MULTI-PLATFORM ELECTRONIC DOCUMENT MANAGEMENT SYSTEM FOR SAMAR STATE UNIVERSITY UNIT DOCUMENT CONTROLLERS

A Thesis

Presented to

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In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Information Technology

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APPROVAL SHEET

This thesis entitled ""MULTI - PLATFORM ELECTRONIC DOCUMENT MANAGEMENT SYSTEM FOR SAMAR STATE UNIVERSITY UNIT DOCUMENT CONTROLLERS" has been prepared and submitted by NATHANIEL GUIO A. MENDOZA, who having passed the comprehensive examination, is hereby recommended for oral examination.

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- **Dudui**

DEDICATION

First and foremost, I want to dedicate this work to our Almighty God for the guidance and blessings that He has entrusted me and to Our Lady of the Most Holy Rosary for keeping me sane in every step of the way throughout the process. Also, to my family who have been there for me every time I am down and for keeping my head held high, my Mama, Papa, Ate Mona, Kuya Bulad, Kuya Butcoy, Kuya Bombom, Kuya Rambo and their families.

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ABSTRACT

The study aims to develop an electronic document management system in support of data management that can be accessed through the user's terminal computer in the Local Area Network or Internet that will showcase document management features like version control, audit log, retrieval, storage, security and workflow. Since this was developmental, the study used Software Development Life Cycle (SDLC) (Kennaley, 2010) focusing on determining the existing process, designing and develop electronic document management system that can adapt to ISO 9001:2015 standard and lastly, evaluate the functionality, usability, reliability and security of developed system in terms of beta testing. The study identified the existing document management process of both Samar State University – Office of the University Registrar and Research & Extension based on the Quality Management System (QMS). An Electronic document management system was developed for Samar State University. It can give users ability to version control, workflow, storage, retrieval and security. Beta testing was conducted on both offices to come up with an evaluation on how efficient the system was. The identified existing document management processes adopted through the registered product manual of both offices helped the study on the design and development of the document management system to support the document approval and routing. The data revealed that the product conforms to the desired purposes of the study which was to have an electronic document management system. There must be an orientation to all users. Provide a pop-up notification for task/send for better monitoring and conduct of desired task.

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CHAPTER 1

BACKGROUND OF THE STUDY

Introduction

Data is becoming more than an asset in today's digital age. With the large amount of data that we personally own housed in our storage devices like desktop, laptop, external hard drives and thumb drives, it becomes part of many users to the point where many cannot get a certain job done if they do not have it with them, far worse if many users cannot find it. In an interview with CEO Cassin last March of 2019 for Forbes, he stated that the fundamental changes they did with Experian is on how they position the business better in this world where the importance of data was growing. Our data defines us keep us relevant. These data, in its most common form are electronic documents like Word, Excel, PowerPoint, Portable Document Format (PDF), Joint Photographic Experts Group (JPEG), Portable Network Graphics (PNG), MP3, MP4 and many other file types.

On a much bigger thought, organizations like government agencies and private institutions manages these types of electronic documents so their goals and objectives be realized. Like us, data is vital for large organization with its offices having their own document process and management, one problem they encounter is managing these diverse number of electronic documents that needs

certain amount of time in keeping and retrieval. This also includes hard-copy paper documents that consumes another office space that can be digitized.

According to Burner (2015), organizations with the assistance of document management intends to desire work effectively with less the time and cost for them to get the correct documents at the right time. On the other hand, Samar State University currently an ISO 9001:2015 certified is practicing quality management manual for each office in regard to ISO requirements. In a website of International Organization for Standardization (ISO) published last September 2015, to pass the certification, an organization should a.) needs to demonstrate its ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, and b.) aims to enhance customer satisfaction through the effective application of the system, including processes for improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements. A software that can enhance the application of this system in regards to ISO requirements could play a big role to lift the over-all efficiency of the university.

Part of the problem is document keeping. As experienced, if a certain thing is not kept good, assume you will have trouble retrieving some other time. According to Bueza (2014), many public documents were destroyed during the devastation of the Typhoon Haiyan in 2013. Birth certificates, audit records, land titles and voter records were destroyed from the government offices. After the

devastation, document owners decided to digitize surviving documents that will serve as back up data for security. This is not far from happening to Samar State University where it is located in a disaster-prone area. This is where having Electronic Document Management System (EDMS) is essential. Sprague (1995) defines document management as creation, storage, organization, transmission, retrieval through indexing, manipulation, update and eventual disposition of documents to fulfill an organizational purpose.

From the occurrence of the problems mentioned, the researcher came up an idea to developed a system that would solve problems in electronic document keeping, retrieval, processing, versioning, logging and securing. With the utilization of the current Local Area Network (LAN) of Samar State University, the system can be accessed via Uniform Resource Locator (URS) in web browser in the computer terminals of faculty and staff. The advantage of this setup is that the speed of the system will be fast because it will not depend on the internet connection. The system can also be accessed through an android application for the mobility of the system inside the university.

The documents inside the system is centralized through a server computer placed in the Office of the Information and Communications Technology. The researcher will choose faculty and staff of Office of the Research & Extension and University Registrar as respondents because they manage diverse type of documents that comes in and out in their offices.

General Objective

The study aimed to develop an electronic document management system in support to data management that can be accessed through user's terminal computer in the Local Area Network or Intranet that showcased document management features like version control, audit log, retrieval, storage, security and workflow.

Specific Objectives

Specifically, answered the following questions:

1. What is the existing the document management processes **along** these offices:
    1.1. University Registrar; and
    1.2. Office of the Research and Extension?
2. What electronic document management system maybe designed and developed for:
    2.1. University Registrar; and
    2.2. Office of the Research and Extension?
3. What is the efficiency of the developed system based on beta testing along:
    3.1. Functionality;
    3.2. Usability;
    3.3. Reliability;

3.4. Security; and

3.5. Adaptation?

Conceptual Framework of the Study

Shown in the Figure 1 (Page 6), is the illustration of conceptual paradigm of the system that primarily focuses on the development.

The input portion displays the electronic document capturing. As mentioned, these are Word, Excel, PowerPoint, Portable Document Format (PDF), Joint Photographic Experts Group (JPEG), Portable Network Graphics (PNG), MP3, MP4 and others. Digitized hard-copy paper documents is also accepted in the system. The higher the volume or number of documents, the more effort to exert for an organization to manage.

When the inputs are inside the system, the user can now use different components of the system. The functionality, usability, reliability and security of the system are the variables to be measured in this study. Through this, the system can bridge the gap between the users and electronic documents by efficient management of electronic documents.

If there are concerns, there would be feedback process in order to correct the problems by re-designing the system and troubleshooting.

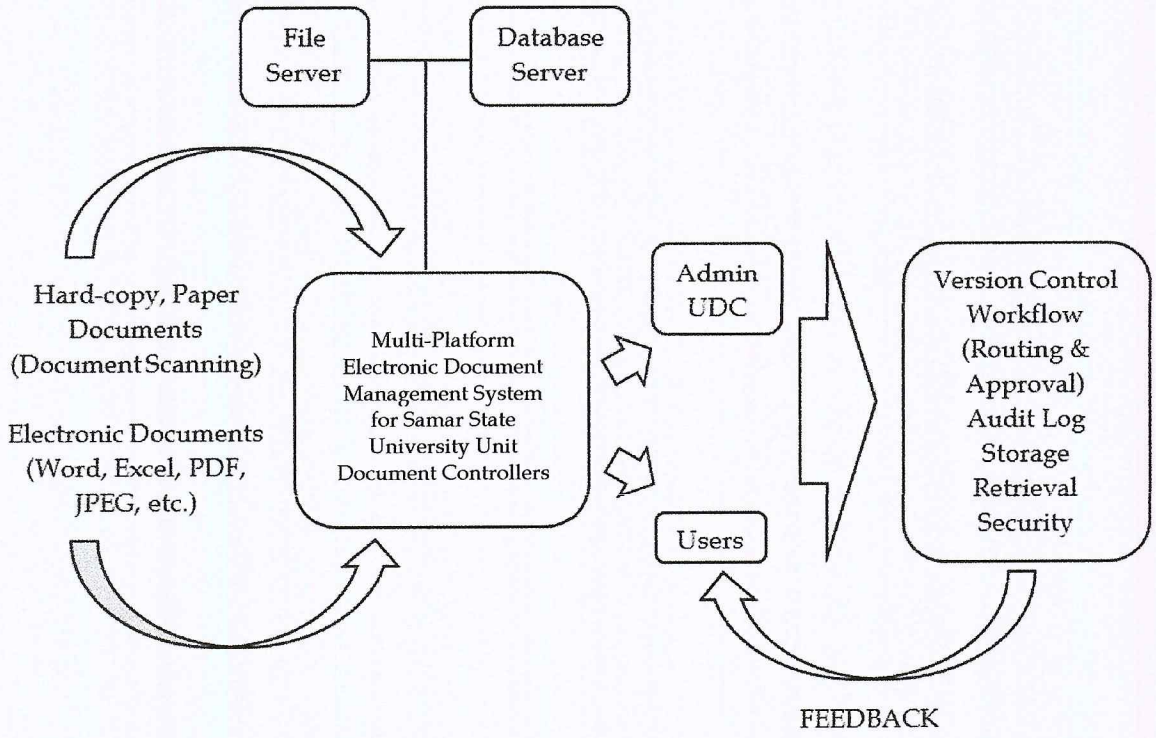


Figure 1. Conceptual Framework of the Study

Scope and Delimitation of the Study

The developed system was tested in the Office of the Vice-President for Research & Extension and University Registrar of Samar State University. This was tested for seven (7) days to determine the functionality, usability, reliability, security and adaptation of the system to the current document management system. The scope of the beta testing was conducted in those offices because of the diverse number of documents that comes in and out from internal or external sources. So, it would determine that the system could scale and adapt to any office other than those two. The study was all about the electronic document

management system. Lastly, the speed of the system would depend on the LAN, not the internet connection.

The focus is version control, workflow (routing & approval), audit log, storage, retrieval and security of digital documents. The system does not focus, or has no say to the validity of files to be uploaded since every user have private repository. The system is limited to the confidentiality of the document to be uploaded whether it is to be shared to everyone, by the certain office only or personal use by a user. This is because of the Republic Act 10173 or the Data Privacy Act of 2012. The system is also limited to the copyright of the documents being own by an office or member of the office.

Significance of the Study

This study is focused on improving the over-all efficiency of the university on managing electronic documents.

It would be beneficial to the following:

Samar State University. This would be very helpful to the over-all efficiency of the university in data management and processing. It can improve the regulatory compliance to quality management manual of ISO Certification by including the digitization of hard-copy paper documents in the process so that everything would be included in the repository. Centralization of electronic documents will make key difference on how the university operate as a whole.

University Registrar. The system could help the University Registrar Office archive all soft and hard copy of students' records. It would also serve as a back-up in case a natural or man-made calamity happen. Physical filing system could be reduced and productivity would increase because a specific document could be retrieved at the right time.

VP for Research and Extension. This would be helpful to the OVPRE office in terms of centralizing diverse number of documents. The module that would be very helpful for them is the document versioning in cases that they need to see the progress of every research and extension project. Another is the collaboration module inside the system with their project members and staff. Centralization of documents is very essential.

Unit Document Controller (UDC). The job of UDC in their office is to maintain registered forms and make sure everyone follows the correct form and process for monitoring then securing a copy. The system could adapt to the physical filing system the office has. With this system, it ensures to have a regulatory compliance of being ISO Certified while keeping everyone up to date with the revised forms.

Faculty and Staff. With the developed system, faculty and staff can keep their office and personal files inside the system. It would feel like having their own flash-drive left in the server. In that way, they can share files to someone whenever

someone needs it for project collaboration and request for data like PDS, syllabus, etc.

Future Researchers. This study would serve as a guide literature for more improved development and implementation on the area of document management system.

Definition of Terms

Document Management. Sprague (1995) defined Document Management as creation, storage, organization, transmission, retrieval, manipulation, update, and eventual disposition of documents to fulfill an organizational purpose. In this study, document management refers to automated process of electronic document management system by the help of the developed system.

Electronic Document. Sprague (1995), An electronic document uses a variety of symbols and media to represent a set of ideas and concepts. In addition to traditional letters and numbers (text), an electronic document may contain graphical symbols, photographs and other images, voice, video clips, and animation. In this study, it refers the things to manage inside the system. Majority of the electronic file types is accepted by the system, including the digitized hard-copy paper documents.

Information and Communications Technology (ICT). It recognized as a critical factor in productivity and growth in the industrialized world. Accordingly, the policy priorities of developing countries pursuing an ICT-for-development (ICT4D) agenda are focused on the macro issues such as access and infrastructure, government service delivery and efficiency, education and skills, and ICT industry development, (Vaugnhan, 2011). In this study, ICT pertains to the field in the industry where the utilization of hardware and software plays a role in solving real world problems encountered by the people.

Indexing. According to Cleveland (2013), basic purpose of an index or an abstract is effectives and efficient access to information, either through structured records, such as books and databases, or random stores of information, such as information found with Internet Search engines. In this study, it is the process of adding and attribute or additional information to electronic document for easy retrieval.

Local Area Network (LAN). Generally, (LAN) devices communicate using secure means such as encrypted data (Meng Ho, 2009). In this study, existing LAN of the university is used so that users can use the system in their own terminal or office. They do not need to come closer to the server computer just to access.

Multi-Platform. Permits to follow a "develop once, deploy anywhere" approach, but the performance of the final product may not be as good as in a native application (Corral, 2011). In this study, it is described as accessing the

system in two different platforms such as android mobile and desktop web browser.

Repository. In this study, it is used to serve all the electronic documents in once place for the utilization of faculty and staff.

Unit Document Controller (UDC). The system could make the job of UDC easier because they are responsible of controlling all office documents. The component of the system that are aligned to their job are numbering, sorting, filing and retrieving which is the main features of the system.

Workflow. The way that a particular type of work is organized, or the order of the stages in a particular work process (Cambridge Dictionary). In this study, it pertains to a certain task that needs to be achieved by a certain document for its requirements and where it will go through from start to finish.

CHAPTER 2

REVIEW OF RELATED LITERATURE AND PROJECT STUDIES

This chapter cited literature and project studies that were relevant locally and globally that help the researcher in the development of the topic under study. The courses of these articles came from journals, published/unpublished master/s thesis, dissertations, and other media related documents.

Related Literature

A study of Kassab et al., (2017) entitled "The Impact of the Availability of Technological Infrastructure on the Success of the Electronic Document Management System of the Palestinian Pension Authority" implied that all members in their study agreed that Electronic Document Management System (EDMS) needs special technical capabilities and resistance from some of the components and specialties in organization who do not want to deal with computer. In addition, EDBMS will reduce the cost of manual system and will reduce the works assigned to different staff. With this, in Marasina et al., (2008) study that electronic business is important for Small Medium Enterprise (SME) and results in tangible financial benefits and other gains in improving work performance. Because of this, the researcher considered the faculty and staff who

are not into computers by making the functions easy to understand and pleasing User Interface (UI) for easy navigation and experience.

Further, a study of Burner (2015) entitled "User Adoption of SharePoint Document Management System" discussed about implementing new information management systems in every organization always faces many challenges for both the implementer and its end users. Decision makers have to understand end users' needs and encourage them to take responsibility and give them a good training program. In addition, SharePoint Document Management System have advantages and disadvantages in usage like for a local file server, it is easy and covers most of their needs. For SharePoint DMS, it facilitates small Oslo Pensjonsforsikring AS (OPF) collaboration and project folders are being the point of sharing. All those issues mentioned must be focused on to increase the adaptation rate. Staff should collaborate and provide continuous feedback, support and encouragement for users so that they can master the skills within a short period of time. On this aspect, the researcher considered development of system that is easy to use so in cases that the users can adapt easily, money will be save by not conducting a training program.

According to Hernad & Gaya (2013) in their study entitled "Methodology for implementing Document Management Systems to Support ISO 9001:2008 Quality Management Systems", it provides the means to meet the document requirements of ISO 9001:2008 that also ensures that every activities within a

quality system are embodied in accessible, relevant, reliable documents, and a method to define the control processes and the evaluation framework that foster that maintenance and continuous improvement of the system. Their method can also be applied to other ISO Management Systems likes 14001, 27001, 50001, 26000. They insist that the essential part of their approach is the creation of documents that where the document management will be based on for planning (policy, goals, plans) and require a system that supports the generation of these documents. This published paper guided the researcher on what are the necessary steps undertaken with the development, considering Samar State University is now ISO 9001:2015 certified.

A quantitative research of David et al., (2013) stated the need to enhance employees' competencies and understanding on document management requires hiring qualified records manager and have good conversations with technicians and clerical staff on one side, and the top management on the other side. They emphasize that there should be staff training together with presence at relevant workshops and seminars to enhance staff's mastery of both document management operationalization and cost-benefit analysis. The skills and competences of employees on those are limited which has a negative impact on their appreciation of the need for more effective and efficient document management.

A study of Leikum (2012) entitled "A Study on Electronic Document Management System Integration Needs in The Public Sector" implied that not all information systems functions fully independently and eventually all organizations decided to start integration. Quality management processes meant to enhance by digitization are often coincide and therefore systems need collaboration interfaces. Electronic document management systems in the public organizations is the one Information System of central common actions and nearly all the business processes are more or less related to document management. Hence, two ways are available - implement one big system that can include, optimize and digitize all the processes or integrate the current systems.

Lastly, according to Kwatsha (2010) in her study entitled "Factors Affecting the Implementation of an Electronic Document and Records Management System" stated a total of 13 factors affecting EDRMS implementation based on the interviews and a review of related literature. The three wide categories were identified as strategic, social and system specific which constitute core factors in any EDRMS implementation. The significance of relations within those categories and across 13 categories was also demonstrated. Her study revealed that user involvement can be affected by top management support and commitment. If the required level of top management support and involvement is lacking during the implementation of EDRMS, user involvement tends to be low. On this aspect, if the developed system is easy to navigate and offers useful features that will

improve their work and efficiency, the user involvement on the implementation will be high since there would be not much adjustments to do.

With these researches, it helped the researcher to identify problems related to the area of the study. In addition, the data gathered was added in the formulation of the solution to solve such problems with document management systems.

Related Projects Studies

A study entitled "Web Based Project Management System" by Aadamsoo (2010), discussed about a system that have a functionality of project management system where in users and administrator have different functionalities to run. Some key features include modifying or upload / download or delete files in a system while user is logged in. Administrators having the rights to add, modify or delete users in a system or add new projects and definitely available to modify projects as the user or add new projects to the system. The system also has security integration, grouping, shared database for information, generate project and defining admin rights.

This study has features like uses roles and administration, edit, upload, download, projects and grouping. The present study can offer Submission/Forwarding/Workflows which would complete the missing puzzle in every document management system. File versioning would also be helpful

with this kind of system for monitoring the progress of the documentation and other files needed. They have similarities with the present study in a way that they are both systems that can manage documents but the present study captures all the features of the previous study can offer with additional key features.

A study by Joshi (2011) entitled "A Web Based Content Management System", where in developed system allows faculty members to create their accounts, access and update information, images to classes and discussions. With this in mind, it is very useful for university department to manage information, user friendly interface and ease of use are the key features.

This study was based on a Content Management System (CMS) which has the same features with Document Management System (DMS) but for faculty members only. Nevertheless, the present study can offer features for faculty like workflow for the submission of assignment, exercise files between the faculty and students. Faculty can also enjoy flexible search feature for easy retrieval of documents in cases the repository grew up big. The present study can also adapt to the nature of work of organizational offices in electronic document management system.

Another study by Kodmelwar et al., (2012) with the title "Document Management System with Enhanced Security" which discussed the design and implementation of document management system for small to medium scale organization. Their paper acknowledges the fact having only a simple

storage/retrieval system is not enough, and hence they have stressed upon some features to enhance the base DMS that are very useful in terms of security, optimal disk usage, level of abstraction and productivity of the employees within an organization. They provided a collection of features that enhance traditional document management systems in such a way that is relevant to today's organizational needs. Additional features also include file versioning and searching technique.

The system has similarity with the present study in the sense that both are related to document management system. However, the present study was about EDMS that can officer collaboration between offices, workflow for document review and approval, user and office dashboard, and audit trail. Utilization of the University Local Area Network (LAN) would make the present study easy to implement and low-cost. Meanwhile, the previous system focused only on the enhanced security which the present study can also offer.

Another study entitled "Development of a Document Management System for Private Cloud Environment" by Chia Hung Kao and Shin Tzu (2013) presented a system that explores the requirements of information management in organization and describes the design of the EDMS. It aimed to provide users in organization a simple and efficient mechanism to access, manage and share their information. It also provides basic document manipulations, synchronization, and sharing functionalities, and considers the support of heterogenous client devices

that facilitates management of personal documents and improves the efficiency of collaboration among users. They also conducted a case study that describe the scenarios and the benefits of using the document management system in an academic environment. Feedbacks from teachers and students of the elementary schools show that the DMS facilitates the management and sharing of learning materials.

The aforementioned study is similar in the way that both studies are for document management system but they differ from the focus on users and specific features. The said study had management and manipulations of information, synchronizations, sharing functionalities, personal documents and collaboration while the present study had all of those key features of a document management plus the workflow feature for document approval of routing and audit trail which is very important for logging who and when a document was previewed, uploaded, edited and deleted. The advantages of the present study are that it can adapt to any nature of offices outside the student to teacher's interaction.

In addition, a developed study "CollaborateIT: A CCS IT Thesis Portal with Electronic Document Management System" by Del Rosario et al., (2016) where they developed a system with features of preparation, request, consultation, defense scheduling, evaluation results, revisions, document management, report generation, and consultation and announcements. They used Rapid Application Development (RAD) methodology which composed of four phases namely,

requirements planning, system design, construction and cutover (Rosenblatt & Shelly, 2012). The DMS is divided into three: storing, indexing, and search and retrieval. The storing handles the documents, thesis documents, teaser videos, request forms, and other documents uploaded in the digital repository. Indexing handles the encoding of information about the document and tagging that would be used for easy search and retrieval module for the thesis documents.

The previous study focused only on the document management system for thesis portal only while the present study used document management system any office or uses can adapt. In addition, the present study highlighted its potential to improve the overall efficiency of the university in document management as a whole while the previous study emphasizes only for one aspect. The methodology used for the previous study is not suitable in the development of systems like document management system because it needs to have comprehensive actions on every phase that's is why waterfall model fits this kind of systems.

CHAPTER 3

METHODOLOGY

This chapter presents the procedures employed by the researcher in the development of the proposed system. Also, this chapter presents how the study was implemented and how to come up with correct findings.

Research Design

The researcher utilized a developmental study. The study used Software Development Life Cycle (SDLC) (Kennaley, 2010) focusing on determining the existing process, designing and develop electronic document management system that can adapt to ISO 9001:2015 standard and lastly, evaluate the functionality, usability, reliability and security of developed system in terms of beta testing. The employees of Samar State University Office of the University Registrar and Office of the Vice-President for Research and Extension together with their Unit Document Controller (UDC) was tested on how they manage their electronic files saved in their desktop computers that they create or forwarded from internal or external source. Scanned paper documents were also accepted in the system. Scalability and inter-operability were observed so that it could adapt to the nature of document management of other offices. This methodology also presented the specifications requirements and tools needed in the development of the software.

Since this was a developmental study, there was details for the gathering of information on the testing of the system.

The researcher applied one type of SDLC which was Waterfall Model (Royce, 1970) in system development being the pioneer model in SDLC processes and first model that was widely used in the software industry. This was divided into phases that makes to the current phase eventually becomes the input of the next phase. Figure 2 (Page 22) shows how Waterfall Model was being utilized below.

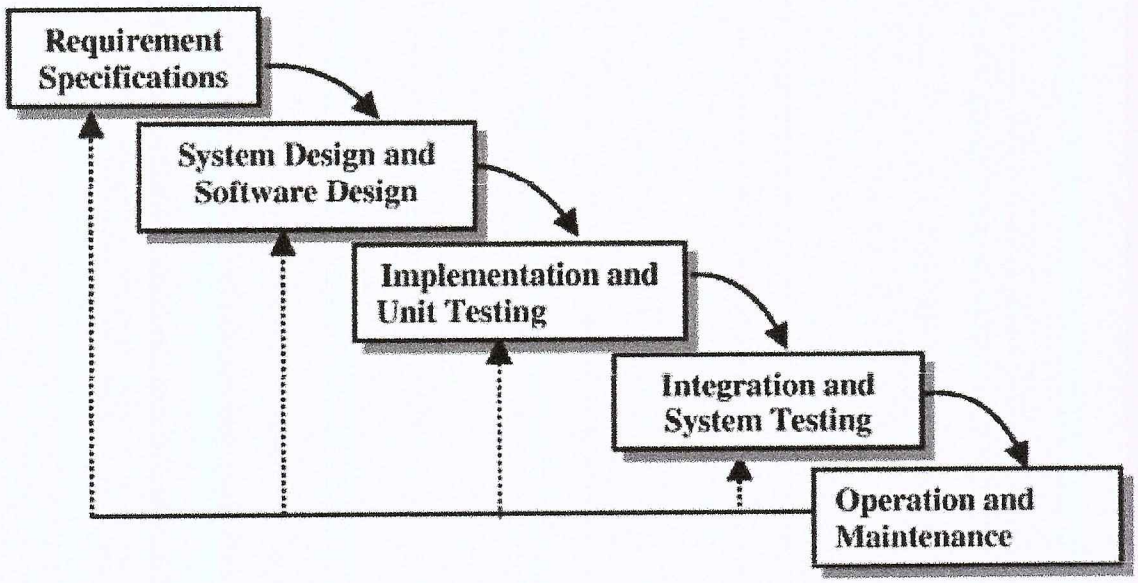


Figure 2. Waterfall Model of SDLC

Research Procedure

Below are the explanation and steps conducted in relation to the development of the project.

Requirements Specification and System Analysis

The first and the most vital stage in Waterfall Model was the requirements analysis. The proponent gathered data through observations, questionnaire and conducted an interview with the employees under University Registrar and Research and Extension. All gathered data were carefully analyzed and identified the existing electronic document management system. This stage went through all the requirements needed in order to attain what was expected with the help of brainstorming and walkthrough of the initial data collected then conducted feasibility test to ensure that the requirements was testable.

Requirement analysis also pertains identifying the platform, technologies and programming languages suited in order to reach the objectives while utilizing current assets of the university like intranet.

System Design

This stage started to where the Requirement Analysis ended. Start the design of the system which include user interface (UI), user experience (UX), dataflow diagram, flowchart and database schema. This was to make sure that

these designs were compatible with the hardware paired with the server computer of the system. These designs were developed logically and should satisfy the functionality, usability, reliability and security mentioned from the previous phase.

Implementation

In this phase, development of the system commences and should be based on what was the results of Design phase. The system was accessed in two ways, on a web browser or android mobile application.

The main program was web application that was configured in server computer with the hardware specifications that can handle the traffic when multiple users access the system at the same moment. XAMPP was utilized that served as application server. XAMPP, referred to as a free and open-source cross-platform web server solution developed by Apache Friends. It implements web programming languages like PHP (PHP: Hypertext Preprocessor) which was a general-purpose programming language originally designed for web development. Originally created by Rasmus Lerdorf in 1994 where in PHP reference implementation was now produced by the PHP Group. In addition, since it was a web application, this system utilized the capabilities of HyperText Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript to deliver the content in web browsers with design, layout and user experience. The database software that was utilized was MySQL. It is a powerful, open source relational

database management system with an emphasis on extensibility and standards compliance.

On the android mobile application module, the system was developed using the MIT App Inventor (Web View) module where in the link of system inside the university was pasted in the Android Software Development Kit (SDK) that can access the server computer through Hyper Text Transfer Protocol (HTTP) or Hyper Text Transfer Protocol Secured (HTTPS) provided with the IP address of the server.

Testing and Integration

After the development, server computer was connected in the current intranet the Samar State University. Testing was done to make sure all the requirements was met considering the suggestions of the end users. The system was only connected through LAN with the access link, this ensures smooth and fast application because the speed did not depend on the internet connection. The proponent visited the offices of the identified users and conducted a 10-minute orientation on what the platform is all about and a demonstration for 20 minutes. The users tested the system and the proponent gave a research instrument to gather data which will be discussed and presented in Chapter 5 about the results discussion and recommendation.

Operation and Maintenance

After the testing and evaluation process, the next was the maintenance of the system. This stage had made sure that the application was up and running in both offices. In cases that the users seen some glitches in the system, the problem was documented and troubleshooting process followed. In relation to the conceptual framework with the endless collection of the feedbacks from the users, the system was enhanced to incorporate more features and deploy the update to the environment with the latest features.

Research Instrument

The instrument that was used in the data gathering in this study was the following.

Observation. This was vital for the very first purpose of the study was to determine the existing electronic document management processes. Since the Samar State University was currently ISO 9001:2015 certified, the system to be developed should be based with current Procedure Manual of University Registrar and Research and Extension Office. These offices were selected to be the research locale because of the diverse documents that comes in and out from inside the Samar State University and external sources. Their procedure manuals were selected to be part in the beta testing process.

Questionnaire. The questionnaire for the employees of University Registrar and Research and Extension Office consists of three parts.

Part I. Solicited information about the respondents' name and office designation.

Part II. contained statements intended to measure the functionality, usability, reliability, security and adaptation of the system if it served its purpose. It was responded using the scale: 5 for Strongly Agree (SA); 4 for Agree (A); 3 for Undecided (U); 2 for Disagree (D) and 1 for Strongly Disagree (SD).

Part III. Composed of recommendation and suggestions from the end users of the system. For the recommendation, they asked if they would like to recommend that the proposed system be implemented with the options of Yes, No and Undecided. Suggestions should be written in the intendent blank space.

Hardware Design

Figure 3 (Page 28) shows the block diagram of the system which displays the overall structure of the system. This was the specialized flowchart that was used in systems development that illustrates the system components, key process participants and working relationships. This diagram did not comprehensively explain the details of the flow since this only displayed the input and output.

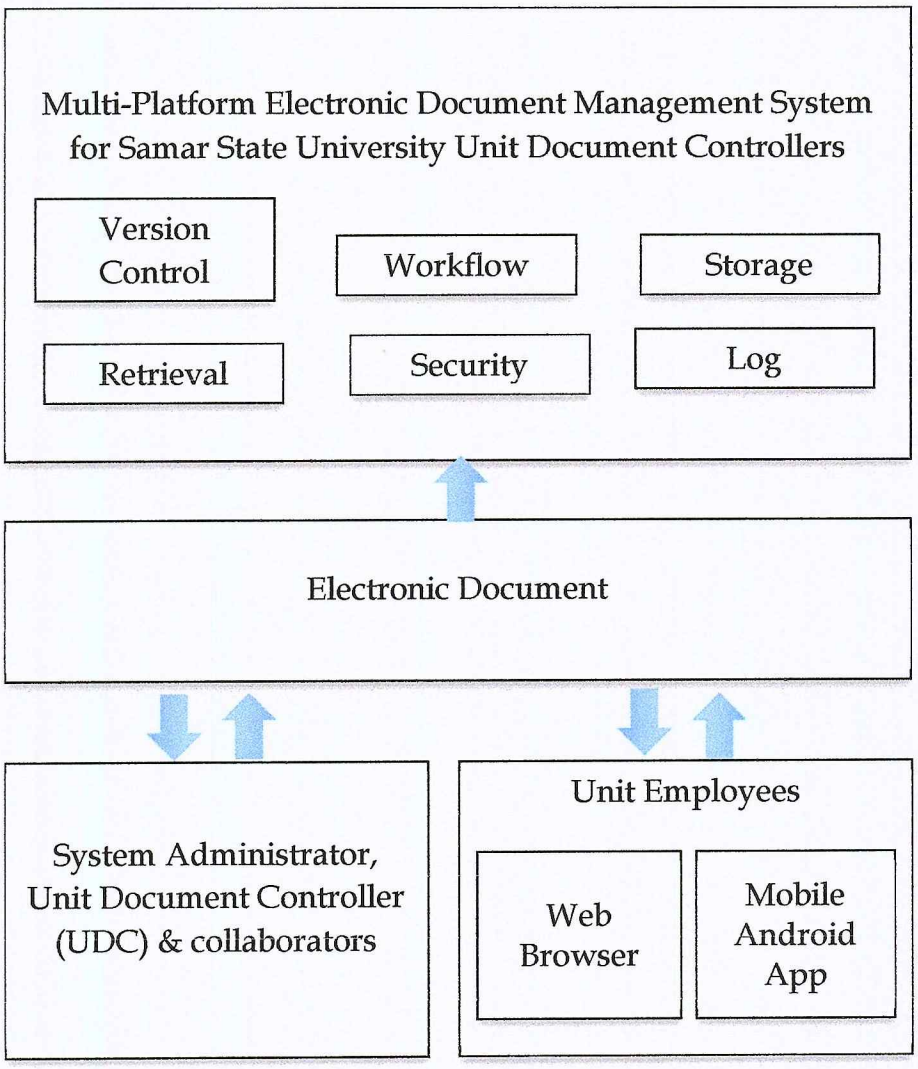


Figure 3. Block Diagram of The Proposed System

As reflected, system administrators and unit document controller worked as a super user because they had some privileges in terms of what they can do inside the system especially in the document library of every office.

Since digitized paper document and existing electronic document can be uploaded inside the system, all users can now utilize all the functionalities that

was offered. They can access the system in web and in the android phone using the uniform resource location (URL) of the system in the server computer.

Software Design

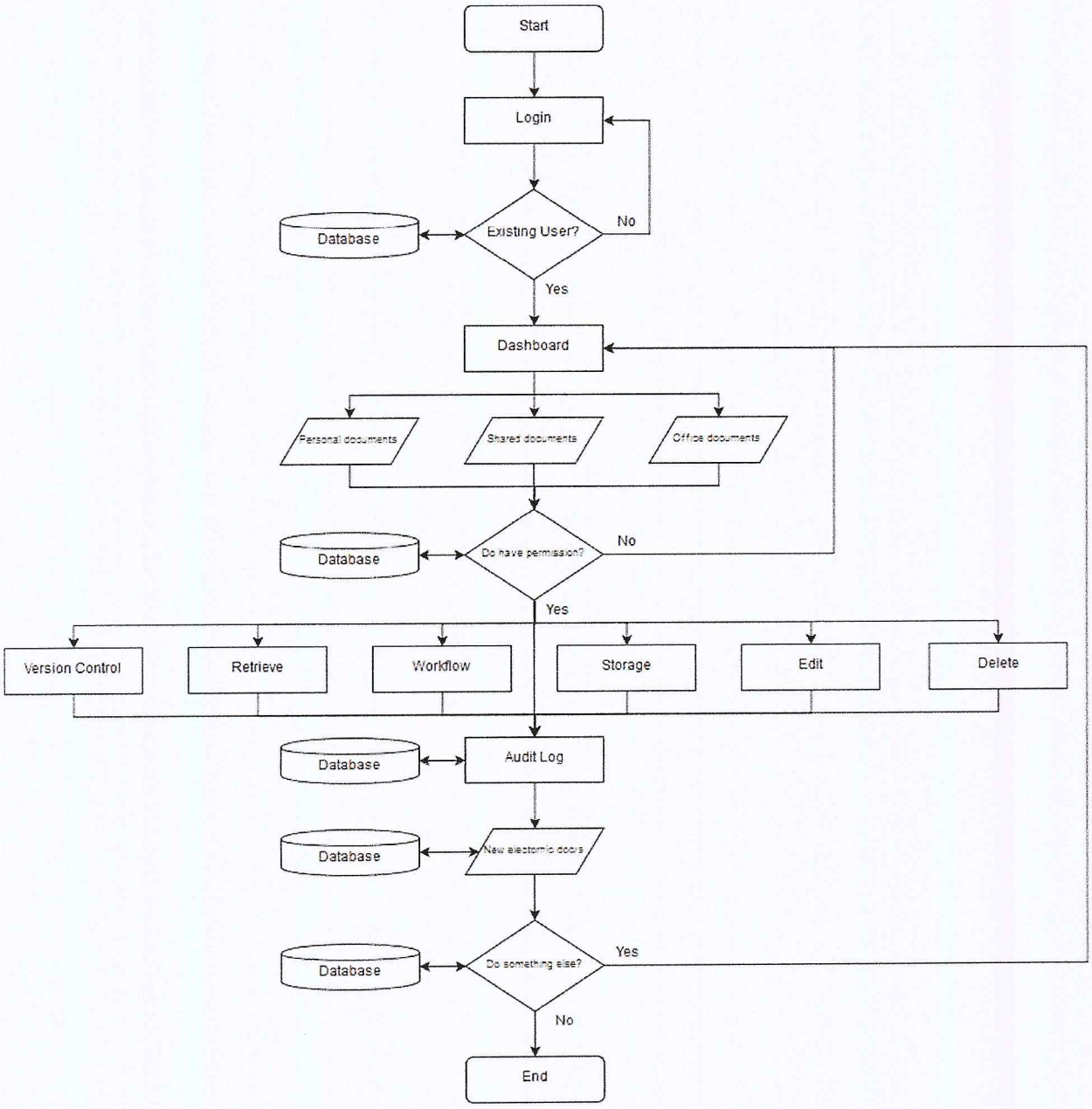


Figure 4. System Flowchart for Both Web and Android Application

In figure 4, it was divided into several parts wherein it could cater essential features such as version control, retrieval, workflow, storage, security and audit log. These features were selected during the first phase of the Waterfall Model for the success of the system. First, users will have to login users their registered account by the administrators. If successful, the dashboard or the home page will automatically display where the users will have a choice select personal documents, shared documents, which means shared documents to all users inside the platform or specific users, and lastly the office documents where in documents that can only be access by members of a unit or office. Each user could be a member of more than 1 unit. Then there follow the main features where a document or multiple documents, if the user if permitted can do version control, retrieve or view, store files in a folder, edit and delete documents. Every transaction done by a user's is logged for monitoring.

Database Schema

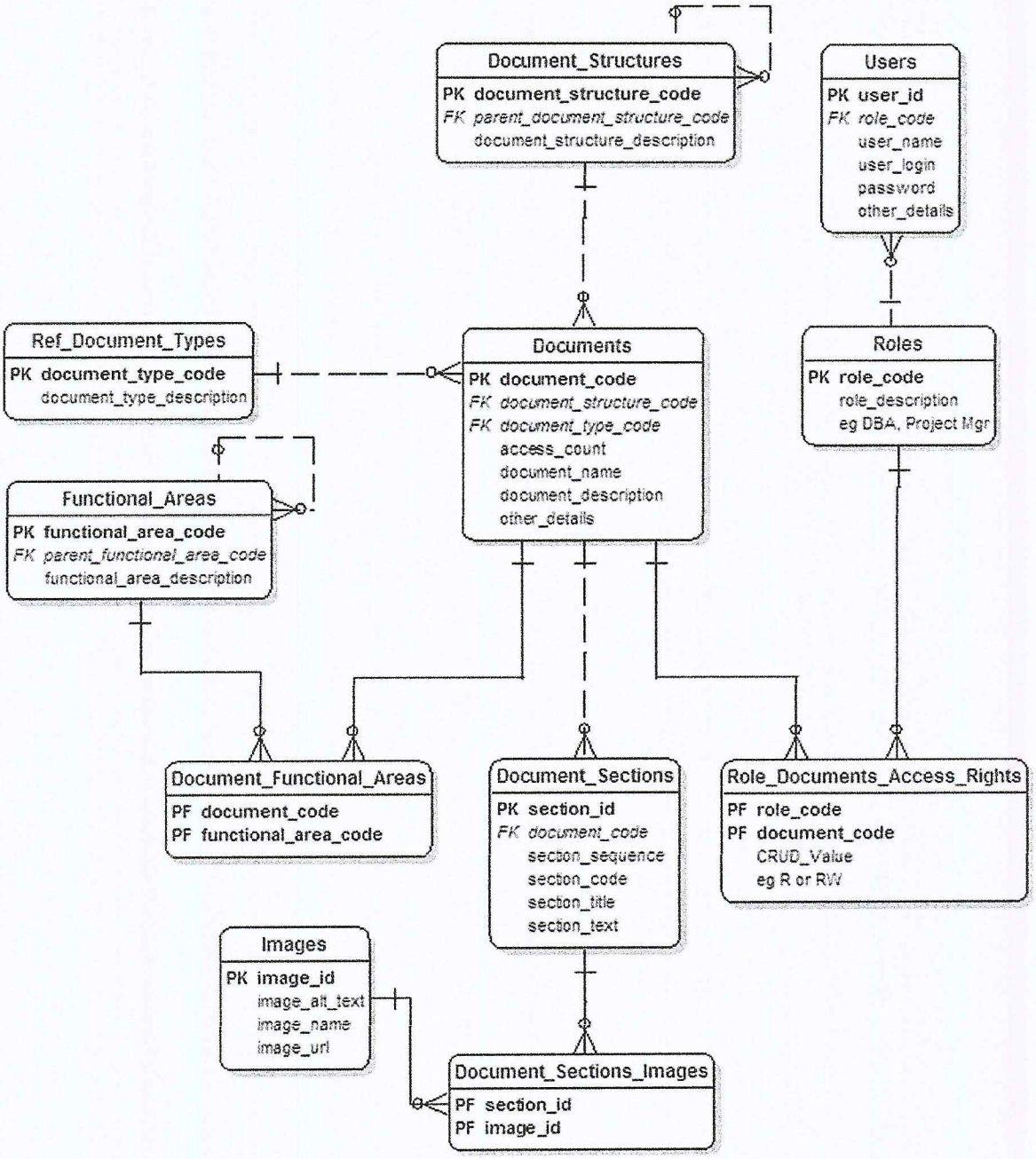


Figure 5. Database Schema of The System

Figure 5 above shows the skeleton structure that represents logical view of entire database. It defines how data was organized and what was the relations

among them were associated. It also formulates all the constraints that was applied on the data. A database schema defines the data structure of a database. If the system requirements change, the database schema may require changes, mostly commonly requiring additional information and relationships to be stores. (Sjoberg, 1993).

The database software that supported the system was MySQL which held all the data, including the users, roles and permissions and data types.

Statistical Treatment of Data

The statistical tool used in this study is mean to measures the functionality, usability, reliability, security and adaptation of the system. It had an equivalent interpretation for each range of the mean.

CHAPTER 4

PRODUCT DESIGN DESCRIPTION, ANALYSIS AND INTERPRETATION OF DATA

This chapter shows the in-depth discussion of the project in terms on its product design description, analysis and interpretation of results from the tests conducted to evaluate its functionality.

Software Description

Multi-Platform Electronic Document Management System for Samar State University Unit Document Controllers was a software where all of the prime users of the system, specially the unit document controllers can manage electronic documents and digitized paper documents in a way that it was manageable with some features to boost productivity. Since the software runs on a server computer, the users can collaborate at the same time using their terminal computers in their respective office. Users can utilize features such as storage, retrieval, audit log, workflow and security to boost their productivity by focusing on their work, instead of spending time managing electronic documents. Document management, including its storage and retrieval was very difficult task for an office worker, and developing such a software system was a vital for their success.

Built in document management on Windows computers like Windows Explorer did not meet the requirements. It did not explicitly react to what the user

and documents need. The researcher investigated how an information system and Local Area Network can be incorporated in an existing infrastructure of the university to lessen the cost. The researcher used some of the technologies available at disposal that fit the problem to any degree.

Multi-Platform Electronic Document Management System for Samar State University Unit Document Controllers was better than the current document management system which utilizes folders and filename of documents in Windows Explorer and data file box and cabinet for paper documents. The solution to the problem was very complex and it met the user requirements that could help their productivity.

Cost Benefit Analysis

In order for the study to be feasibly implemented, a systematic process for calculating and comparing benefits and costs of a project was performed. This process was commonly called the Cost-Benefit Analysis (CBA).

But since there was no existing system nor operation which had the same functionality in place, then comparison was difficult and instead a list of expenses of software and hardware was needed on the process of implementation of the study was calculated.

Software Costs

Software costs were not utilized because the system used open-source software that suits the over-all functionality needed.

Hardware Costs

A server computer was needed in order to handle the data traffic that were taken place specially when the users utilizes the system at the same time. Table 5 below reflects the costs for the hardware needed for the system.

Table 1. Hardware Cost

COMPONENTS	QUANTITY	UNIT PRICE	TOTAL PRICE
Acer Altos T110 F3 Xeon E3-1230v3 Quad 1Way Tower Server	1	60,900.00	60,900.00
Keyboard and Mouse	1	600.00	600.00
Computer Monitor	1	3,695.00	3,695.00
Back-UPS 650VA, 230V, AVR, Universal Sockets	1	2,513.66	2,513.66
TOTAL	**4**	67,708.66	67,708.66

Return of Investment

Return of investment (ROI) is the ratio between the net profit and cost of investment resulting from an investment of some resource. A high ROI means the investment's gains compare favorable to its cost. As a performance measure, ROI was used to evaluate the efficiency of an investment or to compare the efficiencies

of several different investments. In purely economic terms, it was one way of relating profits to capital invested.

Return of investment was not applicable in the proposed system because the intent in the operation was not business investment or for commercial use.

Requirements Analysis and Specification

The requirements analysis specification provides important information to the developers, designers and engineer tasked with implementing a project and to the quality assurance people and testers responsible for evaluating the implementation of the project.

User Requirements

Often referred to as user needs, describe what the users did with the system, such as what activities that users must be able to perform. Thus, specific requirements were set to ensure that end-users were use the system into full capacity and efficiency. The users were identified as the following: Administrator, Unit Document Controllers (UDC), Users:

Administrator. The administrator acts as maintenance and technical personnel of the system. Responsible in overseeing the over-all operation and update of the system. The administrator had the technical knowledge and skills in

basic computer operation. Computer troubleshooting, database management, networking, web design and programming.

Unit Document Controller. Responsible for managing all the electronic document including documents that were digitized for archiving. Other duties include overseeing the over-all operation of documents within the office and had the role to add, edit, delete electronic documents including documents of other users.

Users. The main user and collaborator of the system. Their function was to just view, add, edit, delete electronic documents of their own. But can view electronic documents if given the permission to view.

System Requirements

System requirements are the building blocks developers use to build the system. It shows the minimum requirements that describe the capabilities of the system with which, through which, and on which the product functioned. The study's scope employs in an internet-based and a combination of web-based and mobile-app system thus the following were the minimum requirements in order for the system to work properly.

Server Computer:

A. MySQL
B. Apache with PHP version 5.0 support

Users:

A. An android mobile phone
B. Connected to the Local Area Network (LAN) or Intranet

Functional Requirements

The study was designed to facilitate and aggregate different electronic documents sources from its users into a single repository that can also store, retrieve and log where the system can be accessed using its uniform resource locator (URL). The project should be able to perform the following:

- Version control that helped users identify the latest version of a certain document. This prevented the broadcasting wrong version of a certain document for the utilization of all users like memo and current project status.
- Workflow to help users forward and ask for comments to other user or users. This reduced the utilization of paper just to forward document to users just to ask for their comments, suggestions and recommendations.
- Storage of electronic documents through personal, shared and by organizational unit. This helped user's management their electronic documents subjective for collaboration or personal documents.
- Retrieval of document using the comprehensive search features like by date, uploader and file type.

- Security of electronic documents from unauthorized access and prevent users from accessing document beyond their control or not belonging to a certain organization unit.
- Audit log on who uploaded, deleted and edited that served as protection as to accountability of users inside the system.

Presentation, Analysis and Interpretation of Data

Existing Process in Document Management

University Registrar and Office of the Research and Extension

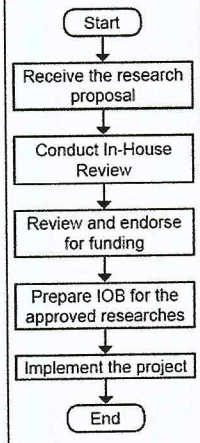
The researcher based the development of the system on the current Quality Management System (QMS) of Samar State University for ISO 9001:2015 compliance. Both the University Registrar and Research and Extension had their own Procedure Manual which entails the comprehensive step by step information about a certain procedure like its purpose, scope, responsibilities of process flow members, definition of important terms in the process, acronyms and abbreviation, process flow of the document, detailed procedure, risk assessment, opportunity analysis and references. Table 2 shows the registered procedure of both offices.

All the processes were discussed on "Detailed Procedure" part of every procedure manual where in it displays the process flow, responsible person on every stage of the process, details of the needed information and work to do of the

responsible person and lastly the documented information where registered ISO 9001:2015 forms documents were needed to be used on every stage of the process for verification and approval. Table 3 shows an example of Detailed Procedure for Conduct of University Funded Researches of Research and Extension Office.

Table 2. Registered Procedure Manual of University Registrar and Research & Extension

OFFICE	PROCEDURE MANUAL
University Registrar	Enrolment Procedure Application for Issuance of Academic Credentials Procedure for Application for Graduation Grading Sheet Submission Claim of Awards and Other Incentives
Research and Extension	Conduct of University Funded Researches Monitoring of RD/E Projects Conduct of Research and Extension Activity

Activity	Details	Responsible Person	Documented Information
	1.0 Receive the research proposal		
	1.1 The UDC receives the proposal submitted by the researcher and provides copy to the concerned Research Center.	-OVPRES UDC -Research Centers	-SSU-OVPRE-FR-002
	2.0 Conduct In-house review		
	2.1 The research center facilitates the conduct of the In-House Review. 2.2 Research Center consolidates the evaluators' analysis and recommendation.	-Research Centers	-SSU-OVPRE-FR-004 -SSU-OVPRE-FR-005 -SSU-OVPRE-FR-007 -Invitation letter to the evaluators -Program of Activities -Proceedings -Attendance Sheet
	3.0 Review and endorse for funding.		
	3.1 The Research Center provides copy of the evaluators' analysis and recommendation to the researcher. 3.2 The researcher revises the paper in accordance to the recommendation of the evaluators. 3.3 The researcher submits the revised	-OVPRES UDC -Research Centers -Researcher	-SSU-OVPRE-FR-002 -SSU-OVPRE-FR-004 -PPMP -PR -RDE Monitoring form

Current document management of both offices for paper documents include using data file box, document cabinet, folder, envelopes that were sometimes labeled for organization of the UDC which consumes office space. Electronic files documents, every staff had their document management using labeled electronic folders. Both did not enable collaboration and centralized of electronic documents across co-employees and offices.

Design and Development

University Registrar and Office of the Research and Extension

The study adopted the Procedure Manual of both offices for ISO 9001:2015 compliance. It was designed and developed with scalability in mind since the number of documents were expected to grow in the future. According to the first phase of the development process, it was identified that version control, workflow, storage, retrieval and security would be essential to the success of electronic document management that would help users on their productivity.

Efficiency of The Developed System Based on Beta Testing

In order to test the efficiency of the system through Beta Testing, a survey was conducted. There were forty (40) respondents that were selected who gave their response to the questionnaires. Out of these forty (40) respondents, ten (10) of them were from the Samar State University – University Registrar and thirty (30) from Vice-President for Research and Extension Services. It was tested for 5

days (April 8 – 12, 2019) during the normal operation hours of both offices. The following scale was used by the respondents in order for them to evaluate each criteria of the questionnaire.

5 - Strongly Agree (SA)
4 - Agree (A)
3 - Undecided (U)
2 - Disagree (D)
1 - Strongly Disagree (SD)

Table 4. Number of Respondents

OFFICE	Frequency	Percentage
University Registrar	10	25%
Research and Extension	30	75%
TOTAL	**40**	**100%**

Table 4 shows the number of respondents of forty (40). Accordingly, thirty (30) of the respondents were from Samar State University Research and Extension Office which constitutes the 75% of the total respondents and ten (10) were from University Registrar which constitutes 25%.

Functionality

Table 5 shows that the majority of the respondents said "Strongly Agree" in terms of functionality of the system. It was proven by the respondents with their responses of 5, 4, and 3 scale and a total grand mean 4.59 interpreted as "Strongly Agree".

Table 5. Results from the Functionality Test of the System

Functionality Test of the System	Scale					Weighted Mean	Interpretation
	5	4	3	2	1		
The Unit Document Controller (UDC) can control and authenticate the electronic documents	24	16				4.60	Strongly Agree
Users can use multiple version control of electronic documents	21	18	1			4.50	Agree
The system can centralize electronic documents for the utilization of staff to keep everyone up to date.	27	12	1			4.65	Strongly Agree
Can manage storage of electronic documents in a way that facilitates convenient retrieval of registrar file when needed.	25	15				4.63	Strongly Agree
The system has a role-based user permission as to what is their capabilities inside the system.	24	16				4.60	Strongly Agree
The system can be used simultaneously by users for updating of data for better collaboration and communication.	22	18				4.55	Strongly Agree
The functionality of the system is appropriate to what office needs.	22	18				4.55	Strongly Agree
Can create workflow for electronic document processing to other office staff.	28	12				4.70	Strongly Agree
Can upload, copy, move, download and delete electronic documents when needed.	22	17	1			4.53	Strongly Agree
Total	**215**					**4.59**	**Strongly Agree**

4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

Usability

As shown in Table 6, it shows the results of the usability evaluation of the system which resulted to interpretation as "Strongly Agree". It summarizes that the system passed the usability test according to questions in the survey since the total interpretation was "Strongly Agree".

Table 6. Results from the Usability Test of the System

Usability Test of the System	Scale					Weighted Mean	Interpretation
	5	4	3	2	1		
Office staff can collaborate with their electronic documents inside the system.	22	18				4.55	Strongly Agree
The system can increase productivity of staff by saving time in electronic document management.	24	16				4.60	Strongly Agree
The system is easy to operate and control while using.	22	17	1			4.53	Strongly Agree
The user interface of the system is pleasant.	23	15	2			4.53	Strongly Agree
Total	**91**	**66**	**3**	**0**	**0**	**4.55**	**Strongly Agree**

4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

Reliability

Table 7 shows that the majority of the respondents said "Strongly Agree" and "Agree" in terms of reliability of the system. It was proven by the respondents with their responses of 5, 4, and 3 scale and a total grand mean 4.62 interpreted as "Strongly Agree".

Table 7. Results from the Reliability Test of The System

Reliability Test Of The System	Scale					Weighted Mean	Interpretation
	5	4	3	2	1		
Can adapt to the policy of ISO 9001:2015 for archiving old paper documents by digitizing/scanning.	24	15	1			4.58	Strongly Agree
Improve the regulatory compliance of university registrar to ISO 9001:2015 of the university.	21	18	1			4.50	Agree
Improve the over-all efficiency of the office.	28	12				4.70	Strongly Agree
The system can help UDC ensure that the latest version of ISO 9001:2015 Forms are being utilized by all faculty and staff.	27	12	1			4.65	Strongly Agree
Ensure safety of electronic documents from recovering physical damage or loss of paper documents.	26	14				4.65	Strongly Agree
TOTAL	**126**	**71**	**3**	**0**	**0**	**4.62**	**Strongly Agree**

Legend:

4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

Security

As shown in Table 8, it shows the results of the security evaluation of the system which resulted to interpretation as "Strongly Agree" and "Agree". It summarizes that the system passed the security test according to questions in the survey since the total interpretation was "Strongly Agree".

Table 8. Results from the Security Test of the System

Security Test of the System	Scale					Weighted Mean	Interpretation
	5	4	3	2	1		
Ensure security of electronic documents from unauthorized access.	21	18	1			4.50	Agree
The system provides audit log to validate activities of faculty and staff inside the system.	24	16				4.60	Strongly Agree
Total	**45**	**34**	**1**	**0**	**0**	**4.55**	**Strongly Agree**

Legend:
4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

Adaptation

Table 9 shows that the majority of the respondents from the University Registrar employees said "Strongly Agree" in terms of the adaption of the system to their quality manual. It was proven by the respondents with their responses of 5 and 4 scale and a total grand mean 4.75 interpreted as "Strongly Agree".

Table 9. Results from the Adaptation Test of The System for University Registrar

Adaptation Test of the System for Registrar	Scale					Weighted Mean	Interpretation
	5	4	3	2	1		
Enrolment Procedure	8	2				4.8	Strongly Agree
Application for Issuance of Academic Credentials	8	2				4.8	Strongly Agree
Procedure for Application for Graduation	7	3				4.7	Strongly Agree
Grading Sheet Submission	7	3				4.7	Strongly Agree
TOTAL	**30**	**10**	**0**	**0**	**0**	**4.75**	**Strongly Agree**

Legend:

4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

Table 10 shows that the majority of the respondents from the Research and Extension employees said "Strongly Agree" and "Agree" in terms of the adaption of the system to their quality manual. It was proven by the respondents to their responses of 5, 4, and 3 scale and a total grand mean 4.44 interpreted as "Agree".

Table 10. Results from the Adaptation Test of the System for Research and Extension

Adaptation Test of the System for Research and Extension	Scale					Weighted Mean	Interpretation
	5	4	3	2	1		
Procedure 014: Claim of Awards and Other Incentives	12	16	2			4.33	Agree
Procedure 069: Conduct of University Funded Researches	10	18	2			4.27	Agree

Continuation

Procedure 070: Monitoring of RD/E Projects	19	11				4.63	Strongly Agree
Procedure 075: Conduct of Research and Extension Activity	17	12	1			4.53	Strongly Agree
Total	**58**	**57**	**5**	**0**	**0**	**4.44**	**Agree**

Legend:
4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

Results Summary

Table 11 shows that the summary of interpretation from the University Registrar employees said "Strongly Agree" in terms of the total evaluation of the system. It was proven by the respondents to their responses on total grand mean 4.78 interpreted as "Strongly Agree".

Table 11. Results Summary Test of The System for University Registrar

Results Summary Test of the System for University Registrar	Grand Mean	Interpretation
Functionality	4.8	Strongly Agree
Usability	4.8	Strongly Agree
Reliability	4.78	Strongly Agree
Security	4.7	Strongly Agree
Adaptation	4.75	Strongly Agree
Total	**4.78**	**Strongly Agree**

Legend:
4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

Table 12 shows that the summary of interpretation from the Research and Extension employees said "Strongly Agree" and "Agree" in terms of the total evaluation of the system. It was proven by the respondents to their responses on total grand mean 4.50 interpreted as "Agree".

Table 12. Results Summary Test of The System for Research and Extension

Results Summary Test of the System for Research and Extension	Grand Mean	Interpretation
Functionality	4.52	Strongly Agree
Usability	4.47	Agree
Reliability	4.56	Strongly Agree
Security	4.50	Agree
Adaptation	4.44	Agree
Total	**4.50**	**Agree**

Legend:

4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

Table 13 shows that the summary of interpretation from both University Registrar and Research & Extension employees said "Strongly Agree" in terms of the total evaluation of the system. It was proven by the respondents to their responses on total grand mean 4.57 interpreted as "Strongly Agree".

Table 13. Results Summary Test of the System for both University Registrar and Research & Extension

Results Summary Test of the System for both University Registrar and Research & Extension	Grand Mean	Interpretation
Functionality	4.59	Strongly Agree
Usability	4.55	Strongly Agree
Reliability	4.62	Strongly Agree
Security	4.55	Strongly Agree
Adaptation	4.52	Strongly Agree
Total	**4.57**	Strongly Agree

Legend:

4.51 – 5.00 Strongly Agree
3.51 – 4.50 Agree
2.51 – 3.50 Undecided
1.51 – 2.50 Disagree
1.00 – 1.50 Strongly Disagree

As shown in Table 14, out of eighty (40) respondents who were part of the system evaluation process, 92.5% of them recommended to implement the proposed system while 7.5% of them were undecided. Based on the result, it implies that majority of the respondents agreed that the proposed system be implemented.

Table 14. Tally of the Result for the Implementation of the System

Would you like to recommend that the proposed system be implemented?	Yes	Undecided	No
	37	3	0

Product Evaluation

The instrument was tested by all employees under the Registrar and Research and Extension Office of the University involving 40 participants during their normal office hours. A day prior to the conduct of the validation process, the researcher asked approval to the head of both offices to secure the list of beta testers.

During the validation process, the respondents had an hour to try the system if it can adapt their current process on electronic document process and management with regard to the ISO 9001:2015 standards.

For the evaluation of the system under functionality, usability, reliability, security and adaptation, it was tested during their regular working hours April of 2019 on two offices, the University Registrar was composed of 10 and the Research and Extension was composed 30, all includes from the unit heads, center directors, faculty researchers and staff. They were selected as participants because of the diversity of electronic document that comes in and out to their offices, an indicator that the system could scale or adapt to any kind office. The researcher tested the functionality, usability, reliability, security and adaptation of the system for a half day. The server computer was placed on the office of the Information and Communications Technology (ICT) where university information systems were placed while the respondents were in their usual terminal and accessed the system

through the link in web browser. The researcher distributed questionnaires for the assessment of the system if it meets the objectives.

For the data gathering, the researcher identified the processes of both offices and test the functionality, usability, reliability and security of the system. First for the processes, the researcher based the process with the approved Procedure Manual of both offices in relation to ISO 9001:2015 standard. However, for scalability purposes, it should adapt any processes of any offices.

Next, the test questionnaires were distributed to forty (40) respondents. The following respondents consisted of ten (10) staff from the University Registrar and twenty (30) from the Research and Extension respondents.

CHAPTER 5

SUMMARY, CONSLUSION AND RECOMMENDATION

This chapter presents the significant findings, conclusions and recommendations of the study.

Summary

The following were the significant findings derived from the study.

1. The study identified the existing document management processes of both Samar State University – Office of the University Registrar and Research & Extension based on the Quality Management System (QMS) Manual of the University which was developed through ISO 9001:2015 where Procedure Manual was adapted.
2. An electronic document management system was developed for Samar State University – Office of the University Registrar and Research and Extension. It can give users ability to version control, workflow, storage, retrieval and security. In addition, audit log was also provided.
3. Beta-testing was conducted on both offices to come up with an evaluation on how efficient the system was. It was a five-day regular working hour test on functionality, usability, reliability, security and adaptability.

Conclusions

Based on the above-mentioned findings, the following conclusions were considered:

1. The identified existing document management processes adopted through registered procedure manual of both offices helped the study on the design and development of the document management system to support the document approval and routing.
2. The system can create version control of documents for keeping the older version available and document processing or workflow for approval. Moreover, the movement of users were logged for better monitoring and transparency. In addition, storage and retrieval was also available for document management. Moreover, security feature also provided to prevent unauthorized access.
3. The data revealed that product conform to the desired purposes of the study which was to have an electronic document management system. The system was efficient on its functionality, usability, reliability, security and adaptability to the current document management process.

Recommendations

Based on the results of the study, the following recommendations were considered significant to enhance the capability of the developed product.

1. The study is recommended for institutional implementation. Research funding is seen as an opportunity for additional issues to be solved. Data analytics may be considered.
2. Plan on how to detect the presence of viruses in files especially when they are to be downloaded which would later infect the device of the person using or accessing the file.
3. It is recommended to have an orientation to all users.
4. Provide a pop-up notification for tasks received/ send for better monitoring and conduct of desired task.

CHAPTER 6

PRODUCT TECHNICAL DESCRIPTION

This chapter presents the significant findings, conclusions and recommendations of the study.

Summary

The following were the significant findings derived from the study.

1. The study identified the existing document management processes of both Samar State University – Office of the University Registrar and Research & Extension based on the Quality Management System (QMS) Manual of the University which was developed through ISO 9001:2015 where Procedure Manual was adapted.
2. An electronic document management system was developed for Samar State University – Office of the University Registrar and Research and Extension. It can give users ability to version control, workflow, storage, retrieval and security. In addition, audit log was also provided.
3. Beta-testing was conducted on both offices to come up with an evaluation on how efficient the system was. It was a five-day regular working hour test on functionality, usability, reliability, security and adaptability.

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APPENDICES

QUESTIONNAIRE

SAMAR STATE UNIVERSITY
Arteche Blvd., Catbalogan City, Philippines 6700
Office of the Dean | College of Graduate Studies

We Innovate. We Build. We Serve.

JAS-ANZ
Certificate No. AJA18.1089

Questionnaires for the Employees of Samar State University
Research and Extension Services

Research Title: MULTI-PLATFORM ELECTRONIC DOCUMENT MANAGEMENT SYSTEM FOR SAMAR STATE UNIVERSITY UNIT DOCUMENT CONTROLLERS

PART I. Personal Background

Direction: Kindly provide the necessary data asked by writing your answers on the space provided.

Name: (Optional) _____ Office: _____ Date: _____

PART II. Functionality, Usability, Reliability and Security of the System.

Direction: Please check (✓) your response using the following scale:

Legends:

5 – Strongly Agree (SA)
4 – Agree (A)
3 – Undecided (U)
2 – Disagree (D)
1 – Strongly Disagree (SD)

	5 (SA)	4 (A)	3 (U)	2 (D)	1 (SD)
A. FUNCTIONALITY					
1. The Unit Document Controller (UDC) can control and authenticate the electronic documents dedicated to Research and Extension.	Full control		average control		No control
2. Users can use multiple version control of electronic documents for Research and Extension Proposal, Project Monitoring, Progress report.	Full usage		average usage		Cannot use
3. The system can centralize electronic documents for the utilization of faculty and staff to keep everyone up to date.	Full centralized		average centralized		Cannot Centralized
4. Can manage storage of electronic documents in a way that facilitates convenient retrieval of research and extension file when needed.	Good management		average management		Not managed
5. The system has a role-based user permission as to what is their capabilities inside the system.	Full permission		average permission		No permission

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AJA REGISTRARS ISO 9001:2015
Certificate No. AJA18.1089

6. The system can be used simultaneously by users for updating of data for better collaboration and communication.	Full usage		average usage		Cannot use
7. The functionality of the system is appropriate to what research and extension office needs.	Very appropriate		average appropriate		Not appropriate
8. Can create workflow for electronic document processing to other staff of research and extension.	Can create		averagely		Cannot create
9. Can upload, copy, move, download and delete electronic documents when needed.	Can do basic function		averagely can		Cannot do basic functions
B. USABILITY					
1. Staff, executive directors, center directors and researchers can collaborate with their electronic documents inside the system.	Fully collaborate		average		Cannot collaborate
2. The system can increase productivity of faculty and staff by saving time in electronic document management.	Increased productivity		Same productivity		Decreased productivity
3. The system is easy to operate and control while using.	Easy		average		Not easy
4. The user interface of the system is pleasant.	Very pleasant		average		Not pleasant
C. RELIABILITY					
1. Can adapt to the policy of ISO 9001:2015 for archiving old paper documents by digitizing/scanning.	Full adaptation		average		Cannot adapt
2. Improve the regulatory compliance of research and extension to ISO 9001:2015 of the university.	Fully improved		average		Cannot improve
3. Improve the over-all efficiency of the research and extension office.	Fully improve		average		Cannot improve
4. The system can help UDC ensure that the latest version of Research and Extension ISO 9001:2015 Forms are being utilized by all faculty and staff.	Fully ensure		average		Cannot ensure
5. Ensure safety of electronic documents from recovering physical damage or loss of paper documents.	Fully ensure		average		Cannot ensure
D. SECURITY					
1. Ensure security of electronic documents from unauthorized access.	Fully ensure		average		Cannot ensure
2. The system provides audit log to validate activities of faculty and staff inside the system.	Fully provide		average		Cannot provide

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E. ADAPTATION OF THE SYSETM TO THE PROCEDURE MANUAL OF RESEARCH AND EXTENSION SERVICES THROUGH ISO 9001:2015 IN ELECTRONIC DOCUMENT MANAGEMENT					
1. Procedure 014: Claim of Awards and Other Incentives	Fully adapt		average		Cannot adapt
2. Procedure 069: Conduct of University Funded Researches	Fully adapt		average		Cannot adapt
3. Procedure 070: Monitoring of RD/E Projects	Fully adapt		average		Cannot adapt
4. Procedure 075: Conduct of Research and Extension Activity	Fully adapt		average		Cannot adapt

PART III. Recommendation and Suggestions

Direction: Please provide your answer by putting check (/) mark on the box that suits your assessment.

Would you like to recommend that the proposed system be implemented?	Yes	No	Undecided

Suggestion/s:

_____
_____
_____

Thank you for your time in answering the evaluation form.

Nathaniel Guio A. Mendoza
Researcher

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Questionnaires for the Employees of Samar State University
University Registrar

Research Title: MULTI-PLATFORM ELECTRONIC DOCUMENT MANAGEMENT SYSTEM FOR SAMAR STATE UNIVERSITY UNIT DOCUMENT CONTROLLERS

PART I. Personal Background

Direction: Kindly provide the necessary data asked by writing your answers on the space provided.

Name: (Optional) _____ Office: _____ Date: _____

PART II. Functionality, Usability, Reliability and Security of the System.

Direction: Please check (✓) your response using the following scale:

Legends:

5 – Strongly Agree (SA)
4 – Agree (A)
3 – Undecided (U)
2 – Disagree (D)
1 – Strongly Disagree (SD)

	5 (SA)	4 (A)	3 (U)	2 (D)	1 (SD)
A. FUNCTIONALITY					
1. The Unit Document Controller (UDC) can control and authenticate the electronic documents dedicated to University Registrar.	Full control		average control		No control
2. Users can use multiple version control of electronic documents for Evaluation of Grades, Units Earned, etc.	Full usage		average usage		Cannot use
3. The system can centralize electronic documents for the utilization of registrar staff to keep everyone up to date.	Full centralized		average centralized		Cannot Centralized
4. Can manage storage of electronic documents in a way that facilitates convenient retrieval of registrar file when needed.	Good management		average management		Not managed
5. The system has a role-based user permission as to what is their capabilities inside the system.	Full permission		average permission		No permission

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6. The system can be used simultaneously by users for updating of data for better collaboration and communication.	Full usage		average usage		Cannot use
7. The functionality of the system is appropriate to what university registrar office needs.	Very appropriate		average appropriate		Not appropriate
8. Can create workflow for electronic document processing to other staff of university registrar.	Can create		averagely		Cannot create
9. Can upload, copy, move, download and delete electronic documents when needed.	Can do basic function		avoragely can		Cannot do basic functions
B. USABILITY					
1. University Registrar and staff can collaborate with their electronic documents inside the system.	Fully collaborate		average		Cannot collaborate
2. The system can increase productivity of registrar staff by saving time in electronic document management.	Increased productivity		Same productivity		Decreased productivity
3. The system is easy to operate and control while using.	Easy		average		Not easy
4. The user interface of the system is pleasant.	Very pleasant		average		Not pleasant
C. RELIABILITY					
1. Can adapt to the policy of ISO 9001:2015 for archiving old paper documents by digitizing/scanning.	Full adaptation		average		Cannot adapt
2. Improve the regulatory compliance of university registrar to ISO 9001:2015 of the university.	Fully improved		average		Cannot improve
3. Improve the over-all efficiency of the university registrar office.	Fully improve		average		Cannot improve
4. The system can help UDC ensure that the latest version of University Registrar ISO 9001:2015 Forms are being utilized by all faculty and staff.	Fully ensure		average		Cannot ensure
5. Ensure safety of electronic documents from recovering physical damage or loss of paper documents.	Fully ensure		average		Cannot ensure
D. SECURITY					
1. Ensure security of electronic documents from unauthorized access.	Fully ensure		average		Cannot ensure
2. The system provides audit log to validate activities of faculty and staff inside the system.	Fully provide		average		Cannot provide

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E. ADAPTATION OF THE SYSETM TO THE PROCEDURE MANUAL OF UNIVERSITY REGISTRAR SERVICES THROUGH ISO 9001:2015 IN ELECTRONIC DOCUMENT MANAGEMENT					
1. Enrolment Procedure	Fully adapt		average		Cannot adapt
2. Application for Issuance of Academic Credentials	Fully adapt		average		Cannot adapt
3. Procedure for Application for Graduation	Fully adapt		average		Cannot adapt
4. Grading Sheet Submission	Fully adapt		average		Cannot adapt

PART III. Recommendation and Suggestions

Direction: Please provide your answer by putting check (/) mark on the box that suits your assessment.

Would you like to recommend that the proposed system be implemented?	Yes	No	Undecided

Suggestion/s:

_____
_____
_____

Thank you for your time in answering the evaluation form.

Nathaniel Guio A. Mendoza
Researcher

GANTT CHART

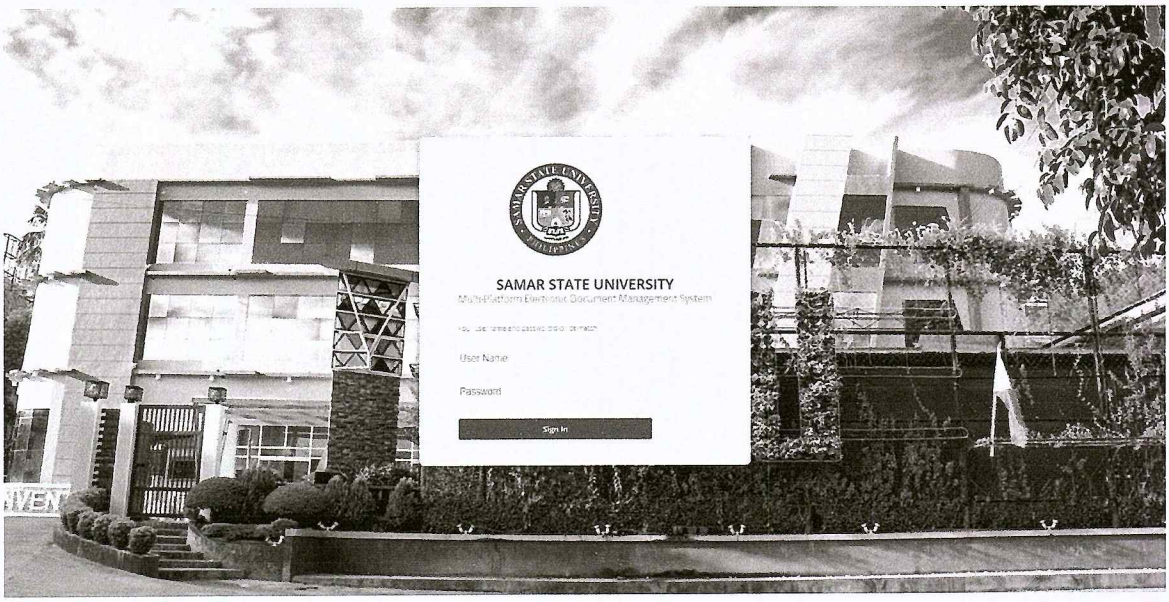
Gantt Chart

Gantt chart is one of the most popular and useful ways of showing activities displayed against time. Left part of the chart is a list of activities and along its top is a suitable time period. Each activity is represented by a shaded bar; the position ad length of the shaded bar shows the start data, duration and end of the activity. The figure below shows the Gantt chart of the study.

Task	2017	2018	2019				
	Oct – Dec	Jan – Dec	Ja	Fe	Ma	Ap	Ma
Requirement Specification and System Analysis							
Preliminary							
Requirement							
System Analysis							
System Design							
Dataflow Diagram							
Flow Chart							
Database Schema							
Implementation							
Implementation Plan							
Develop the Program							
Testing and Integration							
Testing							
Evaluation							
Operation and Maintenance							
Maintenance							

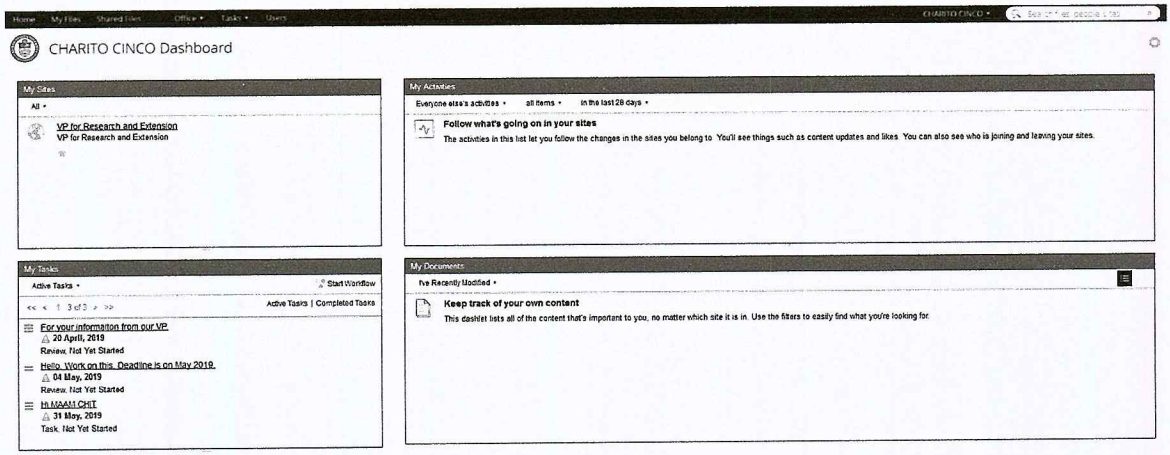
Figure 11. Gantt Chart

USER'S MANUAL



Login Page

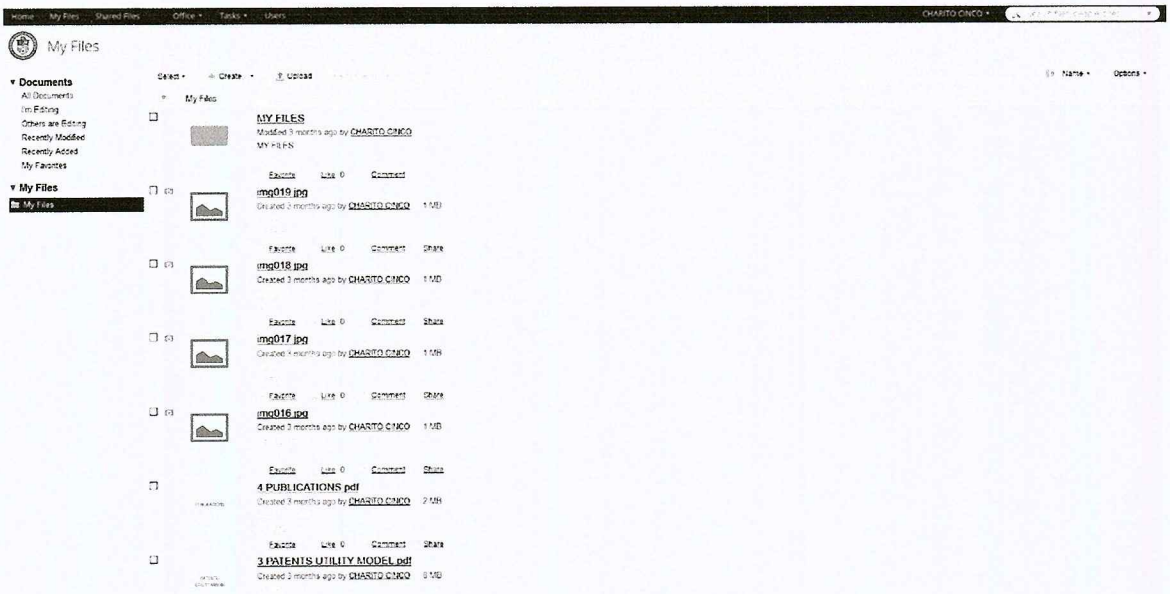
1. This is the login page. They need first to visit the website link for them to be this page.
2. They need to be registered first by the administrator for them to login.
3. They need to key in they username and password.



User Dashboard

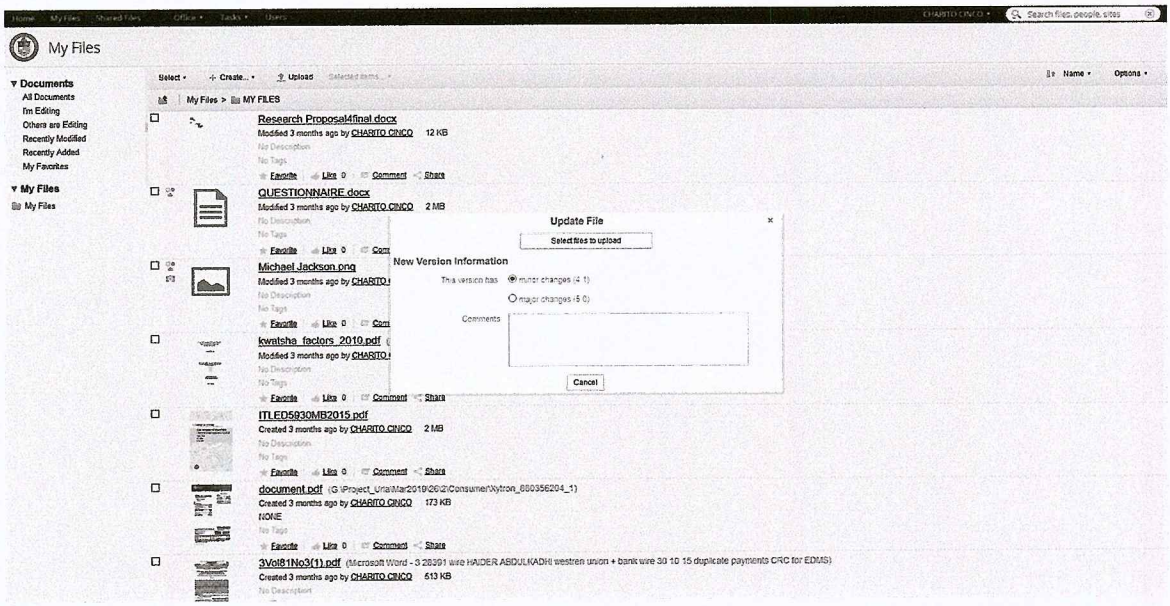
1. Once logged in, the users will be redirected to the User Dashboard.
2. This is the main page of the system where users have.

3. They can now choose where they go from that point by clicking My Files, Shared Files and Office Files.



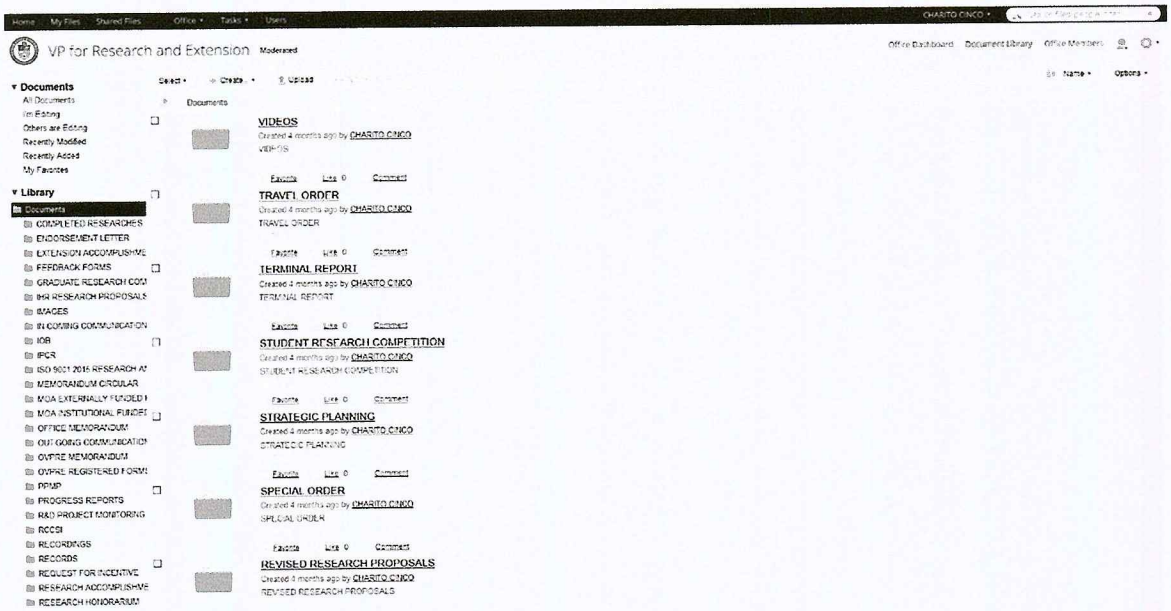
My Files Page

1. My files page is the page where the user places his/her files for storage.
2. Click a certain file to view, download, edit and delete file.
3. Click upload files or drag and drop a certain file if you want to add another file.
4. Create folder so you can management your documents well.



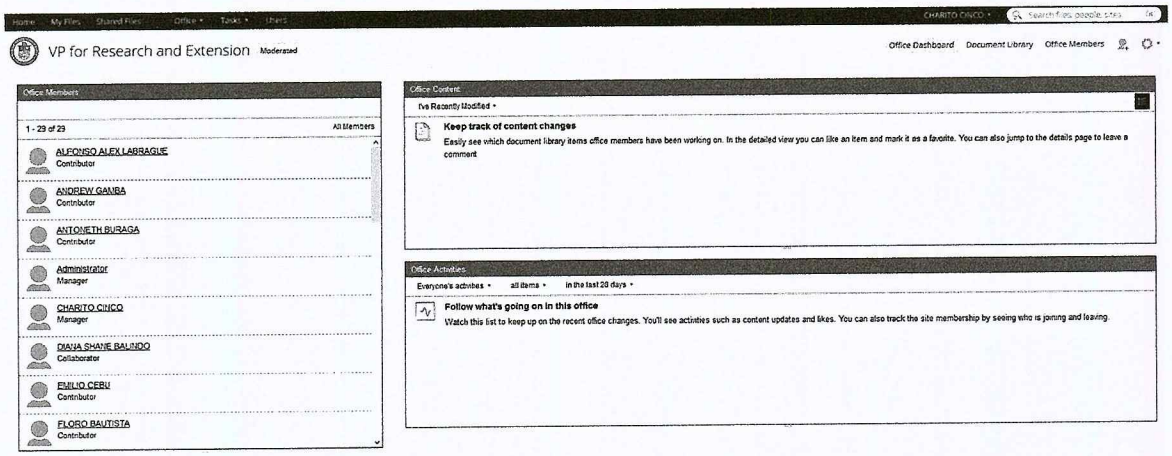
Upload Files

1. Click Upload File button for you to be able to upload files here.
2. You can select find location or you can just drag and drop from your desktop files to the browser window.
3. You can also upload multiple files at once.



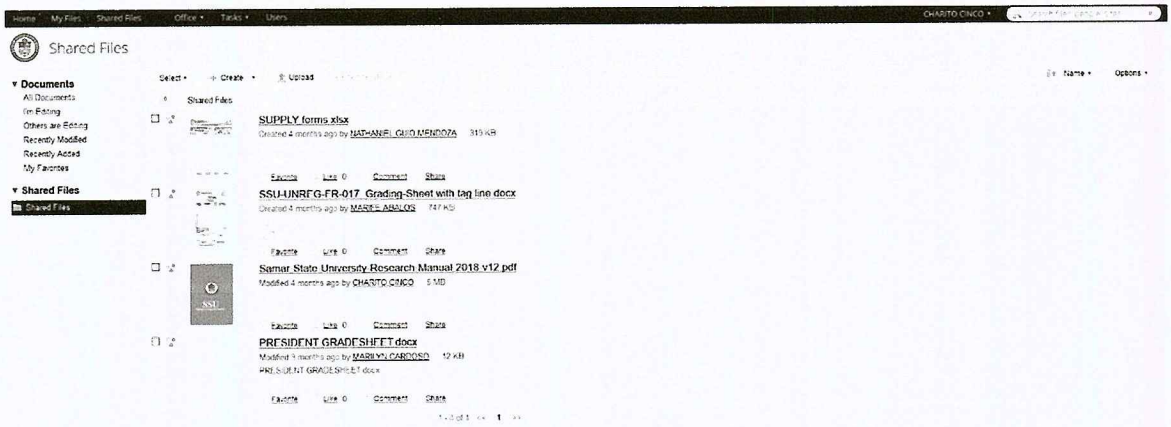
Document Library

1. This is the page where you can see the library of your files.
2. It is divided into 3 categories. First, personal or my files. Second, Office files or files that are shared together by a certain group of people and public files where all of the users inside the document management system can access regardless of office and ownership.
3. Owner of files can limit what a viewer can do like, limit to just view, limit downloading of files and cannot be edited files.



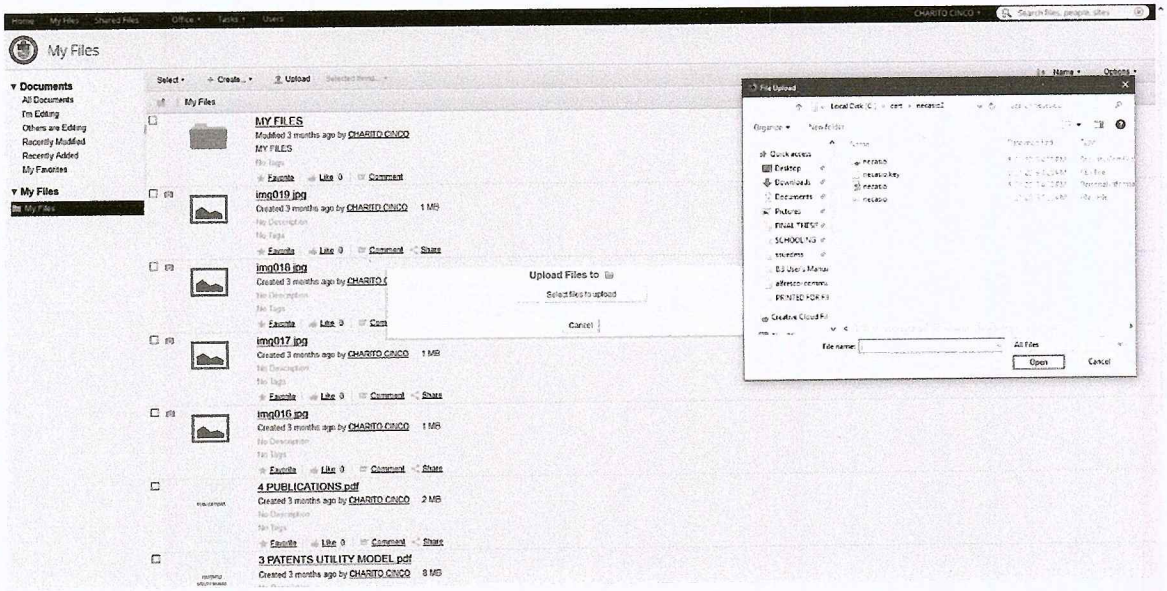
Office Dashboard

1. Click Office Dashboard Files for you to visit the files within your office.
2. This can only be accessed by the members of the certain group of people or office.
3. To access files, in every office, there is assigned manager and members.
4. Office managers can have all the capabilities of users.
5. Members of office have limited capabilities.



Shared Files

1. Click shared files if you want to access files that are shared by other users publicly or privately to you.
2. You can also share files by uploading files then changing the permissions and capabilities on what the viewers can do when they visited the file.
3. Shared files have the same function like office files specially if the file is only privately shared to you only.



Storage Page

1. This is the demo page for the storage of files.
2. Click the button if you want to upload the files by opening the Desktop File Explorer.
3. Drag and drop files for you to browse files to the other folders, sub-folders or folders that are shared to you by your office files or privately shared files.

SOURCE CODE

delete.php

```
<?php
use Aura\Html\Escaper as e;

session_start();
if (!isset($_SESSION['uid'])) {
   header('Location:error.php?ec=1');
   exit;
}
include('odm-load.php');
require_once("AccessLog_class.php");

$last_message = (isset($_REQUEST['last_message']) ?
$_REQUEST['last_message'] : '');

$redirect = 'out.php';

$userperm_obj = new User_Perms($_SESSION['uid'], $pdo);

if (isset($_REQUEST['mode']) && $_REQUEST['mode'] == 'tmpdel') {
   if (!isset($_REQUEST['num_checkboxes'])) {
      $_REQUEST['num_checkboxes'] =1;
   }
   if (!is_dir($GLOBALS['CONFIG']['archiveDir'])) {
      if (!mkdir($GLOBALS['CONFIG']['archiveDir'], 0775)) {
         $last_message='Could not create ' . $GLOBALS['CONFIG']['archiveDir'];
         header('Location:error.php?ec=23&last_message=' .
urlencode($last_message));
         exit;
      }
   }

   for ($i = 0; $i<$_REQUEST['num_checkboxes']; $i++) {
      if (isset($_REQUEST['id' . $i])) {
         $id = $_REQUEST['id' . $i];
         if (strchr($id, '_')) {
            header('Location:error.php?ec=20');
         }
         if ($userperm_obj->canAdmin($id)) {
            $file_obj = new FileData($id, $pdo);
            $file_obj->temp_delete();
```

```
            fmove($GLOBALS['CONFIG']['dataDir'] . $id . '.dat',
$GLOBALS['CONFIG']['archiveDir'] . $id . '.dat');
          }
          AccessLog::addLogEntry($_REQUEST['id' . $i], 'X', $pdo);
        }
    }

    $last_message = msg('message_document_has_been_archived');

    callPluginMethod('onAfterArchiveFile');

    header('Location: out.php?last_message=' . urlencode($last_message));
} elseif (isset($_REQUEST['mode']) && $_REQUEST['mode'] ==
'view_del_archive') {

    $query = "SELECT id FROM {$GLOBALS['CONFIG']['db_prefix']}data
WHERE publishable=2";
    $stmt = $pdo->prepare($query);
    $stmt->execute();
    $result = $stmt->fetchAll();

    $array_id = array();
    $i = 0;
    foreach ($result as $row) {
        $array_id[$i] = $row['id'];
        $i++;
    }

    $luserperm_obj = new UserPermission($_SESSION['uid'], $pdo);

    draw_header(msg('area_deleted_files'), $last_message);
    $page_url = e::h($_SERVER['PHP_SELF']) . '?mode=' . $_REQUEST['mode'];

    $user_obj = new User($_SESSION['uid'], $pdo);
    $userperms = new UserPermission($_SESSION['uid'], $pdo);

    $list_status = list_files($array_id, $userperms,
$GLOBALS['CONFIG']['archiveDir'], true);

    if ($list_status != -1) {
        $GLOBALS['smarty']->assign('lmode', '');
        display_smarty_template('deleteview.tpl');
    }
```

Department.php

```
<?php
use Aura\Html\Escaper as e;


session_start();


include('odm-load.php');

if (!isset($_SESSION['uid'])) {
   redirect_visitor();
}

$last_message = (isset($_REQUEST['last_message']) ?
$_REQUEST['last_message'] : '');

$user_obj = new User($_SESSION['uid'], $pdo);

if (!$user_obj->isAdmin() == true) {
   header('Location:error.php?ec=4');
   exit;
}

if (isset($_GET['submit']) && $_GET['submit']=='add') {
   draw_header(msg('area_add_new_department'), $last_message);
   ?>

      <form id="addDepartmentForm" action="department.php" method="POST"
enctype="multipart/form-data">
   <table border="0" cellspacing="5" cellpadding="5">
         <tr>
            <td>
               <b><?php echo msg('department')?></b>
            </td>
            <td colspan="3">
               <input name="department" type="text" class="required"
minlength="2">
<?php
               // Call the plugin API
               callPluginMethod('onDepartmentAddForm');
   ?>
```

```
            </td>
            <td align="center">
              <input type="hidden" name="submit" value="Add Department">
              <div class="buttons">
                <button class="positive" type="submit" name="submit"
value="Add Department"><?php echo
msg('button_add_department')?></button>
              </div>
            </td>
            <td align="center">
              <div class="buttons">
                <button class="negative cancel" type="submit" name="submit"
value="Cancel"><?php echo msg('button_cancel')?></button>
              </div>
            </td>
          </tr>
    </table>
        </form>
   <script>
  $(document).ready(function(){
    $('#addDepartmentForm').validate();
  });
  </script>
<?php
    draw_footer();
} elseif (isset($_POST['submit']) && 'Add Department' == $_POST['submit']) {

    if (!$user_obj->isAdmin()) {
        header('Location:error.php?ec=4');
        exit;
    }

    $department = (isset($_POST['department']) ? $_POST['department'] : '');
    if ($department == '') {
        $last_message=msg('departmentpage_department_name_required');

        header('Location: admin.php?last_message=' . urlencode($last_message));
        exit;
    }
    $query = "SELECT name FROM
{$GLOBALS['CONFIG']['db_prefix']}department where name = :department";
    $stmt = $pdo->prepare($query);
    $stmt->execute(array(':department' => $department));
```

Edit.php

```
<?php

session_start();
include('odm-load.php');

if (!isset($_SESSION['uid'])) {
   redirect_visitor();
}

include('udf_functions.php');
require_once("AccessLog_class.php");
require_once("User_Perms_class.php");

$user_perms_obj = new User_Perms($_SESSION['uid'], $pdo);

$last_message = (isset($_REQUEST['last_message']) ?
$_REQUEST['last_message'] : '');

if (!isset($_REQUEST['id']) || $_REQUEST['id'] == '') {
   header('Location:error.php?ec=2');
   exit;
}

if (strchr($_REQUEST['id'], '_')) {
   header('Location:error.php?ec=20');
}

$filedata = new FileData($_REQUEST['id'], $pdo);

if ($filedata->isArchived()) {
   header('Location:error.php?ec=21');
}

if (!isset($_REQUEST['submit'])) {
   draw_header(msg('area_update_file'), $last_message);
   checkUserPermission($_REQUEST['id'], $filedata->ADMIN_RIGHT, $filedata);

   $current_user_dept = $user_perms_obj->user_obj->getDeptId();

   $data_id = $_REQUEST['id'];
   // includes
```

```
    $department_query = "SELECT department FROM
{$GLOBALS['CONFIG']['db_prefix']}user WHERE id=:user_id";
    $department_stmt = $pdo->prepare($department_query);
    $department_stmt->bindParam(':user_id', $_SESSION['uid']);
    $department_stmt->execute();
    $result = $department_stmt->fetchAll();

    if ($department_stmt->rowCount() != 1) {
        header('Location:error.php?ec=14');
        exit; //non-unique error
    }

    $filedata = new FileData($data_id, $pdo);

    // error check
    if (!$filedata->exists()) {
        header('Location:error.php?ec=2');
        exit;
    } else {
        $category = $filedata->getCategory();
        $realname = $filedata->getName();
        $description = $filedata->getDescription();
        $comment = $filedata->getComment();
        $owner_id = $filedata->getOwner();
        $department = $filedata->getDepartment();

        //CHM
        $table_name_query = "SELECT table_name FROM
{$GLOBALS['CONFIG']['db_prefix']}udf WHERE field_type = '4'";
        $table_name_stmt = $pdo->prepare($table_name_query);
        $table_name_stmt->execute();
        $result = $table_name_stmt->fetchAll();

        $num_rows = $table_name_stmt->rowCount();

        $t_name = array();
        $i = 0;
        foreach ($result as $data) {
            $explode_v = explode('_', $data['table_name']);
            $t_name = $explode_v[2];
            $i++;
        }
```

File_class.php

```
<?php


class File
{

   public static function mime($filename, $realname)
   {
      $filename = realpath($filename);

      $extension = strtolower(pathinfo($realname, PATHINFO_EXTENSION));

      if (preg_match('/^(?:jpe?g|png|[gt]if|bmp|swf)$/', $extension)) {
         $file = getimagesize($filename);

         if (isset($file['mime']))
            return $file['mime'];
      }

      if (class_exists('finfo')) {
         if ($info = new finfo(defined('FILEINFO_MIME_TYPE') ?
FILEINFO_MIME_TYPE : FILEINFO_MIME)) {
            return $info->file($filename);
         } else if ($info = new finfo(defined('FILEINFO_MIME_TYPE') ?
FILEINFO_MIME_TYPE : FILEINFO_MIME, 'magic')) {
            return $info->file($filename);
         }
      }

      if (function_exists('mime_content_type')) {
         $mimetype = mime_content_type($filename);
         if($mimetype) {
            return $mimetype;
         }
      }

      if (!empty($extension)) {
         return File::mime_by_ext($extension);
      }

      return FALSE;
   }
```

```
    public static function mime_by_ext($extension)
    {
        $return = isset($GLOBALS['mimetypes'][$extension]) ?
$GLOBALS['mimetypes'][$extension][0] : FALSE;
        return $return;
    }

    public static function mimes_by_ext($extension)
    {
        return isset($GLOBALS['mimetypes'][$extension]) ? ( (array)
$GLOBALS['mimetypes'][$extension]) : array();
    }


    public static function exts_by_mime($type)
    {
        static $types = array();

        if (empty($types)) {
            foreach ($GLOBALS['mimetypes'] as $ext => $mimes) {
                foreach ($mimes as $mime) {
                    if ($mime == 'application/octet-stream') {
                        // octet-stream is a generic binary
                        continue;
                    }

                    if (!isset($types[$mime])) {
                        $types[$mime] = array((string) $ext);
                    } elseif (!in_array($ext, $types[$mime])) {
                        $types[$mime][] = (string) $ext;
                    }
                }
            }
        }

        return isset($types[$type]) ? $types[$type] : FALSE;
    }
```

Search.php

```
<?php
use Aura\Html\Escaper as e;


session_start();

include('odm-load.php');

if (!isset($_SESSION['uid'])) {
   redirect_visitor();
}

include('udf_functions.php');

$last_message = (isset($_REQUEST['last_message']) ?
$_REQUEST['last_message'] : '');


$start_time = time();
draw_header(msg('search'), $last_message);

echo '<body bgcolor="white">';
if (!isset($_GET['submit'])) {
   ?>
   <p>

   <table border="0" cellspacing="5" cellpadding="5">
      <form action="search.php" method="get">

         <tr>
            <td valign="top"><b><?php echo msg('label_search_term');
   ?></b></td>
            <td><input type="Text" name="keyword" size="50"></td>
         </tr>
         <tr>
            <td valign="top"><b><?php echo msg('search');
   ?></b></td>
            <td><select name="where">
                  <option value="author"><?php echo msg('author').
"(".msg('label_last_name')." ".msg('label_first_name').")";
   ?></option>
```

```
                <option value="department"><?php echo msg('department');
  ?></option>
                <option value="category"><?php echo msg('category');
  ?></option>
                <option value="descriptions"><?php echo msg('label_description');
  ?></option>
                <option value="filenames"><?php echo msg('label_filename');
  ?></option>
                <option value="comments"><?php echo msg('label_comment');
  ?></option>
                <option value="file_id"><?php echo msg('file');
  ?> #</option>
                  <?php
                  udf_functions_search_options();
  ?>
                <option value="all" selected><?php echo
msg('searchpage_all_meta');
  ?></option>
              </select></td>
        </tr>

        <tr>
          <td><?php echo msg('label_exact_phrase');
  ?>: <input type="checkbox" name="exact_phrase"></td>
          <td><?php echo msg('label_case_sensitive');
  ?><input type="checkbox" name="case_sensitivity"></td>
        </tr>
        <tr>
          <td>
            <div class="buttons"><button class="positive" type="Submit"
name="submit" value="Search"><?php echo msg('search');
  ?></button></div>
          </td>
        </tr>
      </form>
  </table>

  <?php
  draw_footer();
} else {
  function search($where, $keyword, $exact_phrase, $case_sensitivity,
$search_array)
```

Settings.php

```
<?php

session_start();


include('odm-load.php');

if (!isset($_SESSION['uid'])) {
   redirect_visitor();
}

$last_message = (isset($_REQUEST['last_message']) ?
$_REQUEST['last_message'] : '');

$user_obj = new User($_SESSION['uid'], $pdo);
$settings = new Settings($pdo);

if (!$user_obj->isRoot() == true) {
   header('Location: error.php?ec=24');
   exit;
}

if (isset($_REQUEST['submit']) && $_REQUEST['submit']=='update') {
   draw_header(msg('label_settings'), $last_message);

   $settings->edit();

   draw_footer();
} elseif (isset($_REQUEST['submit']) && $_REQUEST['submit'] == 'Save') {
   draw_header(msg('label_settings'), $last_message);

   if (!empty($_POST['dataDir'])) {
      if (substr($_POST['dataDir'], -1) != '/') {
         $_POST['dataDir'] .= '/';
      }
   }
   if (!is_dir($_POST['dataDir'])) {
      $_POST['last_message'] =
$GLOBALS['lang']['message_datadir_problem_exists'];
   } elseif (!is_writable($_POST['dataDir'])) {
      $_POST['last_message'] =
$GLOBALS['lang']['message_datadir_problem_writable'];
```

```
   } elseif ((!is_numeric($_POST['max_filesize'])) | |
(!is_numeric($_POST['revision_expiration']) | |
(!is_numeric($_POST['max_query'])))) {
      $_POST['last_message'] =
$GLOBALS['lang']['message_config_value_problem'];
   } elseif ($settings->save($_POST)) {
      $_POST['last_message'] =
$GLOBALS['lang']['message_all_actions_successfull'];
   } else {
      $_POST['last_message'] =
$GLOBALS['lang']['message_error_performing_action'];
   }

   if (!isset($_POST['last_message'])) {
      $_POST['last_message']='';
   }

   $settings->edit();

   draw_footer();

   $GLOBALS['smarty']->clear_compiled_tpl();
} elseif (isset($_REQUEST['submit']) and $_REQUEST['submit'] == 'Cancel') {
   header('Location: admin.php?last_message=' .
urlencode(msg('message_action_cancelled')));
} else {
   header('Location: admin.php?last_message=' .
urlencode(msg('message_nothing_to_do')));
}
```

User.php

```
<?php
use Aura\Html\Escaper as e;

session_start();

include('odm-load.php');

if (!isset($_SESSION['uid'])) {
   redirect_visitor();
}
```

```
$last_message = (isset($_REQUEST['last_message']) ?
$_REQUEST['last_message'] : '');

$user_obj = new User($_SESSION['uid'], $pdo);

if (isset($_SESSION['uid']) & isset($_GET['item'])) {
   if ($_SESSION['uid'] != $_GET['item'] && $user_obj->isAdmin() != true) {
      header('Location: error.php?ec=4');
      exit;
   }
}

$redirect = 'admin.php';

if ($user_obj->isAdmin() == true) {
   $mode = 'enabled';
} else {
   $mode = 'disabled';
}
if ($mode == 'disabled' && isset($_GET['item']) && $_GET['item'] !=
$_SESSION['uid']) {
   header('Location: error.php?ec=4');
   exit;
}


if (isset($_REQUEST['submit']) and $_REQUEST['submit'] == 'adduser') {
   draw_header(msg('area_add_new_user'), $last_message);

   $onBeforeAddUser = callPluginMethod('onBeforeAddUser');

   $mysql_auth = $GLOBALS["CONFIG"]["authen"] == 'mysql';

   $rand_password = makeRandomPassword();

   $query = "SELECT id, name FROM
{$GLOBALS['CONFIG']['db_prefix']}department ORDER BY name";
   $stmt = $pdo->prepare($query);
   $stmt->execute(array());
   $department_list = $stmt->fetchAll();

   $GLOBALS['smarty']->assign('onBeforeAddUser', $onBeforeAddUser);
```

```
    $GLOBALS['smarty']->assign('mysql_auth', $mysql_auth);
    $GLOBALS['smarty']->assign('rand_password', $rand_password);
    $GLOBALS['smarty']->assign('department_list', $department_list);

    display_smarty_template('user_add.tpl');

    draw_footer();
} elseif (isset($_POST['submit']) && 'Add User' == $_POST['submit']) {
    if (!$user_obj->isAdmin()) {
        header('Location: error.php?ec=4');
        exit;
    }
    $query = "SELECT username FROM {$GLOBALS['CONFIG']['db_prefix']}user
WHERE username = :username ";
    $stmt = $pdo->prepare($query);
    $stmt->execute(array(
        ':username' => $_POST['username']
    ));

    if ($stmt->rowCount() > 0) {
        header('Location: error.php?ec=3');
        exit;
    } else {
        $phonenumber = @$_POST['phonenumber'];

        if (!isset($_POST['can_add'])) {
            $_POST['can_add'] = 0;
        }
        if (!isset($_POST['can_checkin'])) {
            $_POST['can_checkin'] = 0;
        }

        $query = "INSERT INTO {$GLOBALS['CONFIG']['db_prefix']}user
                (username, password, department, phone, Email,last_name,
first_name, can_add, can_checkin)
                VALUES(
                    :username,
                    md5(:password),
                    :department,
                    :phonenumber,
                    :email,
                    :lastname,
                    :firstname,
```

View.php

```
<?php

session_start();

include_once('odm-load.php');

if (!isset($_SESSION['uid'])) {
   redirect_visitor();
}

$last_message = (isset($_REQUEST['last_message']) ?
$_REQUEST['last_message'] : '');

if (!isset($id) || $id == '') {
   header('Location:error.php?ec=2');
   exit;
}

$filedata = new FileData($id, $pdo);
$filedata->setId($id);

if ($filedata->getError() != '') {
   header('Location:error.php?ec=2');
   ob_end_flush();      // Flush buffer onto screens
   ob_end_clean();      // Clean up buffer
   exit;
} else {
   if (!isset($submit)) {
      draw_header('View File', $last_message);

      $GLOBALS['smarty']->assign('file_id', $filedata->getId());
      display_smarty_template('view.tpl');

      draw_footer();
   }
   else {
      $id = $filedata->getId();
      $realname = $filedata->getName();

      $filename = $GLOBALS['CONFIG']['dataDir'] . $_POST['id'] . '.dat';

      if (file_exists($filename)) {
```

```
            // send headers to browser to initiate file download
            header('Content-Type: application/octet-stream');
            header('Content-Disposition: attachment;
filename='.rawurlencode($realname));
            readfile($filename);

            // Call the plugin API
            callPluginMethod('onViewFile');
        } else {
            echo 'File not readable...';
        }
    }
}
```

DATA SHEETS

		Functionality									Usability				Reliability					Security		Adaptation				Implementation		
Office	Q. Number	A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	E1	E2	E3	E4			
1	1	5	5	5	5	5	4	5	4	4	4	5	5	4	4	5	4	5	5	4	5	5	5	5	5	3		
1	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3		
1	3	5	4	5	5	5	5	5	4	5	5	5	5	5	4	5	5	5	4	5	5	4	5	5	4	3		
1	4	5	4	5	5	4	5	5	4	5	5	5	5	4	5	4	5	5	5	5	5	5	5	4	5	3		
1	5	5	5	5	4	5	4	5	5	4	4	4	4	5	5	5	5	4	5	5	4	5	5	5	4	3		
1	6	5	5	5	5	5	5	5	5	5	5	5	4	5	4	4	5	5	4	4	5	5	5	5	5	3		
1	7	5	5	5	4	5	5	5	4	5	5	4	5	5	5	4	5	5	5	4	5	5	4	4	5	3		
1	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3		
1	9	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3		
1	10	4	4	4	4	4	5	5	5	5	5	5	5	5	5	4	5	5	5	4	4	4	4	4	4	3		
	5	9	7	9	7	8	8	10	6	8	8	8	8	8	7	6	9	9	8	6	8	8	8	7	7	10	**3**	
Frequenc	**4**	1	3	1	3	2	2	0	4	2	2	2	2	2	3	4	1	1	2	4	2	2	2	3	3	0	**2**	
y Count	**3**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	5	45	35	45	35	40	40	50	30	40	40	40	40	40	35	30	45	45	40	30	40	40	40	35	35	30	**3**	
	4	4	12	4	12	8	8	0	16	8	8	8	8	8	12	16	4	4	8	16	8	8	8	12	12	0	**2**	
B*Col	**3**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
COL SUM		49	47	49	47	48	48	50	46	48	48	48	48	48	47	46	49	49	48	46	48	48	48	47	47	30		
WEIGHED MEAN		4.9	4.7	4.9	4.7	4.8	4.8	5	4.6	4.8	4.8	4.8	4.8	4.8	4.7	4.6	4.9	4.9	4.8	4.6	4.8	4.8	4.8	4.7	4.7	3		
CATEGORY MEAN						4.8						4.8					4.78			4.7			4.75					
GRAND MEAN													4.78															

Subject	
Office	
Registrar	
Research	
PART III	
YES	
Undecided	
NO	

Office	Q. Number	Functionality									Usability				Reliability					Security		Adaptation				Implementation	
		A1	A2	A3	A4	A5	A6	A7	A8	A9	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	E1	E2	E3	E4		
2	11	5	4	5	5	4	5	5	4	4	5	4	5	5	5	5	5	5	4	5	5	5	5	5	5	3	
2	12	4	4	4	4	4	5	4	5	5	4	4	4	4	4	4	5	4	5	5	5	4	4	4	4	3	
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2	18	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	
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2	29	5	5	5	4	5	4	5	5	4	5	5	4	4	5	5	5	4	5	5	5	5	5	4	5	2	
2	30	4	5	5	5	5	5	4	5	4	5	4	5	5	4	4	5	4	4	4	4	5	5	4	4	3	
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2	32	4	4	4	5	4	4	4	5	4	4	4	5	4	5	5	5	4	5	4	5	5	4	5	5	2	
2	33	4	4	4	5	4	4	4	5	4	4	4	5	4	5	5	5	4	5	4	4	5	4	4	4	3	
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2	35	4	5	5	5	4	4	4	5	5	4	4	4	5	4	4	4	5	4	4	4	4	4	4	5	3	
2	36	4	4	4	5	4	4	4	5	4	5	5	5	4	4	4	4	4	5	5	5	4	4	4	5	3	
2	37	4	4	4	4	5	4	4	4	5	4	4	4	5	4	4	4	5	4	5	5	4	4	5	5	3	
2	38	5	5	5	4	4	4	4	5	4	4	4	5	5	5	5	5	4	4	5	5	4	4	5	4	2	
2	39	4	4	5	4	4	4	4	5	4	4	4	4	4	5	5	4	5	5	4	4	4	4	5	4	3	
2	40	5	4	4	4	5	5	4	5	4	4	4	4	5	4	4	4	5	5	4	4	4	4	5	5	3	
	5	15	14	18	18	16	14	12	22	14	14	16	14	15	17	15	19	18	18	15	16	12	10	19	17	27	**3**
	4	15	15	11	12	14	16	18	8	15	16	14	15	13	12	14	11	11	12	14	14	16	18	11	12	3	**2**
Frequenc y Count	**3**	0	1	1	0	0	0	0	0	1	0	0	1	2	1	1	0	1	0	1	0	2	2	0	1	0	**1**
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	5	75	70	90	90	80	70	60	110	70	70	80	70	75	85	75	95	90	90	75	80	60	50	95	85	81	**3**
	4	60	60	44	48	56	64	72	32	60	64	56	60	52	48	56	44	44	48	56	56	64	72	44	48	6	**2**
B*Col	**3**	0	3	3	0	0	0	0	0	3	0	0	3	6	3	3	0	3	0	3	0	6	6	0	3	0	**1**
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
COL SUM		135	133	137	138	136	134	132	142	133	134	136	133	133	136	134	139	137	138	134	136	130	128	139	136	87	
WEIGHED MEAN		4.50	4.43	4.57	4.60	4.53	4.47	4.40	4.73	4.43	4.47	4.53	4.43	4.43	4.53	4.47	4.63	4.57	4.60	4.47	4.53	4.33	4.27	4.63	4.53	2.9	
CATEGORY MEAN						4.52						4.47					4.56			4.50			4.44				
GRAND MEAN													4.50														

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Chapter 1-3.docx

Date: 2019-04-03 19:21 CST

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[41] https://www.researchgate.net/profile/Ngu...rvice-In-Vietnam.pdf
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[42] "BACHAO Thesis October 2018 PLAGSCAN.docx" dated 2018-10-24
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NATHANIEL GUIO A. MENDOZA

CONTACT INFORMATION

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E-mail	nathanielguio.mendoza@ssu.edu.ph
Mobile Phone	+639051435328

EDUCATIONAL ATTAINMENT

Graduate	Samar State University Masters of Science in Information Technology, 2019
College	Samar State University Bachelor of Science in Information Technology, 2013
High School	Samar National School, 2009
Grade School	Catbalogan I Central Elementary School, 2005

CURRENT RESEARCH INTERESTS

- Graphic Design
- Web
- Machine Learning and Artificial Intelligence

WORK EXPERIENCE

May 29, 2017 – Present	*Instructor I* Samar State University Arteche Blvd. Catbalogan City, Samar College of Arts and Sciences

	Subjects Taught: PC Troubleshooting, Web Development, Multimedia, DBMS, Operating System, Special Topics in IT Trends
July 1,2016 - March 15, 2017	*Part-time Instructor* Samar State University Arteche Blvd. Catbalogan City, Samar College of Arts and Sciences
March 22, 2016 – March 15, 2017	*Web and Graphics Designer/IT Technician* Samar State University Arteche Blvd. Catbalogan City, Samar
Sept. 2, 2014 – January 18, 2016	*Web and Graphics Designer* ITECH-PFS Technology, Inc. Catbalogan City, Samar
October 29, 2013- Sept. 1, 2014	*Web and Graphics Designer* Dalang Web Design Catbalogan City, Samar

OUTREACH and OTHER SEMINARS CONDUCTED

- Resource Person: BPLS Automation/COmputerization and Data Build-Up 2019-08-13 2019-08-16 32 Technical Department of Information and Communications Technology, DILG "DILG Leyte Traininer Center, Kanhuraw Hill, Tacloban City
- "Resource Speaker: TOPIC: Multidisciplinary Blended-Learning Formats (Google Classroom, etc.) during the Faculty In-House Seminar-Workshop: Internationalization via Digitization: Preparing SSU Classrooms for Multi-Disciplinary Blended-Learning Format 2019-07-22 2019-07-26 4 Technical Samar State University - VP for Academic Affairs Samar State University Convention Center"Resource Speaker, "5th SSU PRESS CONFERENCE", 2018-01-29 - 2018-01-30, Samar State University The Tradesman, Samar State University Audio Visual Center
- Resource Speaker, "Training of Faculty on Enrolment System", 2018-07-26 - 2018-07-27, Samar State University ICT Office, Samar State University NCAS Room 13
- Resource Speaker, "4th SSU Press Conference", 2016-12-16 - 2016-12-16, Samar State University The Tradesman, Samar State University AVC

TRAININGS/SEMINARS ATTENDED

- AACCUP 4th Survey Visit of the DMEDM, TM, BSED, BSCE and BSEE 2019-04-29 2019-05-03 Samar State University Quality Assurance Samar State University
- Training of Trainers (TOT) Web Implementation Using WordPress Content Management System (CMS) 2019-08-19 2019-08-23 40 Technical DICT (Department of Science in Information Technology) DICT (Department of Science in Information Technology) Regional Office 8, Tacloban City
- Faculty In-House Seminar-Workshop: Internationalization via Digitization: Preparing SSU Classrooms for Multi-Disciplinary Blended-Learning Format 2019-07-22 2019-07-26 40 Technical Samar State University - VP for Academic Affairs Samar State University Convention Center
- EPSON SSU Pocket Talk 2019-01-25 2019-01-25 BBCS and EPSON Nana Manuelas
- Rural Impact Sourcing Technical Training on Digital Marketing and ECommerce 2018-10-10 2018-12-06 DICT, DTI, Samar Provincial Government DICT, DTI, Samar Provincial Government
- 2018 In House Review2018-11-07 2018-11-08 Samar State University Research and Extension Samar State University
- AACCUP Preliminary and Second Survey Visit 2018-09-28 2018-08-29 Samar State University QA Samar State University
- 1st International Conference on Poverty Alleviation and Sustainable Development (iPOVCON) 2018-08-15 2018-08-17 Samar State University Samar State University Gymnasium
- Google IO 2017 Extended Leyte 2018-08-08 2018-08-08 Google Developer Group Cebu Ritz Hotel, Tacloban City
- Certified Cabling Test Technician Associate 2018-06-29 2018-06-29 ABIDE, Inc. Samar State University College of Engineering
- Certified Cabling Test Technician (CCTT) 2018-06-28 2018-06-28 ABIDE, Inc. Samar State University College of Engineering
- ABIDE CERTIFIED FIBER OPTIC INSTALLER (CFOI) 2018-06-27 2018-06-27 ABIDE, Inc. Samar State University College of Engineering
- Abide Certificate Copper Installer 2019-06-25 2018-06-26 ABIDE, Inc. Samar State University College of Engineering
- Abide Certified Distribution Designer Associate (CDDA) 2018-06-25 2018-06-25 ABIDE Inc. Samar State University College of Engineering
- Sangguniang Kabataan (SK) Mandatory Training 2018-04-19 2018-05-26 DILG and Samar State University Samar State University COED Building
- MoodleMoot Philippines 20182018-04-26 2018-04-27 Nephila Web Technology Inc. Nephila Web Technology Inc.
- Nationwide Information Caravan for RA 10931 2018-04-25 2018-04-25 CHED UniFAST Leyte Academic Center Pawing, Palo, Leyte

- Training on Writing Research Project in Data Analytics 2018-03-05 2018-03-06 (NwSSU) Northwest Samar State University (NwSSU) Northwest Samar State University
- 2018 In House Review for Samar State University Extension Programs 2018-02-07 2018-02-07 Samar State University Research and Extension Office Samar State University Audio Visual Center
- Seminar on Thesis & Dissertation Writing 2018-01-13 2018-01-14 Samar State University CGS Samar State University CGS
- Business Permits and Licensing System (BPLS) Coaches Conference2017-12-08 2017-12-08 DICT and DILG DILG 08 Trianing Center, Kanhuraw Hill, Tacloban City
- Coaching and Mentoring of LGUs ON BPLS AutomationComputirization Cum eBPLS User Training 2017-12-04 2017-12-07 DICT and DILG Hotel Consuelo, Tacloban City
- Coaching and Mentoring of LGUs ON BPLS AutomationComputirization Cum eBPLS User Training 2017-11-14 2017-11-17 DICT and DILG Hotel Consuelo, Tacloban City
- Patent Drafting SeminarWorkshop for the Preparation of a Patent Application 2017-10-26 2017-10-27 Samar State University TLISO Samar State University TLISO
- Web Development Course 2017-10-09 2017-10-13 DICT (Department of Information and Commmunications Technology) DICT (Department of Information and Commmunications Technology)
- Angle: WHATs and HOWs of a Research Journal 2017-09-15 2017-09-15 Samar State University Research and Extension Office M Grand Royale Resort and Hotel, Catbalogan City
- 1st National Conference on Poverty and Sustainable Development 2017 (POVCON) 2017-09-13 2017-09-15 Samar State University RCCSI M Grand Royale, Catbalogan City
- 2017 Student Invention Contest & Exhibit 2017-09-05 2017-09-05 Samar State University TLISO Samar State University TLISO
- eBPLS Promotional Activity 2017-08-18 2017-08-18 DICT and DILG Robinsons Place, Tacloban City
- Workshop on Writing & Publishing in ISI Journals 2017-07-25 2017-07-26 Samar State University CESTISamar State University CESTI
- Organization and Training of Coaches and Mentors on Business Permits and Licensingg System (BPLS) AutomationComputerization 2017-07-10 2017-07-14 DICT and DILG Smallville Commercial Complex, Iloilo City

- InHouse Seminar Workshop on Academic Processes towards SSU Quality and Excellence 2017-06-29 2017-06-01 Samar State University Samar State University

- Training 2017-04-25 2017-04-25 Bits and Bytes Computer Systems (BBCS) Bits and Bytes Computer Systems (BBCS)
- Basic Documentary Video Production Seminar Workshop 2017-04-21 2017-04-24 Samar State University CFARRD Samar State University CFARRD
- UCLG ASPAC 2017-04-04 2017-04-07 UCLG ASPAC and City of Catbalogan Samar State University
- ISO 9001:2008 Stage 2 External Audit 2017-03-14 2017-03-17 Samar State University Quality Assurance Samar State University
- 1st Intellectual Property Conference for Students 2017-02-14 2017-02-14 Samar State University TLISO Samar State University AVC
- Gender Sexuality and Reproductive Health Training 2016-09-11 2016-09-02 Samar State University GAD Sama State University
- Psychological FirstAid Seminar Workshop 2016-03-05 2016-03-05 Samar State University Samar State University
- TESDA Computer Systems Servicing National Certificate II 2016-03-04 2016-03-04 TESDA TESDA
- The Philippine Association for Graduate Education (PAGE) REGION VIII 2015-08-29 2015-08-29 Commission on Higher Education (CHED) Commission on Higher Education (CHED)
- Payapa and Masaganag Pamayanan Orientation Program 2014-09-27 2014-09-27 Samar State University CGS Students Mabuhay Hall, Samar State University

- TESDA Computer Hardware Servicing National Certificate II 2013-09-16 2013-09-16 TESDA TESDA
- Computer Hardware Servicing2013-08-15 2013-09-15 Innovate ICT Systems Innovate ICT Systems
- 2013 College of Arts and Sciences Enrichment Program 2013-03-01 2013-03-01 Samar State University CAS Samar State University CAS
- GAP Labs Webcamp 2013 2013-02-23 2013-02-24 GapLabs and GoAbroad Philippines GapLabs and GoAbroad Philippines
- DLCC NEW CREATION SEMINAR2012-12-01 2012-12-02 DLCC DLCC Formation Center, Brgy. Canlapwas, Catbalogan City
- Leyte Samar IT Summit 2012-09-07 2012-09-07 LESITS 3rd Floor Library Hall UP Tacloban
- Integrated Sangguniang Kabataan Organizational Leadership and Reorientation Basic Orientation Seminar (ISKOLARBOS)2012-05-11 2012-05-13 City Govt of Catbalogan and DILG City Govt of Catbalogan and DILG

MEMBERSHIP IN UNIVERSITY/PROFESSIONAL ORGANIZATIONS

PSITE Region VIII

REFERENCES:

Dr. Ronald L. Orale
Professor
VP for Research and Extension
Samar State University

Zaldy A. Jabiñar
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College of Arts and Sciences
Samar State University

Marilyn D. Cardoso
University President
Samar State University
Catbalogan City

07-23-19/Nathaniel Guio A. Mendoza_CV

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