

**ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR  
CITY COLLEGE OF TAGAYTAY**

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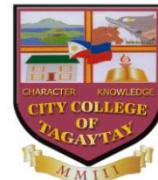
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**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



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**Title:** Enhancement of Coin Operated Document Printing Kiosk for  
City College of Tagaytay

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## **DEDICATION**

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## BIOGRAPHICAL DATA

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## ABSTRACT

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**ALCANTARA, JASPER B., JOPIA, JOSEPH D., MARTINEZ, ISAAC IVAN J., PAYAD, NAZIENCINO A.** Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay. Capstone Project. Bachelor of Science in Information Technology. City College of Tagaytay, April 2025. Prepared under the supervision of Mr. Christian R. Anda.

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The capstone study, "Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay", was developed to enhance a previous study by addressing its recommendations. The improvements include adding color printing, enabling printing on different paper sizes, and refining the overall design. These enhancements are intended to support the document printing needs of the students and faculty at City College of Tagaytay.

The Prototyping Method was used in developing the enhanced prototype, consisting of six (6) phases: (1) Requirements Gathering and Analysis, (2) Quick Design, (3) Building Prototype, (4) User Evaluation, (5) Refining Prototype, and (6) Implement Product and Maintain. The evaluation instrument was the primary tool used to gather data and assess the enhanced prototype based on the ISO 25010 standards for both hardware and software. The ISO 25010 standard for Hardware includes five (5) main categories: Effectiveness, Efficiency, Satisfaction, Freedom from Risk, and Context Coverage. Meanwhile, the ISO 25010 standard for Software consists of eight (8) categories: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. The data gathered were analyzed and interpreted, resulting in an overall average mean of 4.62, interpreted as "Excellent". This result indicates that the enhanced prototype fully meets and significantly exceeds most

expectations. The final enhanced prototype will be given to the respective office for deployment.

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**Alcantara, Jasper B., Jopia, Joseph D., Martinez, Isaac Ivan J., Payad, Naziancino A.**

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A Capstone project submitted to the Faculty of the School of Computer Studies in partial fulfillment of their requirements for graduation with the degree of Bachelor of Science in Information Technology. Prepared under the supervision of Mr. Christian R. Anda.

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## **Chapter I**

### **INTRODUCTION**

Kiosks are compact, standalone devices placed in high-traffic areas to sell products or services to customers. Printing, on the other hand, is the process of putting text, numbers, images, or symbols onto paper with a printer and ink. Integrating these concepts results in a kiosk that enables consumers to access printing services without assistance, making it one of numerous self-service kiosks built for convenience and availability. A coin-operated printing kiosk is especially valuable for people who lack the resources to afford printing services. As a result, developing such a device could be quite beneficial, particularly for students who depend on printed materials for their studies.

A coin-operated document printing kiosk, as the name suggests, is a device that receives coins as payment in exchange for a printing service. This concept was introduced by Percival Everitt in 1883 with a device that accepted coins from consumers to print postcards (Coveny, 2017). Over time, printing kiosks have evolved and have been the subject of multiple studies. Since this kiosk can be particularly helpful, especially in school

settings, at City College of Tagaytay, some researchers have also developed the device. However, through the years, it became outdated, prompting this research to enhance its objective. Lastly, this study is under the area of embedded systems, which, according to Ashtari (2023), comprises a processor, memory, and input/output units, designed for a specific function within a larger system. Thus, embedded systems can also serve as standalone devices such as kiosks.

In 2018, Coper, Buyo, Langomez, Vidamo, and Fallago created the Coin-Operated Document Printing Kiosk for City College of Tagaytay, also known as C.O.D.P.K (Coper et al., 2018). In their research, they highlighted CCT students' need for an accessible printer to avoid the hassle of going to printing shops and waiting in line. Their printing process began with the kiosk system requiring the user to upload files using a USB flash drive by inserting it into the kiosk's designated port and selecting the document to print. Alternatively, the user could use the SHAREit application on their mobile device to wirelessly transfer, select, and print the desired document to the kiosk. The system supports file formats such as PDF, Microsoft Word, and Microsoft Excel and offers black-and-white prints on letter-sized paper. Next, the user inserts one (1), five (5), and ten (10) Peso coins into the device as payment, based on the number of pages to be printed. Finally, the user awaits the printing of the documents and an appropriate change, if necessary, based on the inserted amount.

According to the scope and limitations outlined by Coper et al. (2018), the Coin Operated Document Printing Kiosk faced notable constraints. The study highlighted that the kiosk only supported black-and-white printing on letter-sized (8.5"x11") paper, with a fee of one Peso per page. These limitations may not have fully met user needs, leading to

recommendations for incorporating color printing, expanding the range of paper sizes, and enhancing the overall design of the kiosk. Furthermore, an interview with one of the researchers, Mr. Coper, revealed that C.O.D.P.K. only accepted the previous version of the Peso coins. However, with the release of the New Generation Currency (NGC) series by the Bangko Sentral ng Pilipinas (BSP) on March 26, 2018, which introduced new coins, C.O.D.P.K. was unable to process these as payment. With this evidence, it could be proven that the previous device had gaps that should be filled to maintain its goal, which is to help those who do not have access to printers. This limitation highlights the challenge of not having versatile and accessible printing options, which can cause problems for students needing to print various types of documents. Without adequate printing facilities, students may struggle to complete assignments and prepare for exams, impacting their academic performance. Although the creation of the kiosk was a step toward solving these issues, its limitations suggest that more complete solutions are needed to fully meet the students' needs.

According to the facts stated above, the researchers developed the study entitled "Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay". The study aimed to enhance the printing kiosk by adding the ability to print in color and a variety of paper sizes. It was improved to accept the newly redesigned Peso coins and featured a QR code for an improved method of transferring files. Moreover, Black-and-white prints now cost two (2) Pesos for short bond paper and three (3) Pesos for long bond paper, while colored prints will be priced at five (5) Pesos for short bond paper and seven (7) Pesos for long bond paper. Despite the small price increase, the kiosk offers a

convenient and affordable printing service compared to printing services outside campus, making it an accessible option for users who need easy access to printing.

## **Objectives of the Study**

The main objective of this study is to enhance the Coin-Operated Document Printing Kiosk for City College of Tagaytay. This enhancement addresses the recommendations from the previous study, including colored printing, printing on different sizes of paper, and design improvement. Additionally, a QR code scanning feature is also included for an improved method of transferring files and for enabling the kiosk to accept both old and newly designed Peso coins.

Specifically, the study aims to:

1. identify all the procedures and requirements needed for the enhancement of the existing coin-operated document printing kiosk through an interview with Mr. Juel Coper;
2. analyze the gathered information through the use of different tools and instruments such as a theoretical framework, a conceptual framework, a context diagram, and data flow diagrams;
3. design and develop the kiosk system through the use of Microsoft Visual Studio 2022 for the user interface, MySQL for the back end, and Python for the locally hosted website to upload files;
4. fabricate the enhanced prototype that is capable of:
  - a. providing support for both Letter (8.5"x11") and Legal (8.5"x13") size bond papers;

- b. receiving files through QR code;
  - c. allowing the user to choose between grayscale or colored printing;
  - d. accepting both old and newly designed coins for payment.
  - e. featuring a touchscreen display for user interaction.
5. test the performance of the enhanced prototype through unit testing, integration testing, and user acceptance testing;
  6. evaluate the performance of the enhanced prototype to determine if it complies with the ISO 25010 standards for both software and hardware; and
  7. prepare an implementation plan for deployment of the enhanced prototype entitled Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay.

### **Scope and Limitations of the Study**

The study focused on the Enhancement of the Coin Operated Document Printing Kiosk for City College of Tagaytay, which aimed to help users with their document printing needs. As part of this enhancement, the user now scans the QR code using their mobile phone to upload their files via the locally hosted website. Additionally, the enhanced prototype now features a touchscreen display for user interactions, improving accessibility and ease of use. Moreover, the enhanced prototype is now compatible with both iOS and Android devices, allowing a wider range of users to access the service. In addition, the prototype now supports both grayscale and colored printing, with options for Letter (8.5"x11") and Legal (8.5"x13") paper sizes. To ensure long-term usability, the System Administrator can now modify the printing cost for grayscale and colored prints on both

Legal and Letter size paper, allowing adjustments based on the price of paper and ink in response to changing supply costs. To enhance security, the coin slot is upgraded with an anti-hooking feature to prevent tampering and ensure secure transactions when the user inserts coins. In terms of maintenance, paper and fund refills were managed manually by the System Administrator. Both printers only support 60 pages each when using 70 grams per square meter (gsm) bond paper and 50 pages when using 75 grams per square meter (gsm) bond paper, and the coin hopper that provides change supports 300 one (1) Peso coins. Other coins were not supported because the intended design is to make the kiosk more compact compared to the previous version, and adding additional coin hoppers would increase costs. Furthermore, the user will also receive a notification on the screen when the paper load is low, showing the remaining number of prints available. Likewise, the kiosk system displays a notification if funds are insufficient, informing users before inserting coins to ensure that change is available. After refilling the paper load and funds, the System Administrator updates the kiosk system to reflect the remaining paper and available funds. Ultimately, this study is designed for two levels of access, namely: System Administrator and User.

The System Administrator is the assigned faculty member responsible for the overall management and maintenance of the kiosk. The System Administrator logs in using their unique credentials to access the System Administrator Interface Module, which enables them to manage operations. Additionally, their duties included manually refilling paper loads, ensuring that the kiosk had enough paper to handle the required printing tasks. Also, refilling the funds used for providing change, and refilling the ink to ensure both color and grayscale printing options are available. The System Administrator Module has

two sub-modules: the System Log History Sub-Module and the Report Sub-Module. The System Log History Sub-Module displays the login date and time as well as actions taken, such as paper refilled, fund refilled, and account modifications. Moreover, the Report Sub-Module allows the System Administrator to review daily transactions, including details such as the filename, date, number of pages, amount, number of copies, amount paid, and change.

The User of the enhanced prototype prints their documents by interacting with the kiosk system. First, the system connects the user's mobile phone to the kiosk's hotspot by scanning the QR code above the touchscreen display. Second, the user scans the QR code to access the website hosted on the local server to upload their files (PDF, MS Excel, and/or MS Word). Once the files are uploaded, the enhanced prototype converts the file into PDF format for printing. Third, the user selects and previews the file they intend to print. Then, the user inserts Peso coins into the coin slot, which are converted into credits for payment. Next, the user adjusts settings such as print mode (grayscale or colored), page selection (all or specific pages), paper size (legal or letter), orientation (landscape or portrait), and the number of copies. Thereafter, the enhanced prototype displays a print summary before the printing process begins, including the total amount to be paid and the change to be received. Finally, the user uses the credits to proceed with printing, and the kiosk dispenses the printed documents with change, if necessary.

The study is composed of the Hotspot Module that allows the user to connect their mobile phones to the kiosk's Wi-Fi network, enabling file transfer. The user can connect to the hotspot either manually or by scanning the QR code. The User-Interface Module enables the user to interact with the kiosk system. It has two sub-modules: the QR Code

Sub-Module and the Locally Hosted File Upload Sub-Module. The QR Code Sub-Module provides the QR code, which is scanned to provide the link to the website hosted on the local server. The link then redirects the user to the Locally Hosted File Upload Sub-Module, where the user uploads their files (PDF, MS Excel, and/or MS Word). Using the User-Interface Module, the user can set printing settings, including print mode (color or grayscale), whether to print all pages or specific page(s), paper size (legal or letter), orientation (landscape or portrait), and the number of copies. The module also displays a print summary for user review. The Printing Module handles the printing process based on the selected print settings and ensures that the printed output is only dispensed after the appropriate number of coins is inserted. The System Administrator Interface Module is the interface used for managing the overall maintenance of the enhanced prototype. The System Administrator Interface Module has two sub-modules: the Kiosk Maintenance Sub-Module and the Report Sub-Module. The Kiosk Maintenance Sub-Module manages important maintenance tasks to ensure the kiosk operates efficiently. It allows the System Administrator to update paper refills and coin funds, ensuring sufficient paper for printing and providing change in the kiosk system. Additionally, it enables the modification of printing costs, allowing flexible pricing adjustments based on operational needs. This ensures smooth kiosk operations and adaptability to future changes in cost and resource management. The Report Sub-Module allows the System Administrator to access a dashboard displaying the number of transactions, total paper refills, remaining funds, total paper available for Letter and Legal sizes, and total income gained. Additionally, the Transaction History provides transaction details, including the transaction date and time, file name, number of copies, print type, payment, and change received. The User Account

section contains the System Administrator's account information. The System Log History records system administration activities, tracking and displaying each login session's date and time, as well as actions performed by the System Administrator, such as refilling paper and adding funds to the kiosk.

However, the study is unable to accept bills and is not fully automatic, as the paper, ink, and change funds still need to be refilled manually. Specifically, when the paper load dropped to 10 sheets or below, a notification is displayed on the monitor, prompting users to check the remaining paper in the kiosk and notifying the system administrator, who was responsible for refilling the paper. Similarly, when the change funds become insufficient, a notification is displayed on the monitor, prompting users to be aware of the low coin supply and notifying the system administrator to add more coins. It is also important to note that if the System Administrator miscounts the refilled funds or paper load, it may lead to inaccurate tracking of available resources. Additionally, the enhanced prototype only reads and prints files in Word, Excel, and PDF formats. PowerPoint is not supported as it is designed for presentations, requiring additional processing to ensure proper formatting for printing. Furthermore, the maximum number of pages allowed for printing is 60 pages for both legal-sized and letter-sized paper when using 70 grams per square meter (gsm) bond paper and 50 pages when using 75 grams per square meter (gsm) bond paper, as specified by Epson. Furthermore, error handling for the printer is not supported, and there is no option to cancel the printing process once it has started. Moreover, if a power interruption occurs, there is no Uninterruptible Power Supply (UPS) to continue the printing process because the kiosk was designed to be compact. In such cases, the user must contact the System Administrator for assistance. In addition, the enhanced prototype

does not have an ink monitoring system, instead relying on a print count-based notification system that alerts the System Administrator to refill the ink after 1,000 prints. Finally, paper jams are not detected or handled by the kiosk system, requiring manual intervention to clear the jam and resume operation. This limitation exists because the kiosk lacks built-in sensors to detect paper jams and automatically respond to such issues.

### **Significance of the Study**

The study entitled “Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay” was developed to print documents and provide a user-friendly kiosk for the benefit and convenience of users, while allowing for an improved method of transferring files using QR codes provided by the kiosk system. The researchers developed an enhanced prototype capable of printing in color and accommodating various paper sizes, while supporting the newly designed Peso coins.

This system would benefit the following:

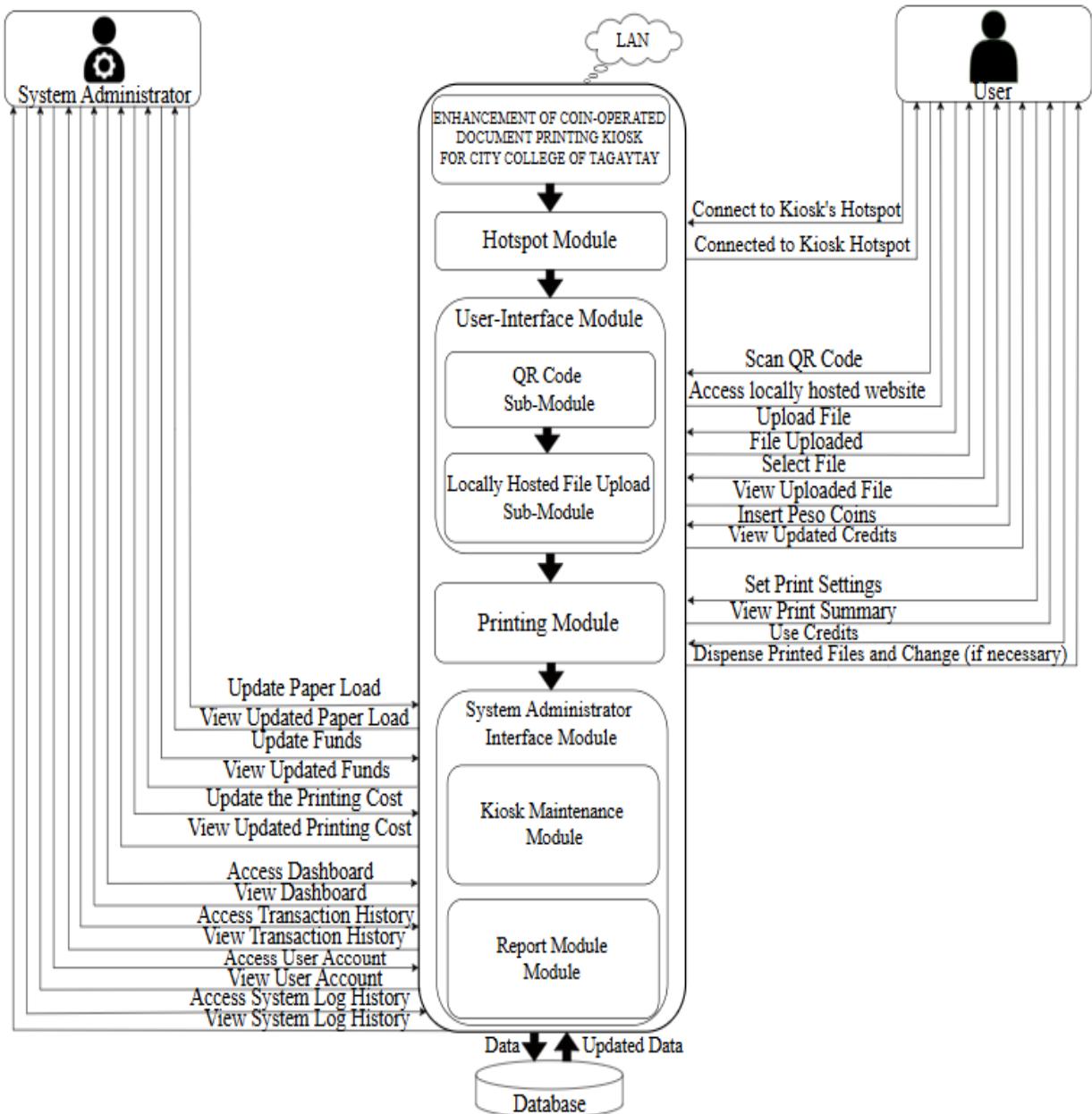
The **Students and Faculty Members** of City College of Tagaytay would benefit from this enhanced prototype, as the printing kiosk inside the campus would help them with their document printing needs.

The **Researchers** would benefit from the study because they would gain more knowledge and experience in conducting such research. They would improve their skills in terms of programming, assembly, presentation, and documentation as well.

For **Future Researchers**, this would be their basis for their research if they would develop another research.

## Theoretical Framework

The diagram below shows the various functions of modules that contribute to the enhanced prototype's functionality, as well as its intended users, such as the System Administrator and User.



**Figure 1.** Theoretical Framework of Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay

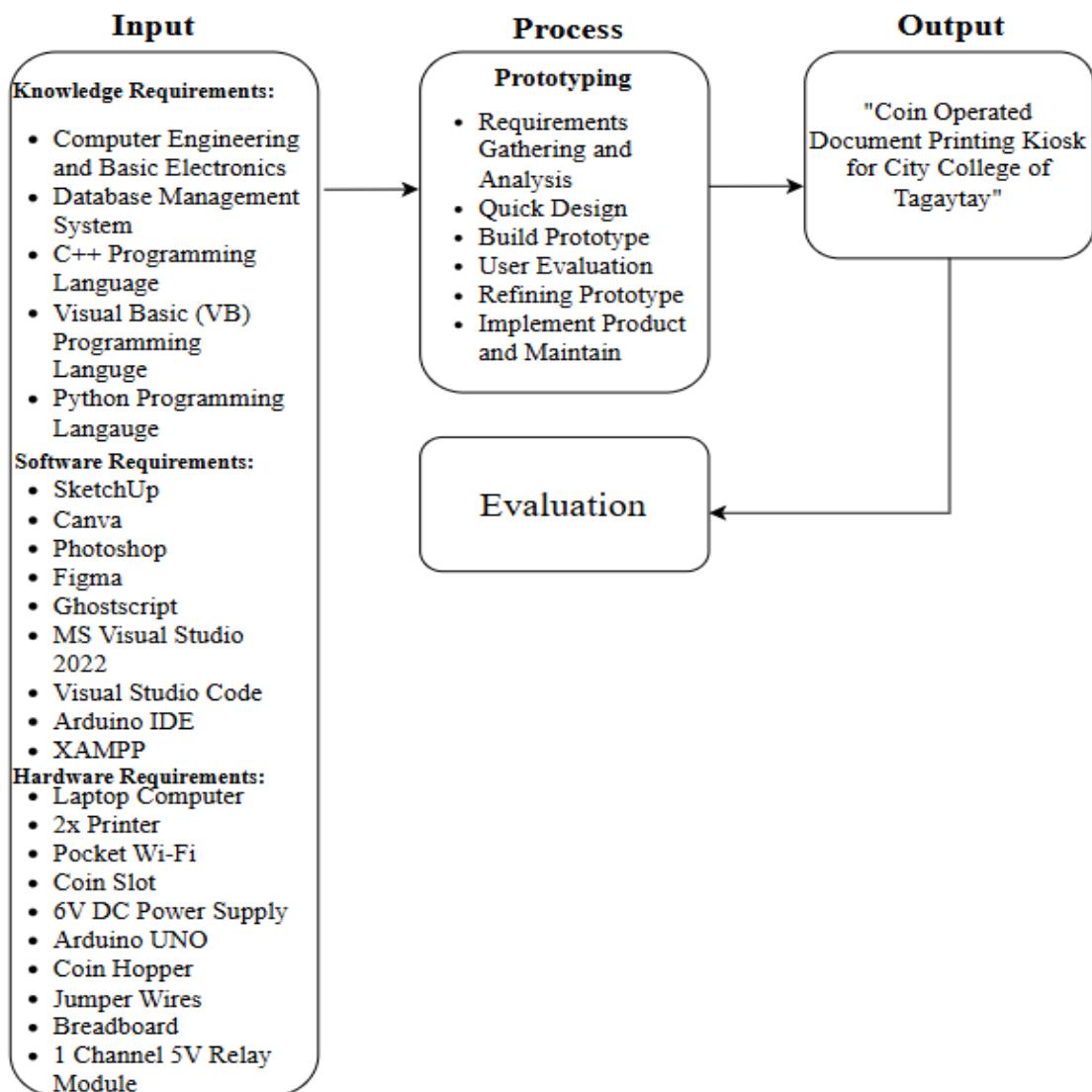
*Figure 1* illustrates the theoretical framework of the Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay. The figure shows five (5) main modules and two (4) submodules: the Hotspot Module, User-Interface Module with QR Code Sub-Module and Locally Hosted File Upload Sub-Module, Printing Module, and System Administrator Interface Module, with the Kiosk Maintenance Sub-Module and Report Sub-Module. The **Hotspot Module** allows the user to connect their mobile phone to the kiosk's Wi-Fi network, enabling file transfer. The user can connect to the hotspot manually or by scanning the QR code above the touchscreen display. The **User-Interface Module** allows the user to interact with the kiosk system. It has two sub-modules: the QR Code Sub-Module and the Locally Hosted File Upload Sub-Module. The **QR Code Module** provides the QR code, which is scanned to provide the link to the locally hosted website. The link will then redirect the user to the **Locally Hosted File Upload Module**, where they can upload their files (PDF, MS Excel, and/or MS Word). After uploading the file, the user can now insert coins into the kiosk and select their uploaded file. In the User Interface Module, the user can set printing settings, including print mode (color or grayscale), whether to print all pages or specific page(s), paper size (legal or letter), orientation (landscape or portrait), and the number of copies. The User Interface Module also provides a print summary for the user to review, which includes the total amount to pay and the change to be received. The **Printing Module** is responsible for managing the entire printing process, ensuring that documents are printed accurately according to the user's selected print settings. Once the user finalizes the print settings discussed earlier, the Printing Module queues the job for processing. The module calculates the total cost based on these settings and ensures that printing does not start until the appropriate number of

coins has been inserted. The System Administrator Interface Module serves as the interface for managing the overall maintenance of the enhanced prototype. It provides functionalities for refilling paper, adding funds, updating printing costs, and viewing reports. This module consists of two sub-modules: the Kiosk Maintenance Sub-Module and the Report Sub-Module. The **Kiosk Maintenance Sub-Module** enables the System Administrator to refill paper, refill coin funds, and modify printing costs. The paper load is refilled based on the number of sheets placed in both printer trays to ensure continuous printing operations. Similarly, coin funds are refilled according to the number of one (1) Peso coins placed in the coin hopper to maintain a sufficient supply of change, allowing the enhanced prototype to function without interruption. If either the paper or coin supply runs out, the kiosk will be unable to process further transactions. This sub-module also allows the administrator to adjust printing costs, which is useful in case of price increases in resources such as ink and bond paper, ensuring the system remains sustainable in the future. The **Report Sub-Module** allows the System Administrator to access a dashboard that displays key information such as the total number of transactions, paper refills, remaining funds, available paper for Letter and Legal sizes, and total income generated, enabling effective monitoring of overall system performance. Additionally, the Transaction History section provides detailed records of each transaction, including the date and time, file name, number of copies, print type, payment amount, and change dispensed, allowing for accurate tracking. The User Account section contains the System Administrator's account information. The System Log History records all activities performed by the System Administrator. It logs each login session, including the date and time, and tracks various

actions such as paper refills and fund replenishments, ensuring transparency and accountability in system operations.

### **Conceptual Model of the Study**

Based on the foregoing concepts, theories, and findings of related literature, studies, and insights taken from them, a conceptual model is developed as shown below.



**Figure 2.** Conceptual Model of Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay

*Figure 2* illustrates the conceptual model of the Enhancement of the Coin Operated Document Printing Kiosk for City College of Tagaytay. The enhanced prototype consists of four stages: input, process, output, and evaluation. These stages must be followed effectively to achieve the study's main objective.

The **Input Stage** consists of the knowledge requirements, software requirements, and hardware requirements in relation to the enhancement of the study.

The **Knowledge Requirements** are the key areas of understanding and expertise required for kiosk development. Knowledge of Computer Engineering and Basic Electronics was essential for the overall design, integration, and functionality of the kiosk's hardware components. This includes selecting and building the appropriate microcontrollers to operate the kiosk's functions, as well as designing and maintaining the electrical circuits and connections to ensure all components connect properly and function successfully. Database Management Systems is important for managing transactions, enabling efficient data handling, and accurate transaction processing. C++ Programming was necessary for programming the Arduino to interact with other hardware components, enabling seamless communication and control. Visual Basic Programming was used for programming the user interface, ensuring a user-friendly experience for operating the kiosk. Python Programming was used for developing the locally hosted website for uploading files, allowing users to transfer documents to the kiosk efficiently.

The **Software Requirements** are important because they provide the platforms and tools used to develop the enhanced prototype. The software used for development included SketchUp, Canva, Photoshop, Figma, Ghostscript, MS Visual Studio 2022, Visual Studio Code, Arduino IDE, and XAMPP. SketchUp is a user-friendly 3D modeling software used

for creating the prototype. Canva is an online graphic design platform used for designing the user interface. Photoshop is a graphics editor that was used for logo design. Figma is a design tool primarily used for interface design prototyping. Ghostscript was used to convert PDFs into images. MS Visual Studio 2022 was used to develop the kiosk's user interface, ensuring a responsive and user-friendly experience while integrating seamlessly with other system components. Arduino IDE was used to program the Arduino so that the coin slot and coin hopper would operate. Visual Studio Code is a source code editor used for developing a locally hosted website to uploading files. XAMPP provided a local SQL database for developing and storing data on the System Administrator's side.

The **Hardware Requirements** include the essential components necessary for the development and operation of the enhanced prototype. The hardware includes a tablet computer, two printers, a Pocket Wi-Fi, a coin slot, a 6V DC power supply, an Arduino UNO, a coin hopper, jumper wires, a breadboard, and a 1-channel 5V relay module.

The **Process Stage** consists of steps that guided the development and implementation of the enhanced prototype. The researchers followed the prototyping methodology, which included Requirements Gathering and Analysis, Quick Design, Building the Prototype, User Evaluation, Refining the Prototype, and Implementing the Product and Maintenance. The first step was Requirements Gathering and Analysis. In this phase, information about the enhanced prototype's requirements was gathered from an interview with Mr. Juel Coper to support development. Followed by the Quick Design stage, an initial design concept is developed using SketchUp to establish the 3D structure and characteristics of the enhanced prototype, along with selecting appropriate hardware components and installing the software to ensure the finished product meets all of the

specified requirements. Next, the researchers proceeded to the Building Prototype stage, where an initial prototype was created. This involved assembling the enhanced prototype's hardware components and setting up the kiosk system. The enhanced prototype was then tested for User Evaluation, involving the gathering of feedback from actual users to identify strengths and areas for improvement. Based on this feedback, the researchers moved on to the Refining Prototype phase, where they made the necessary changes and upgrades to better match user expectations. Finally, the enhanced prototype was fully developed during the Implement Product and Maintain stage, resulting in a finished product that was ready for deployment.

The **Output Stage** is the enhanced version of the Coin Operated Printing Kiosk for City College of Tagaytay.

In the **Evaluation Stage**, the performance of the enhanced prototype was evaluated. The Software Evaluation assessed the kiosk system's performance in terms of functionality, usability, content, and design based on the ISO 25010 standard. The Hardware Evaluation assessed the hardware of the enhanced prototype's performance in terms of functionality, aesthetics, workability, durability, economy, and safety, also based on the ISO 25010 standard. Students, Instructors, and IT professionals evaluated the enhanced prototype to ensure it met the required standards and tested the performance of both the software and hardware.

## **Operational Definition of Terms**

**1 Channel 5V Relay Module.** This was used to control the operation of the coin hopper by switching it on and off to provide change.

**Arduino Uno.** This is a device used in the enhanced prototype to control the coin slot and coin hopper. It ensures seamless communication between these components, contributing to the efficient operation of the kiosk.

**Coin Hopper.** It dispenses 1-Peso coins as change, controlled by the Arduino Uno.

**Coin Slot.** It detects and validates inserted coins before converting them into credits.

**QR Code.** It is a barcode that connects to a pocket Wi-Fi and takes the user to the website hosted on a local server, where they can upload files.

**System Administrator.** This is the person with full access to the enhanced prototype, responsible for maintaining the kiosk, including refilling paper, funds, ink, and modifying the printing cost.

**User.** These are students or faculty members of City College of Tagaytay who will use the kiosk.

## Chapter II

### REVIEW OF RELATED LITERATURE AND STUDIES

This chapter presents a review of related literature and studies underlying the framework of the study.

#### **Review of Related Literature**

**DBMS.** According to Mallick (2022), a Database Management System frequently modifies the data itself, the format of the data, the field names, the record structure, and the file structure. It also includes guidelines for manipulating and validating the data. As database administration techniques advance, specific data handling principles are applied.

Previously, databases could only handle separate, individually prepared chunks of data. Today's sophisticated systems can handle a wide range of less structured data and connect it in complex ways. End users can now use a DBMS to create, protect, read, update, and delete data in a database.

The database management system connects the databases to the end user or application programs. It ensures that the data is always organized and easy to access. The DBMS manages data, and the database engine makes it accessible, locked, and modifiable. The database schema defines the logical structure.

**Kiosk.** According to Kenton (2023), a kiosk is a small, temporary booth that is usually set up in high-traffic places like shopping malls or city streets. These kiosks serve as marketing tools, providing owners with a low-cost opportunity to promote their products or services. They are usually manned by one or two people interacting with visitors to

attract attention and get new clients. It can be noticed that kiosks sell a wide range of products, such as toys, hair care products, insurance policies, and credit cards.

In addition to the manned kiosks, there are self-service computerized kiosks. These automated booths offer users a simple, self-service experience and are created to add to the kiosk owner's current services. Whether staffed or electronic, kiosks are an effective and flexible marketing tool in high-traffic locations.

**Microcontroller.** According to Lutkevich (2019), a Microcontroller is a compact integrated circuit used to control specific tasks in an embedded system. It typically includes a processor, memory, and input/output (I/O) peripherals all on one chip.

Microcontrollers, also called embedded controllers or microcontroller units (MCUs), are found in many devices like cars, robots, office equipment, medical tools, radios, vending machines, and home appliances. They function as small, simple computers that manage specific parts of a bigger system without needing a complex operating system (OS).

**Printer.** The Editors of Encyclopedia Britannica (2009) stated that a printer is an electrical device that prints text or images from a computer onto paper or film. It can connect to the computer directly or over a network. Printers fall into two categories: impact printers, which physically hit the paper, and non-impact printers. The majority of impact printers are dot-matrix printers, which use pins to create characters.

Non-impact printers include three main types: laser printers, which use a laser to apply toner to paper; inkjet printers, which spray liquid ink; and thermal printers, which use heat to transfer wax-based ink or produce an image on specific paper. The Printers' important qualities include resolution (the clarity of the print, measured in dots per inch),

speed (the number of pages printed per minute), color capabilities (whether they print in full color or only black and white), and cache memory (which impacts how soon a file can be printed).

**Printing.** New World Encyclopedia (n.d.) stated that printing is the process of creating text and images on paper with ink using a printing press or other devices. It is frequently performed on a big scale and is essential for paper-based publishing and printing processes, unlike today's electronic or internet publishing.

In photography, printing means the process of creating a picture on a specific piece of paper. This can be done in black and white or color, with a negative or positive image, or with a digital photo and a printer that prints directly from the digital file.

**QR Code.** According to Hayes (2024), a quick response (QR) code is a type of barcode that can be scanned with a digital device and stores data as a series of pixels in a square grid. Unlike the pandemic-era masks, the QR codes that became popular during that time are almost certain to endure. QR codes connect the physical and digital worlds, allowing people to scan menus and posters for information using their mobile phones or from websites.

However, QR codes can be used for more than just informing about the special appetizers at a local restaurant, for example. Inventory managers hope that they are used more widely to track product information throughout the supply chain, rather than just in marketing and advertising campaigns. QR codes are thought to be a step forward from older, unidimensional barcodes, and the International Organization for Standardization (ISO) approved them as international standards in 2000.

## Developing Tools

In developing a financial assistance system, tools are very useful to save time and effort, and have been used to develop a successful system.

**Arduino.** According to Nussey (2018), Arduino consists of both hardware and software. The Arduino board is a printed circuit board (PCB) with a microcontroller chip and other inputs and outputs. The board contains numerous different electronic components that are required for the microcontroller to work or expand its capabilities.

**Coins.** According to Allan et al. (2024), a coin is a piece of metal or, rarely, some other material (such as leather or porcelain) certified by a mark or marks upon it as being of a specific intrinsic or exchange value.

The use of cast-metal pieces as money is very old and likely started from trading regular bronze and other metal ingots that had inherent value. Before the invention of bills of exchange in medieval Europe and paper money in medieval China, metal coins were the only form of currency. Even though coins are used less in many transactions today, they remain essential to modern economies. Their significance is actually increasing because of the widespread use of coin-operated machines.

In 1995, the Bangko Sentral ng Pilipinas (BSP) released a new set of coins and banknotes with the new BSP logo. These included the 5 and 1 Peso coins, and the 25, 10, 5, and 1 centavo coins. On July 10, 2001, the BSP introduced a 10-Peso coin to celebrate its 8th anniversary.

Then, on March 26, 2018, BSP released the New Generation Currency (NGC) Coin Series. This series includes the *10-piso, 5-piso, 1-piso, 25-centavo, 5-centavo, and 1-centavo coins*. These NGC coins represent three national heroes: Apolinario Mabini on the

10-Peso, Andres Bonifacio on the 5-Peso, and Jose Rizal on the 1-Peso. The 25-, 5-, and 1-sentimo coins feature three stars and a sun. All coins have the BSP logo and pictures of native plants, similar to the design of NGC banknotes, showing Philippine animals.

On December 17, 2019, the BSP released a new 20-Peso NGC coin and an enhanced 5-Peso NGC coin with nine sides. The new 20-Peso coin keeps many features of the 20-Peso banknote. The coin's front shows Manuel L. Quezon, while the back displays the BSP logo, Malacañang Palace, and the Nilad plant.

The NGC Coin Series design improves both the appearance and security of the coins. The *20-piso*, *10-piso*, and *5-piso* coins have micro-printed details using laser-engraving technology, making them difficult to counterfeit. The metal composition of NGC coins also prevents them from being stored due to their metal content. The new 20-Peso and enhanced 5-Peso NGC coins will be used alongside the current 20-Peso banknotes and round 5-Peso coins until the old coins are naturally phased out.

**Excel.** According to Rouse (2020), Microsoft Excel is a software program produced by Microsoft that allows users to organize, format, and calculate data with formulas using a spreadsheet system. MS Excel is a spreadsheet program made by Microsoft for Windows and Mac OS. It can do basic math, create charts, make pivot tables, and use macros, among other features. Spreadsheet programs like MS Excel use a grid of cells arranged in rows and columns to organize and manage data. They can also show data as charts, histograms, and line graphs. MS Excel lets users organize data to see different factors from various angles. It uses a programming language called Microsoft Visual Basic, which allows users to create complex numerical methods. Programmers can write code directly in the Visual Basic Editor, which has tools for writing, debugging, and organizing code.

**LCD (Liquid Crystal Display).** Based on Tech Target Contributor (n.d.), LCD (Liquid Crystal Display) is a flat panel display that operates primarily on liquid crystals. Light-Emitting Diodes (LEDs) are widely used in cellphones, televisions, computer monitors, and instrument panels, giving them a wide range of applications for both consumers and companies. LCDs represented a significant advancement over the technologies they superseded, which included light-emitting diode (LED) and gas-plasma displays. LCDs enabled displays to be much thinner than CRT technology. LCDs utilize significantly less power than LED and gas-display displays because they block light rather than emit it. Whereas an LED generates light, an LCD's liquid crystals produce an image via a backlight.

**MySQL.** According to Drake (2020), MySQL is an open-source relational database management system. MySQL, like other relational databases, stores data in table-like structures with rows and columns. Structured Query Language, or SQL for short, allows users to define, manipulate, control, and query data. MySQL is the world's most popular open-source database system, known for its flexibility and capability. As part of the widely used LAMP technology stack (which includes a Linux-based operating system, the Apache web server, a MySQL database, and PHP for processing), it is used to store and retrieve data in a wide range of popular applications, websites, and services.

**PDF.** According to Menendez (2024), PDF stands for "portable document format". It is a versatile file format that is great for keeping unaltered content while making it easy to share and print. Most devices now come pre-installed with Adobe Reader or can access PDFs through web browsers.

PDF is a file format used for storing electronic documents. It is commonly used for document sharing and distribution.

Adobe Acrobat software, which allows users to create and edit PDF documents, is commonly used to create PDFs. The software allows users to add and edit text, graphics, and other document elements. It also has security safeguards to prevent unauthorized alterations to the document's content.

**Visual Basic.** According to Kanade (2023), Microsoft created Visual Basic (VB), an object-oriented language and development environment. It evolved from the previous version of the 'BASIC' language, which stands for 'Beginners All-purpose Symbolic Instruction Code'. Under the VB programming framework, software developers can use GUI-based features to change sections of code by dragging and dropping objects. It enables programmers to define the behavior, function, and appearance of various objects using graphical elements.

VB is considered an event-driven language that is simple to learn and write code in. It is intended to promote rapid application development (RAD), in which the application prototype is developed first, with less emphasis on writing complex code during the early stages of the development cycle.

RAD employs adaptive software development, in which developers prioritize building prototypes over software planning. As a result, professionals can quickly iterate and introduce software updates without having to write difficult code from scratch.

**Word.** Rouse (2022) stated that Microsoft Word is a widely used commercial word processor designed by Microsoft. Microsoft Word is a component of the Microsoft Office suite of productivity software, but can also be purchased as a stand-alone product.

Microsoft Word was initially launched in 1983 and has since been revised numerous times. It is available for both Windows and Apple operating systems. Microsoft Word is often called simply Word or MS Word.

**XAMPP.** According to Mishwani (2022), XAMPP is an acronym for Cross-Platform, Apache, MySQL, PHP, and Perl, with the Ps representing PHP and Perl, respectively. It is an open-source web-solutions package that includes Apache distributions for a range of servers and command-line executables, as well as Apache server, MariaDB, PHP, and Perl components.

Before uploading a website or client to the main server, XAMPP enables a local host or server to test it on PCs and laptops. It is a platform that provides an ideal environment for testing and confirming the functionality of projects built with Apache, Perl, MySQL, and PHP on the host machine. Perl is a web development programming language; PHP is a backend scripting language; and MariaDB is MySQL's most popular database.

## **Related Studies**

### **Local Studies**

#### **Piso Print: A Self-Service Printing Kiosk (2021)**

According to Ablaza et al. (2021), Piso Print, unlike traditional printing services, will provide an innovative and convenient type of printing service using self-service technology. In this case, Piso-Print uses a coin-operated machine to collect payment from the user. Piso Print is a document printing kiosk designed to be installed within universities, specifically libraries. Piso Print's objective is to provide students with simple, convenient,

and hassle-free printing. Piso Print combines many hardware components, such as the coin slot connection to the microcontroller and its connectivity via the computer's serial port. Monitor and touch screen panel, printer, storage device, and system unit. The combination of the mentioned hardware establishes a self-service technology that seeks to provide the user with the ability to print their own papers with ease and comfort whenever they need printing services by using the kiosk created by connecting the said hardware. Piso Print covers printing in the proponents' preferred file formats, which are .doc, .docx, and .pdf, as well as monochrome printing. Unlike the usual practice of traveling to computer shops that offer printing services outside the school campus or even nearby shops outside the school building, the kiosk was located inside the building, making it easier for students to access and ensuring their security.

### **Solar-Powered Coin-Operated Mobile Charging Station for Sustainable Energy Access and Resilience (2023)**

Catalan et al. (2023) focused on the development of an innovative coin-operated mobile device charging station that utilizes the limitless power of solar energy through an integrated storage battery. The primary goal is to promote solar energy as a renewable, independent power source with boundless growth potential. Furthermore, this unique solution expands its value to the business field, where consumers can pay an additional price to keep their mobile devices charged for specific periods of time. In addition to its commercial viability, this charging station serves as a critical lifeline during natural disasters and extended power outages, providing an emergency charging station. Its self-sufficient design allows it to continually charge mobile devices in the presence of sunlight.

Whether it's day or night, the coin-operated mobile gadget charging station stands ready to power up small electronics and mobile devices, ensuring uninterrupted connectivity.

### **Automated Vending Machine for Females' Personal Hygiene with Account Monitoring System (2019)**

According to Alindong et al. (2019), the Philippines is one of Asia's developing countries with the largest population and significant sanitation problems. Poor sanitation endangers the Philippine environment's long-term viability as well as Filipinos' health. The Philippine government has made efforts in educating people about the anatomy and physiology of the female reproductive system, such as the WASH initiative in schools. Even with current education and health policies, menstrual hygiene looked unreal. According to research, the onset of menstruation offers a number of obstacles for females at school. Girls report feeling stress, shame, embarrassment, uncertainty, and fear as a result of their lack of information, inability to manage menstrual flow, or being teased by peers.

These issues may have a negative impact on females' learning experiences. This can lead to absenteeism, distraction, decreased school participation, and falling behind on assignments. Girls may face these challenges as a result of a lack of menstruation-related knowledge, insufficient access to menstrual hygiene materials, and insufficient school water, sanitation, and hygiene (WASH) comfort rooms for girls to wash themselves, change materials in private, and discreetly dispose of menstrual hygiene materials. The UNICEF Philippines Country Office invited Emory University to include the Philippines in the multi-country menstrual hygiene management (MHM) in schools research, which aims to better understand the variety of challenges that school girls face during

menstruation, as well as the factors that contribute to those challenges. Thus, the researchers aimed to develop an Automated Vending Machine for Female Personal Hygiene with Account Monitoring System (AVM for FPH with AMS) to promote proper sanitation and personal hygiene among all female MSU-IIT students.

### **Wired Fingerprint-Based Classroom Attendance System for Secured Student Attendance Archiving Using Arduino UNO Microcontroller (2024)**

Celerez III et al. (2024) addressed the limitations of traditional attendance-checking methods, such as human error, which is unavoidable in manual attendance systems because they are time-consuming. Paper-based systems are vulnerable to forgery, as students may try to sign in on behalf of absent peers. This weakens the validity of attendance records. The study introduces a fingerprint-based classroom attendance system built with the Arduino Uno microcontroller. This research investigates the possibilities of fingerprint biometrics for identity verification in educational contexts. The researchers have created a functional prototype for Wired Fingerprint-Based Classroom Attendance using Arduino Uno, a Fingerprint Sensor, an RTC Module, and an LCD Monitor. 600 tests were conducted to determine the fingerprint sensor's (1.0) lowest and (2.0) maximum times, as well as its average (1.7). The proposed system functions offline and stores data securely on an SD card, making it ideal for institutions in places with limited internet access. Comparative performance evaluations against traditional pen-and-paper methods highlight the fingerprint-based system's notable capacity and accuracy, establishing it as a transformative tool to improve attendance tracking procedures and eliminate attendance-related issues, ultimately improving overall classroom operations.

**Visual Toolkit for Arduino Uno with Integrated Development Environment through Android Application (2022)**

According to Castilla et al. (2022), a mobile-based Arduino UNO simulator is an efficient tool for teaching students to create projects, code, and deploy microcontroller hardware. This study developed a new version of the earlier project UNOdroid, in which the workspace allows users to purposefully apply the components and blocks while also enabling them to freely create designs. The toolkit includes a workbench, an integrated programming environment, a code generator, a virtual simulator, laboratory activities, and a Bluetooth remote controller. To examine the application's functionality, the researchers conducted a test by comparing the application's outputs to a commercially available simulator. The application passed the tests that assessed the capabilities of its components, blocks, and Bluetooth controller.

**Development Of Arduino-Based High Heat Detector Temperature Control Prototype for Household Appliances (2024)**

According to Casinillo et al. (2024), fires are a significant concern in the Philippines, with many incidents caused by electrical equipment. These accidents are the primary cause of non-open flame fires in the country, emphasizing the critical need for preventive measures. Existing devices could only raise an alarm at 100 °C without automatically turning off the appliance. To address these constraints, the researchers set out to create a high heat detector with 95% detection accuracy and fewer than 5% error in detecting high heat. This device used an Arduino Uno Board and a relay to automatically turn off appliances that were overheating. Temperature changes were monitored, and alerts were triggered via an LM35 temperature sensor and buzzer. The LM35 sensor's accuracy

was evaluated using hot bath testing, which included 12 trials at each temperature level ranging from 80°C to 150°C with 10°C intervals. The prototype's performance yielded an average error rate of 1.13% and an average standard deviation of 0.9403. The computed F1 Score of 98% indicates that the prototype met its aims. Functionality testing revealed that the prototype met its stated purpose of turning off the appliance when the threshold temperature was reached and allowing it to operate otherwise.

### **Monitoring and information management system for Central Computer Laboratory Section of CvSU University Computer Center using QR code (2022)**

Cariño and Creencia (2022) reported that Cavite State University's College of Engineering and Information Technology – Central Computer Laboratory (CEIT-CCL) consists of 15 laboratory rooms with a maximum number of 41 computers. Currently, their client is still using the traditional maintenance of each laboratory room. The laboratory assistants continue to use blackboards and pen and paper to record which computers are experiencing problems. Following maintenance, the client did not have report forms to follow and continued to report in an unorganized manner. As a result, maintenance was unable to be carried out every day, and computers were not checked regularly. The authors of this study created a Monitoring and Information Management System using QR codes to assist them whenever the client performs maintenance. This system can also generate, create, and organize reports. The study used both developmental and descriptive research methodologies to build and evaluate the system. The evaluation form includes the following ISO 25010 standards: functional suitability, performance efficiency, compatibility, usability, dependability, security, maintainability, and portability. The system was rated "Excellent" overall by the respondents, who were laboratory assistants

and ICT professionals. After analyzing and evaluating the system, it was proposed that its user be expanded to include professors, students, and other departments, as the existing system is limited for CEIT UCC Laboratory Assistants. Another enhancement that can be made is to provide an archive feature whenever the client wishes to download the created PDF file.

### **Optimizing In-Campus Printing Services: Coin-Operated Printing Kiosk with NFC File Transfer for Polytechnic University of The Philippines (2023)**

According to Dabon et al. (2023), the coin-operated printing kiosk offers a significant advancement in the field of printing services, meeting the needs of students in educational institutions. Efficient printing services are essential to increasing student productivity and satisfaction in schools. This study investigates the optimization of printing services at the Polytechnic University of the Philippines through the implementation of an innovative printing kiosk system. According to the findings, respondents face challenges when using traditional off-campus printing services, such as occasional issues, limited access to current services, and the requirement for technical support. However, the introduction of a printing kiosk on PUP's main campus greatly improves the printing experience, earning a high impact rating of 4.39 on the accessibility and convenience scale. Furthermore, the designed printing kiosk prototype performs well across many transfer techniques, receiving an average rating of 4.6 out of 5 for user-friendliness and reliability. Students demonstrate strong uptake and satisfaction with the system, as evidenced by an average rating of 4.65. To improve service quality, recommendations include diversifying payment choices, increasing the availability of printing kiosks, providing regular updates based on user feedback, collaborating with UX specialists, and exploring potential

partnerships with off-campus suppliers. The positive effect of the printing kiosk at PUP shows the significance of continuous enhancement to meet the changing demands of students and faculty.

### **Design And Development of Laboratory Sheet Dispenser for Department of Industrial Engineering and Technology (2019)**

As stated by Bantolino et al. (2019), the study was conducted to develop a laboratory sheet dispenser. Laboratory sheet dispensers are utilized in the Department of Industrial Engineering and Technology (DIET) to allow students to purchase an exact quantity of laboratory sheets. It also avoids delay and the need for faculty members to operate the design project.

The project was covered with a simple but effective way for faster transactions for buying laboratory sheet dispensers while ensuring payment security and organization. The researchers envision that the project will help electronic students understand the fundamental functions of each component in the project, particularly the microcontroller Arduino Nano.

The overall development of this design project has been successful. DIET students and teachers participated in the evaluation process, resulting in a combined computed mean of 4.74 with a descriptive rating of outstanding. This result indicates that the project is very acceptable to the many evaluators.

### **Central Philippine University Smart Touch Information Kiosk with Campus Navigation (2019)**

According to Manares et al. (2019), the developers of the Central Philippine University Smart Touch Information Kiosk aimed to provide enrolled students with quick and reliable access to vital information. This kiosk allows students to view grades, university events, campus navigation, college histories, and class/exam schedules. Through the website, administrators can manage data such as class details, exams, grades, events, student enrollment, and college histories. Using the Task-Technology Fit (TTF) theory by Goodhue and Thompson (1995), the system's effectiveness was assessed, ensuring it meets user needs. Future researchers are encouraged to improve and enhance this project further.

### **Foreign Studies**

#### **Designing Prototype of Coins Separation and Counting Machine using Arduino UNO R3 Microcontroller (2023)**

Aboalfotoulh et al. (2023) developed a coin sorting machine aimed at improving the efficiency and accuracy of sorting and counting coins. Manual coin sorting and counting in various sectors can be tedious and prone to errors. The goal of this project is to reduce human fatigue, enhance sorting effectiveness, and improve overall utilization. The first step in creating the coin sorting machine is to design a framework based on a lining mechanism to separate the coins for further analysis. The machine then measures coin specifications such as diameter, thickness, and weight to determine their value, which is crucial for accurate sorting and counting. An Arduino serves as the primary controller for the coin-checking and arranging machine. It includes a display board to show the total amount of each coin, and a coin acceptor to select and validate coins while rejecting any invalid or unwanted ones. The integrated design of this machine offers several benefits, including

ease of use and efficiency. It reduces the monotony of manual sorting and counting, increases precision, and enhances overall effectiveness. Additionally, it is suggested that this machine could be useful in applications beyond coin counting, such as in canning and packaging machines in factories.

### **Development and Analysis of Coin-Based Water Dispenser System (2022)**

As stated by Gupta (2022), coin-operated water dispensing machines are increasingly popular due to their convenience and ease of use. These machines are designed to dispense freshwater or various types of drinking liquids upon detecting a valid coin, depending on the available options. Water dispensers serve the important function of providing fresh water or other beverages, benefiting users significantly. This study aims to provide comprehensive knowledge about the benefits and organization of coin-operated water dispensers, which are particularly useful in locations such as railway stations, roadways, shopping malls, and similar public places. The focus of the study is to review and evaluate coin-based water dispenser systems. The findings contribute to the advancement of this technology by offering insights into its potential applications, limitations, and future developments.

### **Automatic Facemask Vending Machine (2022)**

According to Devan et al. (2022), a vending machine is an electronic device that dispenses products to consumers after accepting the required payment, typically in coins. Amid the COVID-19 pandemic, adhering to safety guidelines is crucial. One essential preventive measure is the use of face masks to protect against infections and dust. Mask

vending machines ensure the availability of masks in places such as clinics, bus stops, colleges, schools, densely populated areas, and rural regions. To prevent infection transmission, face masks need to be easily accessible without human interaction. The primary goal of this initiative is to provide convenient access to face masks for people on the go. The face mask vending machine is designed to facilitate public access to masks and personal hygiene products in areas with large gatherings. This fully automated machine dispenses face masks upon receiving coins.

### **Smart Vending Machine (2022)**

Pawar and Badmera (2022) aimed to integrate smart technology into vending machines, utilizing the Internet of Things (IoT) to simplify the process. They detailed the design, implementation, and application of a cashless and secure payment system in vending machines using IoT technology. The proposed methodology includes a server-side database where information is stored. Users can access the vending machine through a screen on the system or via a web page, allowing them to purchase desired products easily. The vending machine uses DC motors and a spring-based mechanical structure to dispense items. The entire process is conducted through wireless communication, with data storage and access facilitated by Wi-Fi or an internet connection.

### **Development of Battery Monitoring System Using Arduino Uno Microcontroller (2020)**

According to Roslan and Muda (2020), the Battery Monitoring System (BMoS) is an electronic system that monitors rechargeable battery cells or packs for various characteristics such as battery voltage, current, and state-of-charge (SoC). This approach can be used to prevent batteries from being overcharged or overdischarged, hence

increasing their shelf life. However, BMoS on the market is costly and unsuitable for low-cost embedded systems. Because the Arduino Uno is widely used for low-cost microcontroller boards, an easy programming environment, and open-source platforms for developing electrical projects, this research focuses on the Arduino Uno BMoS-based system. This system includes current and voltage sensors, an Arduino Uno microprocessor, and a liquid crystal display (LCD). For the development of this system, three goals must be met. First, the link between sensor input and output must be mathematically derived. The mathematical expression produced can be validated by connecting and disconnecting the circuit with the load while monitoring the output sensors. The LCD, current, and voltage sensors were then connected to the Arduino Uno microprocessor to create a complete BMoS prototype. The full prototype was tested with an 11.1 V lithium-ion battery and a DC motor as a load. According to the results, the current sensor exhibits a zero value when no load is attached, indicating no current flow. When the battery is fully charged, the LCD reads 11.1 volts. The developed system allows the user to monitor the current, voltage, and SoC of the battery to ensure that it is not overcharged or misused. The creation of the BMoS can assist in monitoring the operation and performance of batteries in any electrical system. At the conclusion of this investigation, the complete BMoS prototype provides benefits to the user and simplifies work.

### **Smart HygieneMate Hub: A Smart Vending Machine (2024)**

According to Take et al. (2024), activists and groups concerned with women's health and hygiene, as well as news articles, social media posts, and discussions, have raised awareness about the issue of sanitary pad vending machines. Women's Rights

Organizations, Non-Governmental Organizations (NGOs), and Government Initiatives raised awareness of the need for convenient access to sanitary pads through vending machines, particularly in public places such as schools, colleges, airports, hotels, and public restrooms. This topic gained attention since it was part of a bigger discussion about menstruation hygiene and women's empowerment. The concept provides an improved user experience by automating inventory management, enabling touchless interactions, offering several payment options, and improving security. This technology also provides important data insight, reduces maintenance efforts, and enables tailored user profiles. Ultimately, it helps to improve menstrual hygiene and accessibility. The two primary challenges with the existing sanitary pad vending machines are the lack of a scanner, which makes it impossible for people in need of sanitary pads in an emergency, and the difficulty of rapidly monitoring and replacing the machines, as well as sanitary pad supplies. Additionally, consistent resources and labor are required to repair and keep sanitary pad vending devices working. Another issue that still exists is the price of vending machines, particularly in rural regions, due to limited resources. These difficulties primarily drew me to work and research on developing a vending machine that is cost-effective, simple, and user-friendly, utilizing edge-cutting technology.

### **Student Attendance System Using QR Code (2024)**

As stated by Shrivastava (2024), an innovative and efficient way to monitor attendance in educational settings is the Student Attendance System using QR Scan. Teachers face administrative issues due to the time-consuming and prone-to-mistake nature of traditional manual attendance techniques. This system uses QR scanning

technology to increase accuracy and automate attendance recording. It is made up of three main parts: data management, scanning, and QR code creation. Barcode scanning technology allows the system to quickly and accurately gather attendance data, doing away with the need for manual records and reducing the chance of human error. In addition to simplifying attendance management, the Student Attendance System by QR Scan enhances student accountability and engagement. Teachers can spend more time teaching when this procedure is automated, and pupils gain from an accurate and effective record-keeping system.

### **Snack Vending Machine Using QR Code as Payment Method**

According to Maulana et al. (2023), vending machines can be used to minimize sales losses and simplify the payment system. The goal of this research is to create a snack vending machine with a payment system that uses an Android-based QR Code scan application and includes an E-Wallet balance. The payment application also includes an admin account for topping up funds and viewing sales history, making it easier for sellers to track sales success. This snack vending machine employs ESP32 to store and transmit data from each activity that occurs. This vending machine contains four different varieties of snacks. The Keypad is used to select the type of snack, and a servo motor attached to a spiral wire controls the snack's release. A 16x2 LCDs data, and an Infrared Avoid Obstacle sensor prevents the servo from turning when food falls in front of it. Testing on a snack vending machine with a QR Code involved purchasing four different types of snacks ten times. The entire test is successful; the tool can issue snacks, and transactions on the payment application are functioning properly.

### **An Automatic Vending Machine for Vending Books (2023)**

Mohapatra et al. (2023) presented an invention that applies to an automatic book vending machine. The automatic book vending machine includes a product storage unit, a product selection unit, a payment unit, a dispensing unit, a plurality of sensors, a user interface unit, a central processing unit, and a power supply. The product storage unit is set up to store the products available for purchase in the vending machine. The central processing unit is programmed to control the functions of the product storage unit, product selection unit, payment unit, a plurality of sensors, and user interface unit, as well as to regulate the temperature of the refrigerated compartment or the quantity of change to be dispensed. Customers can easily select and pay for their desired items using the automatic vending machine's touch screen interface and several payment options.

### **Smart Sanitizer Vending Machine (2022)**

According to Ubhare et al. (2022), smart sanitizer vending machines are automated, non-contact, alcohol-based hand sanitizer dispensers which is used in hospitals, workplaces, companies, schools, and many other settings. Alcohol is primarily a solvent, but it is also an excellent disinfectant when compared to soap. It also does not require water to rinse off because it is volatile and vaporizes immediately after application to the hands. It has also been suggested that a concentration of alcohol of more than 70% can kill the Coronavirus on the hands. An ultrasonic sensor detects a hand placed near it, and the Arduino Nano serves as a microcontroller, detecting the gap and running the pump to dispense the hand sanitizer. The IR sensor is used to detect bottles. The pump is connected

to an Arduino Nano, which controls the flow of the sanitizing liquid. The arrangement uses a red LED and a buzzer to let the user know that it is operating.

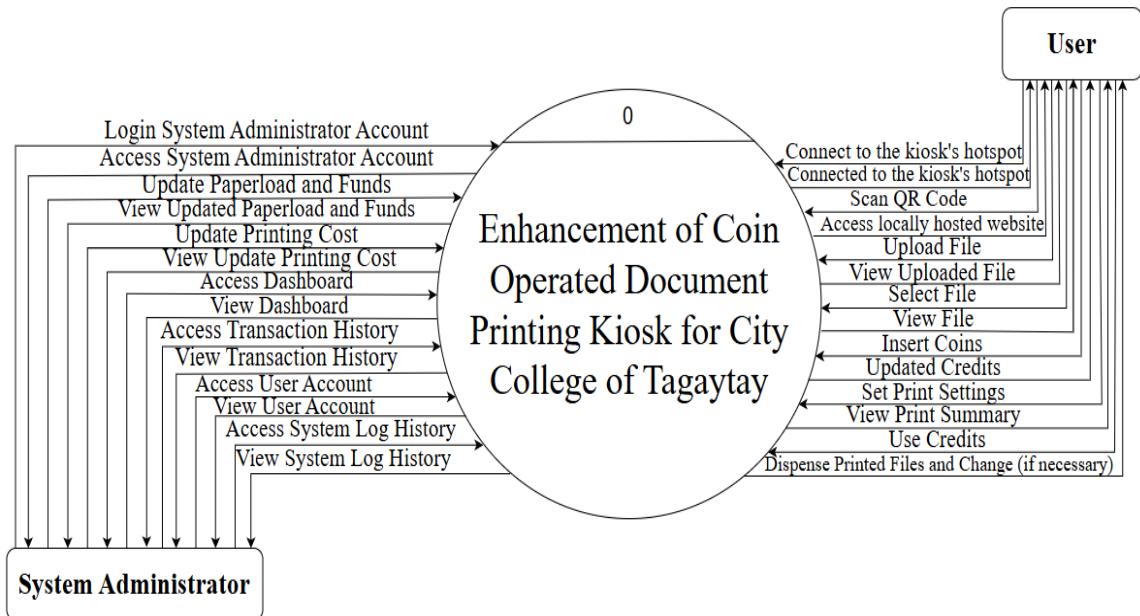
## Chapter III

### METHODOLOGY

This chapter presented the project planning, analysis, design, implementation, and operational maintenance.

#### **Project Design**

The study entitled "Enhancement of Coin Operated Printing Kiosks for City College of Tagaytay used Visual Basic (VB) and Python as programming languages, Arduino IDE as an open-source electronics platform based on user-friendly hardware and software, and MySQL as the backend database. The enhanced prototype is designed for two users: the user and the system administrator.

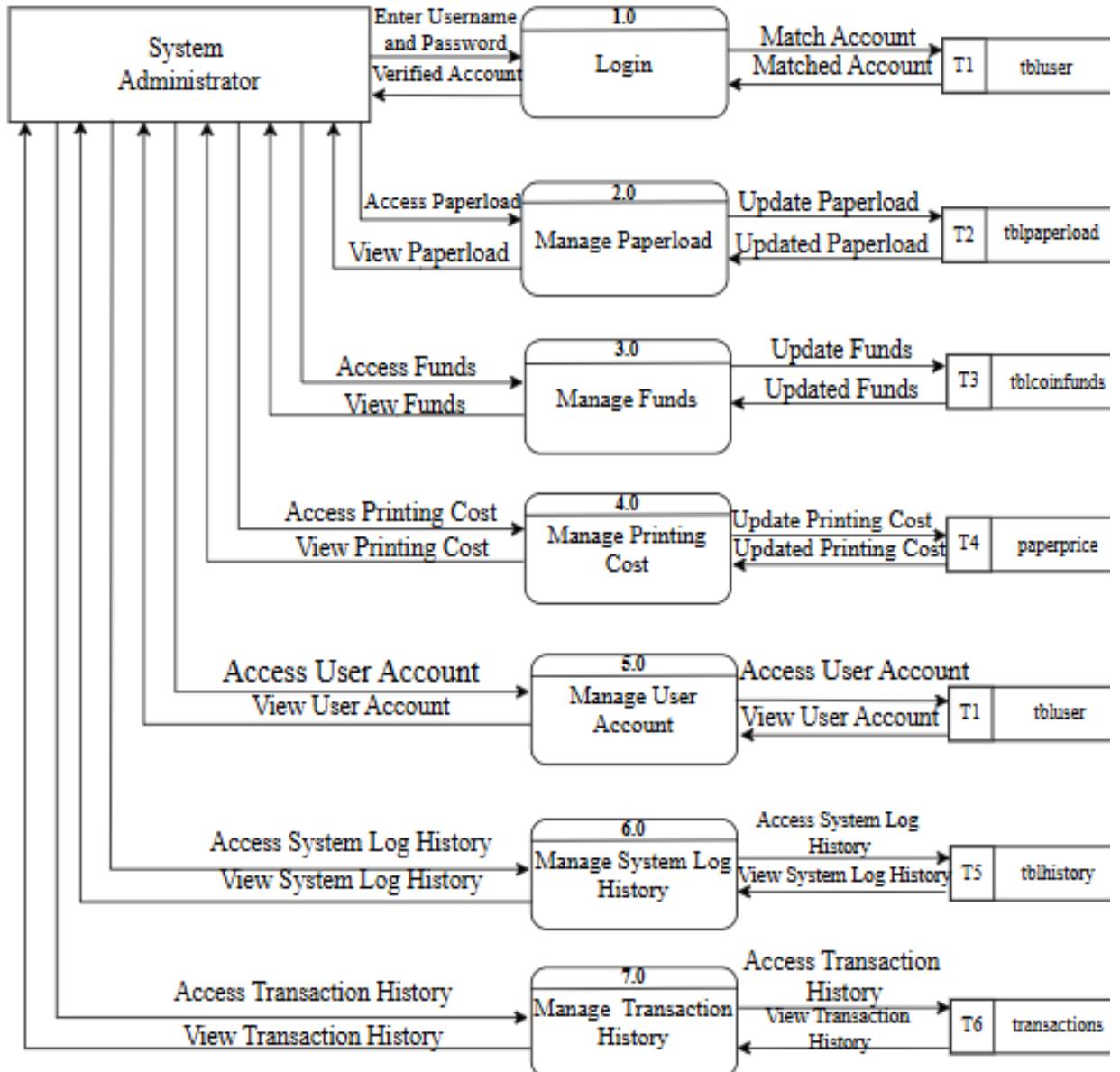


**Figure 3.** Context Diagram of Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay

As seen in *Figure 3*, the System Administrator is the assigned faculty member responsible for the overall management and maintenance of the kiosk. The system administrator logs in using their unique credentials to access the System Administrator Interface. Additionally, the System Administrator is responsible for updating and viewing paper loads and funds in the kiosk system to ensure the kiosk operates continuously. Also, the System Administrator is responsible for modifying the printing cost as needed to adjust based on the price of paper and ink, ensuring that the kiosk remains cost-effective and sustainable. Moreover, the system administrator can access and view the dashboard that shows the total number of transactions, paper refills, remaining funds, available paper for letter and legal-size bond paper, and total income generated. Additionally, the Transaction History section provides records of each transaction, including the date and time, file name, number of copies, print type, payment amount, and change dispensed, allowing for accurate tracking. The User Account section contains the System Administrator's account information, including the username and password. The System Log History records all activities performed by the System Administrator. It logs each login session, including the date and time, and tracks various actions such as paper refills and fund replenishments, ensuring transparency and accountability in system operations.

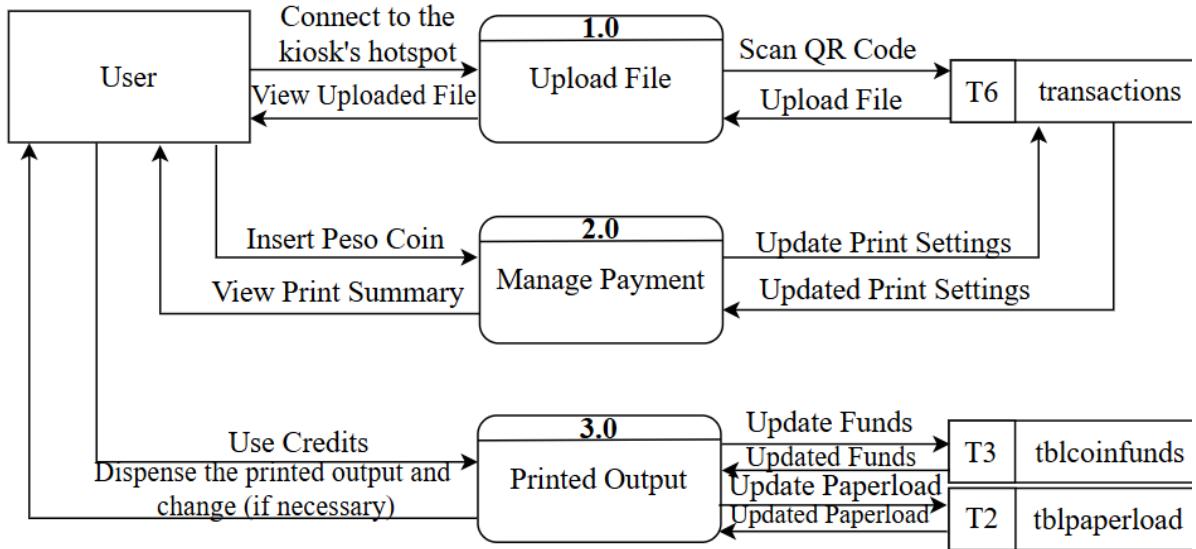
The user starts by scanning a QR code to connect to the kiosk's hotspot with their mobile phone, then scans the QR code provided by the kiosk system to access the locally hosted website and upload their file (PDF, MS Word, or MS Excel). Once the file is uploaded, the user selects it on the kiosk. Next, the user inserts Peso coins, including both old and newly designed one (1), five (5), ten (10), and twenty (20) Peso coins, which are converted into credits. Then, the user sets the print settings by selecting the print mode

(grayscale or color), choosing whether to print all pages or specific pages, selecting the paper size (Legal or Letter), and orientation (portrait or landscape). Thereafter, the user enters the number of copies they need and uses their credits to proceed with printing. Finally, the user waits for the printing process to be completed and collects their printed documents along with any changes, if applicable.



**Figure 4.** Data Flow Diagram System Administrator

**System Administrator.** The System Administrator logs in using their credentials, with the username and password stored in the tblusers database table, to manage the kiosk's operations. In addition, the System Administrator manages paper loads by monitoring and refilling them as needed, using the tblpaperload database table to save the data to the kiosk system and ensure it remains operational. Also, the System Administrator manages funds by refilling the coin funds in the enhanced prototype, ensuring that the kiosk has sufficient funds to provide change to users. The data is saved to the kiosk system through the tblcoinfunds database table. Furthermore, the System Administrator can modify the printing cost based on factors such as the prices of paper and ink, helping to maintain the kiosk's long-term operation. The updated printing price is saved and applied to the kiosk system through the paperprice database table. The System Administrator can view and access the user accounts, which display the username and password of the System Administrator stored in the tbluser database table. Moreover, the System Administrator can access the system log history, stored in the tblhistory database table, which records their login date and time, along with actions taken such as paper and fund refills. This is important for tracking activities, ensuring accountability, and maintaining the operation of the enhanced prototype. Finally, the System Administrator also has access to the report, which allows them to monitor daily transactions stored in the transactions database table, including filenames, dates, number of pages, amount, number of copies, and changes dispensed. This ensures accurate tracking of kiosk activity.



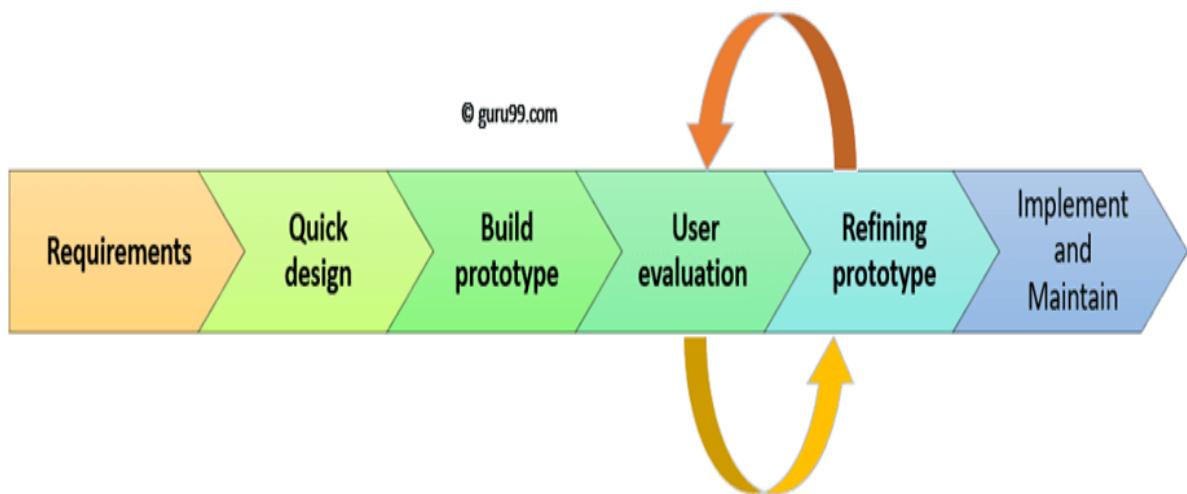
**Figure 5.** Data Flow Diagram User

**User.** The user connects to the hotspot provided by the kiosk by scanning the QR code. Next, the user scans another QR code with their mobile phone to access a locally hosted website to upload their file (PDF, MS Word, or MS Excel). Once the file is uploaded, the user inserts coins into the kiosk, which are converted into credits. After the transaction is completed, the uploaded file name is saved to the transactions table. The enhanced prototype accepts one (1), five (5), ten (10), and twenty (20) Peso coins. Next, the user selects the uploaded file and previews it. Then, the user configures the print settings, including print type (grayscale or color), page selection (all pages or specific pages), paper size (legal or letter), orientation (portrait or landscape), and the number of copies. These print settings are also saved in the transactions table for record-tracking and monitoring purposes. Using their credits, the user proceeds with printing and waits for the documents to be processed and collected, along with any changes if applicable. Since both coins and paper are consumed during the transaction in the enhanced prototype, the values

are automatically updated in the database tables tblcoinfunds and tbldpaperload, reflecting the current count in the kiosk system.

### **Project Methodology**

The researchers used the prototyping model to plan and design the enhanced prototype development process. This approach involves requirements gathering and analysis, quick design, prototype development, user evaluation, refinement, implementation, and maintenance.



**Figure 6.** Prototyping Model (Lucas Bennett, 2024)

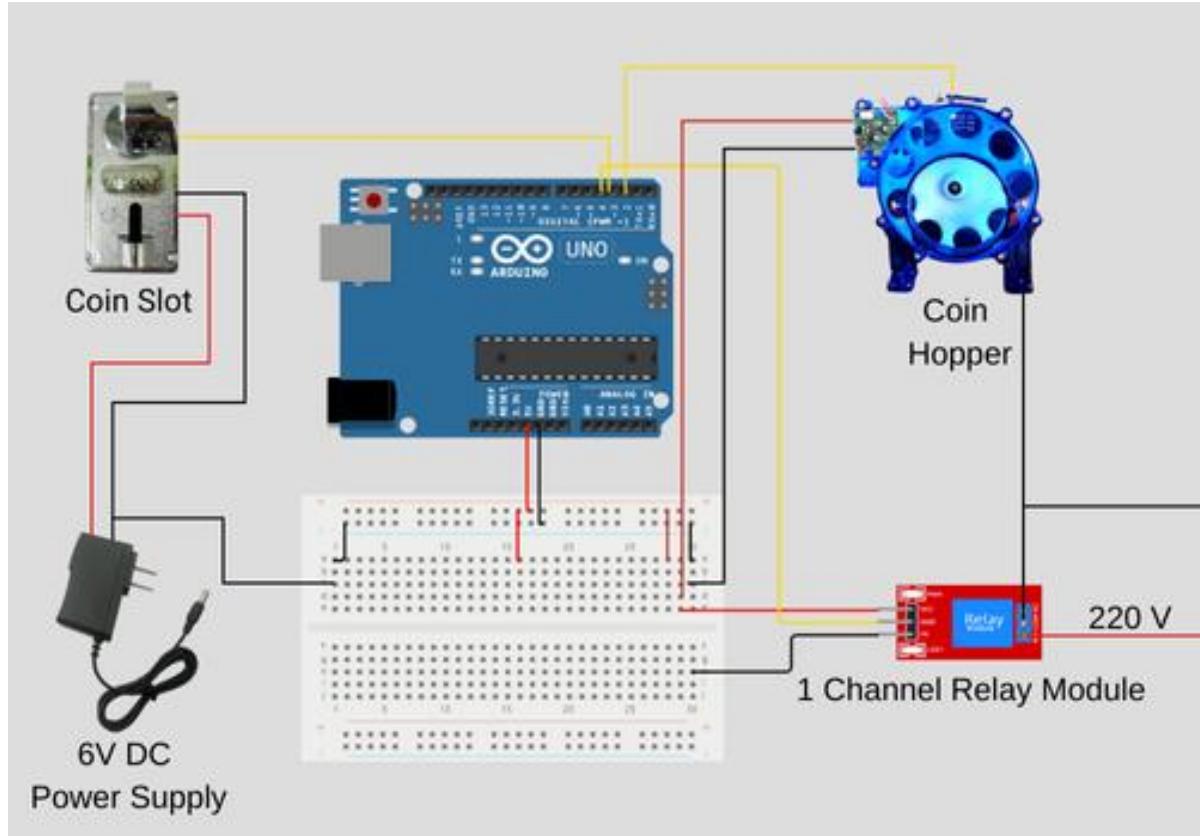
### **Requirements Gathering and Analysis**

The Requirements Gathering and Analysis stage was the first phase in the Enhancement of the Coin Operated Document Printing Kiosk. This phase began with identifying the recommendations from the previous study and determining the necessary enhancements, including color printing, support for different paper sizes, and an improved design. To gain a better understanding, the researchers conducted an interview with Mr. Juel Coper, the original developer of the previous study, to understand the challenges faced

and the expectations for the enhanced system. Key improvements were identified, including support for both old and newly designed Peso coins, color printing, and multiple paper sizes. Additionally, Mr. Coper provided insights into the hardware components necessary for developing the enhanced prototype.

## **Quick Design**

The Quick Design phase served as an initial design for the enhanced Coin Operated Document Printing Kiosk, providing a visual representation of the enhanced prototype's structure and functionality. Context diagrams were created to illustrate the interaction between the System Administrator and the User with the enhanced prototype. Data Flow Diagram for System Administrator was developed to illustrate the System Administrator's interactions with the enhanced prototype, highlighting key functionalities such as refilling paper, funds, and ink, modifying printing cost, reviewing system logs, and generating reports for performance analysis. Data Flow Diagrams for Users were developed to outline user interactions with the enhanced prototype, emphasizing key aspects such as file transfer, print settings configuration, and transaction processing. Essential kiosk system components were identified and structured during the module design phase. Modules, including the Hotspot Module, User Interface with QR Code Sub-Module and Locally Hosted File Upload Sub-Module, Printing Module, and System Administrator Interface Module with System History Log Sub-Module and Report Sub-Module, were established to ensure seamless document printing and system maintenance. These modules were designed using Figma, Canva, and Photoshop to provide a user-friendly experience throughout the printing process.



**Figure 7.** Pictorial Diagram of Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay

Figure 7 displays the pictorial diagram of the Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay. The pictorial diagram focuses on the connections between the parts. The hardware components include a Laptop Computer, 2x Printers, Pocket Wi-Fi, Coin Slot, 6V DC Power Supply, Arduino UNO, Coin Hopper, Jumper Wires, Breadboard, and a 1 Channel 5V Relay Module. At the core, the Arduino UNO serves as the central processing unit, receiving input from the Coin Slot through jumper wires, which detect and validate inserted coins, and controlling the Coin Hopper via jumper wires, which dispense change as needed. A 6V DC Power Supply provides power to the Coin Slot for detecting inserted coins, while the Coin Hopper operates with the help of a 1-channel 5V Relay Module, which allows the Arduino UNO to control its

activation. The wiring connections for each component are structured to ensure proper functionality. The Coin Slot is powered by a 6V DC Power Supply, with the red wire connecting to positive, the black wire to GND, and the yellow wire transmitting signals to a digital input pin on the Arduino UNO when a coin is inserted. The Arduino UNO controls the 1 Channel 5V Relay Module, with the red wire supplying 5V power, the black wire ensuring a common ground, and the yellow wire sending control signals to activate the relay. The 1 Channel 5V Relay Module acts as a switch for the Coin Hopper, allowing it to receive power only when activated. The coin hopper's power wire should be connected to the relay's normally off contact, with the other side connected to the power source, ensuring it dispenses coins only when necessary. A common ground connection must be maintained between the Arduino, relay, and power supply to prevent electrical issues. The Breadboard and Jumper Wires facilitate circuit prototyping, ensuring stable connections before final assembly. When a user inserts a coin, the Coin Slot sends a signal to the Arduino UNO, which verifies the payment and triggers the Relay Module to power the Coin Hopper, dispensing change if needed. Ensuring proper wiring and stable connections allows for an efficient, automated transaction process while maintaining safe and reliable operation.

### **Building Prototype**

During this phase, the information gathered from the quick design process is transformed to create the initial prototype, which represents the working model of the enhanced prototype. This process involved assembling essential hardware components, including the coin slot, 6V DC power supply, coin hopper, printer, touchscreen display, microcontroller, and the casing of the enhanced prototype, to ensure the seamless operation

of the system. The kiosk system functionalities, including QR code-based file transfer, print settings configuration, system administrator login, and transaction processing, were programmed for seamless integration. The hardware and software were integrated to ensure smooth document uploads, print adjustments, and payment processing for users, while enabling the System Administrator to monitor transactions, review system logs, and perform routine maintenance for optimal performance.



**Figure 8.** Project Layout of the Coin Operated Document Printing Kiosk for City College of Tagaytay

Figure 8 displays the layout of the enhanced prototype, featuring a touchscreen display, coin slot, change tray, and two printout trays for legal and letter-size bond paper. The touchscreen display serves as the main interface, allowing users to navigate the kiosk, preview documents, modify print settings such as paper size, print type (color or grayscale), and number of copies, and view the total cost before proceeding with payment. The coin slot enables users to insert coins, with the system detecting the denomination and updating the balance accordingly. If the inserted amount exceeds the required cost, the change tray dispenses the appropriate coins. For document retrieval, the kiosk has two printout trays, with the legal-size tray collecting prints from Printer 1 and the letter-size tray receiving prints from Printer 2, ensuring organized and efficient document retrieval.

## User Evaluation

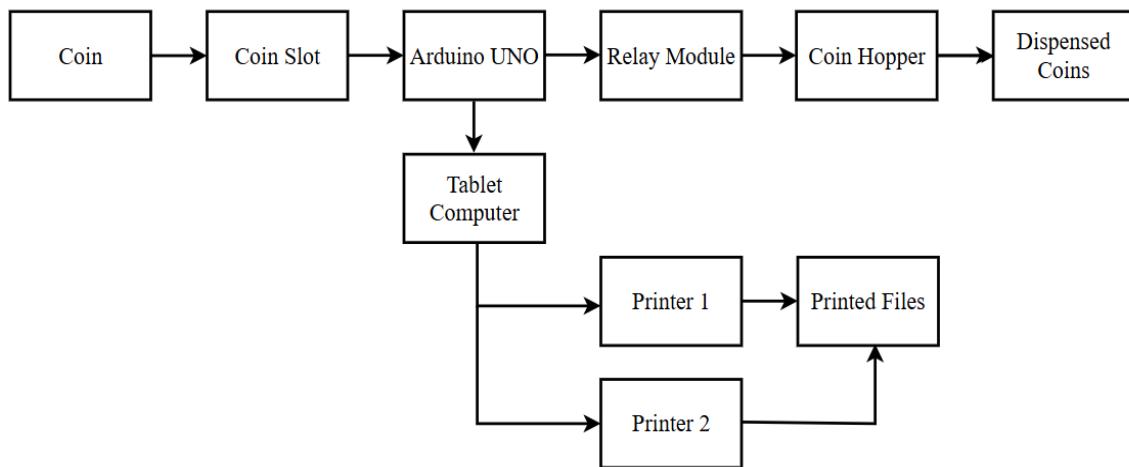
The enhanced prototype was presented to respondents to evaluate its software and hardware performance. Users, including students, instructors, and IT professionals, assessed the system and provided feedback on its strengths, weaknesses, and areas for improvement. Their comments and recommendations were analyzed and forwarded to the development team for necessary refinements before final implementation.

## Refining Prototype

In this phase, the enhanced prototype was refined based on user feedback and recommendations gathered during the user evaluation phase. If users identify issues with functionality, usability, or performance, then the development team will implement the required modifications to improve the enhanced prototype until the final prototype is developed.

## Implement Product and Maintain

This is the final stage of the prototyping model, in which the final prototype is tested and sent to production. The final prototype is thoroughly evaluated before being deployed at City College of Tagaytay, followed by routine maintenance on a regular basis to prevent malfunctions and ensure continuous operation.



**Figure 9.** Block Diagram of the Coin Operated Document Printing Kiosk for City College of Tagaytay

Figure 9 shows the block diagram, which illustrates the connection and interaction of each component within the system. The process begins when a user inserts a coin into the coin slot, which detects and verifies its validity based on size and weight. Once validated, the Arduino UNO, serving as the main controller, processes the coin's denomination and updates the user's credits. If change needs to be dispensed, the relay module is activated, triggering the coin hopper to release the appropriate amount of one (1) Peso coins, which are then dispensed to the user. After inserting the required amount of coins, the Arduino UNO communicates the credit value to the tablet computer, which displays the user interface where the user can select print settings. If the user selects Legal size, the kiosk system directs the print job to Printer 1. If the user selects Letter size, the

kiosk system directs it to Printer 2. The printer then processes the document, and the printed file is dispensed to the user.

## **System Operation and Testing Procedure**

### **Operation Procedure**

#### **System Administrator**

1. The System Administrator plugs the enhanced prototype into the power outlet.
2. The System Administrator turns on the tablet computer and both printers.
3. The System Administrator logs in using unique credentials to access the System Administrator Interface.
4. The System Administrator adds paper refills to the kiosk if the paper supply is low.
5. The System Administrator adds funds to the kiosk if the available change is insufficient.
6. The System Administrator updates the printing cost based on the price of paper and ink.
7. The System Administrator views the system log history to monitor the actions taken.
8. The System Administrator views the reports to monitor transactions.

#### **User**

1. The user scans the QR code to connect to the hotspot provided by the kiosk.
2. The user scans the QR code provided by the kiosk using their mobile phone to access the locally hosted file upload website.

3. The user uploads the file to the locally hosted file upload website (PDF, MS Word, or MS Excel).
4. The user inserts coins into the kiosk, which are converted into credits.
5. The user selects the file and previews it.
6. The user chooses the print mode, either grayscale or color.
7. The user selects whether to print all pages or specific pages.
8. The user selects the orientation, either portrait or landscape.
9. The user selects the paper size (Legal or Letter).
10. The user enters the number of copies to be printed.
11. The user uses the credits to proceed with printing.
12. The user waits for processing and collects the printed documents along with the change, if necessary.

## **Testing Procedure**

### **Unit Testing**

The researchers conducted unit testing to ensure that each hardware component in the enhanced prototype functioned as expected. The main objective was to guarantee that each unit functioned as expected. The Arduino UNO was tested to ensure it properly executed programmed instructions and managed input-output operations. The Coin Slot was checked to confirm it accurately detected and identified different coin denominations such as one (1), five (5), ten (10), and twenty (20) Peso coins while rejecting invalid ones. The Coin Hopper was tested to verify that it correctly dispensed the required number of one (1) Peso coins as change. The 1 Channel 5V Relay Module was assessed to ensure it properly switched power on and off as needed. Additionally, the researchers tested the

kiosk system on the tablet computer to verify its performance, responsiveness, and compatibility with the hardware components. By testing these components individually, the researchers ensured their reliability and smooth integration within the Coin-Operated Document Printing Kiosk.

### **Integration Testing**

In integration testing, the hardware components and the kiosk system were evaluated together to ensure that they operated seamlessly as a complete system. The QR code scanning feature was tested to confirm that users could reliably connect their mobile phones to the kiosk's local host website and successfully transfer documents for printing. The integration testing focused on verifying that all components, such as the Arduino UNO, touchscreen display, coin slot, coin hopper, and 1 Channel 5V Relay Module, functioned correctly and in sync with the kiosk system, ensuring that the printing process was executed accurately. This phase also examined potential issues that might arise during the interaction between the hardware and software, such as connectivity disruptions, incorrect payment processing, or printing errors. By thoroughly testing the functionality of the integrated hardware and software, the researchers ensured that the enhanced prototype met performance standards and operated as intended, guaranteeing its overall reliability.

### **Acceptance Testing**

The user tested the "Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay" in acceptance testing to check if it met user needs and followed the set guidelines. During this stage, the researchers carefully tested both the hardware and the kiosk system to make sure they worked as expected, providing the required performance and reliability. The main goal of this testing was to confirm that the system

met user expectations, followed quality standards, and provided a reliable and easy-to-use document printing service for students and faculty members.

### **Evaluation Procedure**

The researchers examined each necessary factor needed in the completion of the enhanced prototype. Evaluation forms that comply with ISO 25010 software and hardware standards were made available for users so they can evaluate different factors like usability, functionality, and reliability.

Table 1 shows the numeric rating and its equivalent interpretation to scale the results of the evaluation. Gathered data will be computed by using Mean Range Formula to identify if the created system satisfies the Software Factors Standard for Acceptance.

Table 1. Kiosk System and Hardware Prototype Evaluation Sheet: Numerical and

Descriptive Scale

<b>NUMERICAL RATING</b>	<b>INTERPRETATION</b>	<b>DEFINITION</b>
4.21 - 5.00	Excellent	The system fully meets and far exceeds most expectations.
3.41 - 4.20	Very Good	The system fully meets all and exceeds several expectations.
2.61 - 3.40	Good	The system fully meets all expectations.
1.81 - 2.60	Fair	The system does not fully meet all expectations.
1.00 - 1.80	Poor	The system fails to meet expectation to a significant degree in several areas.

## **Chapter IV**

### **RESULTS AND DISCUSSION**

This chapter discussed and presented the results and discussions of the project description, project structure, and project evaluation of the study.

#### **Project Description**

The study entitled “Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay” was developed to enhance the existing printing kiosk based on the recommendations from the previous study. The goal of the study was to help students and faculty members with their printing needs by improving the kiosk's functionality and efficiency. Enhancements include support for colored printing, multiple paper sizes, a QR code-based file transfer system, and the ability to accept both old and newly designed Peso coins to provide a more convenient and user-friendly experience. This study was designed for two (2) users only: the User and the System Administrator. Students and faculty members are the users who will utilize the enhanced Coin Operated Document Printing Kiosk for their printing needs. Users first connect their mobile devices to the kiosk's hotspot and scan a QR code to access the locally hosted website, where they upload files in PDF, MS Excel, or MS Word formats. The system then converts the uploaded files into a PDF for printing. Users can preview their selected file, insert Peso coins to convert them into credits, and adjust printing settings, including print mode, page selection, paper size, orientation, and the number of copies. Before proceeding, a print summary displays the total cost and any changes to be dispensed. Upon confirmation, the kiosk processes the

transaction and dispenses the printed documents along with any necessary change. The System Administrator, a designated faculty member, is responsible for the overall maintenance of the kiosk, including refilling paper, ink, and funds, as well as monitoring system logs and transactions.

The methodology used in this study was Prototyping Method. The methodology comprises six (6) phases which includes requirements gathering and analysis, quick design, building prototype, user evaluation, refining prototype, and implement product and maintain.

In requirements gathering and analysis, the researchers identified enhancements for the Coin Operated Document Printing Kiosk based on recommendations from the previous study. Key improvements included color printing, multiple paper sizes, and support for both old and newly designed Peso coins. An interview with Mr. Juel Coper, the original developer, provided insights into challenges, expectations, and necessary hardware components for the enhanced prototype.

In the quick design phase, context and data flow diagrams were created to illustrate interactions between the System Administrator and Users. Key functionalities such as file transfer, print settings, transaction processing, and system maintenance were outlined. Modules, including the Hotspot Module, User Interface with QR Code and File Upload Sub-Modules, Printing Module, and System Administrator Interface with System Log and Report Sub-Modules, were structured for seamless operation. The design was developed using Figma, Canva, and Photoshop to ensure a user-friendly experience.

In the building prototype phase, the initial working model of the enhanced kiosk was developed based on the quick design. Essential hardware components, including the

coin slot, coin hopper, printer, touchscreen display, microcontroller, and casing, were assembled for seamless operation. System functionalities such as QR code-based file transfer, print settings configuration, system administrator login, and transaction processing were programmed and integrated to ensure a smooth user experience and efficient maintenance.

In the user evaluation phase, students, instructors, and IT professionals assessed the prototype's software and hardware performance. Their feedback on strengths, weaknesses, and areas for improvement was analyzed and used for refinements before final implementation.

In the refining prototype phase, the enhanced prototype was refined based on user feedback and recommendations gathered during the user evaluation phase. If users identified issues with functionality, usability, or performance, the development team would implement the required modifications to improve the enhanced prototype until the final prototype is developed.

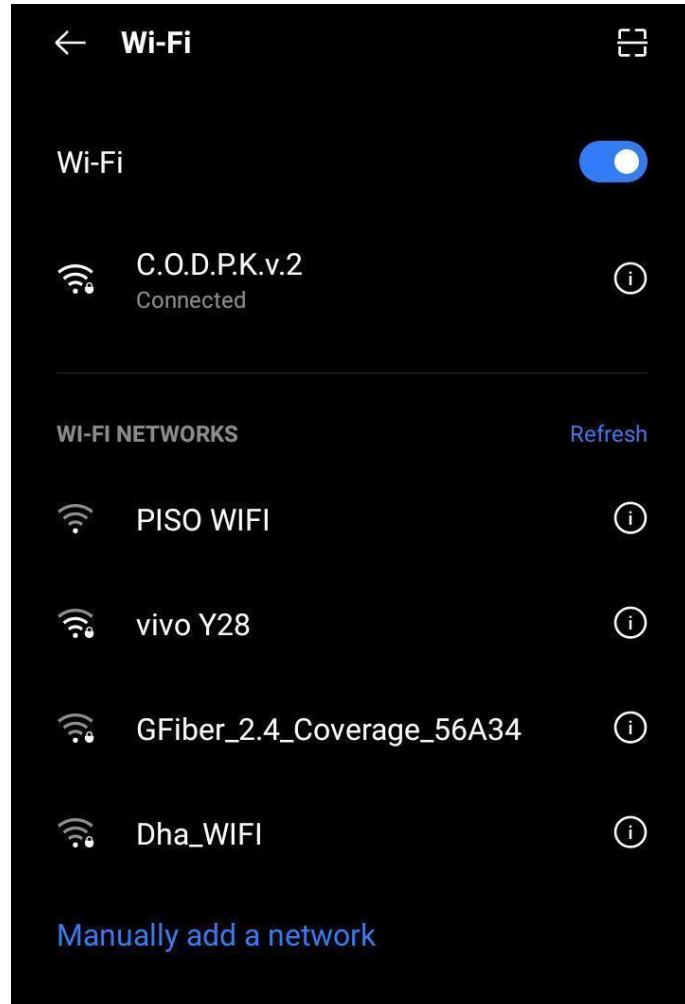
In the implement product and maintain phase, the final prototype was tested and sent to production. The final prototype was thoroughly evaluated before being deployed at City College of Tagaytay, followed by routine maintenance on a regular basis to prevent malfunctions and ensure continuous operation.

## **Project Structure**

The enhanced prototype named Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay was made using various hardware components, which includes a tablet computer, two printers, an Arduino UNO, a coin slot, 6V DC power

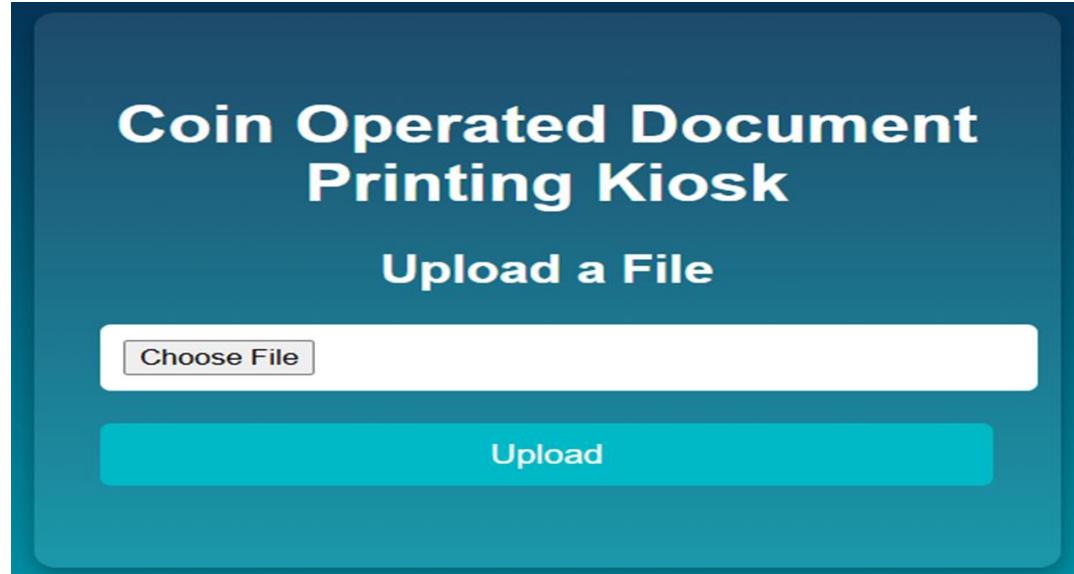
supply, a coin hopper, a 1 Channel 5V Relay Module, and a Breadboard. The tablet computer served as the main interface, running the user interface module that allowed users to upload documents, select print settings, and view the required payment amount. The two printers handled document printing, with one dedicated to letter-sized paper and the other to legal-sized paper, ensuring seamless printing operations based on user preferences. The Arduino UNO functioned as the main controller, managing hardware components such as the coin slot, which detected and validated inserted coins (supporting both old and newly designed Peso coins of 1, 5, 10, and 20 denominations). Once the system verified the coins, the coin hopper, controlled by the Arduino UNO, dispensed change in one (1) Peso coins when necessary. The 1 Channel 5V Relay Module was integrated into the system to control the operation of the coin hopper, which dispenses change based on the required amount. The Breadboard was used for prototyping and connecting the various electronic components, ensuring proper circuit completion and facilitating future enhancements.

### Screen Hierarchy of the Study



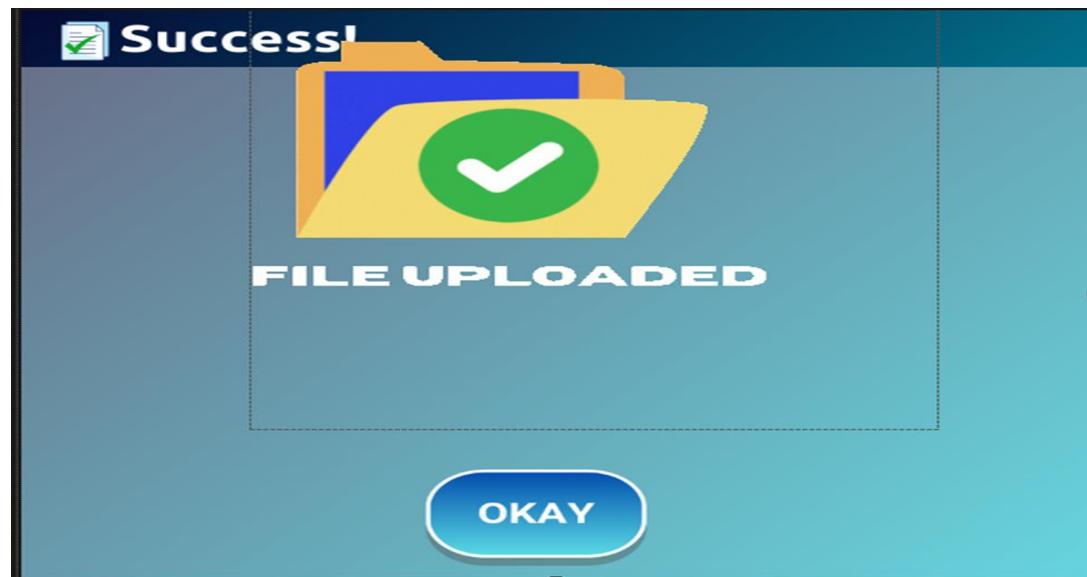
**Figure 10.** Kiosk's Hotspot Connection Interface

Figure 10 displays the Kiosk's Hotspot Connection Interface, where the user can connect manually or by scanning the QR code above the touchscreen display. This is required to access the locally hosted website where files are uploaded for printing.



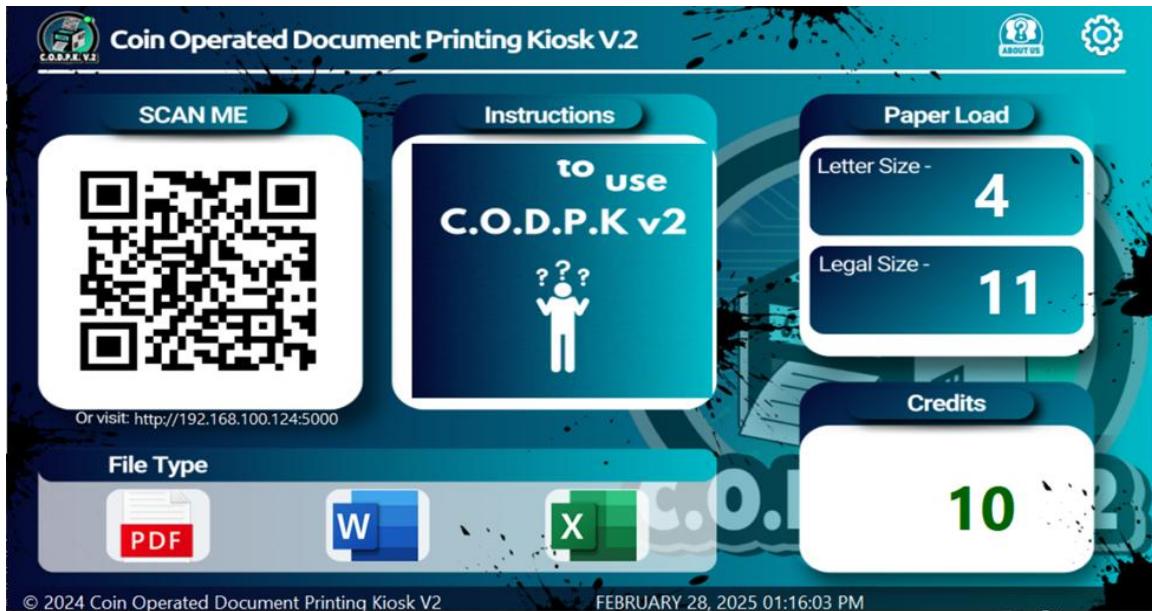
**Figure 11.** File Upload Interface

Figure 11 shows the locally hosted website where the user uploads their files. The supported file formats for upload include Word, Excel, and PDF.



**Figure 12.** File Uploaded Notification Form

Figure 12 displays a File Uploaded Notification, informing the user if the file has already been uploaded to the kiosk system.



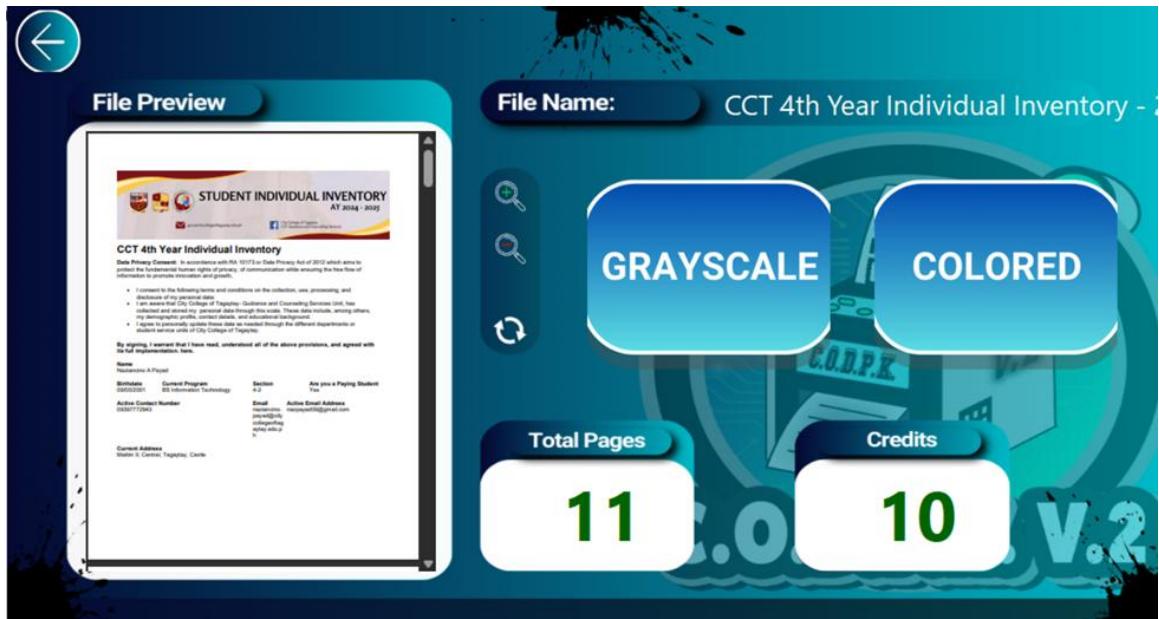
**Figure 13.** Start Page Form

Figure 13 displays the Start Page, the main user interface where users can scan a QR code to upload a file, select the uploaded file type, view the instructions on how to use the enhanced prototype, check the remaining paper count for both legal and letter sizes, and view their credits. Additionally, an "About the Developer" section is included.



**Figure 14.** File Selection Form

Figure 14 displays the File Selection Form, showing the file uploaded by the user, which will be deleted once the printing process is completed.



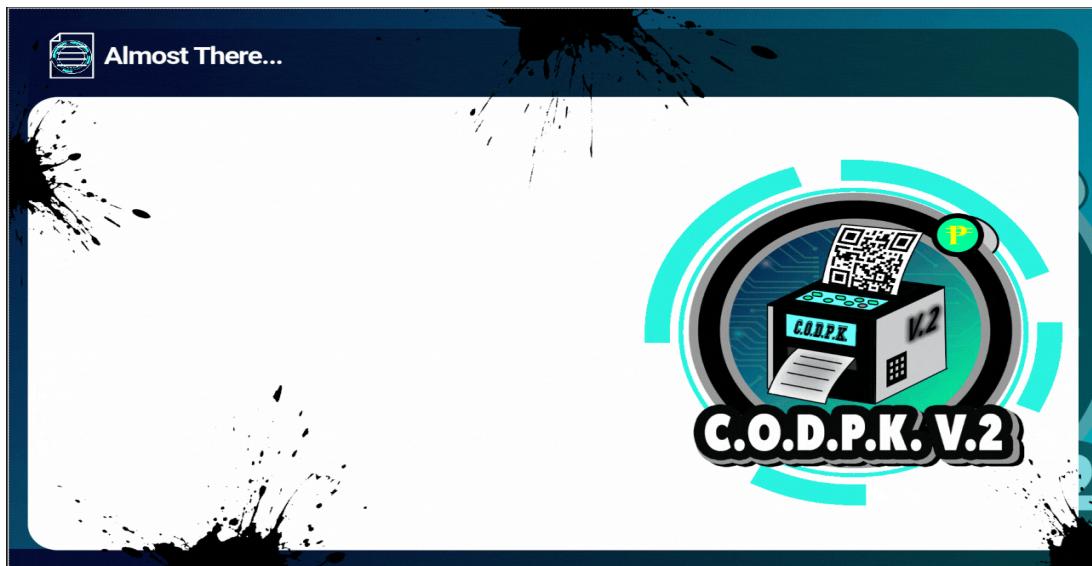
**Figure 15.** File Preview Form

Figure 15 displays the File Preview, which allows the user to verify that the correct file has been selected. It also shows the file name, enables zooming in and out, displays the total number of pages, checks the credits based on the inserted coins, and provides the option to choose between grayscale or color printing.

The Print Summary form is a digital interface for managing print jobs. It includes sections for selecting pages to print (All Pages or Specific Page(s)), defining print ranges (From: 1, To: 11), choosing orientations (Portrait or Landscape), and specifying paper sizes (Letter or Legal). It also displays the number of copies (1) and provides payment information: To Pay: 22, Credits: 10, and Change: 0. Large blue 'PRINT' and orange 'CANCEL' buttons are prominently displayed at the bottom.

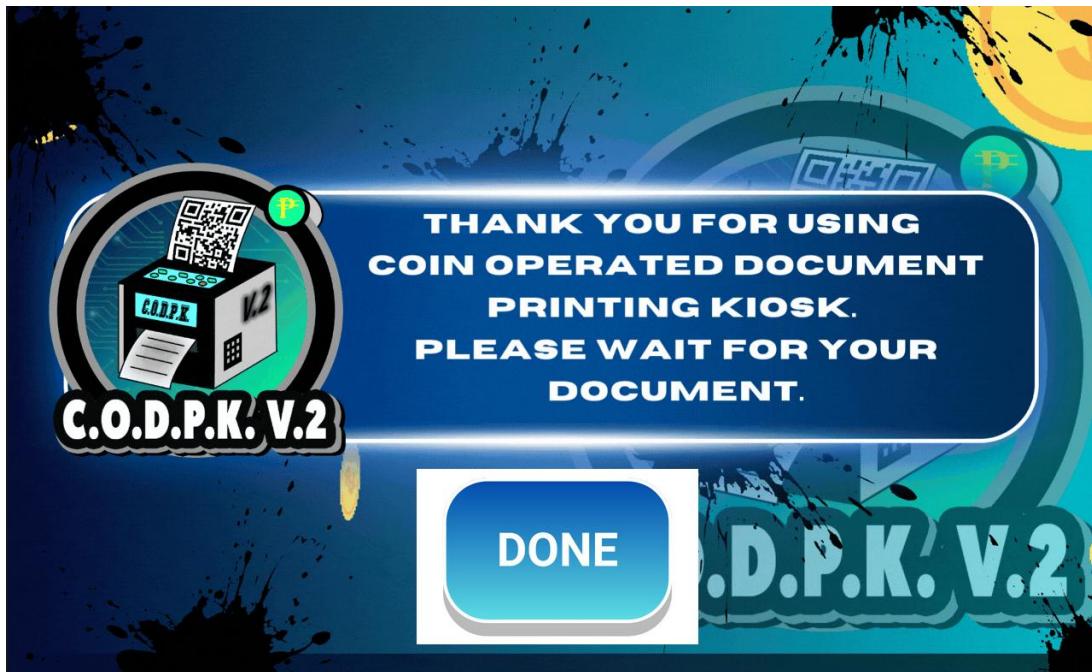
**Figure 16.** Print Summary Form

Figure 16 shows the Print Summary, where the user can modify the print settings, including selecting the pages to print (all pages or specific pages), the orientation (portrait or landscape), selecting the paper size (legal or letter), and setting the number of copies. In addition, users can view the price, check available credits, and view the change if applicable.



**Figure 17.** Print Processing Form

Figure 17 displays the Print Processing Form, which indicates the loading status while the print job is being processed.

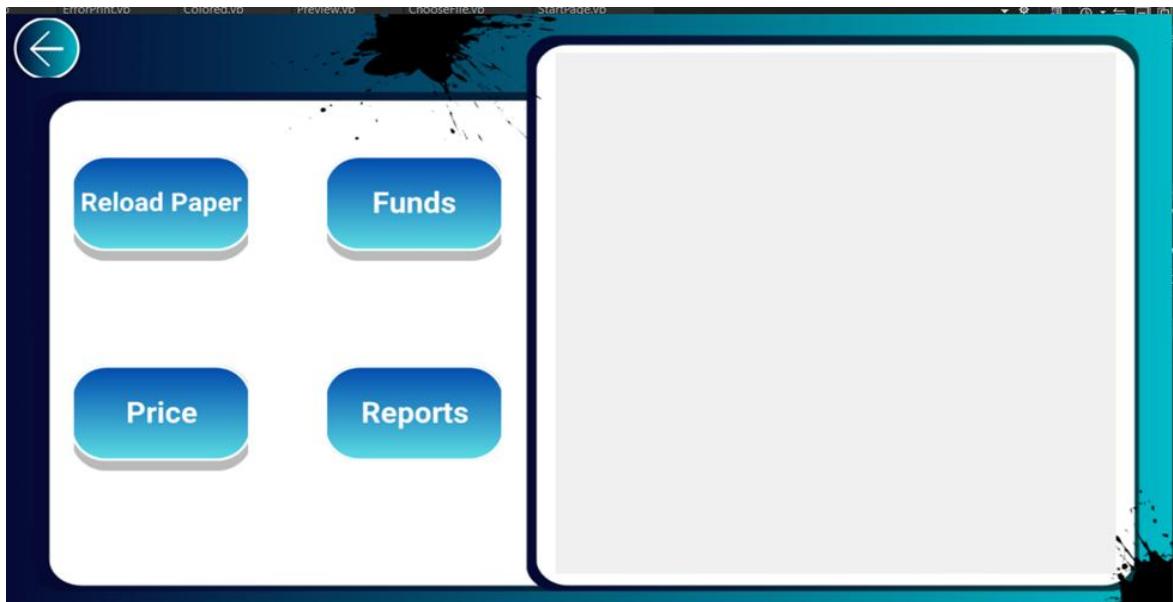


**Figure 18.** Thank You Notification

Figure 18 displays the ‘Thank You’ message for using the Coin Operated Document Printing Kiosk V.2, informing the user to wait while their document is being printed.

**Figure 19.** System Administrator Login Form

Figure 19 displays the System Administrator Login Form, where the system administrator logs in using unique credentials to access the system administrator interface. This form allows the system administrator to perform overall system maintenance.



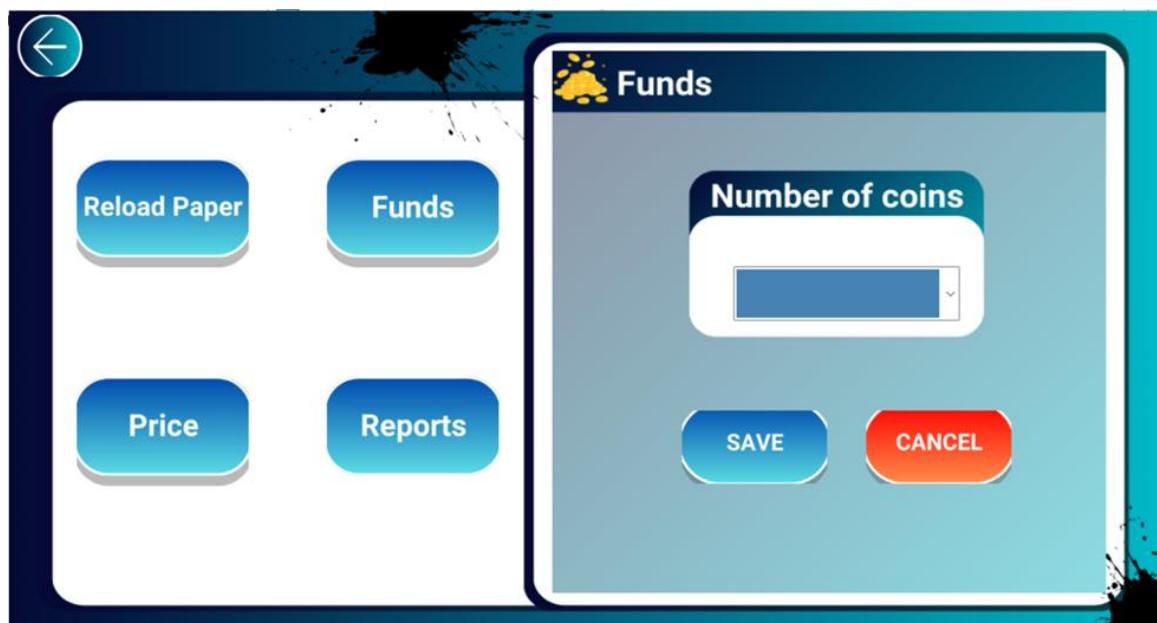
**Figure 20.** System Administrator Interface Form

Figure 20 shows the System Administrator Interface, where the system administrator manages the system. This includes refilling paper, refilling funds, and modifying the price. The system administrator can also view reports and system log history.



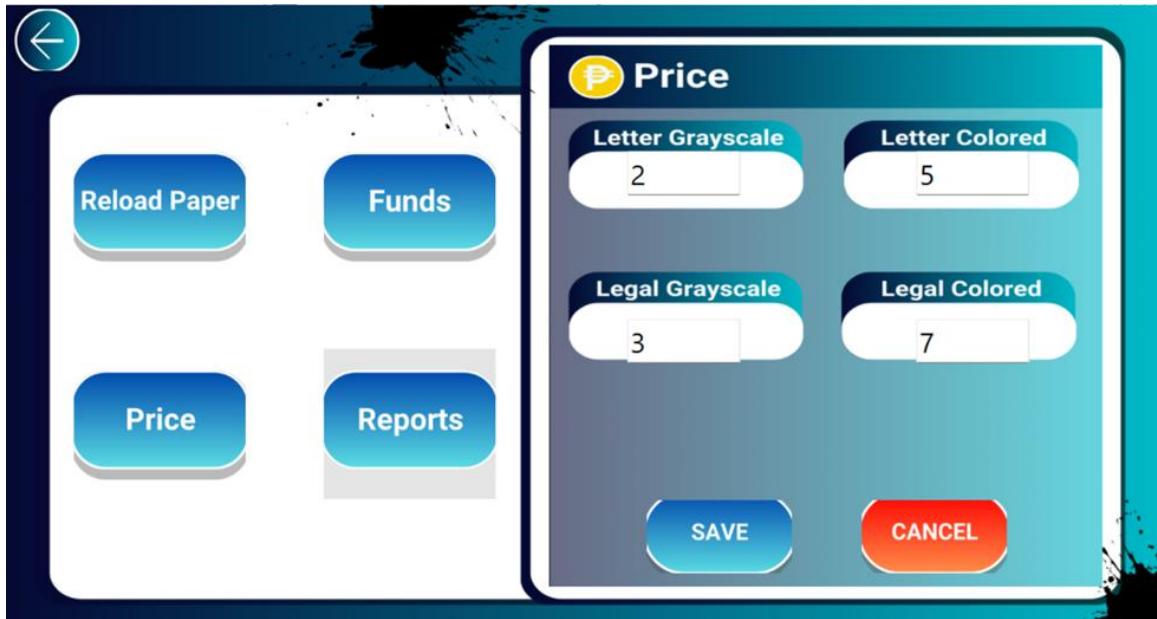
**Figure 21.** Reload Paper Form

Figure 21 shows the Reload Paper Form, where the system administrator updates the paper load in the kiosk system based on the paper inserted into the paper tray. This includes both legal and letter sizes.



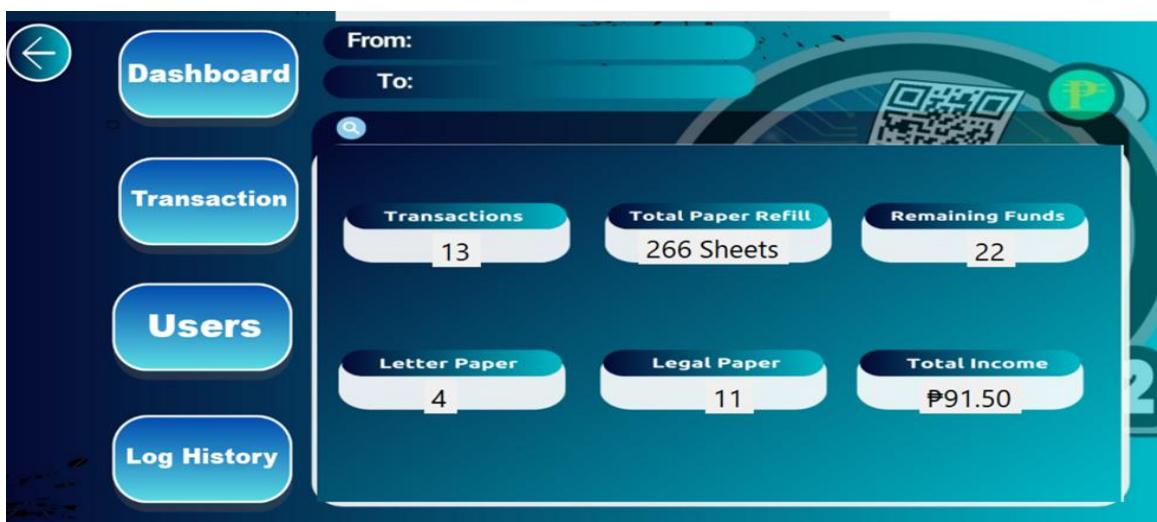
**Figure 22.** Refill Funds Form

Figure 22 shows the Refill Funds Form, where the system administrator updates the funds in the kiosk system based on the number of coins inserted into the coin hopper.



**Figure 23.** Price Form

Figure 23 displays the Price Form, which allows the system administrator to adjust the pricing for letter and legal paper sizes, as well as for color and grayscale printing.



**Figure 24.** Dashboard Form

Figure 24 displays the Dashboard, which provides an overview of all transactions, the total paper refills for letter and legal sizes, the remaining funds, the current paper load for both letter and legal sizes, and the total income earned for the day. This offers a clear summary of daily activities, facilitating efficient tracking of resources and finances.

The screenshot shows a transaction history form with the following data:

Transaction_ID	Kiosk_ID	Transaction_Date	File_Name	Number_Of_Pa	Print_Type	Payment	Change_Amount
56	1	02/03/2025 10:12 pm	#3-FA-Alcantara Jasper B. (1).pdf	1	Grayscale	2.00	8.00
55	1	02/03/2025 7:58 pm	#3-FA-Alcantara Jasper B. (2) - Copy.pdf	5	Grayscale	10.00	0.00
54	1	02/03/2025 7:58 pm	#3-FA-Alcantara Jasper B. (2) - Copy.pdf	5	Grayscale	10.00	0.00
53	1	02/03/2025 7:58 pm	#3-FA-Alcantara Jasper B. (2) - Copy.pdf	5	Grayscale	10.00	0.00
52	1	02/03/2025 7:58 pm	#3-FA-Alcantara Jasper B. (2) - Copy.pdf	5	Grayscale	10.00	0.00
51	1	02/03/2025 7:58 pm	#3-FA-Alcantara Jasper B. (2) - Copy.pdf	5	Grayscale	10.00	0.00

**Figure 25.** Transaction History Form

Figure 25 displays the Transactions History, which includes the Transaction ID, Kiosk ID, Date, File Name, Number of Papers, Printing Type, and Change. The transactions can also be filtered by date and printed for record-keeping and monitoring purposes.

The screenshot shows a user interface for managing user accounts. On the left, there is a vertical navigation bar with buttons for Dashboard, Transaction, Users, and Log History. The main area features a search bar at the top with 'From: Friday, February 28, 2025' and 'To: Friday, February 28, 2025'. Below the search bar is a 'FILTER' button and a 'CLEAR' button. To the right of these is a large blue 'PRINT' button. The central part of the screen displays a table with the following data:

id	Kiosk_ID	name	username	password
1	1	Administrator	admin	admin
3	1	Jasper	titenus	titenus

At the bottom of the table area, it says 'Page 1 of 1'. Below the table are 'PREVIOUS' and 'NEXT' buttons.

**Figure 26.** User Accounts Form

Figure 26 displays the User Accounts Form, which contains the system administrator's account information, including ID, Kiosk ID, username, and password.

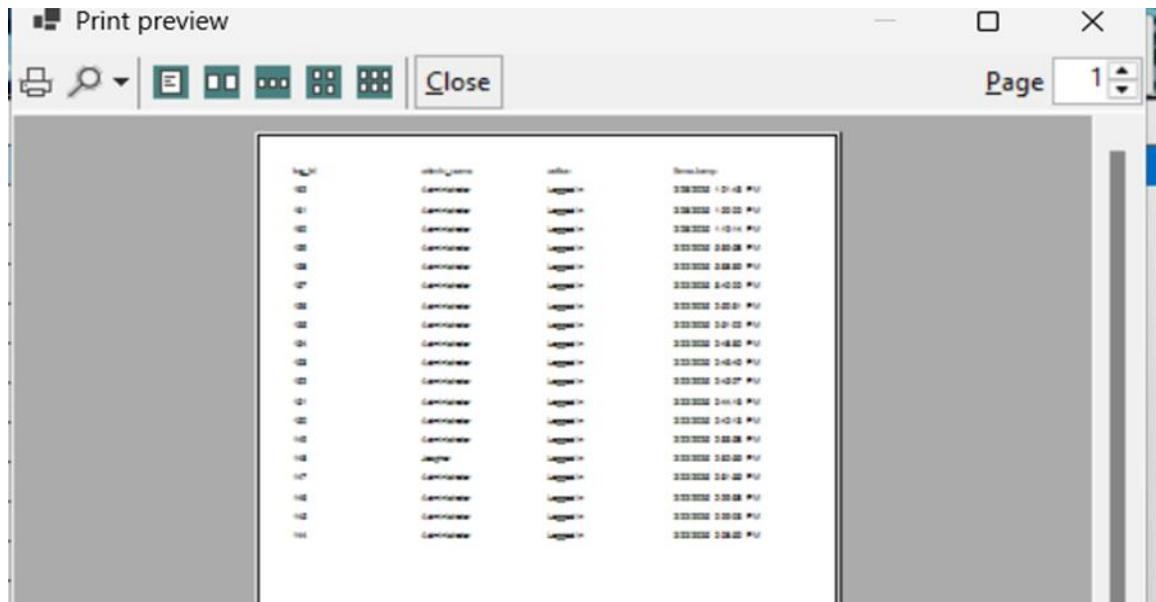
The screenshot shows a user interface for viewing system log history. On the left, there is a vertical navigation bar with buttons for Dashboard, Transaction, Users, and Log History. The main area features a search bar at the top with 'From: Friday, February 28, 2025' and 'To: Friday, February 28, 2025'. Below the search bar is a 'FILTER' button and a 'CLEAR' button. To the right of these is a large blue 'PRINT' button. The central part of the screen displays a table with the following data:

log_id	admin_name	action	timestamp
162	Administrator	Logged in	2/28/2025 1:21 PM
161	Administrator	Logged in	2/28/2025 1:20 PM
160	Administrator	Logged in	2/28/2025 1:19 PM
159	Administrator	Logged in	2/22/2025 5:39 PM
158	Administrator	Logged in	2/22/2025 5:38 PM
157	Administrator	Logged in	2/22/2025 3:40 PM
156	Administrator	Logged in	2/22/2025 2:52 PM
155	Administrator	Logged in	2/22/2025 2:51 PM
154	Administrator	Logged in	2/22/2025 2:48 PM
153	Administrator	Logged in	2/22/2025 2:46 PM
152	Administrator	Logged in	2/22/2025 2:45 PM
151	Administrator	Logged in	2/22/2025 2:44 PM
150	Administrator	Logged in	2/22/2025 2:42 PM
149	Administrator	Logged in	2/22/2025 2:33 PM
148	Jasper	Logged in	2/22/2025 2:32 PM
147	Administrator	Logged in	2/22/2025 2:31 PM
146	Administrator	Logged in	2/22/2025 2:29 PM
145	Administrator	Logged in	2/22/2025 2:29 PM
144	Administrator	Logged in	2/22/2025 2:28 PM

At the bottom of the table area, it says 'Page 1 of 1'. Below the table are 'PREVIOUS' and 'NEXT' buttons.

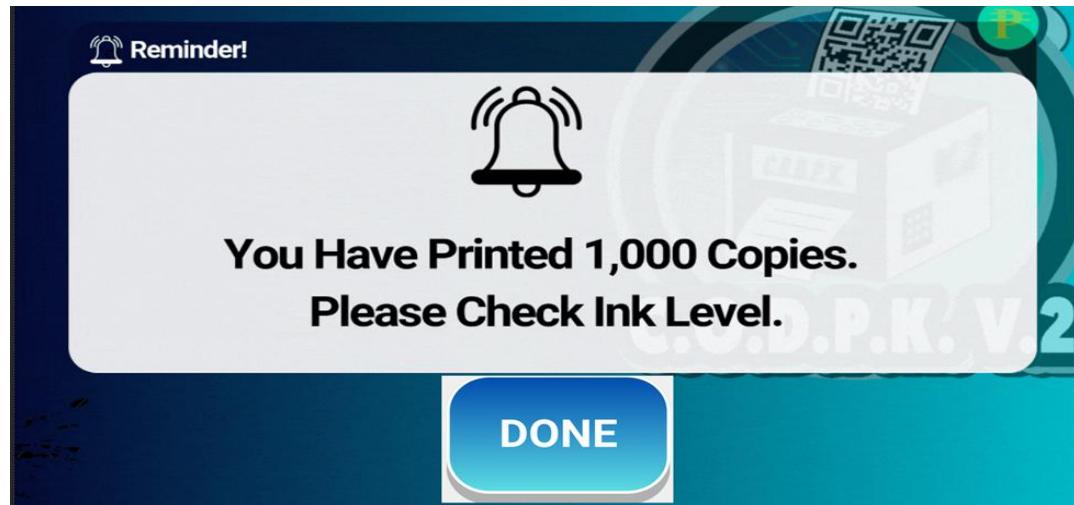
**Figure 27.** System Log History Form

Figure 27 displays the System Log History Form, which includes the Login ID, Administrator Name, Action, and Timestamp. This form records the actions taken by the system administrator for monitoring and accountability.



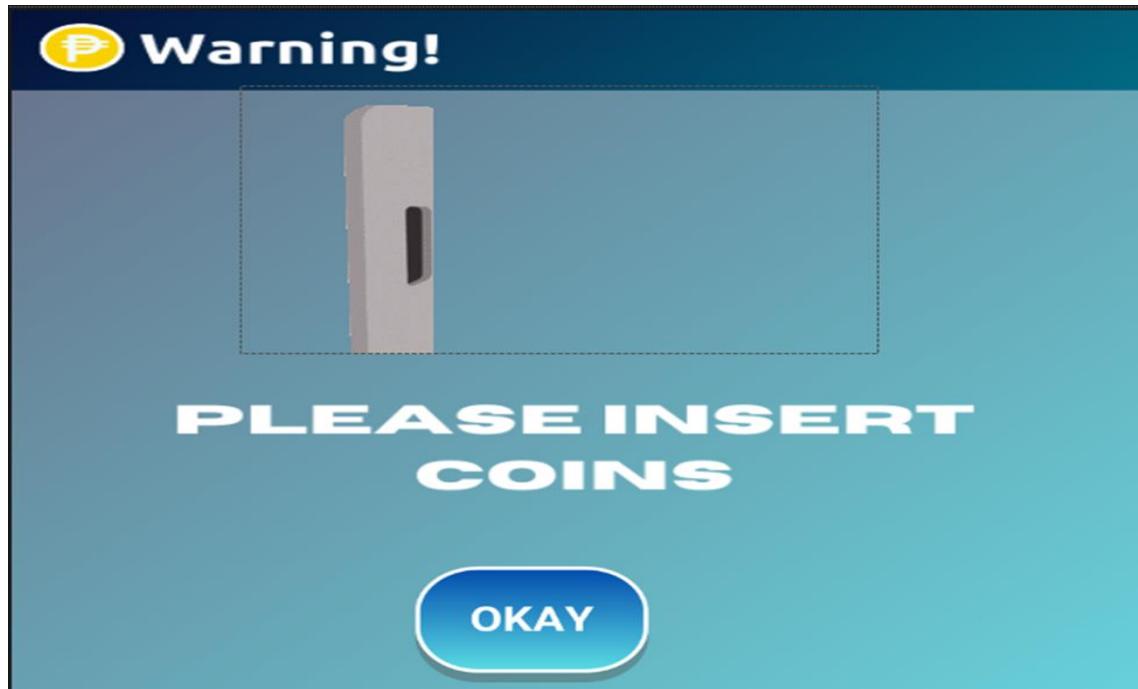
**Figure 28.** Print Preview Form

Figure 28 shows the print preview for the reports to ensure transparency.



**Figure 29.** Ink Level Monitoring Notification

Figure 29 displays the Ink Level Monitoring Notification, which alerts the system administrator to check the ink level once the enhanced prototype reaches one thousand printed copies. This notification ensures timely ink refills to prevent printing interruptions.



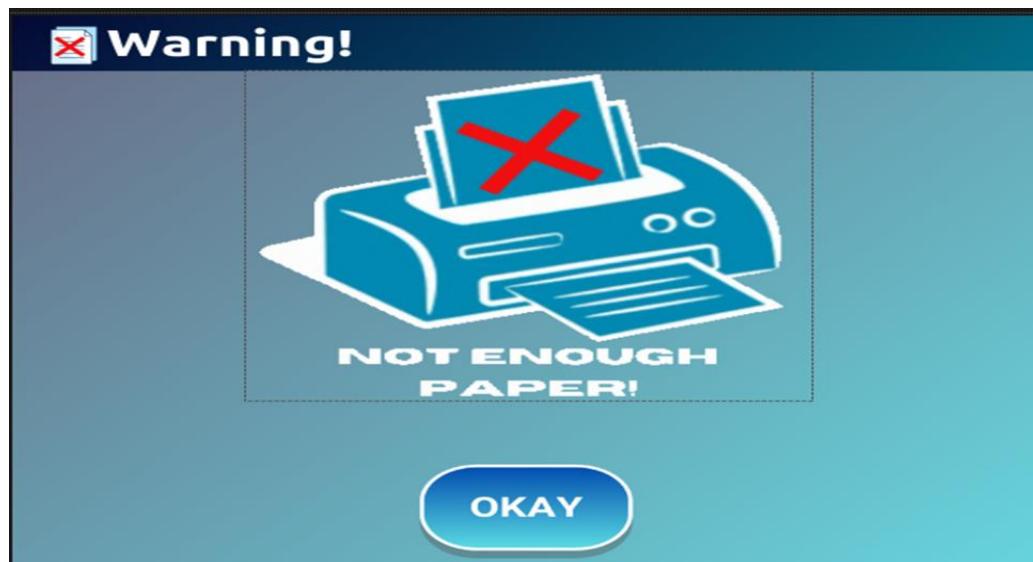
**Figure 30.** Insert Coin Notification

Figure 30 displays the Insert Coin Notification, which warns the user to insert coins before proceeding with the printing process. This notification ensures that the required payment is made to continue printing.



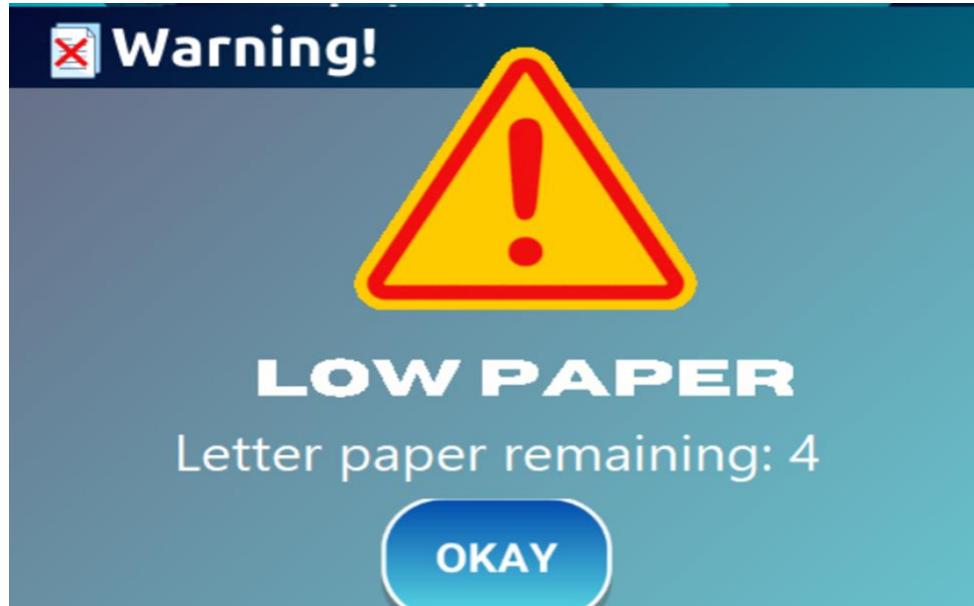
**Figure 31.** Insufficient Funds Notification

Figure 31 displays the Insufficient Funds Notification, which alerts the user that they do not have enough funds to proceed. To continue printing, the user needs to add more coins.



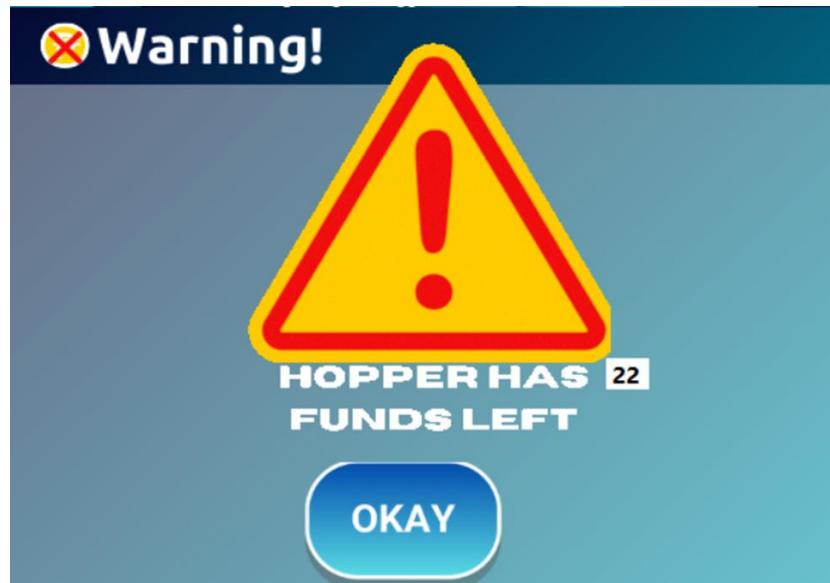
**Figure 32.** Not Enough Paper Notification

Figure 32 displays the Not Enough Paper Notification, which alerts the user when the number of pages to be printed exceeds the available paper in the printer. This notification ensures that users are informed in advance to avoid incomplete print jobs.



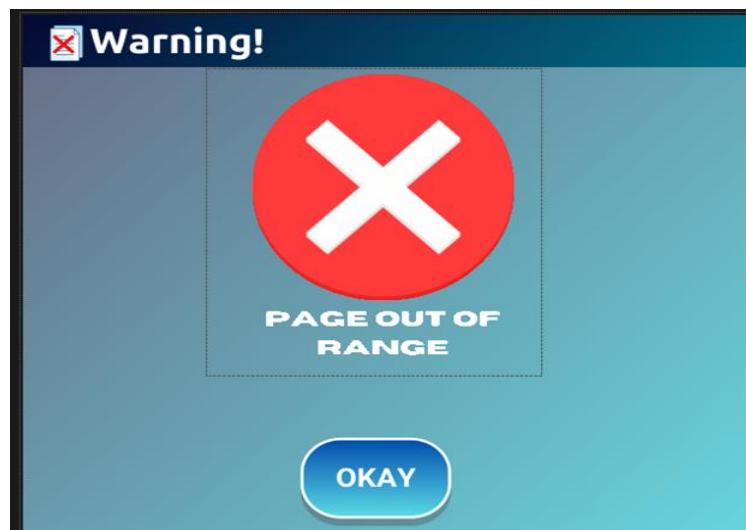
**Figure 33.** Low Paper Notification

Figure 33 displays the Low Paper Notification, which alerts both the user and system administrator when the printer is running low on paper. This notification ensures timely refills to prevent printing interruptions and will be displayed once the paper load drops below 10 sheets.



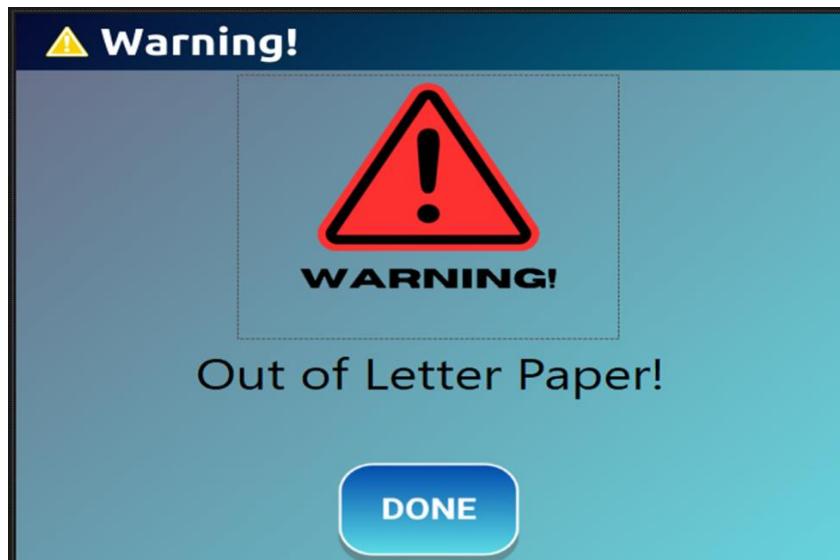
**Figure 34.** Low Fund Notification

Figure 34 displays the Low Fund Notification, which shows the remaining funds in the coin hopper. This notification alerts both the user and system administrator, helping ensure that the kiosk has sufficient funds for change and smooth transactions. It will be displayed once the coin hopper funds drop below 50 coins.



**Figure 35.** Page Out of Range Notification

Figure 35 displays a notification when the selected page range exceeds the available pages in the document. This applies specifically to the 'Specific Pages' section. If the user enters a page number that does not exist in the document, the system will trigger this notification to alert them of the issue.



**Figure 36.** Out of Paper Notification

Figure 36 displays the Out of Paper Notification, which alerts the user when there is no more paper left in the printer. Once this notification appears, the kiosk can no longer be used until the paper is refilled.



**Figure 37.** Arduino Uno

Figure 37 shows the Arduino Uno, a microcontroller board based on the ATmega328P, featuring 14 digital I/O pins, 6 analog inputs, a 16 MHz crystal oscillator, USB connectivity, a power jack, and a reset button. It is widely used for prototyping and embedded systems due to its versatility and ease of use.



**Figure 38.** Coin Slot

Figure 38 displays the Coin Slot, the entry point of a Coin Operated Document Printing Kiosk, where users insert coins for payment. It is designed to accept both old and newly designed Peso coins, including one (1), five (5), ten (10), and twenty (20) Peso denominations, ensuring compatibility with various coin types for seamless transactions.



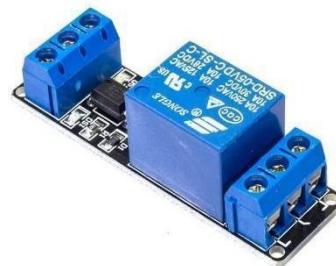
**Figure 39.** 6V DC Power Supply

Figure 39 shows the 6V DC power supply, which provides the necessary voltage to operate the coin slot. This power supply ensures that the coin slot functions properly by enabling it to detect and process inserted coins efficiently.



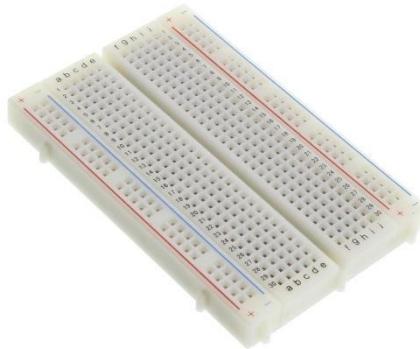
**Figure 40.** Coin Hopper

Figure 40 shows the Coin Hopper, a component responsible for storing and dispensing change. It is designed to handle only 1-Peso coins and ensures users receive the correct change after inserting their coins for payment.



**Figure 41.** 1 Channel 5V Relay Module

Figure 41 displays the 1 Channel 5V Relay Module, which is used to control the operation of the coin hopper by switching it on and off. This relay module is triggered by the microcontroller to activate or deactivate the hopper, ensuring that change is dispensed when necessary.



**Figure 42.** Breadboard

Figure 42 shows the Breadboard, a tool used for prototyping electronic circuits without the need for soldering. It provides a grid of holes where components like microcontrollers can be easily inserted and connected using jumper wires, enabling quick testing and modifications of circuit designs.



**Figure 43.** Pocket Wi-Fi

Figure 43 shows the Pocket Wi-Fi, which provides an internet connection where users connect to access the kiosk's local host server.

## Project Evaluation

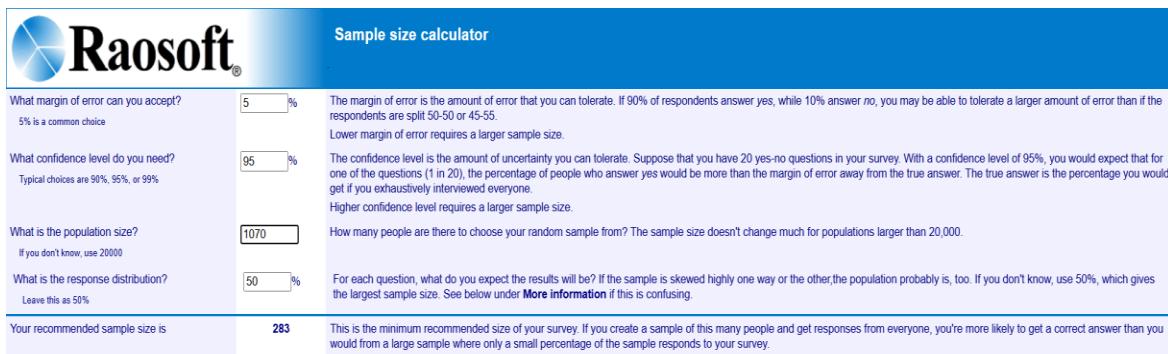
The researchers evaluated the enhanced prototype using the ISO 25010 standard for both hardware and software. The ISO 25010 standard for hardware consists of five (5) categories: Effectiveness, Efficiency, Satisfaction, Freedom from Risk, and Context Coverage. Effectiveness refers to the enhanced prototype's ability to achieve specific goals accurately, while Efficiency assesses resource utilization concerning these goals. Satisfaction emphasizes user comfort and acceptability. Freedom from risk considers the mitigation of economic, safety, or environmental risks. Lastly, Context Coverage evaluates the enhanced prototype's ability to function across different environments.

The ISO 25010 standard for Software consists of eight (8) categories: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. Functional Suitability assesses how well the software meets its requirements, including accuracy and completeness. Performance Efficiency measures responsiveness, resource utilization, and scalability. Compatibility refers to the ability to work with other systems or products. Usability includes ease of use, learnability, and user satisfaction. Reliability involves stability, fault tolerance, and recoverability. Security highlights protecting information and ensuring data integrity. Maintainability pertains to the ease of modification, analyzability, and testability. Portability includes adaptability to different environments or platforms.

## Evaluation Results

### Breakdown of the Respondents

The researchers used the sample size calculator by Raosoft Inc, to identify the sample size using a 5% margin error, 95% confidence level, and a 50% response distribution. The sample size of the students is two-hundred eighty-three (283), twenty-six (26) is the sample size for the Client/Instructors, and three (3) for the IT professionals.



The screenshot shows the Raosoft Sample size calculator interface. It has a blue header with the Raosoft logo and the title 'Sample size calculator'. Below the header are five input fields with their respective descriptions:

- What margin of error can you accept?** (5%) Description: The margin of error is the amount of error that you can tolerate. If 90% of respondents answer yes, while 10% answer no, you may be able to tolerate a larger amount of error than if the respondents are split 50-50 or 45-55. Lower margin of error requires a larger sample size.
- What confidence level do you need?** (95%) Description: The confidence level is the amount of uncertainty you can tolerate. Suppose that you have 20 yes-no questions in your survey. With a confidence level of 95%, you would expect that for one of the questions (1 in 20), the percentage of people who answer yes would be more than the margin of error away from the true answer. The true answer is the percentage you would get if you exhaustively interviewed everyone. Higher confidence level requires a larger sample size.
- What is the population size?** (1070) Description: How many people are there to choose your random sample from? The sample size doesn't change much for populations larger than 20,000.
- What is the response distribution?** (50%) Description: For each question, what do you expect the results will be? If the sample is skewed highly one way or the other, the population probably is, too. If you don't know, use 50%, which gives the largest sample size. See below under [More information](#) if this is confusing.
- Your recommended sample size is** (283) Description: This is the minimum recommended size of your survey. If you create a sample of this many people and get responses from everyone, you're more likely to get a correct answer than you would from a large sample where only a small percentage of the sample responds to your survey.

**Figure 44.** Raosoft Sample Size Calculator for Students at the School of Computer Studies (SCS) of City College of Tagaytay

Figure 44 shows the computation for the sample size of students at the School of Computer Studies (SCS) of City College of Tagaytay. The total population of students is 1070 and based on the Raosoft Sample Size Calculator, the recommended sample is 283.

The Raosoft Sample Size Calculator interface. It includes fields for margin of error (5%), confidence level (95%), population size (27), and response distribution (50%). The calculated result is a recommended sample size of 26.

Sample size calculator		
What margin of error can you accept? 5% is a common choice	<input type="text" value="5"/> %	The margin of error is the amount of error that you can tolerate. If 90% of respondents answer yes, while 10% answer no, you may be able to tolerate a larger amount of error than if the respondents are split 50-50 or 45-55.
What confidence level do you need? Typical choices are 90%, 95%, or 99%	<input type="text" value="95"/> %	The confidence level is the amount of uncertainty you can tolerate. Suppose that you have 20 yes-no questions in your survey. With a confidence level of 95%, you would expect that for one of the questions (1 in 20), the percentage of people who answer yes would be more than the margin of error away from the true answer. The true answer is the percentage you would get if you exhaustively interviewed everyone.
What is the population size? If you don't know, use 20000	<input type="text" value="27"/>	Higher confidence level requires a larger sample size. How many people are there to choose your random sample from? The sample size doesn't change much for populations larger than 20,000.
What is the response distribution? Leave this as 50%	<input type="text" value="50"/> %	For each question, what do you expect the results will be? If the sample is skewed highly one way or the other, the population probably is, too. If you don't know, use 50%, which gives the largest sample size. See below under More information if this is confusing.
Your recommended sample size is	<input type="text" value="26"/>	This is the minimum recommended size of your survey. If you create a sample of this many people and get responses from everyone, you're more likely to get a correct answer than you would from a large sample where only a small percentage of the sample responds to your survey.

**Figure 45.** Raosoft Sample Size Calculator for Instructors at the School of Computer Studies (SCS) of City College of Tagaytay

Figure 45 shows the computation for the sample size of instructors at the School of Computer Studies (SCS) of City College of Tagaytay. The total population of students is 27 and based on the Raosoft Sample Size Calculator, the recommended sample is 26.

### Breakdown of the Respondents

Table 2 shows the breakdown of the respondents who evaluated the prototype using the ISO 25010 standards. 90.71% or 283 of the total respondents is from the students, 8.33% or 26 is from the instructors and 0.96% or 3 is from IT professionals.

**Table 2.** Breakdown of the Respondents

RESPONDENTS	NUMBER	PERCENTAGE
Students	283	90.76%
IT Professionals	3	0.96%
Instructor	26	8.33%
<b>Total</b>	<b>312</b>	<b>100%</b>

### **Hardware Prototype:**

#### **Respondents' Assessment of the Effectiveness Criteria**

Table 3 shows the result of respondents' assessment of the Effectiveness of the hardware prototype. The hardware prototype was evaluated and obtained a mean average of 4.72, which was interpreted as "Excellent". This means that the hardware prototype fully meets and far exceeds most expectations.

**Table 3.** Respondents' Assessment of the Effectiveness of the Hardware Prototype

<b>INDICATORS</b>	<b>MEAN</b>	<b>INTERPRETATION</b>
Completeness	4.74	Excellent
Accuracy	4.71	Excellent
<b>MEAN AVERAGE</b>	<b>4.72</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

#### **Respondents' Assessment of the Efficiency Criteria**

Table 4 shows the result of respondents' assessment of the Efficiency of the hardware prototype. The hardware prototype was evaluated and obtained a mean average of 4.67, which was interpreted as "Excellent". This means that the hardware prototype fully meets and far exceeds most expectations.

**Table 4.** Respondents' Assessment of the Efficiency of the Hardware Prototype

INDICATORS	MEAN	INTERPRETATION
Completeness	4.69	Excellent
Accuracy	4.66	Excellent
<b>MEAN AVERAGE</b>	<b>4.67</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

#### **Respondents' Assessment of the Satisfaction Criteria**

Table 5 shows the result of respondents' assessment of their Satisfaction with the hardware prototype. The hardware prototype was evaluated and obtained a mean average of 4.68, which was interpreted as "Excellent". This means that the hardware prototype fully meets and far exceeds most expectations.

**Table 5.** Respondent's Assessment of Satisfaction with the Hardware Prototype

INDICATORS	MEAN	INTERPRETATION
Usefulness	4.78	Excellent
Trust	4.66	Excellent
Pleasure	4.63	Excellent
Comfort	4.68	Excellent
<b>MEAN AVERAGE</b>	<b>4.68</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Freedom of Risk Criteria**

Table 6 shows the result of respondents' assessment of the Freedom of Risk of the hardware prototype. The hardware prototype was evaluated and obtained a mean average of 4.63, which was interpreted as "Excellent". This means that the hardware prototype fully meets and far exceeds most expectations.

**Table 6.** Respondents' Assessment of the Freedom from Risk of the Hardware Prototype

<b>INDICATORS</b>	<b>MEAN</b>	<b>INTERPRETATION</b>
Economic Risk Mitigation	4.58	Excellent
Health and Safety Risk Mitigation	4.74	Excellent
Environmental Risk Mitigation	4.57	Excellent
<b>MEAN AVERAGE</b>	<b>4.63</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Context Coverage Criteria**

Table 7 shows the result of respondents' assessment of the Context Coverage of the hardware prototype. The hardware prototype was evaluated and obtained a mean average of 4.65, which was interpreted as "Excellent". This means that the hardware prototype fully meets and far exceeds most expectations.

**Table 7.** Respondents' Assessment of the Context Coverage of the Hardware Prototype

<b>INDICATORS</b>	<b>MEAN</b>	<b>INTERPRETATION</b>
Context Completeness	4.73	Excellent
Flexibility	4.57	Excellent
<b>MEAN AVERAGE</b>	<b>4.65</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Kiosk System:**

#### **Respondents' Assessment of the Functional Suitability Criteria**

Table 8 shows the result of respondents' assessment of the Functional Sustainability of the Kiosk System. The Kiosk System was evaluated and obtained a mean average of 4.66, which was interpreted as "Excellent". This means that the Kiosk System fully meets and far exceeds most expectations.

**Table 8.** Respondents' Assessment of the Functional Suitability of the Kiosk System

INDICATORS	MEAN	INTERPRETATION
Functional Completeness	4.68	Excellent
Functional Correctness	4.74	Excellent
Functional Appropriateness	4.56	Excellent
<b>MEAN AVERAGE</b>	<b>4.66</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Performance Efficiency Criteria**

Table 9 shows the result of respondents' assessment on the Performance Efficiency of the Kiosk System. The Kiosk System was evaluated and obtained a mean average of 4.62, which was interpreted as "Excellent". This means that the Kiosk System fully meets and far exceeds most expectations.

**Table 9.** Respondents' Assessment of the Performance Efficiency of the Kiosk System

INDICATORS	MEAN	INTERPRETATION
Time Behavior	4.67	Excellent
Resource Utilization	4.63	Excellent
Capacity	4.55	Excellent
<b>MEAN AVERAGE</b>	<b>4.62</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Compatibility Criteria**

Table 10 shows the result of respondents' assessment of the Compatibility of the Kiosk System. The Kiosk System was evaluated and obtained a mean average of 4.57, which was interpreted as "Excellent". This means that the Kiosk System fully meets and far exceeds most expectations.

**Table 10.** Respondents' Assessment of the Compatibility of the Kiosk System

<b>INDICATORS</b>	<b>MEAN</b>	<b>INTERPRETATION</b>
Co-Existence	4.59	Excellent
Interoperability	4.54	Excellent
<b>MEAN AVERAGE</b>	<b>4.57</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Usability Criteria**

Table 11 shows the result of respondents' assessment of the Usability of the Kiosk System. The Kiosk System was evaluated and obtained a mean average of 4.51, which was

interpreted as "Excellent". This means that the Kiosk System fully meets and far exceeds most expectations.

**Table 11.** Respondents' Assessment of the Usability of the Kiosk System

INDICATORS	MEAN	INTERPRETATION
Appropriateness Recognizability	4.68	Excellent
Learnability	4.62	Excellent
Operability	4.57	Excellent
Uses Error Protection	3.97	Very Good
User Interface Aesthetics	4.62	Excellent
Accessibility	4.61	Excellent
<b>MEAN AVERAGE</b>	<b>4.51</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Reliability Criteria**

Table 12 shows the result of the respondents' assessment of the Reliability of the Kiosk System. The Kiosk System was evaluated and obtained a mean average of 4.51, which was interpreted as "Excellent". This means that the Kiosk System fully meets and far exceeds most expectations.

**Table 12.** Respondents' Assessment of the Reliability of the Kiosk System

INDICATORS	MEAN	INTERPRETATION
Maturity	4.53	Excellent
Availability	4.54	Excellent
Fault Tolerance	4.54	Excellent
Recoverability	4.45	Excellent
<b>MEAN AVERAGE</b>	<b>4.51</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Security Criteria**

Table 13 shows the result of the respondents' assessment of the Security of the Kiosk System. The Kiosk System was evaluated and obtained a mean average of 4.48, which was interpreted as "Excellent". This means that the Kiosk System fully meets and far exceeds most expectations.

**Table 13.** Respondents' Assessment of the Security of the Kiosk System

INDICATORS	MEAN	INTERPRETATION
Confidentiality	4.57	Excellent
Integrity	4.50	Excellent
Non-Repudiation	4.43	Excellent
Accountability	4.39	Excellent
Authenticity	4.54	Excellent
<b>MEAN AVERAGE</b>	<b>4.48</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Maintainability Criteria**

Table 14 shows the result of respondents' assessment of the Maintainability of the Kiosk System. The Kiosk System was evaluated and obtained a mean average of 4.58, which was interpreted as "Excellent". This means that the Kiosk System fully meets and far exceeds most expectations.

**Table 14.** Respondents' Assessment of the Maintainability of the Kiosk System

INDICATORS	MEAN	INTERPRETATION
Modularity	4.61	Excellent
Reusability	4.59	Excellent
Analyzability	4.61	Excellent
Modifiability	4.56	Excellent
Testability	4.57	Excellent
<b>MEAN AVERAGE</b>	<b>4.58</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Portability Criteria**

Table 15 shows the result of respondents' assessment of the Portability of the Kiosk System. The Kiosk System was evaluated and obtained a mean average of 4.58, which was interpreted as "Excellent". This means that the Kiosk System fully meets and far exceeds most expectations.

**Table 15.** Respondent's Assessment of the Portability of the Kiosk System

INDICATORS	MEAN	INTERPRETATION
Adaptability	4.56	Excellent
Installability	4.58	Excellent
Replaceability	4.69	Excellent
<b>MEAN AVERAGE</b>	<b>4.58</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Overall Assessment**

Table 16 presents the respondents' assessment of the overall performance of the Hardware Prototype, which yielded an average score of 4.67, rated as "Excellent". The highest mean in Hardware Prototype was achieved in Effectiveness with a mean of "4.72", rated as "Excellent."

**Table 16.** Respondents' Assessment of the Hardware Prototype

INDICATORS	MEAN	INTERPRETATION
Effectiveness	4.72	Excellent
Efficiency	4.67	Excellent
Satisfaction	4.68	Excellent
Freedom from Risk	4.63	Excellent
Context Coverage	4.65	Excellent
<b>MEAN AVERAGE</b>	<b>4.67</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Assessment of the Kiosk System**

Table 17 presents the respondents' assessment of the overall performance of the Kiosk System, which yielded an average score of 4.56, rated as "Excellent". The highest mean in the Kiosk System was achieved in Functional Suitability, with a mean of "4.66", rated as "Excellent."

**Table 17.** Respondents' Assessment of the Kiosk System

INDICATORS	MEAN	INTERPRETATION
Functional Stability	4.66	Excellent
Efficiency Performance	4.62	Excellent
Compatibility	4.57	Excellent
Usability	4.51	Excellent
Reliability	4.51	Excellent
Security	4.48	Excellent
Maintainability	4.58	Excellent
Portability	4.58	Excellent
<b>MEAN AVERAGE</b>	<b>4.56</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

### **Respondents' Overall Assessment of the Enhanced Prototype**

Table 18 presents the respondents' overall assessment of the enhanced prototype, which is the Hardware Prototype together with the Kiosk System. It yielded an average score of 4.67, rated as "Excellent" for the Hardware Prototype and 4.56, rated as "Excellent" also for the Kiosk System, indicating that the enhanced prototype successfully fulfilled its intended function and met the user's expectations.

**Table 18.** Respondents' Overall Assessment of the Enhanced Prototype

INDICATORS	MEAN	INTERPRETATION
Hardware Prototype	4.67	Excellent
Kiosk System	4.56	Excellent
<b>MEAN AVERAGE</b>	<b>4.62</b>	<b>Excellent</b>

Scale:

- 4.21-5.00 Excellent
- 3.41-4.20 Very Good
- 2.61-3.40 Good
- 1.81-2.60 Fair
- 1.00-1.80 Poor

## **Chapter V**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

The study focused on developing the Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay. The main goal of this study is to improve the existing Coin Operated Document Printing Kiosk (C.O.D.P.K.) based on its recommendations, including support for color printing, the ability to print on different paper sizes, and design enhancements. Additionally, a QR code scanning feature will also be included for an improved way of transferring files and to enable the kiosk to accept both old and newly designed Peso coins.

The primary objective of the study is to develop an enhanced prototype that provides for the printing needs of students and faculty members at City College of Tagaytay.

The researchers used Visual Basic 2022 (VB.Net) to build the kiosk system, C++ Programming Language to execute the code in Arduino Uno, and Python for the locally hosted website to upload files. The kiosk system allowed users to interact with the enhanced prototype through its user interface, which included a QR Code and a Locally Hosted File Upload section. Users scanned the QR code to access the locally hosted website, where they could upload files (PDF, MS Excel, and MS Word). They could then adjust printing settings such as print mode (color or grayscale), specific pages, paper size (legal or letter), orientation, and the number of copies. A print summary was displayed for review before proceeding with the printing process.

The enhanced prototype was built using a tablet computer, two printers, an Arduino UNO, a coin slot, a coin hopper, a 1 Channel 5V Relay Module, and a Breadboard. The tablet served as the main interface, allowing users to upload documents, set print options, and view payment details. Two printers handled letter and legal-sized documents. The Arduino UNO managed hardware operations, including validating old and new Peso coins (1, 5, 10, and 20 denominations) via the coin slot and controlling the coin hopper to dispense change in one-Peso coins. The relay module regulated the coin hopper, while the Breadboard facilitated circuit connections for seamless functionality and future enhancements.

The researcher used the Prototyping Methodology in developing the enhanced prototype. The process involves six (6) phases which includes Requirements Gathering and Analysis, Quick Design, Build Prototype, User Evaluation, Refining Prototype, and Implement Product and Maintain.

The evaluation for the students, instructors, and IT professionals was based on ISO 25010 for both Software and Hardware. The ISO 25010 for Software Standards consists of eight (8) categories: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. The ISO 25010 for Hardware consists of five (5) categories: Effectiveness, Efficiency, Satisfaction, Freedom from Risk, and Context Coverage. The evaluation involved one thousand seventy (1,070) students from the School of Computer Studies and twenty-six (26) faculty members of the School of Computer Studies Department and three (3) IT professionals.

The overall evaluation yielded an average score of 4.67, rated as "Excellent" for the Hardware Prototype and 4.56, rated as "Excellent" also for the Kiosk System, indicating

that the enhanced prototype successfully fulfilled its intended function and met users' expectations. The highest mean in Hardware Prototype was achieved in Effectiveness with a mean of "4.72", rated as "Excellent", while the highest mean in Kiosk System is achieved in Functional Suitability, with a mean of "4.66", rated as "Excellent".

## **Conclusions**

In conclusion, the enhancement of the Coin Operated Document Printing Kiosk for City College of Tagaytay makes document printing easier and more accessible for students and faculty members. With new features like QR code file transfer, support for both old and new Peso coins, color printing, touchscreen display, and the ability to print on different paper sizes, the kiosk is now more user-friendly and convenient. The addition of ink level monitoring and the modification of printing cost help ensure smooth operation and easier maintenance. Overall, this enhanced prototype provides a faster and more reliable method to print documents, making it a valuable tool for the City College of Tagaytay.

The study involves the development of an enhanced prototype that combines the Arduino-based hardware prototype with the kiosk system. The enhanced prototype was developed and tested to ensure it functioned properly, printed documents efficiently, and dispensed change accurately. Users evaluated the enhanced prototype, providing feedback that led to refinements in both the hardware prototype and the kiosk system to improve reliability and usability. After refinements, the final prototype was tested to ensure it met user needs and functioned effectively. Tests were administered to confirm that printing was accurate, paper load, funds, and ink levels were monitored properly, payments were

processed smoothly, inserted coins were accurately recognized, and change was dispensed correctly, making the kiosk a more convenient and efficient way to print documents.

The evaluations conducted for the enhanced prototype followed the ISO 25010 standard for hardware and software. The ISO 25010 standard for hardware categorizes quality into five (5) characteristics: Effectiveness, Efficiency, Satisfaction, Freedom from Risk, and Context Coverage. Meanwhile, the ISO 25010 standard for software defines eight (8) quality characteristics: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability. Feedback from students, instructors, and IT professionals resulted in an overall average rating of 4.67, classified as "Excellent", for the hardware prototype, and 4.56, also rated as "Excellent," for the kiosk system. The highest-rated characteristic in the evaluation was Effectiveness for the hardware prototype, with a mean score of 4.72, indicating that the hardware is designed to operate safely and reliably, minimizing potential hazards for users and the environment. For the kiosk system, Functional Suitability received the highest rating, with a mean score of 4.66, reflecting that the system is highly accessible, convenient to use, and flexible for users.

The Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay achieved its main objective to enhance the Coin Operated Document Printing Kiosk by addressing the recommendations from the previous study, including colored printing, support for different paper sizes, and design improvements. Additionally, a QR code scanning feature was included for a more efficient method of transferring files, and the kiosk was upgraded to accept both old and new Peso coin designs. These enhancements

will provide for the printing needs of the students and faculty members of City College of Tagaytay.

This study demonstrates the potential of developing a self-service document printing system using an Arduino-based hardware prototype and a kiosk system developed with VB.Net to meet the printing needs of institutions. The enhanced prototype not only serves the needs of City College of Tagaytay but also presents opportunities for implementation in other educational institutions and public spaces that require document printing services.

## **Recommendations**

The following recommendations are proposed for the future enhancement of the Coin Operated Document Printing Kiosk at City College of Tagaytay:

- a) Adding support for PowerPoint Files;
- b) Integrating an ink monitoring system to precisely track ink levels, ensuring timely refills, and preventing interruptions in printing services;
- c) Implementing a bill acceptor to allow users to pay with paper bills;
- d) Upgrading the kiosk to dispense change using various coin denominations instead of limiting it to 1-Peso coins, making transactions more flexible and efficient;
- e) Incorporating an Uninterruptible Power Supply (UPS) to prevent power interruptions and ensure continuous operation;

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## **APPENDICES**

## Appendix A: Summary of Evaluation

Indicators	IT Professionals	Client/Instructors	Student	Mean Average	Descriptive Rating
<b>Hardware Prototype:</b>					
<b>EFFECTIVENESS</b>					
Completeness	5	4.4	4.82	4.74	Excellent
Accuracy	5	4.36	4.77	4.71	Excellent
<b>Average:</b>				<b>4.72</b>	Excellent
<b>EFFICIENCY</b>					
Completeness	5	4.32	4.77	4.69	Excellent
Accuracy	5	4.24	4.76	4.66	Excellent
<b>Average:</b>				<b>4.67</b>	Excellent
<b>SATISFACTION</b>					
Usefulness	5	4.44	4.9	4.78	Excellent
Trust	5	4.36	4.62	4.66	Excellent
Pleasure	5	4.24	4.67	4.63	Excellent
Comfort	5	4.28	4.77	4.68	Excellent
<b>Average:</b>				<b>4.68</b>	Excellent
<b>FREEDOM FROM RISK</b>					
Economic Risk Mitigation	5	4.12	4.63	4.58	Excellent
Health and Safety Risk Mitigation	5	4.48	4.76	4.74	Excellent
Environmental Risk Mitigation	5	4.04	4.69	4.56	Excellent
<b>Average:</b>				<b>4.63</b>	Excellent
<b>CONTEXT COVERAGE</b>					
Context Completeness	5	4.36	4.85	4.73	Excellent
Flexibility	5	3.96	4.76	4.57	Excellent
<b>Average:</b>				<b>4.65</b>	Excellent
<b>OVERALL MEAN:</b>	<b>5</b>	<b>4.28</b>	<b>4.75</b>	<b>4.67</b>	Excellent

Indicators	IT Professionals	Client/ Instructors	Student	Mean Average	Descriptive Rating
<b>Kiosk System:</b>					
<b>FUNCTIONAL SUITABILITY</b>					
Functional Completeness	5	4.24	4.79	4.68	Very Good
Functional Correctness	5	4.4	4.82	4.74	Excellent
Functional Appropriateness	4.67	4.2	4.82	4.56	Excellent
<b>Average:</b>				<b>4.66</b>	Excellent
<b>PERFORMANCE EFFICIENCY</b>					
Time Behavior	5	4.24	4.75	4.67	Excellent
Resource Utilization	4.7	4.44	4.77	4.63	Excellent
Capacity	4.67	4.08	4.9	4.55	Excellent
<b>Average:</b>				<b>4.62</b>	Excellent
<b>COMPATIBILITY</b>					
Co-Existence	4.66	4.36	4.75	4.59	Excellent
Interoperability	4.65	4.2	4.76	4.54	Excellent
<b>Average:</b>				<b>4.57</b>	Excellent
<b>USABILITY</b>					
Appropriateness Recognizability	4.66	4.64	4.75	4.68	Excellent
Learnability	4.7	4.48	4.72	4.63	Excellent
Operability	4.66	4.24	4.82	4.57	Excellent
User Error Protection	4.66	2.6	4.66	3.97	Very Good
User Interface Aesthetics	4.68	4.44	4.75	4.62	Excellent
Accessibility	4.69	4.36	4.8	4.61	Excellent
<b>Average:</b>				<b>4.52</b>	Excellent
<b>RELIABILITY</b>					
Maturity	4.67	4.16	4.76	4.53	Excellent
Availability	4.67	4.2	4.75	4.54	Excellent
Fault Tolerance	4.67	4.24	4.71	4.54	Very Good
Recoverability	4.66	4	4.7	4.45	Very Good
<b>Average:</b>				<b>4.51</b>	Very Good
<b>SECURITY</b>					
Confidentiality	4.67	4.32	4.73	4.57	Excellent

Integrity	4.67	4.2	4.64	4.50	Excellent
Non-Reputation	4.67	3.96	4.67	4.43	Excellent
Accountability	4.66	3.88	4.64	4.39	Excellent
Authenticity	4.67	4.32	4.63	4.54	Excellent
<b>Average:</b>				<b>4.48</b>	Excellent
<b>MAINTAINABILITY</b>					
Modularity	4.67	4.4	4.76	4.61	Excellent
Reusability	4.66	4.4	4.72	4.59	Excellent
Analyzability	4.66	4.4	4.78	4.61	Excellent
Modifiability	4.67	4.28	4.74	4.56	Excellent
Testability	4.67	4.32	4.73	4.57	Excellent
<b>Average:</b>				<b>4.58</b>	Excellent
<b>PORTABILITY</b>					
Adaptability	4.67	4.24	4.77	4.56	Excellent
Installability	4.67	4.36	4.72	4.58	Excellent
Replaceability	4.98	4.4	4.69	4.69	Excellent
<b>Average:</b>				<b>4.58</b>	Excellent
<b>OVERALL MEAN:</b>	<b>4.71</b>	<b>4.23</b>	<b>4.74</b>	<b>4.56</b>	Excellent

## Appendix B: Sample Evaluation Instrument

### Hardware:

CCT\_SCS - Form 8



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

Proponents: Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: Gladys Moran Ara

Type of Evaluator:  IT Professional  Client/Instructor  Student

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).	/				
2. Accuracy - (with which users achieve specified goals).	/				
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.	/				
2. Resources expended in relation to the accuracy with which users achieve goals.	/				
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)	/				
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)	/				
3. Pleasure - (degree to which a user obtains pleasure from fulfilling their personal needs)	/				
4. Comfort (degree to which the user is satisfied with physical comfort)	/				

#### D. FREEDOM FROM RISK

1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)	/				
2. Health and Safety Risk Mitigation - (degree to which a product or system mitigates the potential risk to people in the intended contexts of use)	/				
3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)	/				

#### E. CONTEXT COVERAGE

1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)	/				
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)	/				

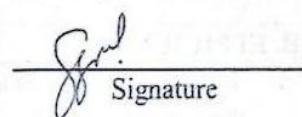
• Based on ISO 25010

#### Findings:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

#### Recommendations:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

Proponents: Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: PIERRE B. NEULID

Type of Evaluator:  IT Professional  Client/Instructor  Student

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).		✓			
2. Accuracy - (with which users achieve specified goals).	✓				
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.		✓			
2. Resources expended in relation to the accuracy with which users achieve goals.	✓				
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)	/				
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)		/			
3. Pleasure - (degree to which a user obtains pleasure from fulfilling their personal needs)		/			
4. Comfort (degree to which the user is satisfied with physical comfort)		/			
<b>D. FREEDOM FROM RISK</b>					
1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)	/				
2. Health and Safety Risk Mitigation - (degree to which a product or system mitigates the potential risk to people in the intended contexts of use)	/				
3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)	/				
<b>E. CONTEXT COVERAGE</b>					
1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)		/			
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)		/			

● Based on ISO 25010

#### Findings:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

#### Recommendations:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

Proponents: Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: ANDREE B. RODRIGUEZ 28 IT 25

Type of Evaluator:  IT Professional  Client/Instructor  Student

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).	✓				
2. Accuracy - (with which users achieve specified goals).	✓				
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.	✓				
2. Resources expended in relation to the accuracy with which users achieve goals.	✓				
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)	/			
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)	/			
3. Pleasure - (degree to which a user obtains pleasure from fulfilling their personal needs)	/			
4. Comfort (degree to which the user is satisfied with physical comfort)	/			
<b>D. FREEDOM FROM RISK</b>				
1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)	/			
2. Health and Safety Risk Mitigation - (degree to which a product or system mitigates the potential risk to people in the intended contexts of use)	/			
3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)	/			
<b>E. CONTEXT COVERAGE</b>				
1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)	/			
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)	/			

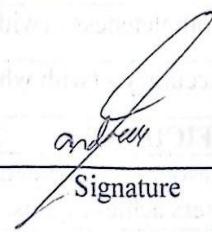
● Based on ISO 25010

#### Findings:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

#### Recommendations:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

Proponents: Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: Joshua O Layo BSCIT 3-5

Type of Evaluator:  IT Professional  Client/Instructor  Student

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
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3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).	/				
2. Accuracy - (with which users achieve specified goals).	/				
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.	/				
2. Resources expended in relation to the accuracy with which users achieve goals.	/				
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)	/				
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)	/				
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<b>D. FREEDOM FROM RISK</b>					
1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)	/				
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3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)	/				
<b>E. CONTEXT COVERAGE</b>					
1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)	/				
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)	/				

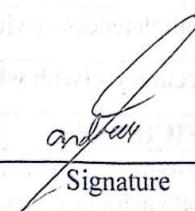
● Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

Proponents: Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: NOVENO KREANDER S. B.S.W 3-5

Type of Evaluator:  IT Professional  Client/Instructor  Student

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).	/				
2. Accuracy - (with which users achieve specified goals).	/				
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.	/				
2. Resources expended in relation to the accuracy with which users achieve goals.	/				
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)	/				
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)	/				
3. Pleasure - (degree to which a user obtains pleasure from fulfilling their personal needs)	/				
4. Comfort (degree to which the user is satisfied with physical comfort)	/				
<b>D. FREEDOM FROM RISK</b>					
1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)	/				
2. Health and Safety Risk Mitigation - (degree to which a product or system mitigates the potential risk to people in the intended contexts of use)	/				
3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)	/				
<b>E. CONTEXT COVERAGE</b>					
1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)	/				
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)	/				

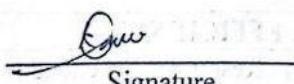
● Based on ISO 25010

#### Findings:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

#### Recommendations:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature

## Software:

CCT\_SCS - Form 8



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR SOFTWARE (ISO 25010)

Title: ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

Proponents: Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: GLADYS MARANGA

Type of Evaluator:  IT Professional  Client/Instructor  Student

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
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2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
A. FUNCTIONAL SUITABILITY (This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions)					
1. Functional Completeness - (Degree to which the set of functions covers all the specified tasks and user objectives).	/				
2. Functional Correctness - (Degree to which a product or system provides the correct results with the needed degree of precision)	/				
3. Functional Appropriateness - (Degree to which the functions facilitate the accomplishment of specified tasks and objectives)	/				

<b>B. PERFORMANCE EFFICIENCY</b> (This characteristic represents the performance relative to the amount of resources used under stated conditions)					
1. Time Behaviour - (Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements)	/				
2. Resource Utilization - (Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements)	/				
3. Capacity - (Degree to which the maximum limits of a product or system parameter meet requirements)	/				
<b>C. COMPATIBILITY</b> (Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment)					
1. Co-Existence - (Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product)	/				
2. Interoperability - (Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged)	/				
<b>D. USABILITY</b> (Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use)					
1. Appropriateness Recognizability - (Degree to which users can recognize whether a product or system is appropriate for their needs)	/				
2. Learnability - (Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use)	/				
3. Operability - (Degree to which a product or system has attributes that make it easy to operate and control)	/				
4. User Error Protection - (Degree to which a system protects users against making errors)					
5. User Interface Aesthetics - (Degree to which a user interface enables pleasing and satisfying interaction for the user)	/				
6. Accessibility - (Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use)	/				
<b>E. RELIABILITY</b> (Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time)					
1. Maturity - (Degree to which a system, product or component meets needs for reliability under normal operation)	/				
2. Availability - (Degree to which a system, product or component is operational and accessible when required for use)	/				
3. Fault tolerance - (Degree to which a system, product or component operates as intended despite the presence of hardware or software faults)	/				

4. Recoverability (Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system)					
<b>F. SECURITY</b> (Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization)					
1. Confidentiality (Degree to which a product or system ensures that data are accessible only to those authorized to have access)	/				
2. Integrity (Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data)	/				
3. Non-Repudiation (Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later)	/				
4. Accountability (Degree to which the actions of an entity can be traced uniquely to the entity)	/				
5. Authenticity (Degree to which the identity of a subject or resource can be proved to be the one claimed)	/				
<b>G. MAINTAINABILITY</b> (This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements)					
1. Modularity (Degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components)	/				
2. Reusability (Degree to which an asset can be used in more than one system, or in building other assets)	/				
3. Analysability (Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified)	/				
4. Modifiability (Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality)	/				
5. Testability (Degree of effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met)	/				
<b>H. PORTABILITY</b> (Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another)					
1. Adaptability (Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments)	/				
2. Installability (Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment)	/				
3. Replaceability (Degree to which a product can replace another specified software product for the same purpose in the same environment)	/				

• Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

\_\_\_\_\_  
Signature



Republic of the Philippines  
 City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
 Akle St., Kaybagal South, Tagaytay City 4120  
 Tel. Nos. (046) 483-0470 / (046) 483 -0672



### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR SOFTWARE (ISO 25010)

**Title:** ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

**Proponents:** Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: PIERRE B. NIEULID

Type of Evaluator:  IT Professional  Client/Instructor  Student

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. FUNCTIONAL SUITABILITY</b> (This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions)					
1. Functional Completeness - (Degree to which the set of functions covers all the specified tasks and user objectives)	/				
2. Functional Correctness - (Degree to which a product or system provides the correct results with the needed degree of precision)		/			
3. Functional Appropriateness - (Degree to which the functions facilitate the accomplishment of specified tasks and objectives)	/				

<b>B. PERFORMANCE EFFICIENCY</b> (This characteristic represents the performance relative to the amount of resources used under stated conditions)					
1. Time Behaviour - (Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements)		/			
2. Resource Utilization - (Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements)	/				
3. Capacity - (Degree to which the maximum limits of a product or system parameter meet requirements)	/				
<b>C. COMPATIBILITY</b> (Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment)					
1. Co-Existence - (Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product)		/			
2. Interoperability - (Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged)	/				
<b>D. USABILITY</b> (Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use)					
1. Appropriateness Recognizability - (Degree to which users can recognize whether a product or system is appropriate for their needs)	/				
2. Learnability - (Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use)	/				
3. Operability - (Degree to which a product or system has attributes that make it easy to operate and control)	/				
4. User Error Protection - (Degree to which a system protects users against making errors)	/				
5. User Interface Aesthetics - (Degree to which a user interface enables pleasing and satisfying interaction for the user)	/				
6. Accessibility - (Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use)	/				
<b>E. RELIABILITY</b> (Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time)					
1. Maturity - (Degree to which a system, product or component meets needs for reliability under normal operation)		/			
2. Availability - (Degree to which a system, product or component is operational and accessible when required for use)	/				
3. Fault tolerance - (Degree to which a system, product or component operates as intended despite the presence of hardware or software faults)	/				

4. Recoverability (Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system)	/				
<b>F. SECURITY</b> (Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization)					
1. Confidentiality (Degree to which a product or system ensures that data are accessible only to those authorized to have access)		/			
2. Integrity (Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data)	/				
3. Non-Repudiation (Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later)		/			
4. Accountability (Degree to which the actions of an entity can be traced uniquely to the entity)	/				
5. Authenticity (Degree to which the identity of a subject or resource can be proved to be the one claimed)		/			
<b>G. MAINTAINABILITY</b> (This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements)					
1. Modularity (Degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components)		/			
2. Reusability (Degree to which an asset can be used in more than one system, or in building other assets)	/				
3. Analysability (Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified)		/			
4. Modifiability (Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality)	/				
5. Testability (Degree of effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met)		/			
<b>H. PORTABILITY</b> (Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another)					
1. Adaptability (Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments)	/				
2. Installability (Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment)	/				
3. Replaceability (Degree to which a product can replace another specified software product for the same purpose in the same environment)	/				

• Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. — X - A —
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. — X - A —
3. \_\_\_\_\_



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Proponents: Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: JUNIE B. RODRIGUEZ BS IT 3-5

Type of Evaluator:  IT Professional  Client/Instructor  Student

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

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INDICATORS	5	4	3	2	1
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1. Functional Completeness - (Degree to which the set of functions covers all the specified tasks and user objectives).	✓				
2. Functional Correctness - (Degree to which a product or system provides the correct results with the needed degree of precision)	✓				
3. Functional Appropriateness - (Degree to which the functions facilitate the accomplishment of specified tasks and objectives)	✓				
<b>B. PERFORMANCE EFFICIENCY</b> (This characteristic represents the performance relative					

to the amount of resources used under stated conditions)						
1. Time Behaviour - (Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements)	/					
2. Resource Utilization - (Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements)	/					
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3. Operability - (Degree to which a product or system has attributes that make it easy to operate and control)	/					
4. User Error Protection - (Degree to which a system protects users against making errors)	/					
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2. Availability - (Degree to which a system, product or component is operational and accessible when required for use)	/					
3. Fault tolerance - (Degree to which a system, product or component operates as intended despite the presence of hardware or software faults)	/					
4. Recoverability (Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly)	/					

affected and re-establish the desired state of the system)	<input checked="" type="checkbox"/>			
<b>F. SECURITY</b> (Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization)				
1. Confidentiality (Degree to which a product or system ensures that data are accessible only to those authorized to have access)	<input checked="" type="checkbox"/>			
2. Integrity (Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data)	<input checked="" type="checkbox"/>			
3. Non-Repudiation (Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later)	<input checked="" type="checkbox"/>			
4. Accountability (Degree to which the actions of an entity can be traced uniquely to the entity)	<input checked="" type="checkbox"/>			
5. Authenticity (Degree to which the identity of a subject or resource can be proved to be the one claimed)	<input checked="" type="checkbox"/>			
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1. Modularity (Degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components)	<input checked="" type="checkbox"/>			
2. Reusability (Degree to which an asset can be used in more than one system, or in building other assets)	<input checked="" type="checkbox"/>			
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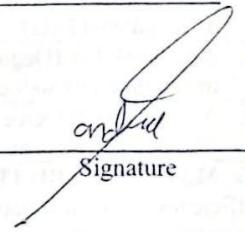
● Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

  
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**Proponents:** Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: Loyng, Joshua O. BSET 7-5

Type of Evaluator:  IT Professional  Client/Instructor  Student

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
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INDICATORS	5	4	3	2	1
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● Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



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Evaluator Name: NOVENO KARANDAT, BSIT 3-5

Type of Evaluator:  IT Professional  Client/Instructor  Student

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

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● Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
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2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. FUNCTIONAL SUITABILITY</b> (This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions)					
1. Functional Completeness - (Degree to which the set of functions covers all the specified tasks and user objectives).	/				
2. Functional Correctness - (Degree to which a product or system provides the correct results with the needed degree of precision)	/				
3. Functional Appropriateness - (Degree to which the functions facilitate the accomplishment of specified tasks and objectives)	/				

<b>B. PERFORMANCE EFFICIENCY</b> (This characteristic represents the performance relative to the amount of resources used under stated conditions)					
1. Time Behaviour - (Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements)	/				
2. Resource Utilization - (Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements)	/				
3. Capacity - (Degree to which the maximum limits of a product or system parameter meet requirements)	/				
<b>C. COMPATIBILITY</b> (Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment)					
1. Co-Existence - (Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product)	/				
2. Interoperability - (Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged)	/				
<b>D. USABILITY</b> (Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use)					
1. Appropriateness Recognizability - (Degree to which users can recognize whether a product or system is appropriate for their needs)	/				
2. Learnability - (Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use)	/				
3. Operability - (Degree to which a product or system has attributes that make it easy to operate and control)	/				
4. User Error Protection - (Degree to which a system protects users against making errors)	/				
5. User Interface Aesthetics - (Degree to which a user interface enables pleasing and satisfying interaction for the user)	/				
6. Accessibility - (Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use)	/				
<b>E. RELIABILITY</b> (Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time)					
1. Maturity - (Degree to which a system, product or component meets needs for reliability under normal operation)	/				
2. Availability - (Degree to which a system, product or component is operational and accessible when required for use)	/				
3. Fault tolerance - (Degree to which a system, product or component operates as intended despite the presence of hardware or software faults)	/				



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: **ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY**

Proponents: **Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad**

Evaluator Name: \_\_\_\_\_

Type of Evaluator:      IT Professional      Client/Instructor      Student  
           

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).			✓		
2. Accuracy - (with which users achieve specified goals).	✓				
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.		✓			
2. Resources expended in relation to the accuracy with which users achieve goals.	✓				
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)	/			
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)	/			
3. Pleasure - (degree to which a user obtains pleasure from fulfilling their personal needs)	/			
4. Comfort (degree to which the user is satisfied with physical comfort)	/			
<b>D. FREEDOM FROM RISK</b>				
1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)	/			
2. Health and Safety Risk Mitigation - (degree to which a product or system mitigates the potential risk to people in the intended contexts of use)	/			
3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)	/			
<b>E. CONTEXT COVERAGE</b>				
1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)	/			
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)	/			

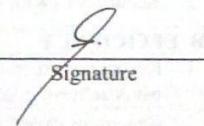
• Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR SOFTWARE (ISO 25010)

Title: **ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY**

Proponents: **Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad**

Evaluator Name: AIRIA RONQUILLO

Type of Evaluator:  IT Professional  Client/Instructor  Student

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
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3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. FUNCTIONAL SUITABILITY</b> (This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions)					
1. Functional Completeness - (Degree to which the set of functions covers all the specified tasks and user objectives).	/				
2. Functional Correctness - (Degree to which a product or system provides the correct results with the needed degree of precision)	/				
3. Functional Appropriateness - (Degree to which the functions facilitate the accomplishment of specified tasks and objectives)		/			

**B. PERFORMANCE EFFICIENCY** (This characteristic represents the performance relative to the amount of resources used under stated conditions)

1. Time Behaviour - (Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements) /
2. Resource Utilization - (Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements) /
3. Capacity - (Degree to which the maximum limits of a product or system parameter meet requirements) /

**C. COMPATIBILITY** (Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment)

1. Co-Existence - (Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product) /
2. Interoperability - (Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged) /

**D. USABILITY** (Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use)

1. Appropriateness Recognizability - (Degree to which users can recognize whether a product or system is appropriate for their needs) /
2. Learnability - (Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use) /
3. Operability - (Degree to which a product or system has attributes that make it easy to operate and control) /
4. User Error Protection - (Degree to which a system protects users against making errors) /
5. User Interface Aesthetics - (Degree to which a user interface enables pleasing and satisfying interaction for the user) /
6. Accessibility - (Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use) /

**E. RELIABILITY** (Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time)

1. Maturity - (Degree to which a system, product or component meets needs for reliability under normal operation) /
2. Availability - (Degree to which a system, product or component is operational and accessible when required for use) /
3. Fault tolerance - (Degree to which a system, product or component operates as intended despite the presence of hardware or software faults) /

4. Recoverability (Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system)	/				
<b>F. SECURITY</b> (Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization)					
1. Confidentiality (Degree to which a product or system ensures that data are accessible only to those authorized to have access)	/				
2. Integrity (Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data)		/			
3. Non-Repudiation (Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later)		/			
4. Accountability (Degree to which the actions of an entity can be traced uniquely to the entity)		/			
5. Authenticity (Degree to which the identity of a subject or resource can be proved to be the one claimed)		/			
<b>G. MAINTAINABILITY</b> (This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements)					
1. Modularity (Degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components)		/			
2. Reusability (Degree to which an asset can be used in more than one system, or in building other assets)		/			
3. Analysability (Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified)		/			
4. Modifiability (Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality)		/			
5. Testability (Degree of effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met)		/			
<b>H. PORTABILITY</b> (Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another)					
1. Adaptability (Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments)		/			
2. Installability (Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment)		/			
3. Replaceability (Degree to which a product can replace another specified software product for the same purpose in the same environment)	/				

- Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

*A. R. M. Jaffer*  
Signature



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: **ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY**

Proponents: **Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad**

Evaluator Name: AIRA RONQUILLO

Type of Evaluator: IT Professional  Client/Instructor  Student

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
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INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).	/				
2. Accuracy - (with which users achieve specified goals).		/			
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.		/			
2. Resources expended in relation to the accuracy with which users achieve goals.		/			
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)	/				
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)		/			
3. Pleasure - (degree to which a user obtains pleasure from fulfilling their personal needs)		/			
4. Comfort (degree to which the user is satisfied with physical comfort)		/			
<b>D. FREEDOM FROM RISK</b>					
1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)		/			
2. Health and Safety Risk Mitigation - (degree to which a product or system mitigates the potential risk to people in the intended contexts of use)		/			
3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)		/			
<b>E. CONTEXT COVERAGE</b>					
1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)		/			
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)		/			

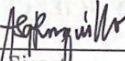
• Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

  
Signature



Republic of the Philippines

City of Tagaytay

**CITY COLLEGE OF TAGAYTAY**Akle St., Kaybagal South, Tagaytay City 4120  
Tel. Nos. (046) 483-0470 / (046) 483-0672**SCHOOL OF COMPUTER STUDIES****EVALUATION INSTRUMENT FOR SOFTWARE (ISO 25010)**

**Title:** ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

Proponents: Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: MARK LESTER B. ORSAL

Type of Evaluator:  IT Professional  Client/Instructor  Student

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
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1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. FUNCTIONAL SUITABILITY</b> (This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions)					
1. Functional Completeness - (Degree to which the set of functions covers all the specified tasks and user objectives).	/				
2. Functional Correctness - (Degree to which a product or system provides the correct results with the needed degree of precision)	/				
3. Functional Appropriateness - (Degree to which the functions facilitate the accomplishment of specified tasks and objectives)	/				

<b>B. PERFORMANCE EFFICIENCY</b> (This characteristic represents the performance relative to the amount of resources used under stated conditions)					
1. Time Behaviour - (Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements)	/				
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<b>E. RELIABILITY</b> (Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time)					
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4. Recoverability (Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system)	/				
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2. Integrity (Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data)		/			
3. Non-Repudiation (Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later)		/			
4. Accountability (Degree to which the actions of an entity can be traced uniquely to the entity)		/			
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2. Installability (Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment)	/				
3. Replaceability (Degree to which a product can replace another specified software product for the same purpose in the same environment)		/			

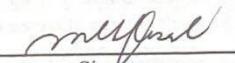
- Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: **ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY**

Proponents: **Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad**

Evaluator Name: MARK LESTER DRSM

Type of Evaluator:  IT Professional  Client/Instructor  Student

Instruction: Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
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INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).	/				
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<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.	/				
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<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)	/				
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<b>E. CONTEXT COVERAGE</b>					
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2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)		/			

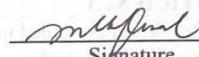
• Based on ISO 25010

#### Findings:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

#### Recommendations:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature



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### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR SOFTWARE (ISO 25010)

**Title: ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY**

**Proponents:** Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: J. CABRERA

Type of Evaluator:  IT Professional  Client/Instructor  Student

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

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<b>A. FUNCTIONAL SUITABILITY</b> (This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions)					
1. Functional Completeness - (Degree to which the set of functions covers all the specified tasks and user objectives).	/				
2. Functional Correctness - (Degree to which a product or system provides the correct results with the needed degree of precision)	/				
3. Functional Appropriateness - (Degree to which the functions facilitate the accomplishment of specified tasks and objectives)	/				

<b>B. PERFORMANCE EFFICIENCY</b> (This characteristic represents the performance relative to the amount of resources used under stated conditions)					
1. Time Behaviour - (Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements)	/				
2. Resource Utilization - (Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements)	/				
3. Capacity - (Degree to which the maximum limits of a product or system parameter meet requirements)	/				
<b>C. COMPATIBILITY</b> (Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment)					
1. Co-Existence - (Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product)		/			
2. Interoperability - (Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged)		/			
<b>D. USABILITY</b> (Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use)					
1. Appropriateness Recognizability - (Degree to which users can recognize whether a product or system is appropriate for their needs)		/			
2. Learnability - (Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use)		/			
3. Operability - (Degree to which a product or system has attributes that make it easy to operate and control)		/			
4. User Error Protection - (Degree to which a system protects users against making errors)		/			
5. User Interface Aesthetics - (Degree to which a user interface enables pleasing and satisfying interaction for the user)		/			
6. Accessibility - (Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use)		/			
<b>E. RELIABILITY</b> (Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time)					
1. Maturity - (Degree to which a system, product or component meets needs for reliability under normal operation)			/		
2. Availability - (Degree to which a system, product or component is operational and accessible when required for use)			/		
3. Fault tolerance - (Degree to which a system, product or component operates as intended despite the presence of hardware or software faults)			/		

4. Recoverability (Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system)					
<b>F. SECURITY</b> (Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization)					
1. Confidentiality (Degree to which a product or system ensures that data are accessible only to those authorized to have access)					
2. Integrity (Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data)					
3. Non-Repudiation (Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later)					
4. Accountability (Degree to which the actions of an entity can be traced uniquely to the entity)					
5. Authenticity (Degree to which the identity of a subject or resource can be proved to be the one claimed)					
<b>G. MAINTAINABILITY</b> (This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements)					
1. Modularity (Degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components)					
2. Reusability (Degree to which an asset can be used in more than one system, or in building other assets)					
3. Analysability (Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified)					
4. Modifiability (Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality)					
5. Testability (Degree of effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met)					
<b>H. PORTABILITY</b> (Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another)					
1. Adaptability (Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments)					
2. Installability (Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment)					
3. Replaceability (Degree to which a product can replace another specified software product for the same purpose in the same environment)					

• Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

\_\_\_\_\_  
Signature



Republic of the Philippines  
 City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
 Akle St., Kaybagal South, Tagaytay City 4120  
 Tel. Nos. (046) 483-0470 / (046) 483-0672



### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)

Title: **ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY**

Proponents: **Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad**

Evaluator Name: \_\_\_\_\_

Type of Evaluator: **IT Professional**  **Client/Instructor**  **Student**

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	<b>Excellent</b>	The system fully meets and far exceeds the most expectations.
4	<b>Very Good</b>	The system fully meets all and exceeds several expectations.
3	<b>Good</b>	The system fully meets all expectations.
2	<b>Fair</b>	The system does not fully meet all expectations.
1	<b>Poor</b>	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).				✓	
2. Accuracy - (with which users achieve specified goals).		✓			
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.			✓		
2. Resources expended in relation to the accuracy with which users achieve goals.			✓		
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)				
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)				
3. Pleasure - (degree to which a user obtains pleasure from fulfilling their personal needs)				
4. Comfort (degree to which the user is satisfied with physical comfort)				
<b>D. FREEDOM FROM RISK</b>				
1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)				
2. Health and Safety Risk Mitigation - (degree to which a product or system mitigates the potential risk to people in the intended contexts of use)				
3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)				
<b>E. CONTEXT COVERAGE</b>				
1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)				
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)				

• Based on ISO 25010

#### Findings:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

#### Recommendations:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



Signature

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 2. smt nw  
 7. colord



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City of Tagaytay  
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Akle St., Kaybagal South, Tagaytay City 4120  
Tel. Nos. (046) 483-0470 / (046) 483-0672



### SCHOOL OF COMPUTER STUDIES

#### EVALUATION INSTRUMENT FOR SOFTWARE (ISO 25010)

Title: **ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY**

Proponents: **Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad**

Evaluator Name: Evangelin G. Pamintuan

Type of Evaluator:  IT Professional  Client/Instructor  Student

**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. FUNCTIONAL SUITABILITY</b> (This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions)					
1. Functional Completeness - (Degree to which the set of functions covers all the specified tasks and user objectives).	✓				
2. Functional Correctness - (Degree to which a product or system provides the correct results with the needed degree of precision)	✓				
3. Functional Appropriateness - (Degree to which the functions facilitate the accomplishment of specified tasks and objectives)	✓				

<b>B. PERFORMANCE EFFICIENCY</b> (This characteristic represents the performance relative to the amount of resources used under stated conditions)					
1. Time Behaviour - (Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements)	✓				
2. Resource Utilization - (Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements)	✓				
3. Capacity - (Degree to which the maximum limits of a product or system parameter meet requirements)	✓				
<b>C. COMPATIBILITY</b> (Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment)					
1. Co-Existence - (Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product)	✓				
2. Interoperability - (Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged)		✓			
<b>D. USABILITY</b> (Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use)					
1. Appropriateness Recognizability - (Degree to which users can recognize whether a product or system is appropriate for their needs)	✓				
2. Learnability - (Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use)	✓				
3. Operability - (Degree to which a product or system has attributes that make it easy to operate and control)	✓				
4. User Error Protection - (Degree to which a system protects users against making errors)		✓			
5. User Interface Aesthetics - (Degree to which a user interface enables pleasing and satisfying interaction for the user)	✓				
6. Accessibility - (Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use)	✓				
<b>E. RELIABILITY</b> (Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time)					
1. Maturity - (Degree to which a system, product or component meets needs for reliability under normal operation)	✓				
2. Availability - (Degree to which a system, product or component is operational and accessible when required for use)	✓				
3. Fault tolerance - (Degree to which a system, product or component operates as intended despite the presence of hardware or software faults)	✓				

4. Recoverability (Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system)	✓			
<b>F. SECURITY</b> (Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization)				
1. Confidentiality (Degree to which a product or system ensures that data are accessible only to those authorized to have access)	✓			
2. Integrity (Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data)	✓			
3. Non-Repudiation (Degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later)	✓			
4. Accountability (Degree to which the actions of an entity can be traced uniquely to the entity)	✓			
5. Authenticity (Degree to which the identity of a subject or resource can be proved to be the one claimed)	✓			
<b>G. MAINTAINABILITY</b> (This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements)				
1. Modularity (Degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components)	✓			
2. Reusability (Degree to which an asset can be used in more than one system, or in building other assets)	✓			
3. Analysability (Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified)	✓			
4. Modifiability (Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality)	✓			
5. Testability (Degree of effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met)	✓			
<b>H. PORTABILITY</b> (Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another)				
1. Adaptability (Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments)	✓			
2. Installability (Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment)	✓			
3. Replaceability (Degree to which a product can replace another specified software product for the same purpose in the same environment)	✓			

- Based on ISO 25010

**Findings:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

*[Signature]*

Signature



Republic of the Philippines

City of Tagaytay

**CITY COLLEGE OF TAGAYTAY**Akle St., Kaybagal South, Tagaytay City 4120  
Tel. Nos. (046) 483-0470 / (046) 483-0672**SCHOOL OF COMPUTER STUDIES****EVALUATION INSTRUMENT FOR HARDWARE (ISO 25010)**

**Title:** ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY COLLEGE OF TAGAYTAY

**Proponents:** Jasper B. Alcantara, Joseph D. Jopia, Isaac Ivan J. Martinez, Naziancino A. Payad

Evaluator Name: \_\_\_\_\_

Type of Evaluator:      **IT Professional**      **Client/Instructor**      **Student**




**Instruction:** Please kindly evaluate the software material by using the given scale and placing a checkmark (✓) under the corresponding numerical rating.

NUMERICAL RATING	INTERPRETATION	DEFINITION
5	Excellent	The system fully meets and far exceeds the most expectations.
4	Very Good	The system fully meets all and exceeds several expectations.
3	Good	The system fully meets all expectations.
2	Fair	The system does not fully meet all expectations.
1	Poor	The system fails to meet expectation to a significant degree in several areas.

INDICATORS	5	4	3	2	1
<b>A. EFFECTIVENESS</b>					
1. Completeness - (with which users achieve specified goals).	✓				
2. Accuracy - (with which users achieve specified goals).	✓				
<b>B. EFFICIENCY</b>					
1. Resources expended in relation to the completeness with which users achieve goals.	✓				
2. Resources expended in relation to the accuracy with which users achieve goals.	✓				
<b>C. SATISFACTION</b>					

1. Usefulness - (degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use)		/		
2. Trust - (degree to which a user or other stakeholder has confidence that a product or system will behave as intended)		/		
3. Pleasure - (degree to which a user obtains pleasure from fulfilling their personal needs)		/		
4. Comfort (degree to which the user is satisfied with physical comfort)		/		
<b>D. FREEDOM FROM RISK</b>				
1. Economic Risk Mitigation - (degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use)		/		
2. Health and Safety Risk Mitigation - (degree to which a product or system mitigates the potential risk to people in the intended contexts of use)		/		
3. Environmental Risk Mitigation - (degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use)		/		
<b>E. CONTEXT COVERAGE</b>				
1. Context Completeness - (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use)		/		
2. Flexibility (degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements)		/		

• Based on ISO 25010

**Findings:**

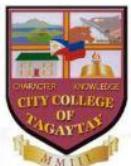
1. \_\_\_\_\_
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**Recommendations:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

\_\_\_\_\_  
Signature

## Appendix C: Letters/Approval Sheet



Republic of the Philippines  
City of Tagaytay  
City College of Tagaytay  
Akle St., Kaybagal South, Tagaytay City 4120



### CERTIFICATION OF ENGLISH CRITIQUE

This is to certify that the undersigned has read, reviewed, and edited the thesis/capstone project,  
**ENHANCEMENT OF COIN OPERATED DOCUMENT PRINTING KIOSK FOR CITY**  
**COLLEGE OF TAGAYTAY** by ALCANTARA, JASPER B., JOPIA, JOSEPH D.,  
MARTINEZ, ISAAC IVAN J., and PAYAD, NAZIANCINO A.

This further certifies that the scope of editing is within only the technical preparation and  
grammatical evaluation of the manuscript.

This certification is issued to the abovementioned student/s on this 15th day of May 2025 for  
whatever purpose it may serve them best.

  
\_\_\_\_\_  
JEFF JEREMIAH C. PEREA, MA, LPT  
License No. 148168  
English Critic  
City College of Tagaytay





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City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
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Tel. Nos. (046) 483-0470 / (046) 483-0672



**SCHOOL OF COMPUTER STUDIES**

June 25, 2023

**JEFERLYN A. ANONUEVO, MIT**  
Dean, School of Computer Studies  
This College

Madam,

We wish to apply for an oral review of the title proposal of our capstone entitled **Enhancement of Coin Operated Document Printing Kiosk** on July 2, 2024 at 9:00 AM at the City College of Tagaytay.

Thank you.

Respectfully yours,

Alcantara, Jasper

Jopia, Joseph

Martinez, Isaac Ivan

Payad, Nazlancino

**Recommending Approval:**

ANGELITO M. CARAAN  
Adviser

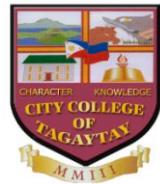
Date: 6/26/2024

FLORENCE R. MANALO  
Unit Research Coordinator

Date: 6/26/2024



Republic of the Philippines  
City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



Department of Information Technology

**REQUEST FOR APPROVAL OF CAPSTONE PROJECT TITLE**

Student Proponents: **Alcantara, Jasper B.**  
**Jopia, Jopia D.**  
**Martinez, Isaac Ivan J.**  
**Payad, Naziancino A.**

Proposed Title: **Enhancement of Coin Operated Document Printing Kiosk for  
City College of Tagaytay**

Research Instructor **ANGELITO M. CARAAN**

**Recommending Approval**

**FLORENCE R. MANALO**  
Unit Research Coordinator

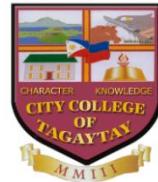
**NOEL JR. G. GARCIA**  
Chair

**Approved**

**JEFERLYN A. AÑONUEVO, MIT**  
School Dean



Republic of the Philippines  
City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



Department of Information Technology

### **RESULT OF TITLE PROPOSAL DEFENSE**

This capstone project entitled **Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay**, prepared and submitted by **Alcantara, Jasper B., Jopia, Jopia D., Martinez, Isaac Ivan J., Payad, Naziancino A.**, in partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology, is recommended for **APPROVAL**.

**ANGELITO M. CARAAN**  
Adviser

Approved by the PANEL OF EXAMINERS for ORAL DEFENSE with a grade of  
**PASSED with MINOR REVISION**

### **PANEL OF EVALUATORS**

**JONEL GATDULA**  
Member

**JUEL D. COPER**  
Member

**NOEL JR. G. GARCIA**  
Chair

Accepted as partial fulfillment of the requirements for the degree Bachelor of Science in  
Information Technology

**FLORENCE R. MANALO**  
Unit Research Coordinator

**JEFERLYN A. AÑONUEVO, MIT**  
School Dean



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Tel. Nos. (046) 483-0470 / (046) 483-0672



**SCHOOL OF COMPUTER STUDIES**  
**ROUTING SLIP FOR CAPSTONE PROJECT**

Names: Alcantara, Jasper B., Jopia, Joseph D., Martinez, Isaac Ivan J., Payad, Naziancino  
A.

Title of Study: Enhancement of Coin Operated Document Printing Kiosk for City College of  
Tagaytay

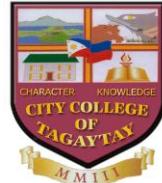
Please Check:  Outline

Final Manuscript

Designation: Name of Faculty Concerned	Date		Remarks
	Received	Released	
Adviser: ALDWIN KARLO M. ANGCAYA	1 2 3	08-05-24 08-05-24	<i>[Signature]</i>
Unit Research Coordinator: ANGELITO M. CARAAAN	1 2 3	8-7-24 8-7-24	<i>[Signature]</i>
Program Coordinator: JAY-R T. ROLLO	1 2 3	8/6/24 8/6/24	<i>[Signature]</i>
IT Department Head: NOEL JR. G. GARCIA	1 2 3	8/4/24 8/4/24	<i>[Signature]</i>
English Critic:	1 2 3		<i>[Signature]</i>
Dean: JEFERLYN A. ANONUEVO	1 2 3	9/6/24 9/6/24	<i>[Signature]</i>



Republic of the Philippines  
City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



August 30, 2024

**JEFERLYN A. AÑONUEVO, MIT**  
Dean, School of Computer Studies  
This College

Madam,

We wish to apply for an oral review of the **outline** of our capstone project entitled **Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay** on August 30, 2024 at 10:00 am at the City College of Tagaytay.

Thank you.

Respectfully yours,

**Alcantara, Jasper B.**

**Jopia, Jopia D.**

**Martinez, Isaac Ivan J.**

**Payad, Naziancino A.**

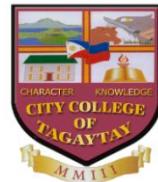
**Recommending Approval:**

**ALDWIN KARLO M. ANGCAYA**  
Adviser  
Date: 08/30/2024

**FLORENCE R. MANALO**  
Unit Research Coordinator  
Date: 08/30/2024



Republic of the Philippines  
City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



Department of Information Technology

**APPROVAL SHEET**  
**Capstone Project**

This capstone project entitled **Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay**, prepared and submitted by **Alcantara, Jasper B., Jopia, Jopia D., Martinez, Isaac Ivan J., Payad, Naziancino A.**, in partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology, is recommended for **OUTLINE DEFENSE**.

**Date of Outline Defense:** August 30, 2024

**ALDWIN KARLO M. ANGCAYA**  
Adviser

**JUEL D. COPER**  
Technical Critic

**PANEL OF EVALUATORS**

**CHRISTIAN R. ANDA**  
Member

**AIRA SHANE RONQUILLO**  
Member

**NOEL JR. G. GARCIA**  
Chair

**Recommending Approval:**

**FLORENCE R. MANALO**  
Unit Research Coordinator

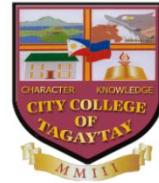
**Approved:**

**JEFERLYN A. AÑONUEVO, MIT**  
School Dean



Republic of the Philippines

City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
Akle St., Kaybagal South, Tagaytay City 4120



Tel. Nos. (046) 483-0470 / (046) 483 -0672

**SCHOOL OF COMPUTER STUDIES**  
**RESULT OF TITLE OUTLINE DEFENSE**

This capstone project entitled **Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay** prepared and submitted by **Alcantara, Jasper B., Jopia, Joseph D., Martinez, Isaac Ivan J., Payad, Naziancino A.**, in partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology, is recommended for **APPROVAL**.

**ALDWIN KARLO M. ANGCAYA**  
Adviser

**JUEL D. COPER**  
Technical Critic

Approved by the PANEL OF EXAMINERS for ORAL DEFENSE with a grade of  
**PASSED with MINOR REVISION**

**PANEL OF EVALUATORS**

**CHRISTIAN R. ANDA**  
Member

**AIRA SHANE RONQUILLO**  
Member

**NOEL JR. G. GARCIA**  
Member

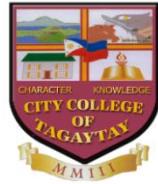
Accepted as partial fulfillment of the requirements for the degree Bachelor of Science in  
Information Technology

**FLORENCE R. MANALO**  
Research Coordinator

**JEFERLYN A. AÑONUEVO, MIT**  
School Dean`



Republic of the Philippines  
City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



### ROUTING SLIP FOR CAPSTONE PROJECT

Names: Alcantara, Jasper B., Jopia, Jopia D., Martinez, Isaac Ivan J., Payad, Naziancino A.

Title of Study: Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay

Please Check:

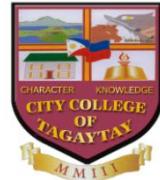
Outline

Final Defense

Designation: Name of Faculty Concerned	Date		Remarks
	Received	Released	
<b>Adviser: CHRISTIAN R. ANDA</b>			
1	03/03/2025	03/03/2025	
2			
3			
<b>Unit Research Coordinator: NOEL JR. G. GARCIA</b>			
1	03/03/2025	03/03/2025	
2			
3			
<b>Program Coordinator: JAY R T. ROLLO</b>			
1	03/03/2025	03/03/2025	
2			
3			
<b>IT Department Head: NOEL JR. G. GARCIA</b>			
1	03/03/2025	03/03/2025	
2			
3			
<b>English Critic: JEFF JEREMIAH PEREA</b>			
1			
2			
3			
<b>Dean: JEFERLYN A. ANONUEVO</b>			
1	03/03/2025	03/03/2025	
2			
3			



Republic of the Philippines  
City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



March 03, 2025

**JEFERLYN A. AÑONUEVO, MIT**

Dean, School of Computer Studies

This College

Madam,

We wish to apply for an oral review of the **final result** of our capstone project entitled **Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay** on March 03, 2025 at 1:00 pm at the City College of Tagaytay.

Thank you.

Respectfully yours,

**Alcantara, Jasper B.**

**Jopia, Jopia D.**

**Martinez, Isaac Ivan J.**

**Payad, Naziancino A.**

**Recommending Approval:**

**CHRISTIAN R. ANDA**  
Adviser

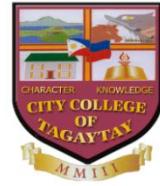
Date: 03/03/2025

**NOEL JR. G. GARCIA**  
Unit Research Coordinator

Date: 03/03/2025



Republic of the Philippines  
City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



Department of Information Technology

**APPROVAL SHEET**  
**Capstone Project**

This capstone project entitled **Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay**, prepared and submitted by **Alcantara, Jasper B., Jopia, Jopia D., Martinez, Isaac Ivan J., Payad, Naziancino A.**, in partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology, is recommended for **FINAL DEFENSE**.

**Date of Outline Defense:** March 03, 2025

**CHRISTIAN R. ANDA**  
Adviser

**JUEL D. COPER**  
Technical Critic

**PANEL OF EVALUATORS**

**ANGELITO M. CARAAN**  
Member

**NOEL JR. G. GARCIA**  
Member

**JEFERLYN A. AÑONUEVO, MIT**  
Chair

**Recommending Approval:**

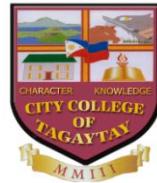
**NOEL JR. G. GARCIA**  
Unit Research Coordinator

**Approved:**

**JEFERLYN A. AÑONUEVO, MIT**  
School Dean



Republic of the Philippines  
City of Tagaytay  
**CITY COLLEGE OF TAGAYTAY**  
**SCHOOL OF COMPUTER STUDIES**



Department of Information Technology

### APPROVAL SHEET

#### Final Capstone Project Manuscript

This capstone project entitled **Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay**, prepared and submitted by **Alcantara, Jasper B., Jopia, Jopia D., Martinez, Isaac Ivan J., Payad, Naziancino A.,**, in partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology, is recommended for APPROVAL.

**CHRISTIAN R. ANDA**  
Adviser

**JUEL D. COPER**  
Technical Critic

Approved by the PANEL OF EXAMINERS for FINAL DEFENSE with a grade of  
**PASSED with MINOR REVISION**

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**JEFERLYN A. AÑONUEVO, MIT**  
Chair

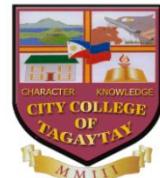
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### ROUTING SLIP FOR CAPSTONE PROJECT

Names: **Alcantara, Jasper B., Jopia, Jopia D., Martinez, Isaac Ivan J., Payad, Naziancino A.**

Title of Study: **Enhancement of Coin Operated Document Printing Kiosk for City College of Tagaytay**

Please Check:

Outline

Final Manuscript

<b>Designation:</b> Name of Faculty Concerned	Date		<b>Remarks</b>
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	1		
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	1		
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	3		
Dean: <b>JEFERLYN A. ANONUEVO</b>			
	1		
	2		
	3		

## Appendix D: Test Results

### UNIT TESTING

Materials/Peripherals	Findings	Solution	Status	Date
Arduino Uno	None	None	Working	10-12-24
Laptop Computer	None	None	Working	10-18-24
Pocket Wifi	None	None	Working	02-23-25
Coin Slot	None	None	Working	10-12-24
6V DC Power Supply	None	None	Working	10-12-24
Coin Hopper	None	None	Working	10-13-24
Breadboard	None	None	Working	10-13-24
1 Channel 5V Relay Module	None	None	Working	10-13-24
Epson L120	None	None	Working	10-18-24
Epson L120	None	None	Working	10-18-24

### INTEGRATION TESTING

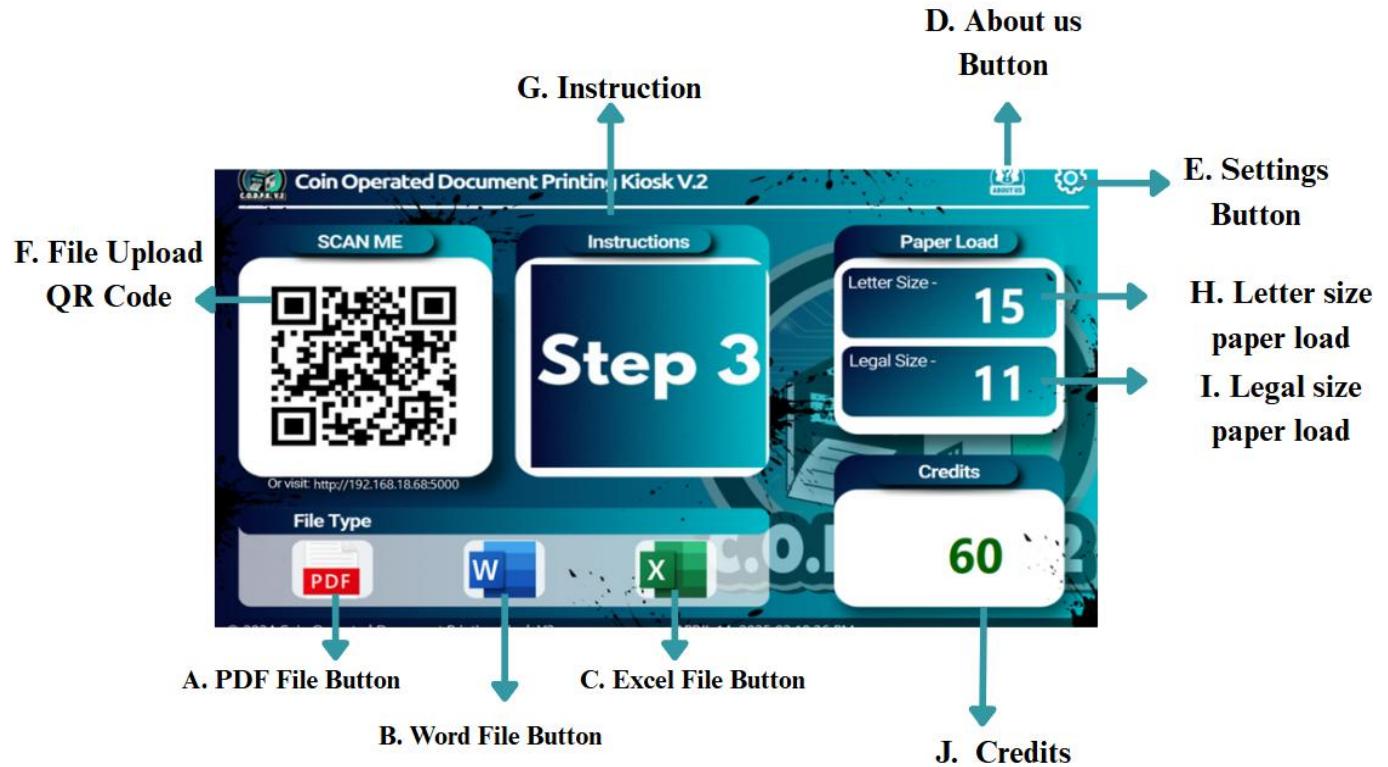
	Findings	Status	Date
C.O.D.P.K V.2	The C.O.D.P.K. V.2 receives coins from the user through the coin slot, utilizes a QR code for file transfer, prints the document via the printer, dispenses the appropriate change from the coin hopper, and transmits the transaction details to the kiosk system.	Working	02-23-25

### SYSTEM TESTING

	Findings	Status	Date
Hotspot Module	Provides the Wi-Fi hotspot that allows the user to connect to the kiosk.	Working	11-09-24
User-Interface Module	Enables the user to interact with the kiosk system.	Working	11-09-24
QR Code Sub-Module	Provides a QR code that allows the user to access the locally hosted website.	Working	11-09-24
Locally Hosted File Upload Sub-Module	Enable the user to upload the documents they intend to print.	Working	11-09-24
Printing Module	Manages the printing process according to the selected settings	Working	11-09-24

System Administrator Module	Provide the overall maintenance of the enhanced prototype.	Working	11-09-24
Kiosk Maintenance Sub-Module	Provides maintenance tasks such as adding paperload, adding coin funds and modifying printing cost to ensure the kiosk operates efficiently.	Working	11-09-24
Report Sub-Module	Provides record of all transactions and the income generated.	Working	11-09-24

## Appendix E. Operation Manual/User Guide



Appendix Figure 1. Start Up Page Form

- A. PDF File Button:** This button displays the PDF file uploaded by the user.
- B. Word File Button:** This button displays the Word file uploaded by the user.
- C. Excel File Button:** This button displays the Excel file uploaded by the user.
- D. About Us Button:** This button shows the information about developer of the enhanced prototype.
- E. Settings Button:** This button opens the system administrator login form to access the system settings.

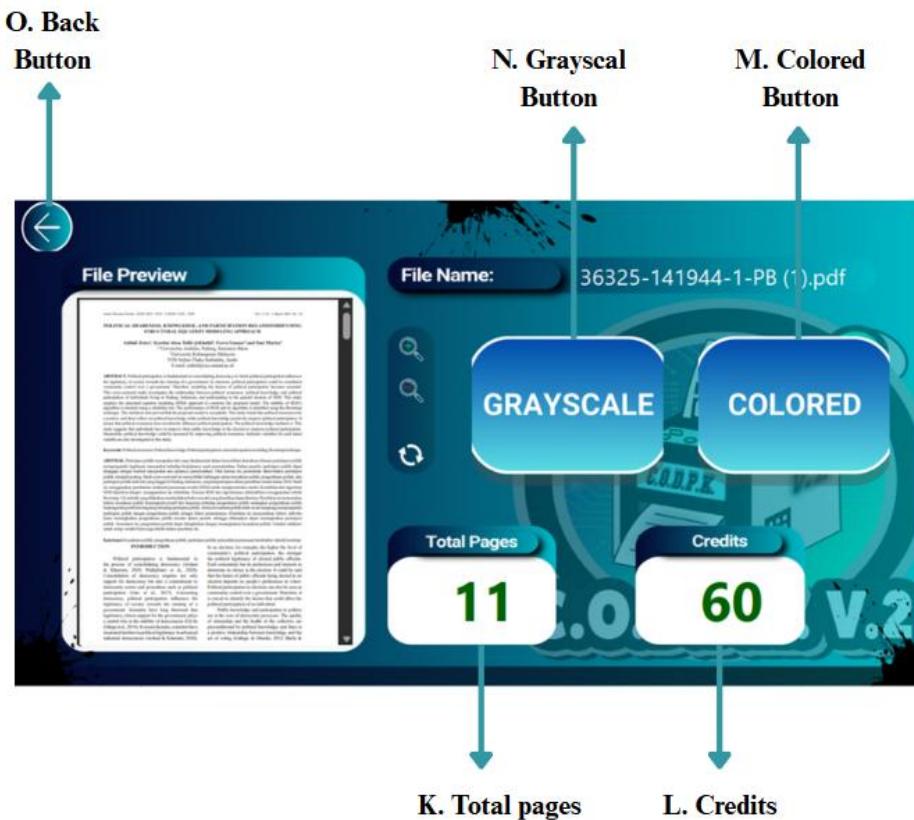
**F. File Upload QR Code:** This QR code is used to transfer files from a mobile phone to the enhanced prototype.

**G. Instruction:** This section shows the step-by-step procedure on how to use the enhanced prototype.

**H. Letter Size paper load:** This section shows the remaining Letter size papers.

**I. Legal Size paper load:** This section shows the remaining Legal size papers.

**J. Credits:** This section shows the credits inserted by the users.



Appendix Figure 2. Preview Page Form

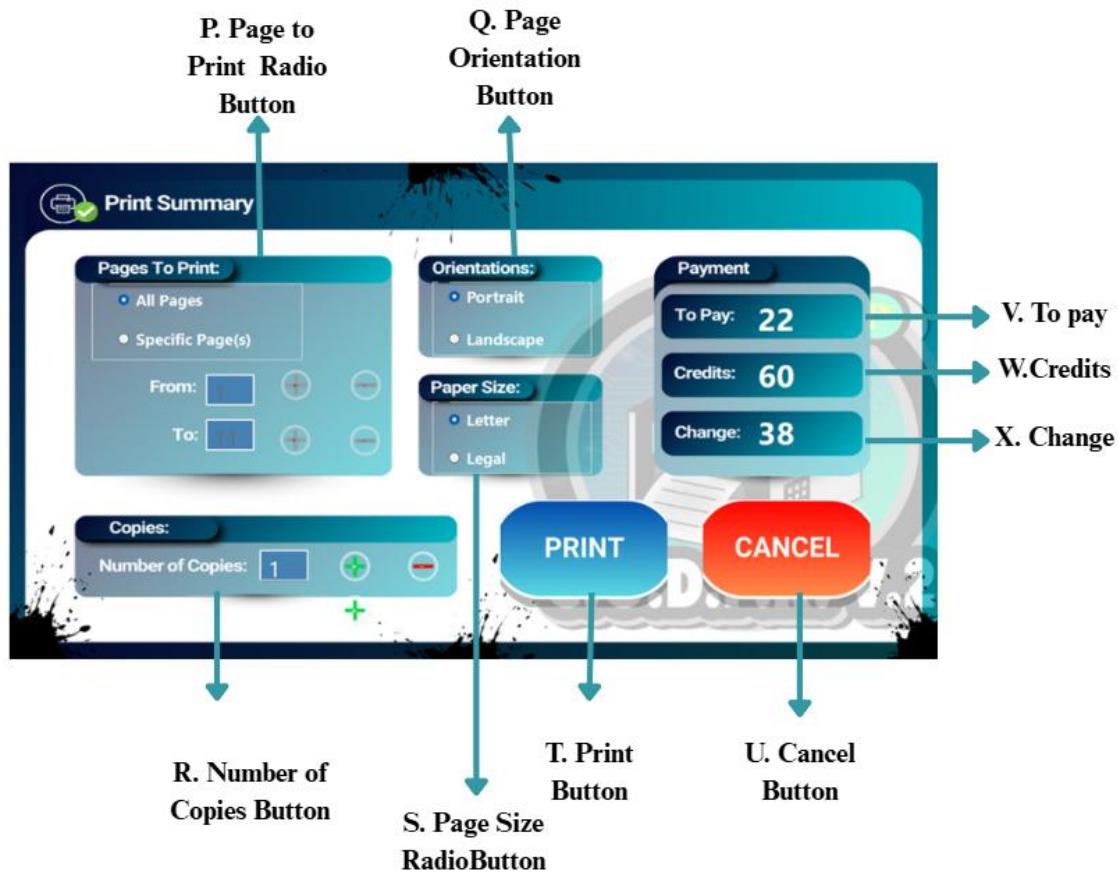
**K. Total Pages:** This section displays the total number of pages of the file uploaded by the user.

**L. Credits:** This section shows the credits inserted by the users.

**M. Colored Button:** This button is used if the user wants to print in color.

**N. Grayscale Button:** This button is used if the user wants to print in grayscale or black and white.

**O. Back Button:** This button is used to return to the start page.



Appendix Figure 3. Print Summary Form

**P. Page to Print Radio Button:** This radio button allows the user to select whether to print all pages or specific pages.

**Q. Page Orientation Button:** This radio button allows the user to choose between portrait or landscape orientation for the printed document.

**R. Number of Copies Button:** This button shows how many copies of the document the user wants to print.

**S. Page Size Radio Button:** This radio button allows the user to choose between letter or legal size for the printed document.

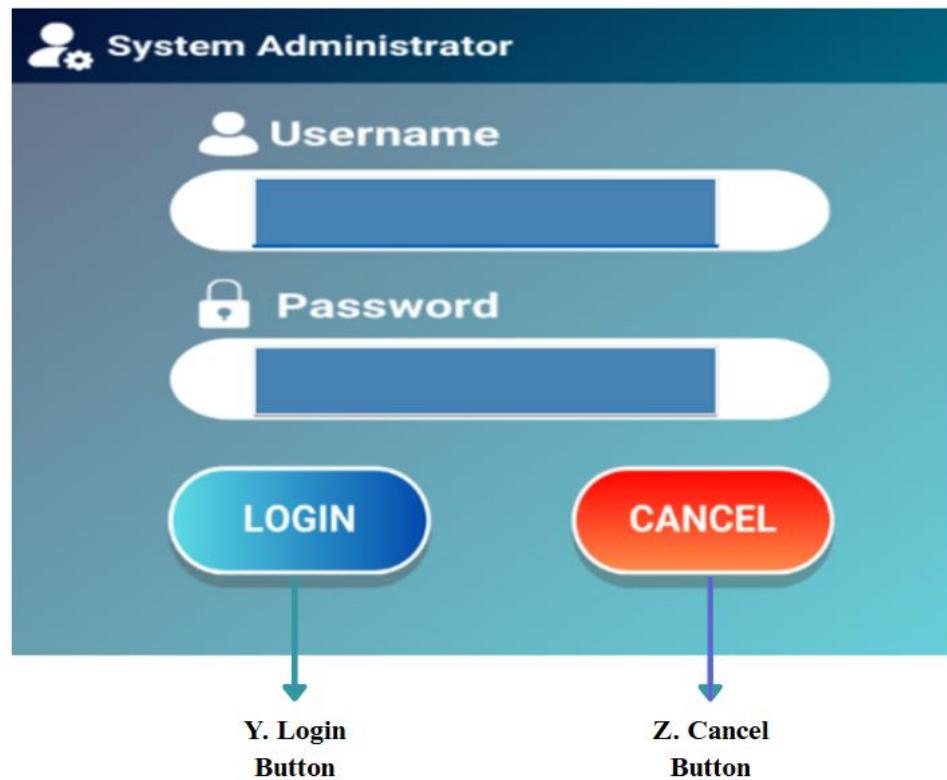
**T. Print Button:** This button allows the user to print their documents.

**U. Cancel Button:** This button allows the user to cancel the print job.

**V. To Pay:** This section displays the total amount the user needs to pay.

**W. Credits:** This section displays the credits inserted by the user.

**X. Change:** This section displays the change to be received by the user.

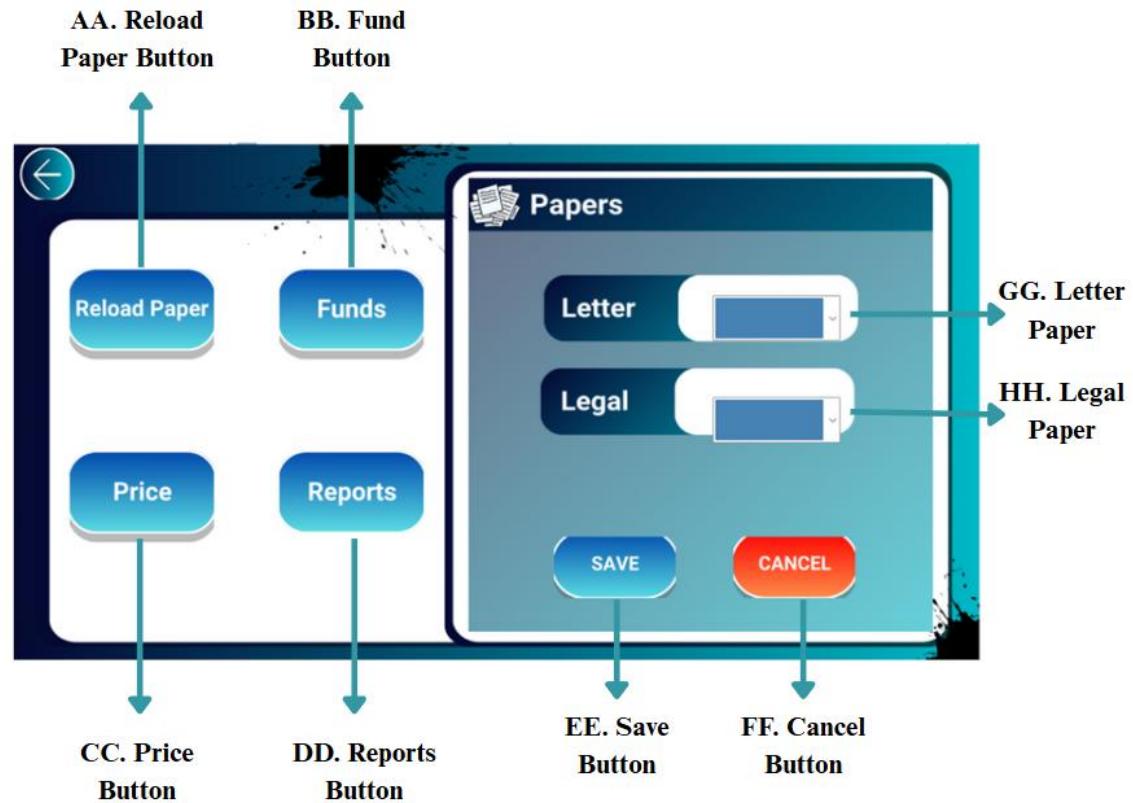


The diagram illustrates a System Administrator login interface. At the top, there is a header bar with the title "System Administrator". Below the header, there are two input fields: "Username" and "Password", each accompanied by a placeholder icon (a person for Username and a lock for Password). At the bottom, there are two large, rounded rectangular buttons: a blue "LOGIN" button on the left and an orange "CANCEL" button on the right. Two arrows point downwards from the bottom of these buttons to labels: a green arrow points to the "LOGIN" button with the label "Y. Login Button", and a purple arrow points to the "CANCEL" button with the label "Z. Cancel Button".

Appendix Figure 4. System Administrator Login Form

**Y. Login Button:** This button is used to log in to the System Administrator account using unique credentials.

**Z. Cancel Button:** This button is used to cancel the login process.



Appendix Figure 5. System Administrator Interface

**AA. Reload Paper Button:** This button is used by the system administrator to reload paper in the kiosk system.

**BB. Fund Button:** This button is used by the system administrator to refill funds in the kiosk system.

**CC. Price Button:** This button is used by the system administrator to modify the print price.

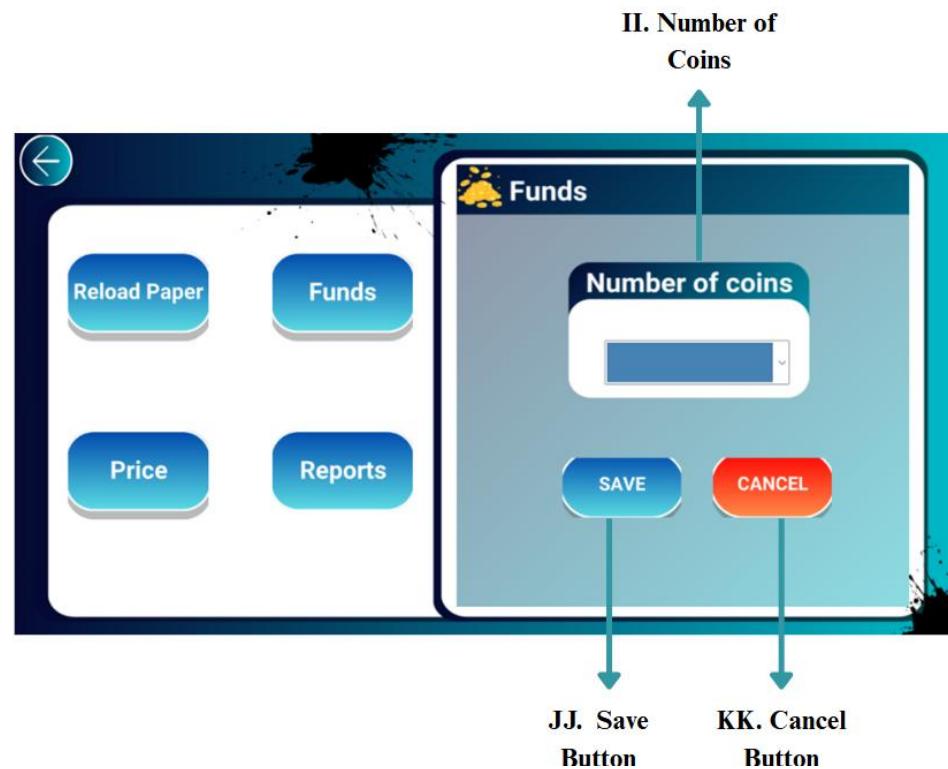
**DD. Reports Button:** This button displays the system reports.

**EE. Save Paper Button:** This button is used by the system administrator to save paper reload entries.

**FF. Cancel Button:** This button is used by the system administrator to cancel the paper reload process.

**GG. Letter Paper Reload:** This section is used by the system administrator to input the number of letter-sized paper reloads.

**HH. Legal Paper Reload:** This section is used by the system administrator to input the number of legal-sized paper reloads.

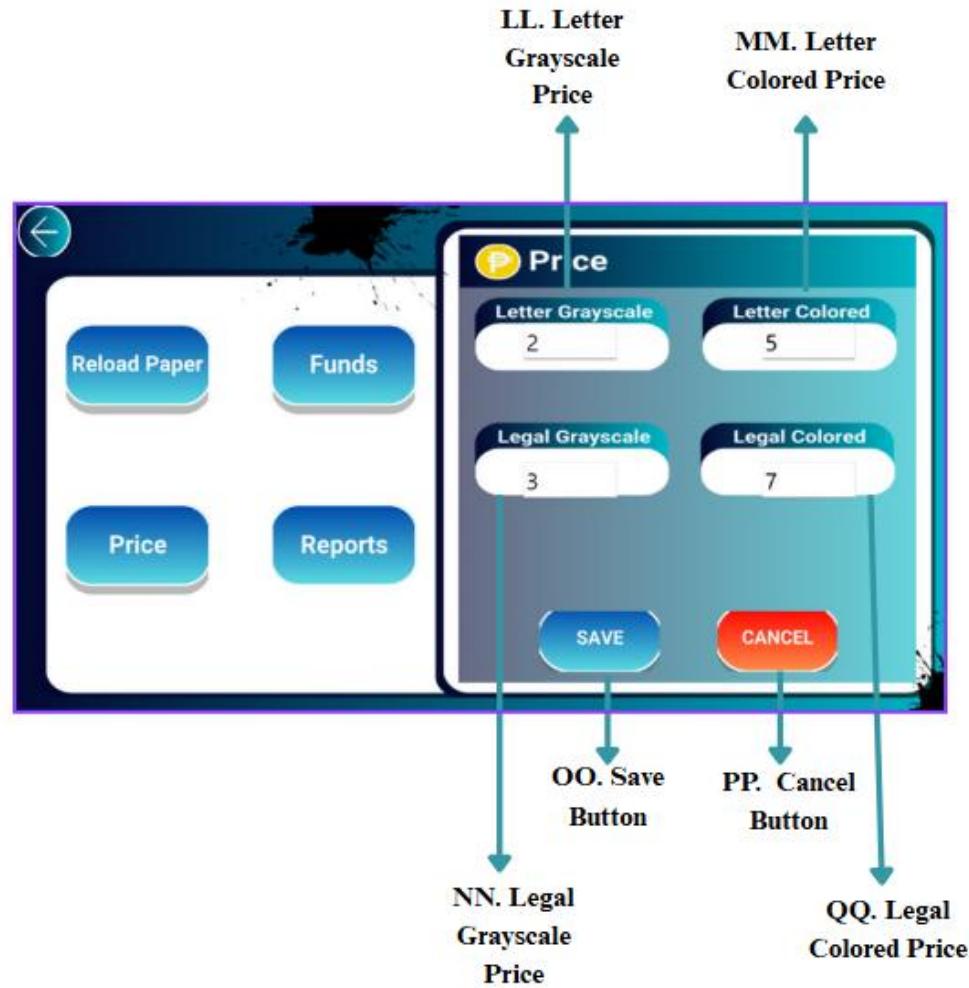


Appendix Figure 6. Coin Refill Form

**II. Number of Coins:** This section is used by the system administrator to input the number of coin refills.

**JJ. Save Funds Button:** This button is used by the system administrator to save the coin refills.

**KK. Cancel Button:** This button is used by the system administrator to cancel the coin refills.



Appendix Figure 7. Printing Price Form

**LL. Letter Grayscale Price:** This section is used to set the printing price for letter-sized grayscale printing.

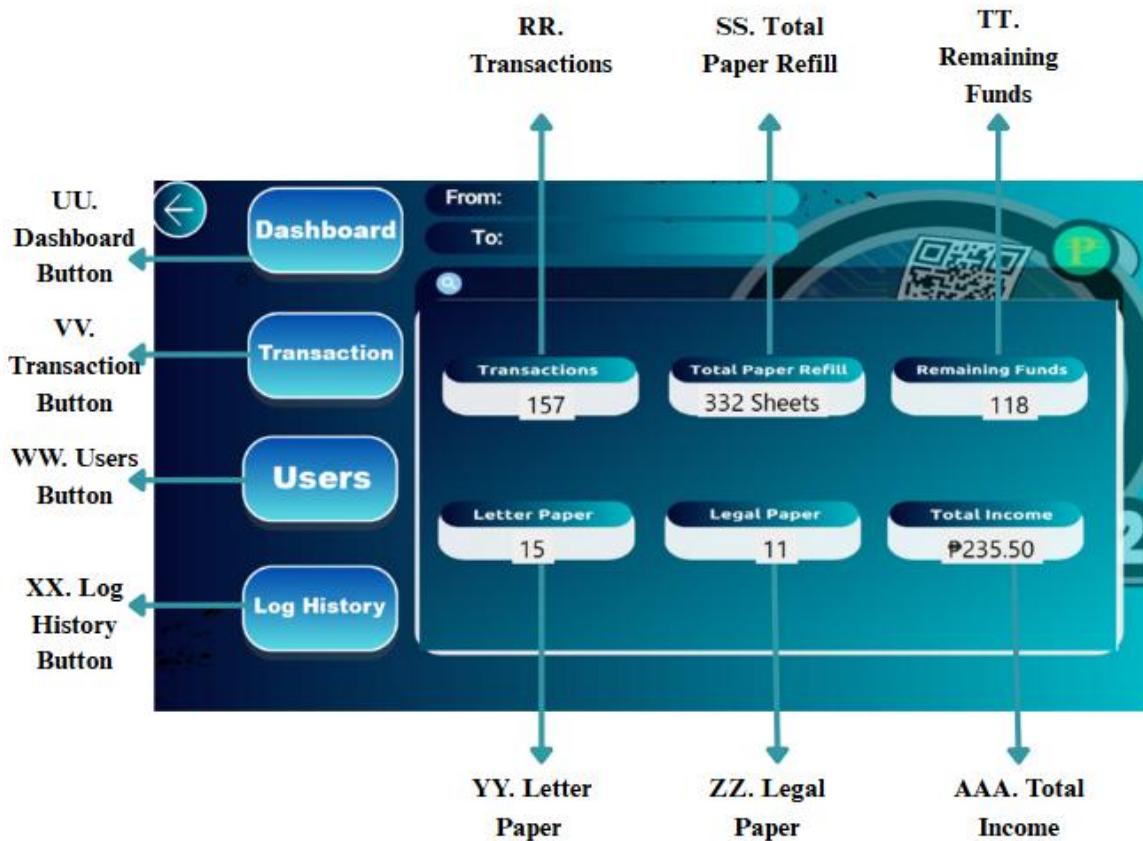
**MM. Letter Colored Price:** This section is used to set the printing price for letter-sized colored printing.

**NN. Legal Grayscale Price:** This section is used to set the printing price for legal-sized grayscale printing.

**OO. Save Price Button:** This button is used by the system administrator to save the printing prices.

**PP. Cancel Button:** This button is used by the system administrator to cancel the price setting process.

**QQ. Legal Colored Price:** This section is used to set the printing price for legal-sized colored printing.



## Appendix Figure 8. Reports Form

**RR. Transactions:** This section displays the total transactions made through the kiosk system.

**SS. Total Paper Refill:** This section displays the total paper refills in the kiosk system.

**TT. Remaining Funds:** This section displays the remaining funds in the enhanced prototype.

**UU. Dashboard Button:** This button displays the dashboard of the enhanced prototype.

**VV. Transaction Button:** This button displays the transaction history.

**WW. Users Button:** This button displays information about the system administrator.

**XX. System Log History Button:** This button displays the system log history performed by the system administrator.

**YY. Letter Paper:** This section shows the available letter-sized paper.

**ZZ. Legal Paper:** This section shows the available legal-sized paper.

**AAA. Total Income:** This section displays the total income of the enhanced prototype.

## Appendix F. Program Sample

```
from flask import Flask, request, render_template_string, make_response
import os
import socket

app = Flask(__name__)
upload_folder = 'C:/DEFENSA'

if not os.path.exists(upload_folder):
    os.makedirs(upload_folder)

app.config['UPLOAD_FOLDER'] = upload_folder
app.config['MAX_CONTENT_LENGTH'] = 1 * 1024 * 1024 * 1024 # 1 GB file size limit

ip_address_file = 'C:/DEFENSA/ip_address.txt' # Specify the path here

# HTML templates
upload_template = """
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
<title>Coin Operated Document Printing Kiosk</title>
<style>
body {
```

```
font-family: Arial, sans-serif;  
background: linear-gradient(to bottom, #050933, #00b9c7);  
color: white;  
height: 100vh;  
display: flex;  
justify-content: center;  
align-items: center;  
margin: 0;  
}  
.container {  
background: rgba(255, 255, 255, 0.1);  
padding: 30px;  
border-radius: 10px;  
text-align: center;  
box-shadow: 0px 4px 10px rgba(0, 0, 0, 0.3);  
max-width: 400px;  
}  
.form-group {  
margin-bottom: 20px;  
}  
input[type=file] {  
padding: 10px;  
width: 100%;  
  
border: none;  
border-radius: 5px;  
}  
button[type=submit] {
```

```
background-color: #00b9c7;
color: white;
padding: 10px 20px;
border: none;
cursor: pointer;
border-radius: 5px;
width: 100%;
font-size: 16px;
}

h1, h2 {
color: white;
}

.error-message {
color: red;
font-weight: bold;
margin-bottom: 20px;
}

</style>

</head>

<body>

<div class="container">

<h1>Coin Operated Document Printing Kiosk</h1>

<h2>Upload a File</h2>

{ % if error_message % }

<p class="error-message">{{ error_message }}</p>

{ % endif % }

<form method="post" enctype="multipart/form-data" action="/">

<div class="form-group">
```

```
<input type="file" name="file" accept=".pdf,.xls,.xlsx,.doc,.docx">
</div>

<div class="form-group">
    <button type="submit">Upload</button>
</div>

</form>

</div>

</body>

</html>

"""

uploaded_template = """
<!doctype html>

<html lang="en">
    <head>
        <meta charset="utf-8">
        <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
        <title>File Uploaded</title>
        <style>
            body {
                font-family: Arial, sans-serif;
                background: linear-gradient(to bottom, #050933, #00b9c7);
                color: white;
                height: 100vh;
                display: flex;
                justify-content: center;
                align-items: center;
                margin: 0;
            }
        </style>
    </head>
    <body>
        <div class="form-group">
            <input type="file" name="file" accept=".pdf,.xls,.xlsx,.doc,.docx">
            <button type="submit">Upload</button>
        </div>
    </body>
</html>
"""
```

```
uploaded_template = """
<!doctype html>

<html lang="en">
    <head>
        <meta charset="utf-8">
        <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
        <title>File Uploaded</title>
        <style>
            body {
                font-family: Arial, sans-serif;
                background: linear-gradient(to bottom, #050933, #00b9c7);
                color: white;
                height: 100vh;
                display: flex;
                justify-content: center;
                align-items: center;
                margin: 0;
            }
        </style>
    </head>
    <body>
        <div class="form-group">
            <input type="file" name="file" accept=".pdf,.xls,.xlsx,.doc,.docx">
            <button type="submit">Upload</button>
        </div>
    </body>
</html>
"""
```

```
}

.container {
    background: rgba(255, 255, 255, 0.1);
    padding: 30px;
    border-radius: 10px;
    text-align: center;
    box-shadow: 0px 4px 10px rgba(0, 0, 0, 0.3);
    max-width: 400px;
}

h1 {
    color: white;
    text-align: center;
}

button[type=submit] {
    background-color: #00b9c7;
    color: white;
    padding: 10px 20px;
    border: none;
    cursor: pointer;
    border-radius: 5px;
    width: 100%;
    font-size: 16px;
}

</style>

</head>

<body>
<div class="container">
    <h1>Coin Operated Printing Kiosk</h1>
```

```

<h2>Your File is uploaded successfully</h2>
<p>File Name: {{ file_name }}</p>
<form action="/" method="get">
    <button type="submit">Upload Another File</button>
</form>
</div>
</body>
</html>
"""

@app.route('/', methods=['GET', 'POST'])

def upload_file():
    error_message = None

    if request.method == 'POST':
        if 'file' not in request.files or request.files['file'].filename == "":
            error_message = 'Please select a file before clicking Upload.'
        else:
            file = request.files['file']

            # Check for allowed file extensions
            allowed_extensions = {'.pdf', '.xls', '.xlsx', '.doc', '.docx'}
            file_ext = os.path.splitext(file.filename)[1].lower()
            if file_ext not in allowed_extensions:
                error_message = 'File type not allowed'
            else:
                # Replace white spaces with underscores in the filename
                filename = file.filename.replace(" ", "_")

```

```
# Save the file with the modified filename

try:

    file.save(os.path.join(app.config['UPLOAD_FOLDER'], filename))

    return make_response(render_template_string(uploaded_template, file_name=filename), 200)

except Exception as e:

    error_message = f"Error saving file: {str(e)}"

return make_response(render_template_string(upload_template, error_message=error_message), 200)

def get_ip_address():

    s = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

    try:

        s.connect(('8.8.8.8', 80))

        IP = s.getsockname()[0]

    except Exception:

        IP = '127.0.0.1'

    finally:

        s.close()

    return IP

def save_ip_address(ip_address):

    with open(ip_address_file, 'w') as file:

        file.write(ip_address)

if __name__ == '__main__':

    ip_address = get_ip_address()

    full_address = f"http://{{ip_address}}:5000"
```

```
save_ip_address(full_address)

print(f"Server is running on {full_address}/")

app.run(host='0.0.0.0', port=5000)

Jasper
Jasper Alcantara

volatile byte hopperPulseCount = 0; // Counter for coins ejected

byte coinHopperValue = 0; // Number of pulses required to dispense each coin type

//***** Pins Used *****
volatile int coinPulseCount = 0;

const int hopperPin = 2; // Optical count input
const int coinAcceptorPin = 3; // Optical count input
const int relayPin = 4; // Output relay

int hopperPinState;

void setup()
{
    Serial.begin(9600);

    //**** Pin Modes *****
    pinMode(coinAcceptorPin, INPUT_PULLUP);
    pinMode(hopperPin, INPUT_PULLUP); // Hopper optical count is an input
    pinMode(relayPin, OUTPUT); // Relay pin output
    digitalWrite(relayPin, HIGH); // Turn off relay - active HIGH
    attachInterrupt(digitalPinToInterrupt(coinAcceptorPin), coinInserted, RISING);
    coinPulseCount = 0;
    hopperPinState = digitalRead(hopperPin);
```

```
}
```

```
void coinInserted()  
{  
    coinPulseCount++;  
    Serial.println(coinPulseCount);  
}
```

```
void loop()  
{  
    while(Serial.available() == 0) {}  
    long x = Serial.parseInt();  
    Serial.println(x);  
    coinHopperValue = x;  
    if (coinHopperValue >= 0) dispense();  
}
```

```
void hopper() // Function called when coins are being dispensed from the hopper  
{  
    if (hopperPinState != digitalRead(hopperPin)) {  
        if (hopperPinState == HIGH) {  
            hopperPinState = LOW;  
        } else {  
            hopperPinState = HIGH;  
            hopperPulseCount++;  
            Serial.println(hopperPulseCount);  
        }  
        delay(50);  
    }
```

```
}

}

void dispense()

{

    hopperPinState = digitalRead(hopperPin);

    digitalWrite(relayPin, LOW); // Turn on relay - active LOW

    delay(50);

    hopperPulseCount = 0;

    while (hopperPulseCount < coinHopperValue)

    {

        hopper();

    }

    delay(50); // Wait to ensure the coin has enough momentum to leave hopper but not long enough for another coin

    to dispense

    digitalWrite(relayPin, HIGH); // Turn off relay - active HIGH

    delay(180);

    coinPulseCount = 0; // Reset coin acceptor pulse count to avoid errors

}
```

## Appendix G. Curriculum Vitae



### CONTACT

09294323449  
alcantarajasper123@gmail.com  
Maitim 2nd West, Tagaytay City

### SKILLS

Microsoft Office Suite  
Communication  
Computer Programming  
Leadership, Adaptability & Flexibility

### LANGUAGES

English  
Filipino

# JASPER B. ALCANTARA

## OBJECTIVES

To use my skills in Information Technology to create innovative solutions and grow professionally in the tech industry.

## PERSONAL INFORMATION

Nationality	Filipino
Age	23 years old
Birthdate	November 3, 2001
Birthplace	Balwag, Bulacan
Weight	147lbs
Height	5'6

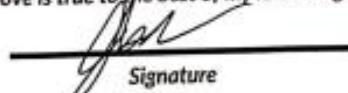
## EDUCATIONAL

- City College of Tagaytay  
Bachelor of Science in Information Technology  
2021 - Present
- STI College Tagaytay  
General Academic Strand  
Senior High School  
2017 - 2019
- Tagaytay City Science National High School - Integrated  
Senior High School  
Junior High School  
2013 - 2017

## CERTIFICATION

Google IT Support Professional Certificate  
(2023)

I hereby declare that the above mentioned information given by me above is true to the best of my knowledge and belief

  
Signature



# Joseph D. Jopia

Internship

## Contact

📞 09108342022

✉️ jopajoseph14@gmail.com

📍 Bayhon Street Balite 1st  
Silang Cavite

## Objectives

As an IT student seeking an On-the-Job Training opportunity, I aim to apply my skills in various computer-related tasks, such as troubleshooting, while gaining hands-on experience. I am eager to learn, contribute to the organization, and further develop my knowledge in different IT fields.

## References

Rachel Frago

09369473269

## Education

**Biga 1 Elementary School**

2009–2010

**Munting ilog National Highschool Silang West Annex**

2010–2014

**City College of Tagaytay**

Bachelor of Science and Information Technology

2020–2024 present

## Skills

**Proficient computer skills**

**Positive thinker**

**Creativity**

## Experience

**ALL Home Silang (Promodiser)**

2019

Joseph D. Jopia



# ISAAC IVAN J. MARTINEZ

## INFORMATION TECHNOLOGY INTERN

📞 09309261517

✉️ isaacivanmartinez22@gmail.com

🏡 Kaybagal South, Tagaytay City, Cavite

### CAREER OBJECTIVES

To obtain a position that allows me to apply my knowledge and develop practical skills. I am motivated to learn, work with a team, and improve my abilities. I aim to work hard, grow within the company, and make a positive impact. My goal is to become a valuable asset, continue learning, and advance in my career.

### ACADEMIC BACKGROUND

**OLIVAREZ COLLEGE TAGAYTAY**      2019 - 2020  
STEM STRAND                          With Highest Honor

**CITY COLLEGE OF TAGAYTAY**      2021 - Present  
BS IN INFORMATION TECHNOLOGY      1.50 GPA

### TECHNICAL SKILLS

- Designed a mobile app using **Flutter**
- Familiar with the fundamentals of **Python**
- Developed and designed system using **Visual Basic** and **MySQL**
- Created websites utilizing **HTML, CSS, JavaScript**, and **Bootstrap**
- Proficient in Microsoft Office Suites (**Word, Excel** and **Presentation**)

### SOFT SKILLS

- Collaborate seamlessly across teams to achieve goals.
- Prioritizes tasks efficiently for maximized productivity.
- Can easily adjust to new situations and handle changes well.
- Continuously improve through adaptation and quick learning.

### PROJECTS

#### SPASHOES

- Created** a shoe inventory system for efficient handling and tracking of stocks. The system incorporated inventory filtering based on shoe size, and color variations.
- Utilized** Visual Basic 2022 for the frontend design and backend functionality, while MySQL for database management.
- Completed** deploying the system while collaborating with 4 team members.

#### FLUTTER CHECKERS

- Developed** a 2D mobile game simulating the board game checkers. It features player-vs-player (PvP) interactions and a competitive gameplay.
- Employed** Flutter as framework and Dart for the backend operations.

### EXPERIENCE

**AMBASSADORS OF PEACE AND ORDER (APO)**      2022 - Present  
CITY COLLEGE OF TAGAYTAY  
Responsible for ensuring safety, security, and discipline in the school, an APO enforces rules, monitors activities, assists with events, and responds to emergencies to maintain a safe learning environment.

### CHARACTER REFERENCE

#### MICHAEL JEFFREY A. AÑONUEVO

Practicum Adviser  
City College of Tagaytay  
michaeljeffrey.anonuevo@citycollegeoftagaytagay.edu.ph



#### CONTACT

- 188, Lourdes St. Purok 105, Maitim II Central, Tagaytay City
- [NaziancinoPayad@gmail.com](mailto:NaziancinoPayad@gmail.com)
- 09397772943

#### SOFT SKILLS

- Fast learner
- Time management
- Teamwork
- Willingness to learn
- Multitasker
- Active listening skills

#### TECHNICAL SKILLS

- Proficient in Microsoft Office applications
- Familiar with various editing tools including Adobe Photoshop, and Premiere Pro

# Naziancino Payad

#### OBJECTIVE

Seeking a challenging and suitable internship where I can improve my skills, develop my personality and ability to work well with people while contributing to the achievement of organization goals.

#### EDUCATIONAL BACKGROUND

2021-Present	City College of Tagaytay Bachelor of Science in Information Technology Kaybagal South, Tagaytay City
2019-2021	City College of Tagaytay (Senior High School Department) Technical-Vocational-Livelihood Information and Communication Technology Kaybagal South, Tagaytay City
2015-2019	Ulat Integrated School (Junior High School Department) Ulat, Silang, Cavite
2008 –2015	Ulat Elementary School Ulat, Silang, Cavite

NAZIANCINO ALLEGRO PAYAD  
Signature over printed name