

**IMPLEMENTATION OF AN AUTOMATED MEMORANDUM  
CREATION AND DISTRIBUTION SYSTEM  
AT TUP VISAYAS**

**A Research Project**

Presented to the Faculty of the  
**Graduate Programs**  
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by

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## **Chapter 1 – INTRODUCTION**

### **Background of the Study**

The advent of technology has significantly changed the landscape of organizations and establishments. Technological advancement has allowed organizations to increase their efficiency and reduce cost and processing time for tasks required. In educational institutions, the use of computers, the internet, and customized software applications have now formed part of the minimum required integrated system that powers the organizations' processes, most especially in matters pertaining to communication.

The importance of effective communication and efficient management information cascade continues to be a work in progress for most organizations. At the Technological University of the Philippines Visayas, the continued pursuit for organizational development and improvement through technology is evident. However, an area of improvement that will be beneficial to all members of the TUPV community, from the administration to the faculty and staff and even students will be in the dissemination of information particularly those in the form of a memorandum.

A memorandum, sometimes called a memo, is a document sent from one office to another within an organization. Generally, memos have two purposes: to bring attention to concerns and persuade the reader to take action. As a written form of communication, the use of memos has slowly declined in other organizations since the introduction of emails and other forms of electronic messaging. For government offices, including SUCs, the continued production of hardcopies and manual distribution has greatly impeded the efficiency of information dissemination, thereby affecting the overall performance of the organization. In addition, during this time of COVID19 pandemic, when contactless interaction has formed part of the norm, a

hardcopy produced, distributed and received does not adhere to minimum health protocols.

A preliminary survey conducted to determine the most usual challenges encountered by different offices at TUP Visayas showed that the top five challenges in terms of sending out a memorandum involves: delivery from the office of origin to the intended recipient, acquisition of the required signatures, receipt confirmation, no response for urgent concerns, and misplaced document (with proof of receipt). On the other hand, the top three challenges faced by offices in terms of having their documents received are: delayed receipt that requires urgent response, document receipt but is not properly cascaded to the designated employee, and delayed receipt where the concern has already lapsed.

These challenges basically show that the manual creation and distribution of memorandum within the organization consumes too much time thereby causing a delay in the dissemination of information and response to concerns especially for urgent matters. In addition, documents tend to be “lost” or “misplaced” even with the “log book system” implemented by the university (using log books to list the documents sent and to record who the receiving employee was by manually affixing their signatures in the log book). These contribute to the decreased efficiency in employee performance and the overall performance of the institution as a whole.

To address these issues and concerns and to contribute to the improvement of organizational functions, an automated memorandum creation and distribution system will be developed and implemented within TUP Visayas to ensure the timely distribution and receipt of these documents and to create a virtual storage space for all memoranda issued for easier access and future referencing. In addition, to ensure that there will be no memorandum left unread and no employee left uninformed, an SMS

notification system will also be integrated to inform the recipients that a memorandum is awaiting their attention and response, as the case may be.

### **Objectives of the Study**

The general objective of this study is the implementation of an automated memorandum creation and distribution with notification system. The establishment of such a system will help improve information dissemination, thereby increasing departmental efficiency and quality of outputs.

The specific objectives of this study are the following:

1. Determine the profile of the prospective users, the issues/challenges they face in the distribution and receipt of memoranda as well as the frequency of these issues/challenges;
2. Develop an offline web-based application for memorandum creation and distribution and integrate a notification system;
3. Produce an Operation Manual for the system as a guide to users;
4. Establish testing procedures to make sure that the system is working;
5. Establish an evaluation procedure that will include the criteria for evaluation, rating mechanism, respondent/evaluator profile, and the descriptive rating or interpretation of the evaluation criteria.

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

The study will be conducted to design, develop, test, evaluate, and implement an Automated Memorandum Creation and Distribution System at Technological University of the Philippines Visayas. The following areas are the scope and limitations of the study:

- (1) The system capability will be restricted to creation, viewing, sending, and receiving memo.
- (2) The system will work on memos only. It will not be capable of automating other documents such as purchase requests, job order requests, etc.
- (3) The system will use a database which stores the memo and profile data of the users.
- (4) The system will work with or without the Internet. For the Internet enabled set-up, the users can have access and can send/receive memos even outside the university premises. On the other hand, the users can access the system within the Local Area Network (LAN) of the university only.
- (5) The system will be integrated with a SMS notification that will aid in notifying the user/s to whom the memo was/were addressed.

### **Significance of the Study**

The implementation of the system will be benefitted by the Technological University of the Philippines Visayas especially its faculty and staff. Specifically, it will increase productivity of the workers which also boosts their performances; increase information integrity, increase efficiency of the information process; search, retrieve and distribute memos on time; and go on a paperless environment.



## **Chapter 2 – CONCEPTUAL FRAMEWORK**

### **Review of Related Studies and Literature**

#### **I. Memorandum**

According to Blinn College (2008), “Memorandums are an important form of written communication within companies. Memorandums are forms of internal communication and are sent to other people within the same organization.” More importantly, the creation of a memorandum is in connection with knowing the audience/reader especially in a workplace. The reader skims the most important document having the necessary information just by looking at the subject line and headings right away.

In writing of a memorandum, the Written Business Correspondence (n.d.) summarized that there is a need for a format depending on the type of institution or organization that may require specific requirements and styles. Additionally, it depends on the type of memo for a specific purpose and audience. However, there is a general format containing these elements:

- (a) Heading
- (b) Message
- (c) Tone
- (d) Length
- (e) Closing
- (f) Initials

The most common and traditional way of representing documents, especially memorandums are through the use of paper. Presently, technologies are advancing and developing with the use of computers along with various software. There was a study published by Oosterhout (2000) on the shift of sending and receiving of documents from paper to electronic method. The

electronic document storage can be used with an existing software, a document interaction software. Principally, it focused on how the office or workgroup deal with changes in terms of office equipment and software. The processes involved in the transition are printing (printing on demand and color document printing) and scanning of documents having an efficient and convenient operation. Due to advancement of technology and digital age, it involves various challenges when it comes to transition to electronic documents and has a developmental status in order to address problems and create sustainable solutions.

## **II. Memorandum Creation and Distribution**

### **A. *Web-based Application***

Technological advancement with the use of computers, internet and even Information Technology (IT) has greatly contributed to the improvement and efficiency of using an organized memo on offices mainly. The study of Ramoni, et.al (2016) shows the idea of using an Electronic Memorandum (E-Memo) which consists of various computer software and computer technology for the enhancement concerning the productivity of the office workers and accessibility of information. In terms of the front end, Macromedia Dream weaver was used; PHP (Hypertext Pre-processor) was for the server side; and the Database Management System (DBMS) used was MySQL or known as the Relational Database Management System (RDBMS) for storing and managing of contents. It was found out that the system has the advantages of eliminating the need of large staff for delegation of tasks, requiring less storage, and accessing of the system can be done with multiple persons at the same time if there will be a schedule change. In this proposed system, the researchers also

wanted to emphasize having a paperless office and ease of sending and receiving memo.

An existing patent by the United States emphasizes the use of World Wide Web Distributed Authorizing and Versioning (WebDAV) Protocol for the document distribution system and method to a number of clients. One unique feature of this system is the image forming apparatus which is coupled to the WebDAV server having the purpose of scanning and transmitting a document which is already scanned. It supports collaborative work with several authors in modifying and managing documents directly on the internet by having a Hyper Text Transfer Protocol (HTTP) extension and does not require the file transmission protocol (FTP) for another installation (Kong, 2016).

In the study of Sukstrienwong (2012), a Memorandum Report System (MRS) was developed so that it will address the problems of the teachers regarding the monitoring of student behaviors inside the school. Memorandum Report System (MRS) is a window-platform application being implemented by C# language. Another is that Microsoft SQL Server 2005 manages the major database of teachers, students, and the admin; and supports growth and volume of information. Microsoft Windows Server 2008 and Microsoft Visual Studio 2008 (C#.NET) were also used as the implemented software for MRS. It was found out from the evaluation that the satisfaction derived from the system is fairly good which included four areas: (1) Functional Requirement, (2) Functional Test, (3) Usability Test; and (4) Security Test. It also revealed that a group of students is required to be taken care of and the system works well and supports their main objectives.

There was a study conducted in Malaysia wherein the researchers made an online memo distribution system using Windows Gadget as a tool for an improved Office Automation (OA) system in an academic institution set-up. By using Windows as the main program, Memo Gadget was set to have two processes such as RSS (Really Simple Syndication) Functionality and RSS Reader with the use of XML (Extensible Markup Language) Scripting. After it was proposed, PHP (Hypertext Pre-processor) was also added in order to manage memo documents well. It was successfully implemented on the faculty and other offices in TATI University College. In this way, the Office Automation system was improved especially that the processes involved for the memo document accessibility and display are crucial especially the XML Scripting (Fahmy et.al., 2012).

In the case study of the Federal University Lokoja in Nigeria, a model for memo tracking and delivery system was designed and developed to solve various challenges encountered with the use of traditional and manual methods of document delivery and communication. It includes document coding (using a unique code), tracking module; and message and file sharing module in the system. One of the advantages in the method is the common Local Area Network (LAN) which does not require an internet connection. For the user's login interface, a Role Based Access Control (RBAC) approach was used which only restricts access based on roles of individual users. It was revealed in the results that the system works well by having a user-friendly interface and a hierarchy structure of document transmission. The memo can be monitored and tracked in the system, the status of the memos can be exhibited in the user

platform, the system can maintain a log due to the secured algorithms, and the system can access three levels of access controls/users (Adewumi et.al, 2018).

#### *B. Notification System*

There was a study conducted in Malaysia by Al-Zoubi (2009) with the use of Event Notification System (ENS) through a mobile phone in order to notify the university staff about a certain event including its details that they should be taking part in. The system was used to directly notify the staff through a Short Message Service (SMS). However in the system development, the researcher used an Object Oriented Approach having conceptual structures within its subdivision and at the same time looking at the whole system processes. *.NET Technology* (2.0 .NET Framework) with VS 2005 (VB.net) as IDE was used in the system and also, Microsoft SQL Server 2005 was used in the system database for storing all information. Results showed that between the two group users (PG Group and UA Group), there is a high percentage of agreement with the use of the system. It turns out that the system helped the university administration and staff in having an effective way of inter-communication and information dissemination.

## Conceptual Model of the Study

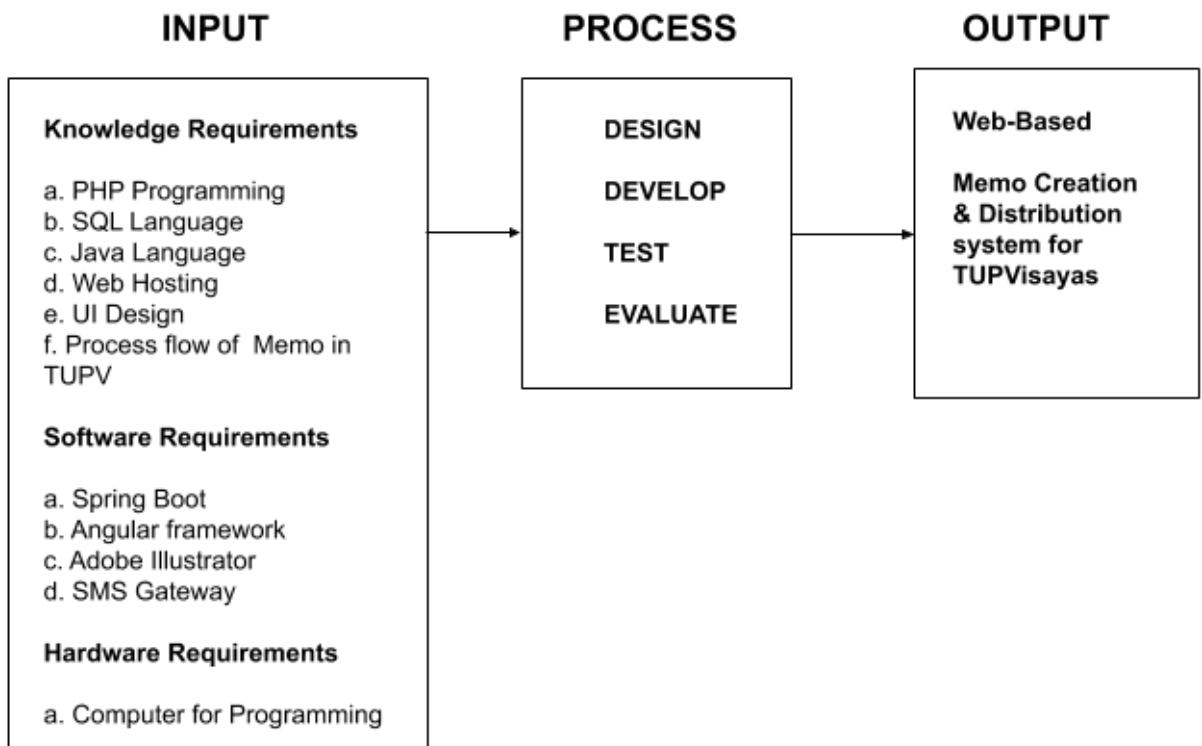


Figure 1. Conceptual model of the study.

### *Input*

Initially, this study includes the collection and thorough review of data from various sources of studies and literature especially for the Knowledge, Software, and Hardware Requirements; examination of sample surveys, recommendations of colleagues, along with the knowledge and expertise of an adviser that are essential for the conceptualization and development of the Memorandum Creation and Distribution System with SMS Notification for TUPVisayas.

### *Process*

Subsequently, the process part involves designing of the automated memorandum creation and distribution with SMS notification system as based on the objectives (i.e., based on profiles of the prospective users, with the issues/challenges

they face in the current memorandum system). The program is then developed which includes the management of the processes and requirements in the system; thereafter, an operation manual can be produced as a user guide. Testing procedures will be done in order to know if the system is working. Evaluation procedures will also be conducted.

### ***Output***

The result of the research is the Memo Creation & Distribution System with SMS Notification for TUPVisayas.

### **Operational Definition of Terms**

This part of the chapter defines the terms that are used in the study and their definition to clarify the readers as to the understanding of the background information of the study.

**Memorandum** - A memorandum, sometimes called a memo, is a document sent from one office to another within an organization.

**Signatories** - persons in-charge of signing a document.

**Users** - An individual who uses a computer or network service.

**Admin** - Someone who is in-charge to make improvements to the system that would affect other computer users.

**User Interface (UI)** - Use to create software design interfaces in software or computerized devices, based on theme or style.

**Development Tools** - Development kits, programming tools, and other materials used in the development of software & system.

**Adobe Illustrator** - A vector based editing software use to design websites, logos, blueprints and other precise independent illustrations.

**Jetbrains IntelliJ IDEA** - is an Integrated Development Environment (IDE) for JVM languages designed to maximize developer productivity.

Reference: <https://www.jetbrains.com/help/idea/discover-intellij-idea.html#developer-tools>

**Postman** - is a collaboration platform for API development. Postman's features simplify each step of building an API and streamline collaboration so you can create better APIs—faster.

**MariaDB** - turns data into structured information in a wide array of applications. Originally designed as enhanced, drop-in replacement for MySQL.

**API** - Application Programming Interface a software that allows two applications to talk to each other.

**Angular** - frontend framework used to develop single-page applications

**SMS** - Stands for Short Message Service is used to send text messages to mobile phones.

**SMS Gateway**- This allows a computer to send or receive text messages in the form of a short message service.

**Web-based** - Is an application software that runs into a web browser.

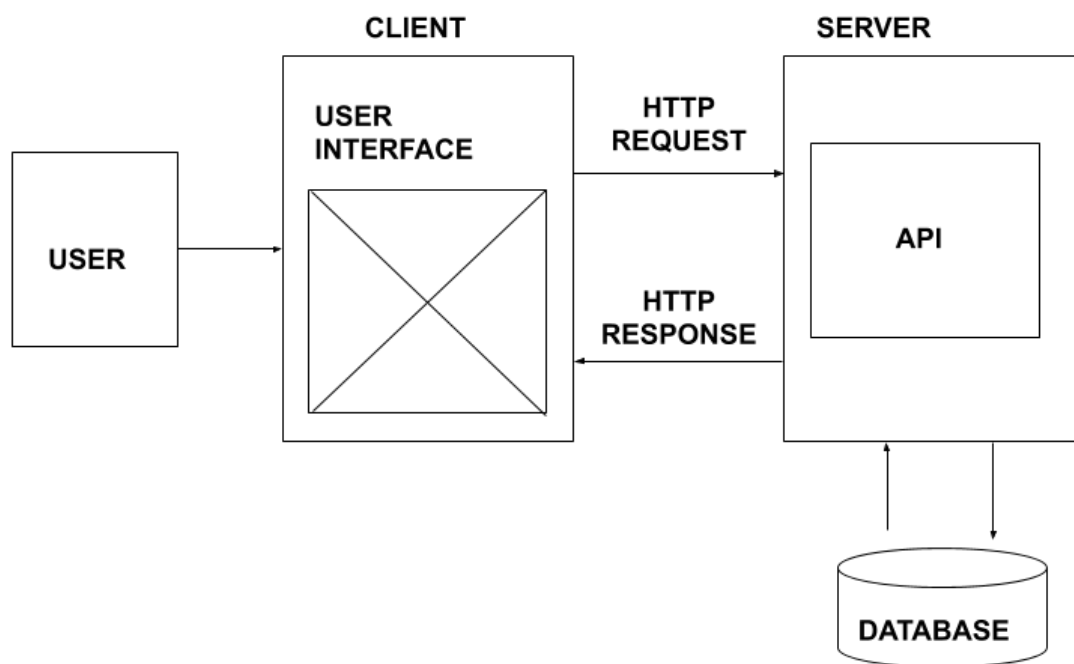


### Chapter 3 - METHODOLOGY

This chapter presents the project design, the project development, the operational and testing procedure, and the evaluation procedure.

#### Project Design

The project presented in Figure 2 is the workflow diagram of the Automated Memorandum Creation and Distribution System for TUP Visayas which was designed to automate and create a memorandum to be sent from one office to another within an organization.



*Figure 2. Workflow of the System*

The system is composed of two main blocks; the frontend (the client) and the backend (the server). The user interface is accessed through the web browser (frontend). To fetch data, the client sends HTTP requests to the server. The HTTP response received by the client is then presented to the user.

In order for the server and the client to communicate, the server provides an application programming interface (API). This serves as commands sent by the client to the server. The server then validates the requests and executes the appropriate business logic. Any changes from data are persisted by the server into the database.

## **Project Development**

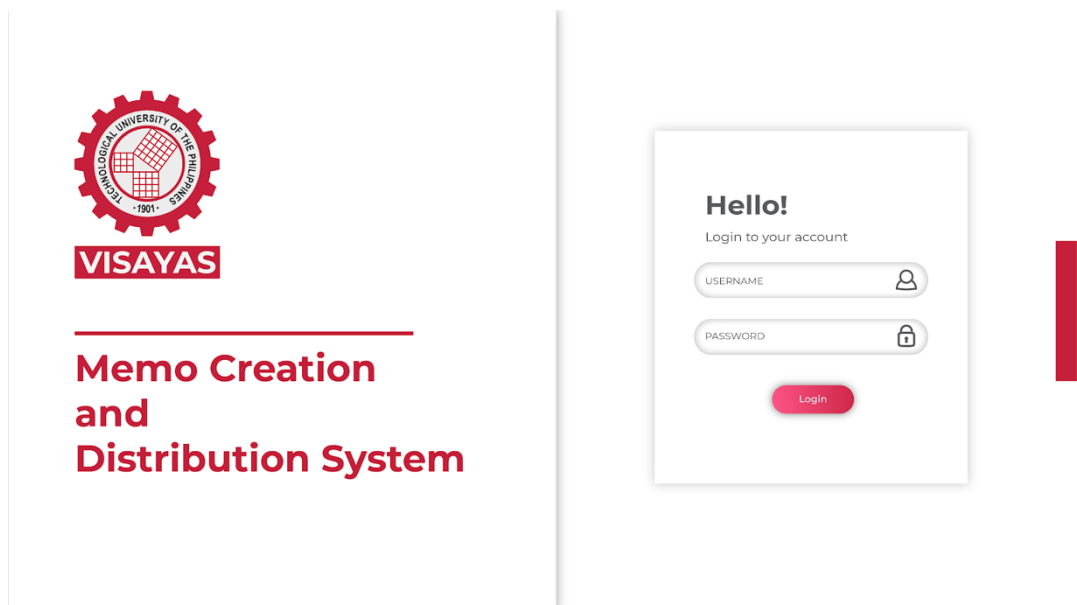
### **1. Problem Identification**

#### **1. Tools Needed**

- 1. Conduct survey from TUPV Faculty & Staff**
- 2. Gather and analyze data**

### **2. Development**

#### **1. Front-end Development (GUI)**



*Figure 3. GUI of the system (log-in page)*

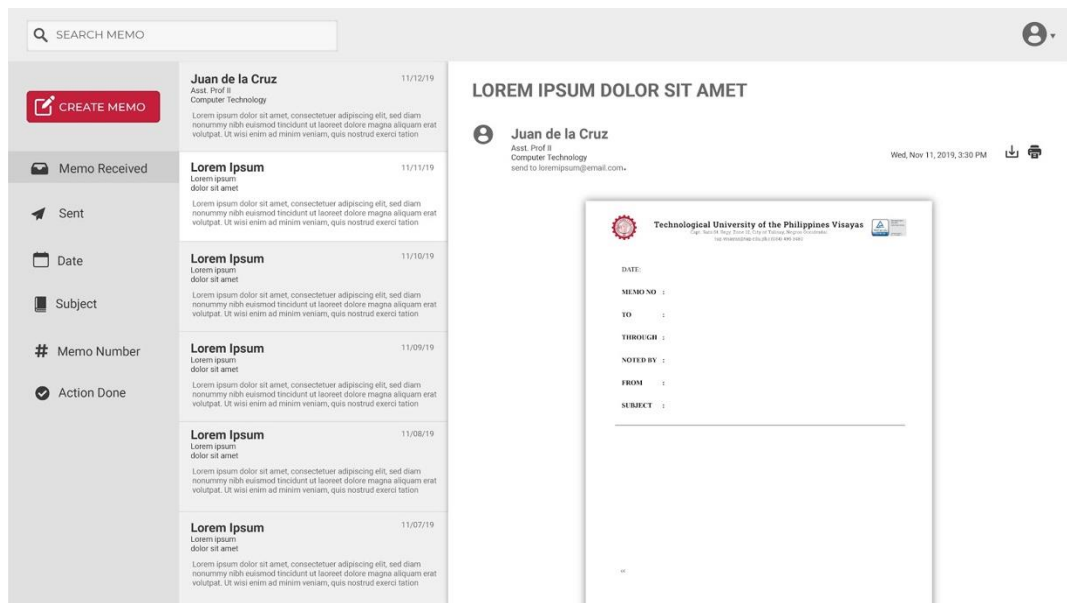


Figure 3.1. GUI of the system (user dashboard)

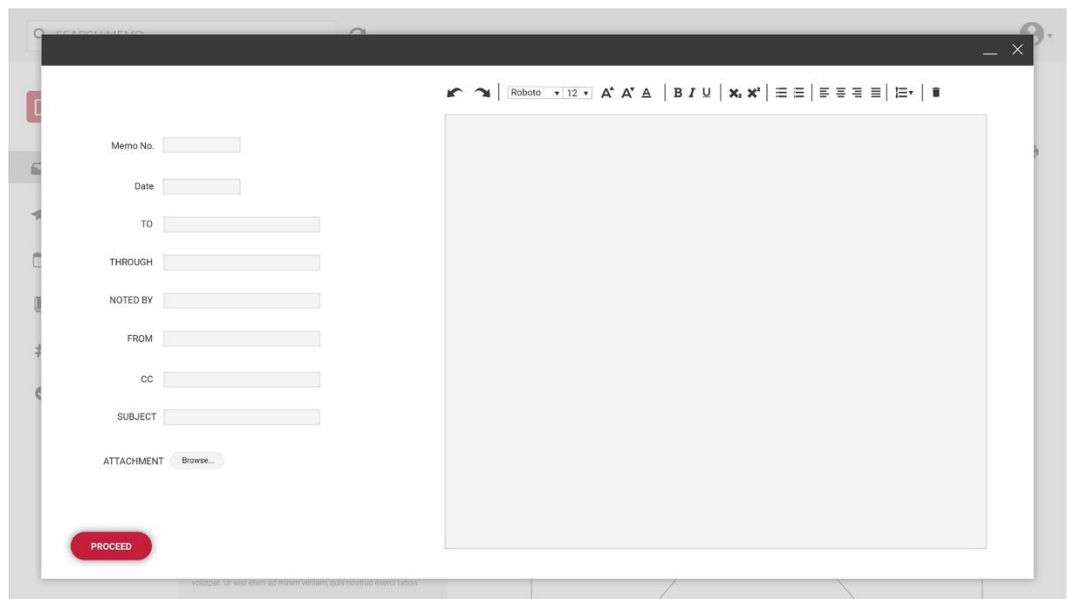
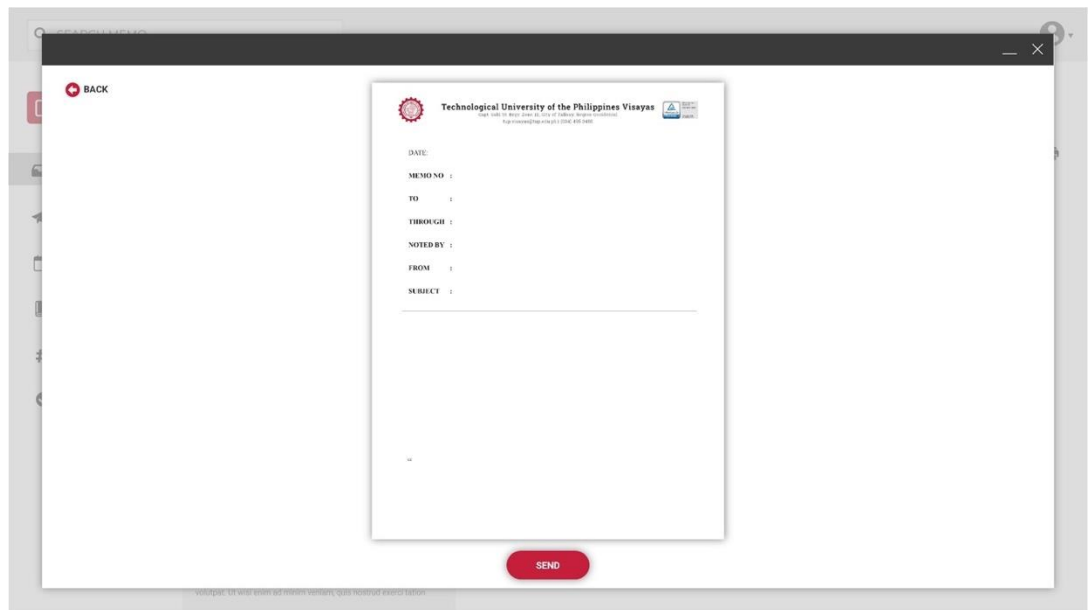


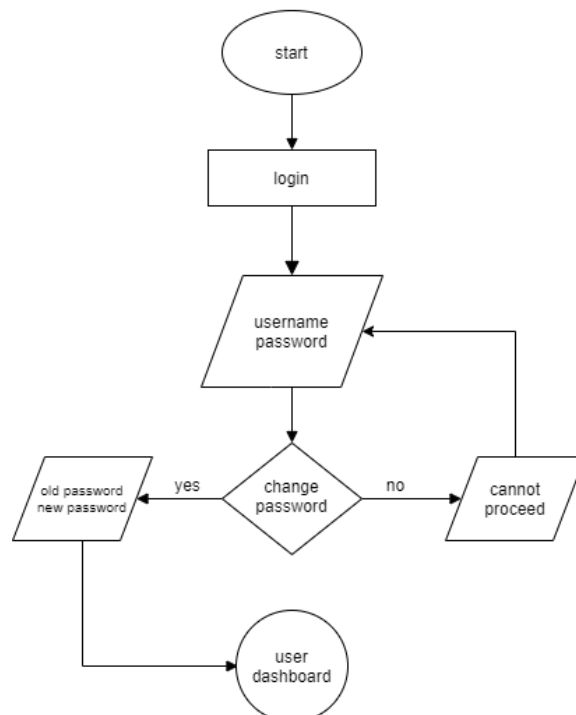
Figure 3.2. GUI of the system (create memo)



*Figure 3.3.* GUI of the system (generated memo)

To better understand the development process, refer to Figure 4, 4.1, 4.2 for the flowchart of the system.

### LOGIN FLOWCHART



*Figure 4.* Flow Chart of the Memo Creation and Distribution System (Log-in Flowchart)

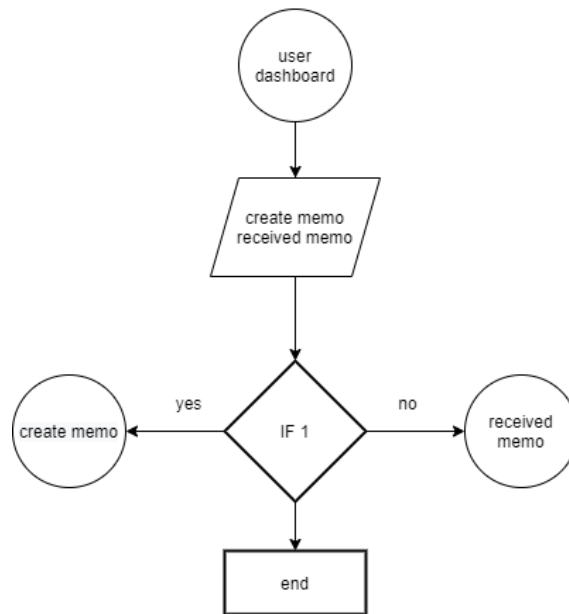


Figure 4.1. Flow Chart of the Memo Creation and Distribution System (User Dashboard)

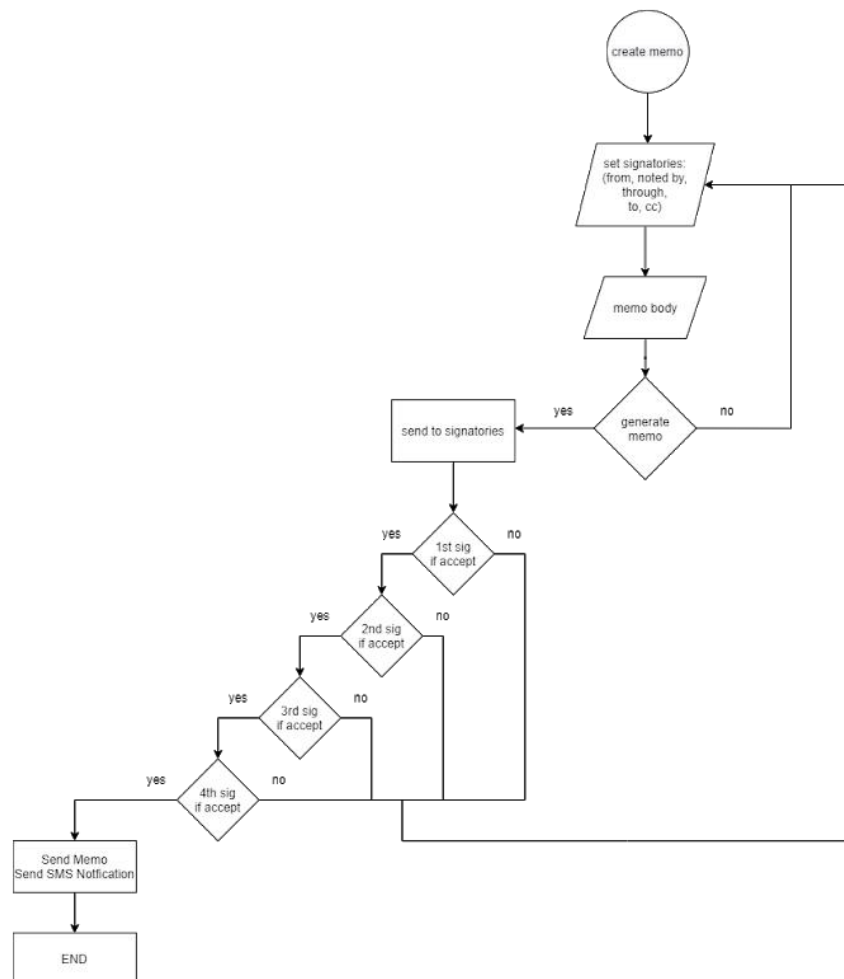


Figure 4.2. Flow chart of the Memo Creation and Distribution System (create memo)

## **2. Programming**

2. 2. 1. Design and Prototyping

2. 2. 2. Software Development

2. 2. 3. Software Testing

### **Operation and Testing Procedure**

Operation procedure has the concise and necessary steps to ensure efficiency and completeness of the whole process with structured quality.

Testing procedure is done to execute the system with the intent of analyzing it, if it follows and satisfies the detailed requirements. This may help in detecting and tracing gaps and errors that may occur; and to evaluate on how it works.

### **Operation Procedure**

This part involves the detailed instructions that the user must perform in order to complete the processes of memo creation and distribution. It is needed for the consistent operation so that there will be a guarantee to get an optimum and expected output from the whole process.

### **General Operation Procedure**

1. Open a new web browser first.
2. Type the URL (<http://memo.tupvisayas.edu.ph>).
3. In order to log-in, the user must type the given username and password.
  3. a. For the first log-in, the user must need to change his/her password only.

3. b. Once set-up, the user can now log-in using the default username and new password then it will be directed to the user dashboard.
4. In creating a memo, the user must click the “create memo” button.
5. Fill in all the required fields.
6. After filling in the required fields, the user must click “proceed” in order to generate the memo.
7. If the memo is ready, the user must then click “send” for it to run to the designated signatories.
8. After the user has clicked “send”, it will be delivered to the first signatory. The first signatory must enter the code number for it to be converted into his/her electronic signature.

Note: This process is applicable to all the people addressed in the memo.

9. Once received by the last signatory, he/she must enter the code number for the electronic signature and for approval. After that, the “send memo” button needs to be clicked in order for it to be delivered and notified through SMS to the people addressed in the said memo.

### **Testing Procedure**

To ensure that the system will run and work, it will be tested by running it with and without internet connection with at least 3 different web browsers to ensure that the system will be compatible with whatever the user will be using.

1. Following the operating procedure, the user must need to log-in first with the default username and password. After that, the password must need to be changed into a new one in order to use the existing account.

2. A sample memo must be created first, then it will be sent to the signatories as part of testing. In this way, the said document will be tracked down.
3. Once received by the signatory, the code number set by the signatory must be entered with the purpose of converting it into his/her electronic signature which is needed in the document for it to proceed to the next signatory.
4. Notes must be jotted down while sending the sample memo so that if there would be unexpected errors, it will be easy to determine and trace.
5. If the sample memo has reached the final signatory, it must be checked thoroughly before clicking the “send” button. Subsequently, it can be sent to all the people who were addressed at the same time it will be notified through SMS.
6. Observe and check whether the sample memo has reached the body or not.
7. In order to validate the sample memo, the functionality of the “sent” button must be tested.
8. After the run through of the program, the findings must be compiled; and in case that there would be errors present, a thorough check and analysis must be done in the purpose of performing a suitable action to fix it.

### **Evaluation Procedure**

To determine the performance of the project, it will be evaluated using a survey form composed of questions. It will be presented to twenty (20) evaluator’s composed



of five (5) internal IT Experts of TUP Visayas, five (5) IT experts from private and government institutions, and ten (10) TUPV Employees.

### **General Evaluation Procedure**

1. Present the project to the evaluators to ensure that the objectives and procedures have been met and to identify rooms for improvement.
2. Give a brief discussion about the project.
3. Give the questionnaires to the evaluators for the assessment of the project/study. These are used to establish a level of satisfaction especially to the ones involved with the impact and conduct of the said project/study.
4. Demonstrate the project to the evaluators.
5. Question and answer session after the presentation.
6. Collect the questionnaires and make sure that they are filled in completely.
7. Analyze and interpret the results with the use of appropriate statistical methods.

The evaluation tool that will be used to test and evaluate the system is the System Usability Scale (SUS). The scores can take values between (1) as “Strongly Agree” to (5) as “Strongly Disagree”. The overall scores range from 0 to 100, which shows the overall performance of the system based on the evaluator’s experience.

Table 1. 5-point Likert Scale with corresponding descriptive ratings

*Likert Scale*

<b>Numerical Scale</b>	<b>Descriptive Rating</b>
5.0	Excellent/Highly Acceptable
4.0	Very Good/Very Acceptable
3.0	Good/Acceptable
2.0	Fair/Fairly Acceptable
1.0	Poor/Not Acceptable

Table 2. 5-point Likert Numerical Scale with descriptive mean interpretations

*Descriptive Interpretation of the Mean*

<b>Numerical Scale</b>	<b>Interpretation</b>
4.51 – 5.00	Excellent/Highly Acceptable
3.51 – 4.50	Very Good/Very Acceptable
2.51 – 3.50	Good/Acceptable
1.51 – 2.50	Fair/Fairly Acceptable
1.00 – 1.50	Poor/Not Acceptable

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