reduce unexpected events during the project, risk analysis and management will be used consistently throughout the project.

Although the future cannot be predicted with complete certainty, adopting a straightforward and efficient risk management approach to predict uncertainties in the project and mitigate their occurrence or impact can have a profound impact on the entire project. This approach can substantially increase the chances of successfully completing the project while minimizing the consequences of any risks that may arise.

With regards to this matter, the project's researchers have carefully identified eight potential risks that could have a significant impact on the suggested donation system:

RISK 001: Failure to meet the project's demand. If the donation system's quality level is deemed unacceptable, it could have a negative impact on the project. In order to emphasize how important project quality is in determining both customer satisfaction and project performance.

RISK 002: Technical issues. System downtime, software glitches, and hardware failures can disrupt the donation system's functionality.

RISK 003: Unable to process the donated funds. Payment processing errors or issues can impact donors' willingness to use the system.

RISK 004: Unsatisfactory user experience. The donor experience may be negatively impacted by issues such as slow page loading times, confusing navigation, or other usability issues. This can lead to frustration, mistakes, and ultimately discourage users from donating.

RISK 005: Reputation of organization due to system failure. Any negative incidents such as data breaches, system downtime, or financial irregularities can damage the orphanage's reputation and deter potential donors.

RISK 006: Potential security threats. The donation system may be vulnerable to cyber-attacks, data breaches, and unauthorized access.

RISK 007: Difficulty in processing high volumes of donations. The system may struggle to process a high volume of donations, resulting in delays, errors, or crashes if it's not equipped to handle a large amount of traffic or if the servers and payment gateway are not properly configured.

RISK 008: Insufficient data backups and disaster recovery measures. The potential loss of critical data in the event of a system failure or disaster, which can lead to downtime, reputational damage, and loss of donor trust. Without proper backup and recovery measures, it may be difficult or impossible to recover important data, resulting in significant negative impacts on the donation system.

The next step is to choose alternative courses of action to manage these risks and to develop and carry out treatment plans after the risks have been identified and assessed. It is crucial to remember that not all identified risks will affect the organization to the same extent, and some risks might not even present a threat of loss or damage. For each identified risk, a summary of the risk treatments suggested by the researchers is presented in Table 10.

		S E V E R I T Y				
L I K E L I H O O D		NEGLECTIBLE	MINOR	MODERATE	SIGNIFICANT	SEVERE
	VERY LIKELY	LOW MED	MEDIUM	MED HIGH	HIGH	HIGH
	LIKELY	LOW	LOW MED	MEDIUM	MED HIGH	HIGH
	POSSIBLE	LOW	LOW MED	MEDIUM	MED HIGH	MED HIGH
	UNLIKELY	LOW	LOW MED	LOW MED	MEDIUM	MED HIGH
	VERY UNLIKELY	LOW	LOW	LOW MED	MEDIUM	MEDIUM

Figure 22. Risk Matrix

To further classify and elaborate the aforementioned risks, illustrated in Figure 22 is the Risk Matrix which would serve as the basis for risk analysis presented in Table 9.

Table 9.

Risk Analysis

ID	RISK	Category	Likelihood	Severity	Impact
001	Failure to meet the project's demand	Technical	Likely	Significant	Med High
002	Technical issues	Technical	Possible	Significant	Med High
003	Unable to process the donated funds	Technical	Unlikely	Moderate	Low Med
004	Unsatisfactory user experience	External	Unlikely	Moderate	Low Med
005	Reputation of organization due to system failure	Organizational	Possible	Severe	Med High
006	Potential security threats	Technical	Likely	Moderate	Medium
007	Difficulty in processing high volumes of donations	Technical	Likely	Significant	Med High
008	Insufficient data backups and disaster recovery measures	External	Possible	Significant	Med High

Following the analysis and assessment of potential risks, the next phase comprises determining alternative and effective risk management solutions. Treatment programs must then be developed and implemented. However, not all identified risks will have the same impact on the company, nor will all risks cause loss or harm. In Table 10, researchers have supplied a thorough list of risk treatments for each identified risk.

Table 10.

Risk Treatment

Risk	Risk Treatment
RISK 001: <i>Failure to meet the project's demand</i>	Regular review and monitoring of the risk management plan throughout the project's development will also help to ensure that the project's demand is met and any potential risks are effectively managed.
RISK 002: <i>Technical issues</i>	Prevention involves taking proactive measures to prevent technical issues from occurring in the first place. For example, the team could implement thorough testing and quality assurance processes to identify and address any potential technical issues before they become problems.
RISK 003: <i>Unable to process the donated funds</i>	Establish a contingency plan that includes multiple payment options for donors to reduce the risk of being unable to process donated funds. Implement regular testing and quality assurance processes, and provide donors with clear instructions on how to donate and what to do in case of payment processing issues.
RISK 004: <i>Unsatisfactory user experience</i>	Conduct user testing and gather feedback throughout the development process to identify and address potential issues with the user interface and experience. Prioritize usability and incorporate industry standards for user interface design.
RISK 005: <i>Reputation of organization due to system failure</i>	To perform backup systems or establish clear communication plans, perform routine system maintenance, and testing to lessen the impact of any system failures.

RISK 006: <i>Potential security threats</i>	Implement robust security measures, such as encryption and access controls, conduct regular security audits and vulnerability assessments, and provide staff and user training on data security and password management to reduce the risk of potential security threats in the web-based donation system.
RISK 007: <i>Difficulty in processing high volumes of donations</i>	Implement a scalable infrastructure, conduct load testing and performance tuning, and upgrade the hardware and software to handle high volumes of donations to minimize the risk of system downtime or performance issues.
RISK 008: <i>Insufficient data backups and disaster recovery measures</i>	Implement regular and automated data backups, and establish a disaster recovery plan to ensure the safe and timely recovery of data in case of system failures or disasters.

Nonetheless, it is only necessary to designate a team member who can best monitor the risk trigger and drive the defined countermeasures for the risk treatments listed in Table 10. As a result, risk owners are tasked with immediately reporting any changes and initiating the specified countermeasures, as shown in Table 11.

Table 11.

Risk Ownership

ID	RISK	Owner
001	Failure to meet the project's demand	Kristhelmae H. Magsombol
002	Technical issues	Kristhelmae H. Magsombol
003	Unable to process the donated funds	Kristhelmae H. Magsombol
004	Unsatisfactory user experience	Charlotte Anne M. Mangubat

005	Reputation of organization due to system failure	Charlotte Anne M. Mangubat
006	Potential security threats	Carl Jan C. Buquiz
007	Difficulty in processing high volumes of donations	Carl Jan C. Buquiz
008	Insufficient data backups and disaster recovery measures	Kristhelmae H. Magsombol

APPENDIX A

SCHEDULE AND TIMELINE

Figure 23 presents a visual representation of the sequence of activities, including relevant details such as important dates, time required, and the individuals responsible for each task. This graphical timeline allowed for the efficient delegation of tasks among team members, ensuring that team resources were allocated optimally without overwhelming any individual.

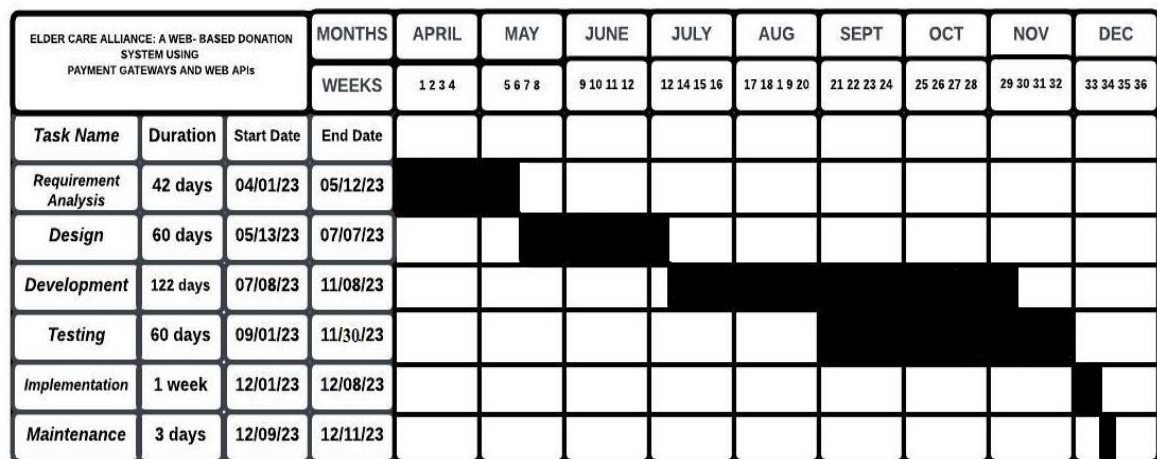


Figure 31. Gantt Chart

Additionally, the management of the project for this research is composed of six distinct stages: requirement analysis, design, development, testing, implementation, and maintenance. The study's researchers consider each phase as an application of knowledge, expertise, and various tools and techniques that are utilized across a wide range of activities aimed at accomplishing the project's objectives.

APPENDIX B

PROJECT ROLES AND RESPONSIBILITIES

Table 12 provides a summary of the contributors to the study, who are listed as Domain Specialists. Each member of the team, who had expertise in various fields and possessed particular skills, made for an efficient team.

Table 12.

Roles Responsibilities

Name of the Proponent	Task/Responsibility
Kristhelmae H. Magsombol	Lead Programmer, UI/UX Designer, Tester
Charlotte Anne M. Mangubat	Documenter, Quality Assurance Tester
Carl Jan C. Buquiz	Documenter, Quality Assurance Tester

According to the table above, Ms. Magsombol's responsibility is to use the client's technical specifications to translate business requirements into a technical

solution, the project deliverables and communicates the status of the donation system, Ms. Magsombol is also in charge of handling technical requirements like UI/UX design and documentation.

Mr. Buquiz and Ms. Mangubat were in charge of coming up with ideas for supporting the documentation and making sure the software solution complies with all necessary business requirements and is free of glitches, errors, and flaws. They worked with Ms. Magsombol to analyze, review, and assess the technical requirements and design specifications during the planning and preparation stages of the software testing. Along with creating test cases, designs, and requirements, they also carefully examined test results and defect reports.

Despite playing different roles, the researchers used the concepts of cross-functionality and self-organization, which increased transparency and improved risk management for system assessments and specifications. As a result of the researchers sharing overall accountability for the project results, this strategy increased innovation and decreased defects. Due to its high level of functionality and lack of outside control components, which allowed for a more autonomous work environment, the approach's researchers found it to be fulfilling.

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