Web-based Fund Collections System

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ABSTRACT

This system streamlines parts of the manual process of receiving client payments in a military organization's Accounting and Finance offices in one of the Municipalities of the province of Zamboanga del Sur, Philippines. The current system of accepting payments as funds is the usual manually performed fund collection whereby clients will hand in their bills, pay the required amount, and get an official transaction receipt. The finance office then takes the carbon copy of the issued receipt as a backup for the performed transaction. With the deployment of this system, the Accounting and Finance offices have eliminated the challenges present in the current process through a web-based interface that integrates both offices to process payment transactions, which are now managed digitally. While it is important to note that this system does not entirely run online and does not deploy a live website where clients can settle their transactions using a digital payment method, it is worth noting that this system has eliminated parts of the required business processes in handling the payment transactions that are manually operated from the issuance of an order of payment, processing the payment, and finally the issuance of transaction receipt. This system also interprets payment transactions and projects a graphical report through data visualization to produce significant information, such as daily and annual perspectives of fund collection. These innovations not only automate office transactions but also transform the transaction efficiently for the organization and its client.

Key words: payment system, fund collections system, web-based system, data visualization, office automation, business process automation

1. INTRODUCTION

Digitization is a crucial aspect of running transactions or providing services in organizations today, and it has become a phenomenon as it streamlines management [1]. Integrating digital technology, or digital transformation, into various areas within an organization fundamentally changes its business process operations and service delivery. Digital transformation has become significant in academic, government, banking, and manufacturing domains. As technology progresses, it will continuously impact our society [2]. Indeed, digital technology's transforming workplaces like offices in ways that were nonexistent many years ago. It has enabled organizations to automate transactions through software applications that transform manually performed service tasks by workers into a streamlined and digital process [3], like a military organization in one of the Municipalities of Zamboanga del Sur in the Philippines, which is the client of this software project.

The Accounting and Finance offices of the cited military organization currently manage client payments in addition to the many other tasks their employees perform daily. Given that the organization is military, these payments come from clients who are primarily soldiers. Some clients are civilians who mainly conduct business, such as merchandising, and provide supplies during biddings within the organization's premises by renting spaces where the business transactions occur. A bidding is required when the organization needs supplies for a particular project. To provide the necessary supplies, civilian clients must formally join as bidders. To do so, they must be able to pay the bidding fee as a requirement. If they win the bidding process, they will supply the necessary items for a particular project. Hence, civilian clients pay rental or bidding fees.

On the other hand, the primary clients who are soldiers, in this case, pay fees for the renewal of their dependents' identification cards or pay for cash refunds. The organization issues the dependent's identification card for the welfare of the individuals or the dependents who rely on the employee for support, most often financial support. When soldiers receive compensation beyond what is due or when they should no longer receive it due to special conditions, such as they have already resigned, one has to return it to the organization by paying it as a cash refund. Hence, the primary clients pay for the renewal of dependent identification cards or refund the cash they are not supposed to receive. To process these types of payments, the organization's Accounting office will issue an

order of payment to the client or the payor after a verification process. The client then proceeds to the organization's Finance office, hands the payment order, and pays the specified amount based on the payment type the client wants to settle. The involved business processes or transactions are handled manually using the typical pen and paper mechanisms, from issuing payment orders to releasing payment receipts. However, with the intervention of digital technology such as this software project, running the necessary business processes for funds collection becomes efficient and provides better service to the organization's clients. In addition, deploying this system transforms how the organization traditionally conducts transactions, thereby providing the employees with better ways to perform their jobs related to fund collection. As an effect, convenience also occurs in the interaction between the organization and the client.

This system digitizes some of the involved processes in funds collection. Instead of manually recording payor details and issuing the order of payment or the bill for payment, it enables the Accounting office to input the payor's basic information into the system and print it so the payor can pay the specified amount to the Finance office. The payment process is also digitized by recording the transaction into the system so the organization can produce electronic reports to determine helpful information regarding fund collection. In addition, the system also visualizes information on fund collection using graphical representations, which effectively communicate and interpret data in various sectors [4].

Business process automation is crucial in managing organizations. It reduces the execution time of routine transactions, freeing up employees to perform other tasks [5]. Automation also promotes financial efficiency through technology and automated systems that optimize and streamline financial processes within an organization [6]. In contrast, manually operated systems are generally inefficient and time-consuming [7]. In addition, using digital technologies also enables organizations to reduce processing costs and elevate the value of their services [8]. Indeed, everything has transformed from traditional and manual into automated office systems, a powerful innovation to foster productivity at work and boost the quality of work by the employees of organizations [9].

Several office automation system developments and studies have been conducted. Bhuyar & Ansari [10] developed an innovative security and alarm system for office automation that uses various advanced technology tools and solutions to improve users' efficiency. Xiao et al. [11] also developed and implemented an office automation system based on the Internet of Things technology to carry out mobile office functions through smartphones, realizing business message exchange and real-time processing of process approval business. Automation has also been a relevant innovation in our homes today, like what Kamble & Mulani [12] developed to control home devices with voice using Google Assistant. Although many systems in the market today can do this, this system aims to create a personalized system. Office system

automation has also been beneficial in energy saving. Selvaraj [13] developed an office automation system to save electricity. The system saves energy by automatically switching off the office fans and lights within a short interval after leaving the room. Indeed, office automation systems have become one of the platforms for progress and development to enhance office productivity in various organizations [14].

Specifically, this software development dealt with the following concerns:

1. How may the Web-based Fund Collections System be developed using the Waterfall Model:
     1.1 Requirements Specification;
     1.2 Planning
     1.3 Designing;
     1.4 Development/Implementation;
     1.5 Testing;
     1.6 Deployment;
     1.7 Maintenance;

2. How may the Web-based Fund Collections System be evaluated by the IT Experts based on the following attributes or criteria:
     2.1 Functional Suitability;
     2.2 Performance Efficiency;
     2.3 Compatibility;
     2.4 Usability;
     2.5 Reliability;
     2.6 Security;
     2.7 Maintainability;
     2.8 Portability

3. How may the Web-based Fund Collections System be evaluated by Employees of the cited military organization based on the following attributes or criteria:
     2.1 Functional Suitability;
     2.2 Performance Efficiency;
     2.3 Compatibility;
     2.4 Usability;
     2.5 Reliability;
     2.6 Security;
     2.7 Maintainability;
     2.8 Portability

2. METHODOLOGY

2.1 Research Design

The Waterfall Model is used as the basis for developing this system. This model has been adapted as a research design methodology due to its structured and systematic approach. As a research design, the waterfall model involves a sequential or linear progression through different phases, akin to a cascading waterfall. In addition, the development of this

system also adopted the IEEE (Institute of Electrical and Electronics Engineers) Recommendation in Software Engineering. This recommendation refers to a set of standards and best practices established by the IEEE for developing, documenting, and maintaining software projects. These recommendations cover various aspects of software engineering, including requirements analysis, design, coding, testing, and documentation. By adhering to IEEE guidelines, software developers ensure that their projects are developed with high quality, reliability, and maintainability. These standards help in promoting consistency and interoperability in software development, making it easier for different teams to collaborate and understand each other's work. Additionally, following IEEE recommendations in software engineering enhances software products' credibility and trustworthiness, benefiting developers and end-users alike.

3. RESULTS

3.1 Design and Development of Web-based Funds Collection System

The Web-based Funds Collection System was completed through the waterfall software development model and by adopting the IEEE recommendation in software engineering. The phases involved in the entire development process are outlined and discussed below.

3.1.1 Requirements Specification

The requirements specification plays a crucial role in the development of software systems. It defines and documents the software's functional and non-functional requirements to meet the intended purpose and user expectations. In this phase, the developers have gathered data in the Accounting and Finance offices of a military organization in one of the Municipalities in Zamboanga del Sur, concerning the fund collection business process that a payor must follow regarding the payment for order of payments based on a type of payment. Ultimately, the collected data will be used and become the basis for the succeeding phases of the development process.

3.1.2 Planning

The planning phase is fundamental in the entire development process. It is where project objectives, requirements, resources, and constraints are further defined and organized to ensure the successful execution of the software project. In this phase, the developers prepared a comprehensive plan that will serve as a guide throughout the project. This plan also serves as a blueprint that outlines the steps to be taken, resources to be used, and potential risks to be managed. Changes may occur during the development process. Hence, reviews and updates are essential should a new set of requirements arise during the course of the project.

3.1.3 Designing

This phase is another crucial step in the software development process as it transforms the requirements gathered in the earlier phases into a detailed design that will produce another blueprint for developing the software system. The system is web-based that enables the Accounting and Finance office employees of the cited military organization process payments from the clients. The system is also designed to integrate the mentioned offices for a streamline experience.

a. Technical Specification

This system is composed of a web-based interface that integrates the Accounting and Finance offices where employees process fund collection, the necessary hardware component, which is a PC, the employees who will process the fund collection and serve as the primary users of the system, and the clients who are the payors. The following components also serve as the building blocks of the system:

- HTML5
- PHP
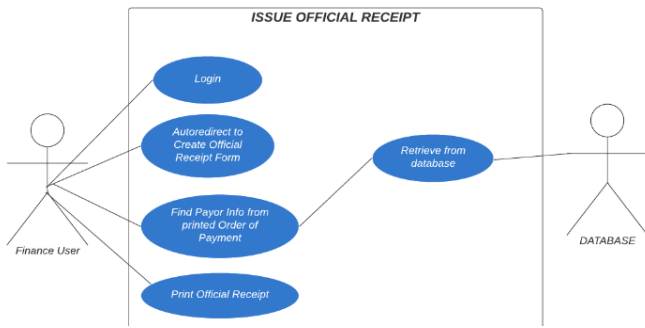- MySQL
- JavaScript
- Bootstrap
- CSS

b. Use Case Diagram

A use case diagram visually represents the functional requirements and the interactions of a system from the perspective of the end users. Its primary purpose is to provide a clear and high-level overview of how the end users interact with the system.
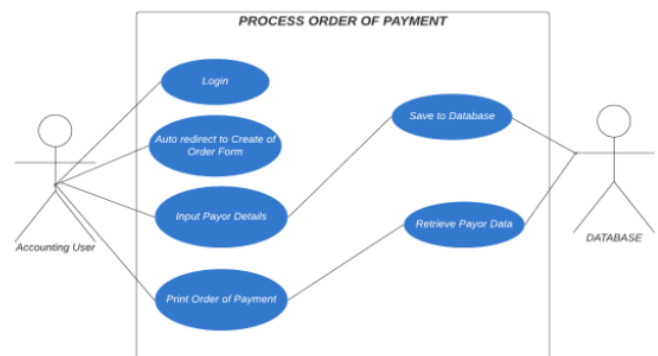
Figure 1: Use Case Diagram for Payment Order

Figure 1 depicts the functional requirements and the interactions of a system from the perspective of the Accounting office by showing how an employee processes an order of payment for a specific client. The order of payment is crucial as it will be handed by the client to the Finance office to settle the payment transaction.

Figure 2: Use Case Diagram for Receipt Issuance

Figure 2 depicts the functional requirements and the interactions of a system from the perspective of the Finance office by showing how an employee processes the payment transaction and issues an official receipt. This transaction is another crucial part of the fund collection because it will be interpreted by the system in order to produce graphical information through data visualization relevant to the needs of the organization.

c. Interface Design

A system's interface design refers to the graphical user interface (GUI) or the command-line interface (CLI) that users interact with to perform relevant tasks or to access system functionalities. The design itself provides users with a seamless and efficient experience while interacting with the system.
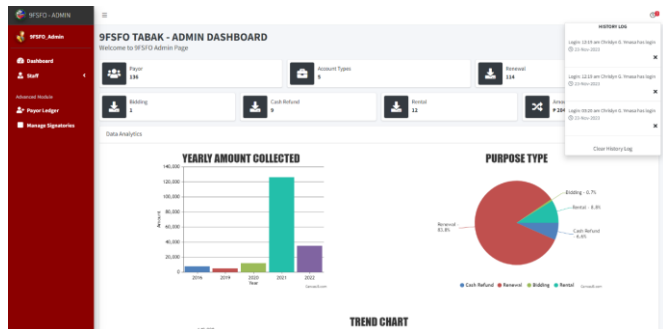

Figure 3: Main Dashboard

Figure 3 shows the interface of the main dashboard of the system where the concerned offices will interact during the fund collection transactions such as processing payor requests.
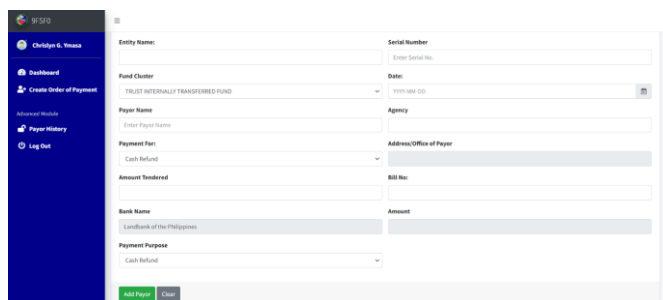
Figure 4: Order of Payment Dashboard

Figure 4 shows the interface for the order payment processing dashboard of the system where the Accounting office will prepare the order of payment which will be handed by the client to the Finance office.
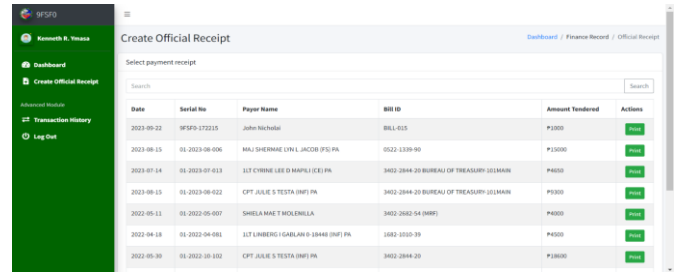
Figure 5: Official Receipt Dashboard

Figure 5 shows the interface for the official receipt processing dashboard of the system where the Finance office will successfully transact the payment transaction.

3.1.4 Development/Implementation

The software or system's actual construction and coding occur in this phase. The planning and design phases were critical steps as this phase follows it. The developers in this phase wrote the code based on the detailed design specifications defined in the previous phase. Hence, this is the actual implementation of the outlined functionalities and features. As already specified, this system is a web-based application, and the actual development involved the technologies HTML5, PHP, MySQL, JavaScript, CSS, and Bootstrap as the underlying building blocks of the system.

3.1.5 Testing

This phase ensures that the system adheres to the requirements specified in the planning phase. Software testing is performed in other phases to regularly identify and manage issues to ensure the software meets the desired quality standards. The testing for the functional requirements yielded an overall positive and acceptable result and were found satisfying by end users. The system was also considered user-friendly, with satisfactory user feedback.

3.1.6 Deployment

Deployment is a phase that prepares the system to be integrated into the intended environment so it is available for use by the intended end-users. Like the other phases, deployment is also a critical step in the system development life cycle which will require planning, coordination with the client, and further testing to ensure its successful use. Currently, this system has already been formally accepted by the client and performs the necessary measures to formally deploy the project and start transforming the business processes into adopting the system's new mechanism to process the transaction. During this phase, the system developers are constantly collaborating with the cited military organization so integration will become a success.

3.1.7 Maintenance

This phase refers to continuously managing the system's performance and functionality throughout its operation. It is also a crucial aspect of the system because it ensures that the system will continuously perform. According to the deployment plan, maintenance is performed by the system developers with the assistance of the Accounting and Finance offices of the concerned military organization as soon as the system is integrated.

IT Experts and Employee Evaluation of Web-based Fund Collections System

Overall, twenty (20) respondents evaluated the system. This figure is a combination of IT Experts and Employees. These respondents rated the system using the same criteria, with 5 as the highest rating and 1 as the lowest rating. The results are the following:

Functional Suitability

The I.T. Experts and Employees rated the Functional Suitability of the Web-based Fund Collections System with a weighted mean of 3.5 (Highly Suitable).

Performance Efficiency

The I.T. Experts and Employees rated the Performance Efficiency of the Web-based Fund Collections System with a weighted mean of 3.5 (Highly   Efficient).

Compatibility

The I.T. Experts and Employees rated the Compatibility of the Web-based Fund Collections System with a weighted mean of 3.3 (Highly Compatible).

Usability

The I.T. Experts and Employees rated the Usability of the Web-based Fund Collections System with a weighted mean of 3.6 (Highly Usable).

Reliability

The I.T. Experts and Employees rated the Reliability of the Web-based Fund Collections System with a weighted mean of 3.5 (Highly Reliable).

Security

The I.T. Experts and Employees rated the Security of the Web-based Fund Collections System with a weighted mean of 3.1 (Secured).

Maintainability

The I.T. Experts and Employees rated the Maintainability of the Web-based Fund Collections System with a weighted mean of 3.5 (Highly   Maintainable).

Portability

The I.T. Experts and Employees rated the Portability of the Web-based Fund Collections System with a weighted mean of 3.5 (Highly Portable).

4. CONCLUSION

In conclusion, the test results confirm the success of the development of the system, integrating all desired features effectively. It ensures security by granting authorized personnel access to the system. The system's efficiency lies in its automated approach. Usability is prioritized, providing a user-friendly interface for executing all necessary functions.

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