

**MSU – EDAAMS: Mindanao State University Main Campus Electronic Document
Approval and Archive Management System**

A Research Project Proposal

In Partial Fulfillment of the Requirements
in the Degree Bachelor of Science in Information Technology

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Chapter 1

Introduction

For the past many years, documents recording management and retrieval of information were we all did until 80's when word refining into our life. Quickly, documents were come into hard copy and on computerized.

With today's rapid technological advancements, organization and systems must adapt to these changes and use technology to streamline their transactions and processes. Every corporate activity relies heavily on documents. Documents are sent back and forth between department. In this way, many institutions using a comprehensive EDMS easily manage all information produced internally and externally. Therefore, in terms of efficiency and productivity in service provision, this system still works at a higher level compared to the institutions that serve with traditional methods. Successful implementation of EDMS is a necessity for every institution since these systems speed up the business processes and provide convenience to the users (Ayaz, A, & Yanartas, M. 2020)

One of the challenges faced by different organizations is how to handle their pile of documents and files. Conventionally, organizations store documents in their flash drives, email threads, or personal computer. The current method of organizing seems to be very hard and time-consuming; thus developing an information system that is efficient and effective in organizing and managing files is highly recommended. (Whittaker, Steve and Julia Hirschberg 2001)

The capstone project, entitled “Mindanao State University Main Campus E – Document Approval and Archive Management System,” is designed as a centralized platform to streamline file organization and management. The system will streamline the process of submission and approval of the documents, which is efficient and timely. The said project will allow the school record document to store their document in a centralized platform to ease up and simplify the process of retrieval.

Project Context

An electronic document management system (EDMS) is a software system for organizing and storing different kinds of documents. This type of system is a more particular kind of document management system, a more general type of storage system that helps users to organize and store paper or digital documents. EDMS refers more specifically to a software system that handles digital documents, rather than paper documents, although in some instances, these systems may also handle digital scanned versions of original paper documents.

The Mindanao State University main campus (MSU main) Records and Management Office faced difficulties to handle their piles of document and important files, stored in their flash drive, email threads, or personal computers. The current method of organizing seems to be very hard and time consuming.

By developing a "Electronic Document Approval and Archive Management System," which will computerize the process of approving the documents (Academic Special Order and Memorandum) by the different department Deans, OVCAA staff,

Office of the President and lastly the Record Management Office, as well as automate the process of managing all these documents by effectively archiving them, the researchers hope to lessen the issue the Record Management Office is having as well as all the employees involved in the paper documents process. This will help secure the documents and reduce the work that must be exerted by the employees as well.

Statement of the Problem

Having taken note of the matter that had taken place on the interview with the Director of Record Management Office, along with the other staff, the researchers advocate the creation of Electronic Document Approval and Archive Management System.

The proposed system aims to solve the following problems:

1. What are the difficulties encountered in the current process of approving MSU Academic Special Order and Memorandum in the current system?
2. What system can be developed to address the encountered difficulties with regard to the current system?
3. What is the extent of efficiency of the proposed system “Electronic Document Approval and Archive Management System” compared to the current system?

Objectives of the Study

The researchers, generally aim to design and develop a web system that serves as a centralized platform for file organization and management.

The researchers specifically aim the following objectives.

- To gather data and information specifically in MSU Records Management Office.
- To design the database structure and a system that electronically stores MSU Academic Special Order and Memorandum documents.
- To develop a web system that allows members of MSU Main Campus to store, process and retrieve academic Special Orders and Memorandum documents electronically.
- To test the system with the identified staff and faculties and will be asked for their feedback after testing.

Significance of the Study

The success of the project is deemed beneficial to the following:

MSU – Records Management Office. The system's success has been regarded as advantageous to a variety of different departments in school campus.

They would be able to keep and store critical documents more efficiently with the help of the system.

It will streamline and simplify the document endorsement and approval procedure. The system will also make document tracking and updating simple, quick and convenient.

Users. Users who are authorized have easy access to the document they require. They can also easily upload documents into the system for approval, storage, and retrieval during the update.

- a. Chairperson
- b. Dean
- c. OVCAA staff
- d. Office of the President staff

Researchers. Their participants in the project can enhance their experience as developers.

The project's development will help them improve their research abilities and expertise.

Future Researchers. They can refer to the study while developing their version of the Approval Process with File Management System.

Scope and Limitation

The researchers are primarily concerned with the design, development, and implementation of an automated Approval and File Management Process.

The system will only allow authorized members of the university to view and process endorsement documents electronically.

The project's respondents are the school campus departments chairpersons, deans, OVCAA, Office of the President, and Record Management System.

The proposed project is intended to be able to upload, retrieve, track, feedback, print, approve and archive document file. The system will ease up and simplify the approval and retrieval process of MSU Academic Special Orders and Memorandums documents. The file type is limited to pdf only.

Chapter 2

Review of Related Literature and Systems

2.1 Research or Related Literature

2.1.1 Electronic Record Management System

An Electronic Document and Record Management System (EDRM) is a computer program (or set of programs) used to track and store records. The term is distinguished from imaging and document management that specialize in paper capture and document management respectively. ERM systems commonly provide specialized security and auditing functionality tailored to the needs of records managers.

The National Archives and Record Administration (NARA) has endorsed the U.S Department of Defense standard 5015.2 as an “adequate and appropriate basis for addressing the basic challenges of managing records in the automated environment that increasingly characterizes the creation and use of records.” Records Management vendors can be certified as compliant with the DoD 5015.2-STD after verification from the Joint Interoperability Test Command which builds test case procedures, writes detailed and summary final reports on 5015.2-certified products, and performs on-site inspection of software.

The National Archives in the UK has published two sets of functional requirements to promote the development of the electronic records management software market (2000 and 2002). It ran a program to evaluate products against the 2002 requirement. While these requirements were initially formulated in collaboration with

central government, they have been taken up with enthusiasm by many parts of the wider public sector in the UK and in other parts of the world. The testing of the program has now closed. The National Archives is no longer accepting application for testing. The National Archives 2002 requirements remain current.

The European Commission has published “MoReq,” the Model Requirement for Electronic Records and Document Management in 2001. Although not a formal standard, it is widely regarded and referred to as a standard. This was funded by the Commission’s IDA program, and was developed at the instigation of the DLM Forum. A major update of MoReq, known as MoReq2, was published in February 2008. This was initiated by the DLM Forum and funded by the European Commission, on this occasion by its IDABC

2.2 Related Studies

Azad Adam (1990) The task of managing documents and records goes far back, even before the beginning of civilization. Our early ancestors, the cavemen, used to draw pictures on the walls of their caves, depicting events of their times. This can be thought of as the earliest known form of record keeping, i.e., recording events for future reference. Egyptian hieroglyphics are another example of primitive record keeping. In both these cases, historians have been able to obtain information indirectly about the environment and activities of people from bygone eras.

Jones (2012) Documents are essentially the stored memory of an organization and record the way in which procedure is done. Forbes – Pitt (2006) Appropriate Document Management makes information more easily retrievable, readily identifiable and economically manageable.

Cho (2010). The primary function of an electronic DM system (EDMS) is to facilitate the free flow of records through an organization, and to ensure the availability of information upon request. Increasingly, EDMSs are vital to organizations and information-using employees. Even though the cost and effort of implementing such a system is high, an EDMS helps the organization to achieve more efficient operations by reducing transaction costs, automating process, improving capacity, minimizing errors, and saving on labor. However, the high failure rates of EDMS implementation have prompted both academics and practitioners to try to understand and pinpoint the critical factors that affect the success of this type of project

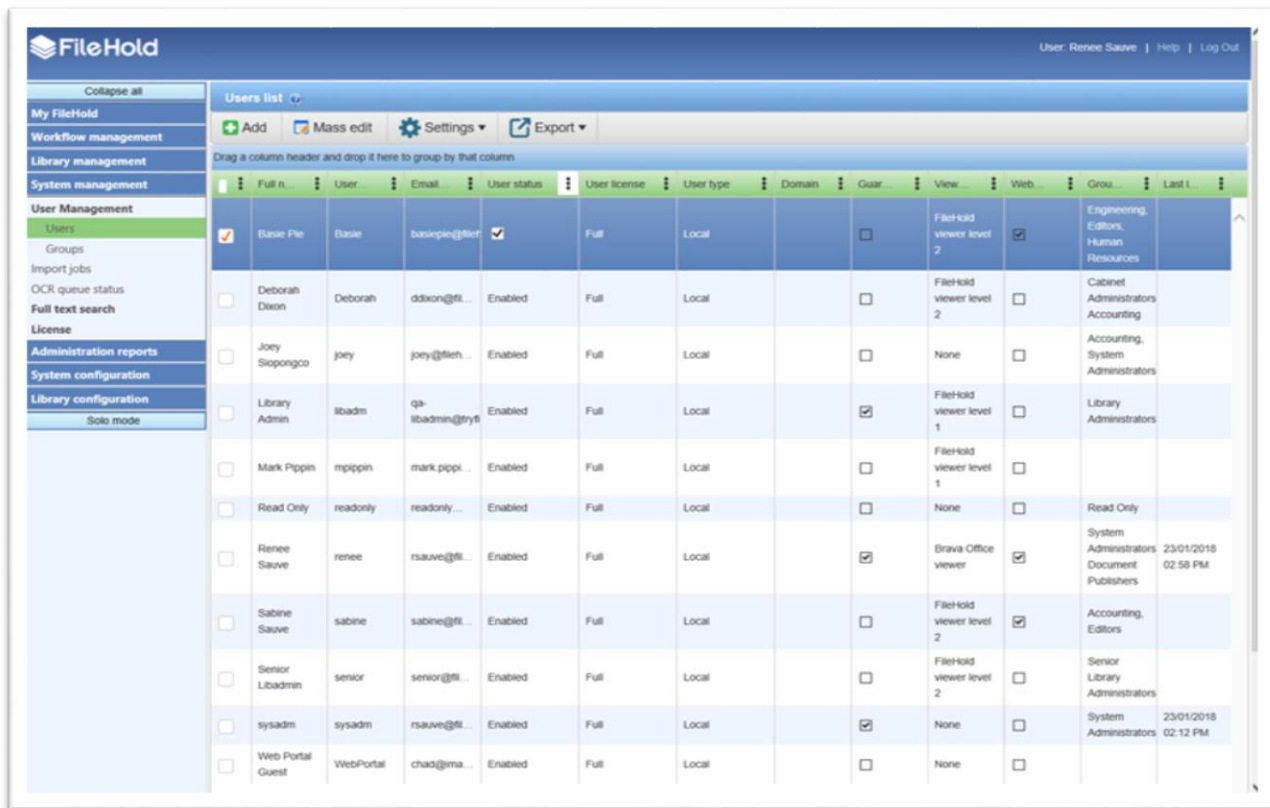
Kain and Koshy (2013) Document management is gaining a new and crucial role in promoting electronic business services. The effective deployment of an EDMS is an important element in establishing a virtual workplace environment and transforming the capabilities of a modern organization and its workforce

Ozaliene and Saparniene (2009). While EDMS are becoming an increasingly significant part of the technological infrastructure in many corporations, their application is not well understood, partly because of the lack of systematic research investigating the factors for successful EDMS implementation

McLeod, Child, and Hardiman (2011) Although there are several studies available on the benefits of EDMSs, the literature in regard to EDMS implementation is limited. This is probably due to facts that, although some organizations in both the public and private sectors have been experimenting with technological solution to manage electronic information, the practice is still not wide-spread or longstanding.

2.3 Related System

2.3.1 FileHold



	Full n...	User...	Email...	User status	User license	User type	Domain	Quar...	View...	Web...	Grou...	Last l...
<input checked="" type="checkbox"/>	Basie Pie	Basie	basiepie@fil...	Enabled	Full	Local		<input type="checkbox"/>	FileHold viewer level 2	<input checked="" type="checkbox"/>	Engineering, Editors, Human Resources	
<input type="checkbox"/>	Deborah Dixon	Deborah	ddixon@fil...	Enabled	Full	Local		<input type="checkbox"/>	FileHold viewer level 2	<input type="checkbox"/>	Cabinet Administrators Accounting	
<input type="checkbox"/>	Joey Siopongo	joey	joey@fil...	Enabled	Full	Local		<input type="checkbox"/>	None	<input type="checkbox"/>	Accounting, System Administrators	
<input type="checkbox"/>	Library Admin	libadm	qa-libadmin@tr...	Enabled	Full	Local		<input checked="" type="checkbox"/>	FileHold viewer level 1	<input type="checkbox"/>	Library Administrators	
<input type="checkbox"/>	Mark Pippin	mpippin	mark.pppi...	Enabled	Full	Local		<input type="checkbox"/>	FileHold viewer level 1	<input type="checkbox"/>		
<input type="checkbox"/>	Read Only	readonly	readonly...	Enabled	Full	Local		<input type="checkbox"/>	None	<input type="checkbox"/>	Read Only	
<input type="checkbox"/>	Renee Sauve	renee	rsauve@fil...	Enabled	Full	Local		<input checked="" type="checkbox"/>	Brava Office viewer	<input checked="" type="checkbox"/>	System Administrators Document Publishers	23/01/2018 02:58 PM
<input type="checkbox"/>	Sabine Sauve	sabine	sabine@fil...	Enabled	Full	Local		<input type="checkbox"/>	FileHold viewer level 2	<input checked="" type="checkbox"/>	Accounting, Editors	
<input type="checkbox"/>	Senior Libadmin	senior	senior@fil...	Enabled	Full	Local		<input type="checkbox"/>	FileHold viewer level 2	<input type="checkbox"/>	Senior Library Administrators	
<input type="checkbox"/>	sysadm	sysadm	rsauve@fil...	Enabled	Full	Local		<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	System Administrators	23/01/2018 02:12 PM
<input type="checkbox"/>	Web Portal Guest	WebPortal	chad@ima...	Enabled	Full	Local		<input type="checkbox"/>	None	<input type="checkbox"/>		

Figure 2.1 File Hold Report

FileHold Document Management System (DMS) is intuitive and easy to use. The filing structure is designed to mirror the physical office filing system that everyone is familiar with. FileHold provide 5 levels of filing hierarchy: cabinet, drawers, folder group (categories), folders, documents.

FileHold provides its customers with many options for document numbering and version control. FileHold has a very flexible and user configurable design to accommodate different industries that have different requirement for number schemes. Some numbering

requirements are based on historical work methodologies and some are based on specific industry requirements and for compliance.

2.3.2 FileCenter Pro

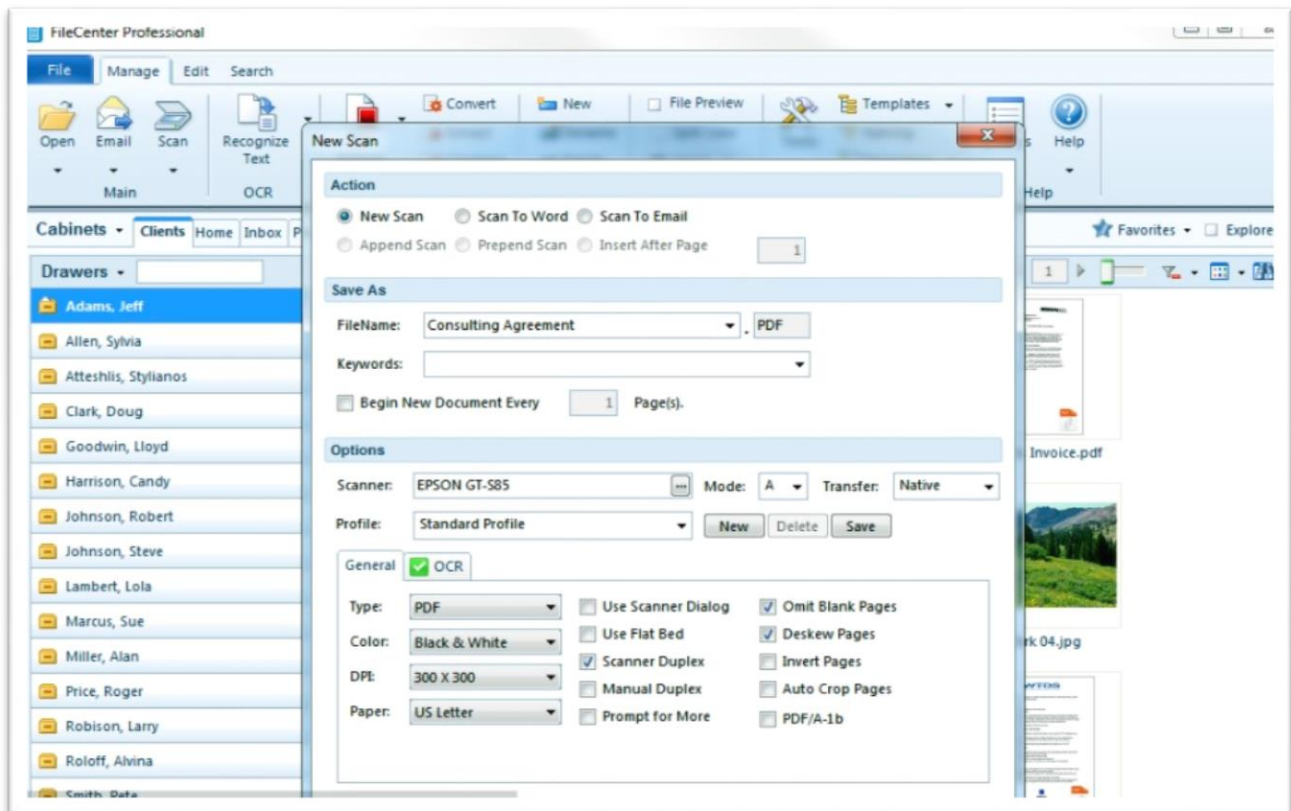


Figure 2.2 Adding Document in FileCenter Pro

FileCenter Pro works with most printers. When you scan a file, you can use the software's optical character recognition (OCR) capabilities to read the text. This makes the document ready for editing, and it allows you to run a full-text search if you can't remember where you filed a document. FileCenter can convert any file to a PDF, and once converted, you get a wide range of options to combine or split file as you need to add your digital terms-and-condition file to a paper contract, you can convert both into a PDF and link them as a new file.

For as intuitive and simple as FileCenter Pro is, this document tracking system does not offer any kind of workflow control. Fortunately, it integrates well into a single user's workflow. You can save your word processor document directly from FileCenter, as well as send emails from the software and upload files to it from mobile devices.

FileCenter Pro is also good in searching document, so well will use this as a guide for implementing the search structure of the proposed project.

2.3.3 OpenKM

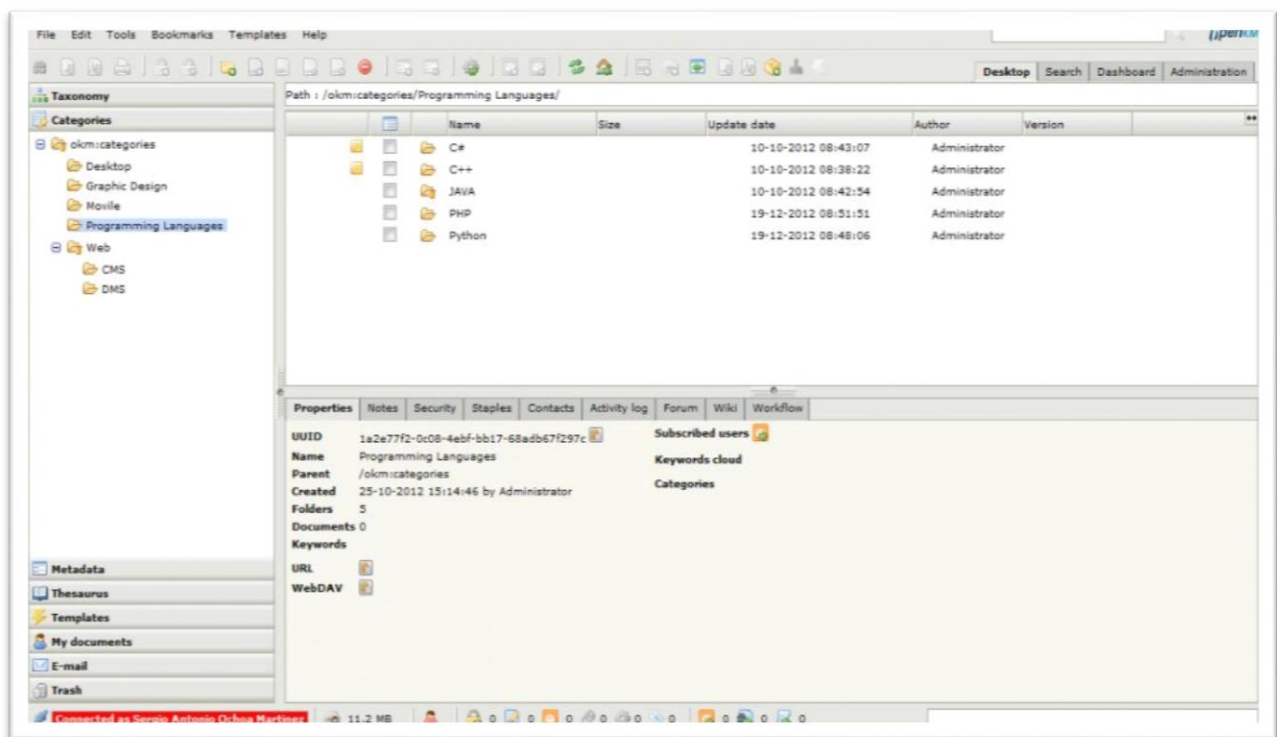


Figure 2.3 OpenKM desktop interface

OpenKM is focused on creating an Open Source Electronic Document Management System, that due to its characteristics can be used by big companies as

well as by small ones as a useful tool in processing knowledge management, providing a more flexible and cost effective alternative to other proprietary applications.

2.3.4 Summary Comparison Matrix

Systems	Upload	Download	Approve	Review	Feedback	E- signature	Retrieve	Track
Filehold	✓	✓	✓			✓	✓	
Filecenter	✓	✓					✓	
OpenKM	✓	✓				✓	✓	
EDAAMS	✓	✓	✓	✓	✓	✓	✓	✓

Figure 2.3.4.1 Feature of EDRMS of Filehold, Filecenter and OpenKM and the proposed system

2.4 Technical Background

Most of the transactions in Mindanao State University Main Campus are done manually with papers. Papers involved during transaction were tracked by the employees, who personally verify the paper documents, by going from one office to another in order to get all the necessary signature for the paper document to be released, which in some cases takes too much time and energy. After these transactions, all managed paper documents are added to a stack of papers. This large amount of paper documents is hard to index and maintained especially with the limited number of employees or personnel to retrieve a specific paper document.

The Director of Record Management Office tried to improvise these stacks of paper documents by making a digital copy of the paper documents and putting them in a single excel format, linking every digital copy of it. But the problem here is the more linked digital copy of document is inserted to the excel file, the longer the excel file takes to be opened each time.

The researchers want to reduce the problem the Record Management Office is having as well as all the employees involved in the paper documents process by creating a "Electronic Document Approval and Archive Management System", which will computerize the process of approving the documents as well as automate the process of managing all these documents by efficiently archiving them, which will help secure the documents and lessen work that has to be exerted by the employees as well as shorten the time consumption in the retrieval of documents.

Record Management Office (RMO)

Issuance of Request Documents in Certified True Copy (CTC) & Photocopy of

Documents Records

Citizen's Charter

Office or Division	Records Management Office, Office of the President
Classification	Simple
Type of Transaction	Government-to-Citizen (G2C), Government-to-Government (G2G)
Who May Avail	Students, Faculty, Staff and other Constituents

CHECKLIST FOR REQUIREMENTS	WHERE TO SECURE
1.Request slip (1 copy)	Record Management Office
2. Valid ID (Original ID and 1 Photocopy)	Requesting person and/or authorized person
3. For authorization representative	Requesting Person

Client	Agency action	Fees to be paid	Processing time	Person responsible
1. Accomplish and submit the duly filled-up request slip	1.1 provide client the requisition slip form	none	5 minutes	RMO assistant
	1.2 receive the form and search document/record	none	5 minutes	RMO assistant

	1.3	print or photocopy the request document/record	none	5 minutes	RMO assistant
	1.4	once the documents are obtained, records officer will review and verify the document/records and certify true copy	None	5 minutes	Records officer RMO Secretary RMO Chief
2. Receive the requested document	2.1	release the document/records to the client		5 minutes	Records officer RMO Secretary RMO Chief
	TOTAL:			25 minutes	

2.4.1 Technical Details

Table 2.1 Developer's Hardware Detail

Processor	Intel Core i5
RAM	8 GB
Monitor	1920 x 1080 at 60Hz
GPU	Intel® UHD Graphics
System Video Memory	128 MB

Table 2.2 Developer's Software Detail

Operating System	Windows 10
Browser	Mozilla Firefox / Google Chrome / Microsoft Edge
Programming Language	PHP, HTML, CSS MySQL, JQuery, JavaScript, Bootstrap
Web Server	Node JS
Application	Visual Studio Code, Figma, Photoshop, Workbench

CHAPTER 3

METHODOLOGY

3.1 Project Concept

The project concept that builds on the previous DMS concepts includes tracking, notifications, and document approval could involve creating a digital workflow management system. This system would allow users to create and manage processes for reviewing and approving documents, such as Memorandum, and Special Orders.

The system would include all the features of the DMS, such as secure storage, organization, and collaboration tools. Additionally, it would include the tracking and notification features, so users can see the history of changes made to a document and receive updates on its status.

The key feature of the Electronic Documents Approval and Archives Management System would be the ability to set up and manage document approval processes. System will specify the steps required for a document to be approved, such as routing it to specific reviewers and requiring a certain number of approvals. The system would provide visibility into the current status of a document, and alert users when it is their turn to review and approve the document.

This system could be useful for organizations that need to manage complex document review and approval processes, and ensure that all documents are properly reviewed and approved before being finalized. It could streamline these processes and make them more efficient and transparent.

3.2 System Analysis and Design

3.2.1 Requirement Analysis

3.2.1.1 Data Gathering

The main objective of the study is to computerize the processes needed to release a document without the employees needing to personally visit one office to another just to get all the necessary approvals. During the interview with the Director of the Record Management Office, He stated that the office wants to computerize the process of getting all the approval from different offices involved in a document as well as track its progress from the time it was uploaded until it is released and archived. The Director also showed us his improvised way of storing documents by linking them to an excel document format, he stated that although it is digitally stored, the problem is with the performance as the more document are linked to the excel document the longer it takes to open and interact with the files. Some of the files are still managed manually in a separate space for assurance in case of file corruption in the excel file.

3.2.1.1 System Usability Scale (SUS)

The System Usability Scale (SUS) is a commonly used tool to measure the usability of a product or system. It is typically used after the product or system has been developed and is ready for testing. It can be used to evaluate the usability of software, websites, mobile apps, or other digital products. The SUS questionnaire is typically administered to a group of users who have experience interacting with the product or system. The results of the SUS questionnaire are then used to identify areas for improvement in the product or system's usability.

	SD	D	N	A	SA
<i>1. I think that I would like to use this MSU – EDAAMS frequently.</i>					
<i>2. I found the MSU - EDAAMS unnecessarily complex.</i>					
<i>3. I thought the MSU – EDAAMS was easy to use.</i>					
<i>4. I think that I would need the support of a technical person to be able to use this MSU – EDAAMS</i>					
<i>5. I found the various functions in this MSU – EDAAMS were well integrated.</i>					
<i>6. I thought there was too much inconsistency in this MSU – EDAAMS.</i>					
<i>7. I imagine that most people would learn to use this MSU – EDAAMS very quickly.</i>					
<i>8. I found the MSU – EDAAMS very cumbersome to use.</i>					

9. <i>I felt very confident using the MSU – EDAAMS.</i>					
10. <i>I needed to learn a lot of things before I could get going with this MSU – EDAAMS.</i>					

3.2.1.4 MSU RMO Manual Document Processing Workflow

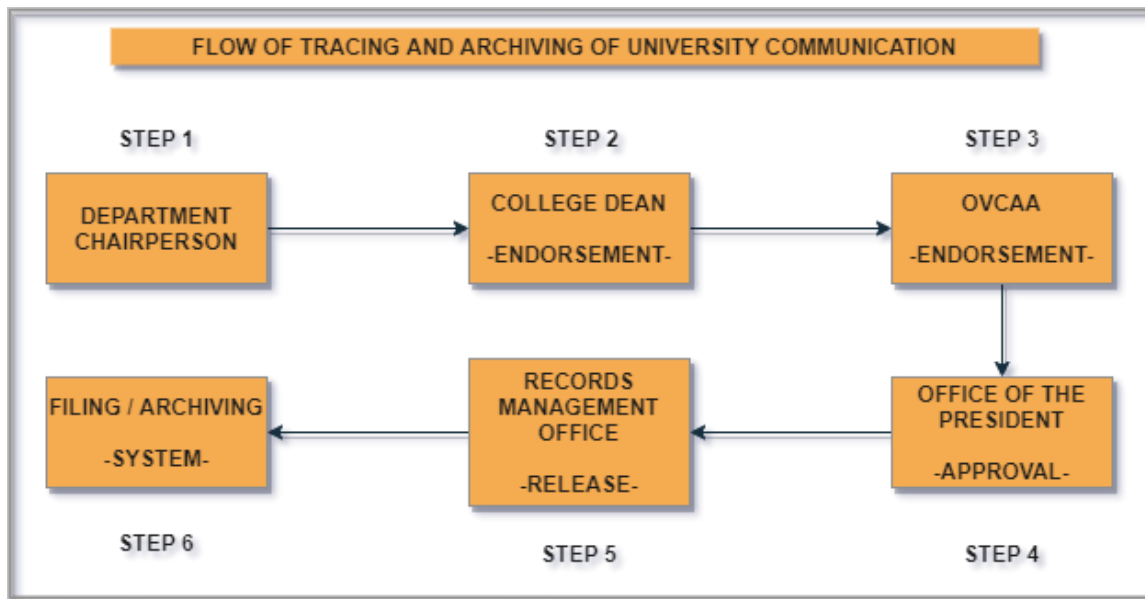


Figure 3.2.1.3.1 MSU RMO Manual Document Processing Workflow

3.2.1.5 EDAAMS Proposed Computerized Workflow

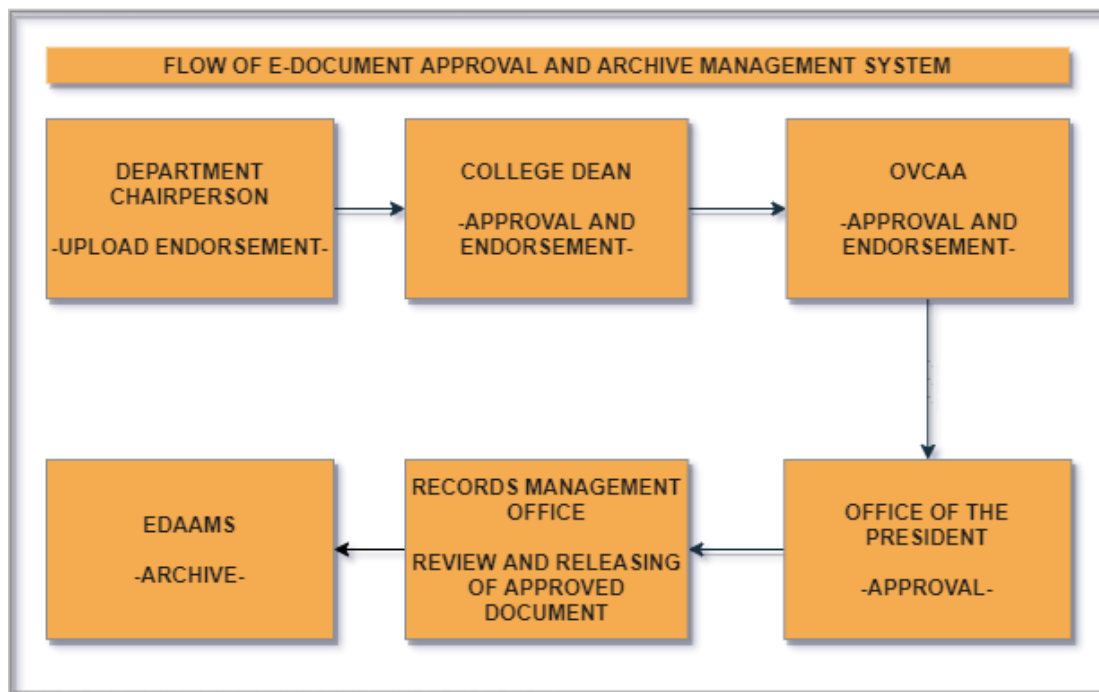


Figure 3.2.1.5.1 EDAAMS Proposed Computerized Workflow

3.2.2 Software Specification

Table 3.2.2.1 Developer's Software Requirements

Name	Description
Operating System	Windows 7, 8, 10, 11
System Type	64bit
Browser	Mozilla Firefox / Google Chrome / Microsoft Edge
Database	MonggoDB Compass
Programming Language	HTML, CSS, JavaScript, Vite, Tailwind CSS, Material UI
Web Server	Node JS
Software	Visual Studio Code

Table 3.2.2.2 User's Software Requirements

Name	Description
Operating System	Windows 10 / 11
System Type	32 bit or 64 bit
Browser	Mozilla Firefox / Google Chrome / Microsoft Edge

3.2.3 Hardware Specification

Table 3.2.3.1 Developer's Hardware Requirements

Name	Description
Screen Resolution	1920 x 1080
Memory (RAM)	8 GB
Processor	2.11 GHz
SDD	128 GB

Table 3.2.3.2 User's Hardware Specifications

Name	Description
Screen Resolution	1920 x 1080 (Recommended)
Memory (RAM)	4 GB or Higher
Processor	2 GHz or Higher
Storage Type	HDD or SDD

3.2.4 Hierarchical Input-Process-Output

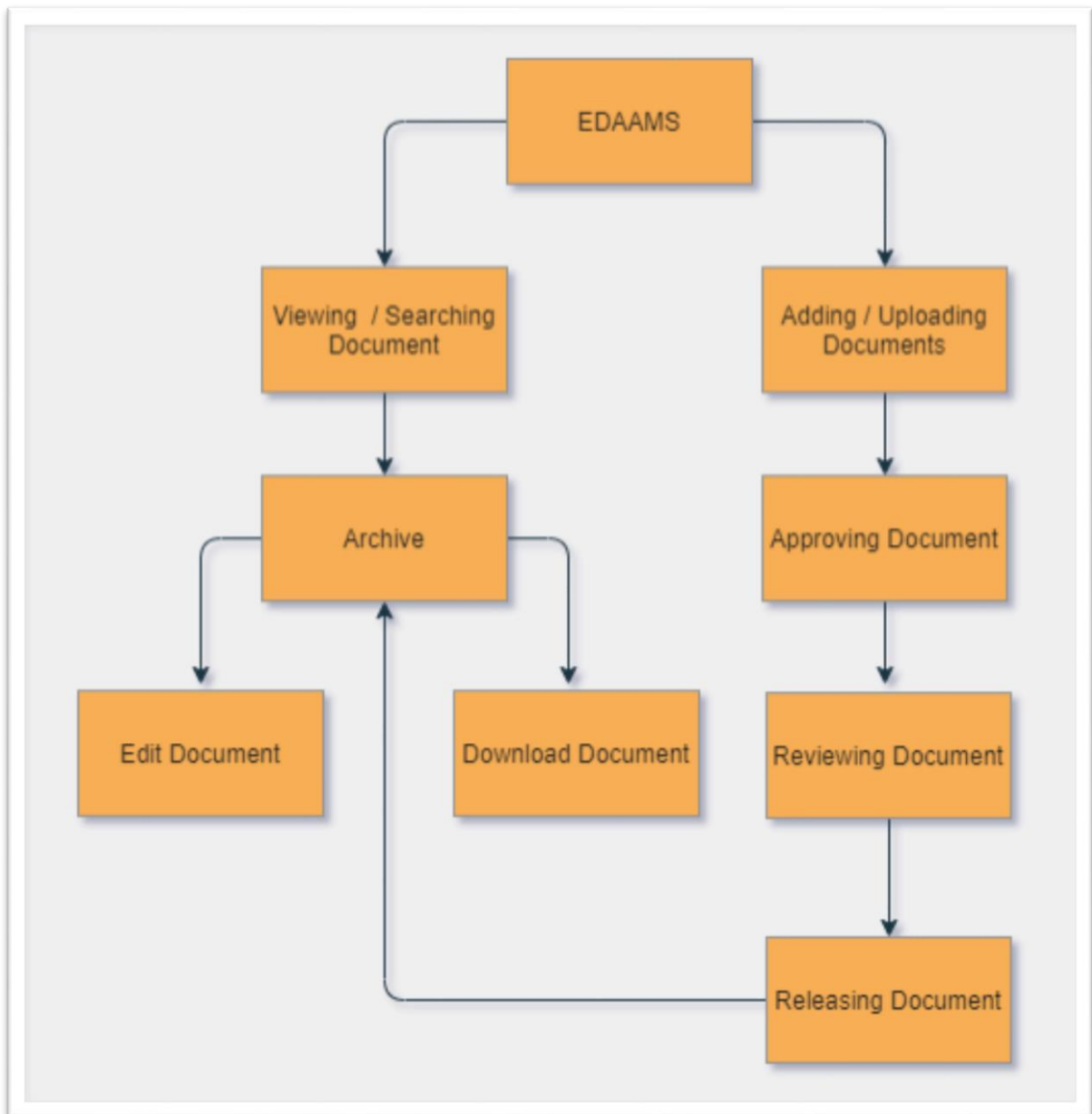


Figure 3.2.4.1 Hierarchical Input-Process-Output

3.2.5 Input Process Output

3.2.5.1 Login Account



Figure 3.2.5.1 Login IPO

3.2.5.2 Create Account

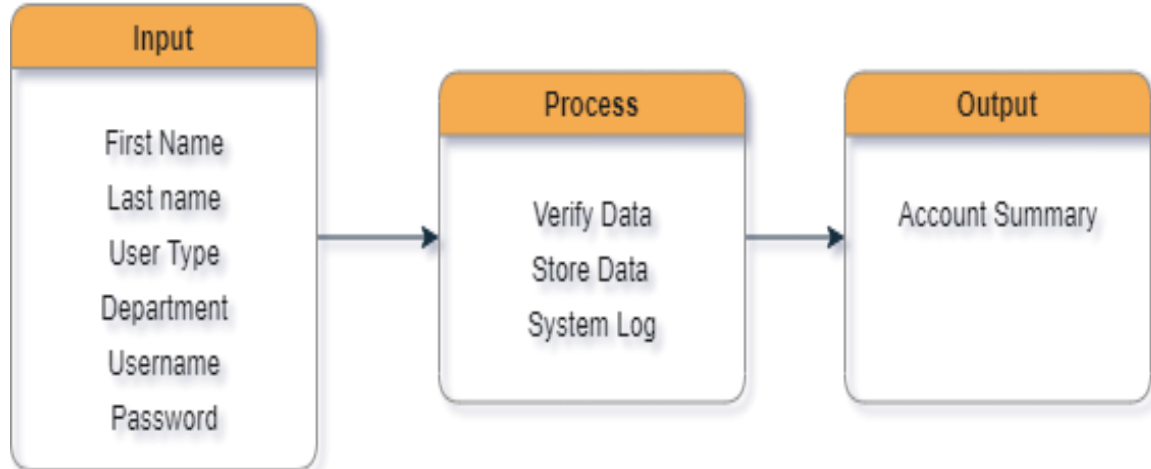


Figure 3.2.5.2 Create Account IPO

3.2.5.3 Search Document

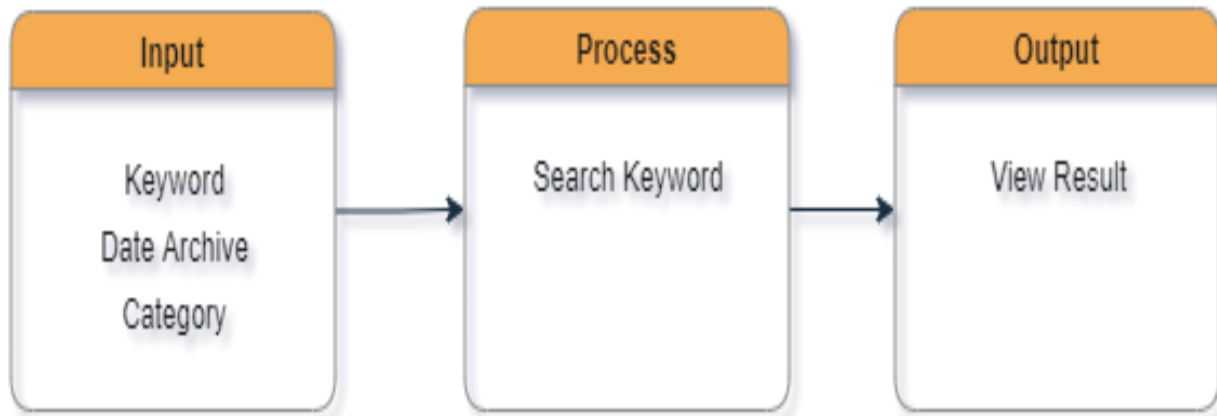


Figure 3.2.5.3 Searching Document IPO

3.2.5.4 Processing Document

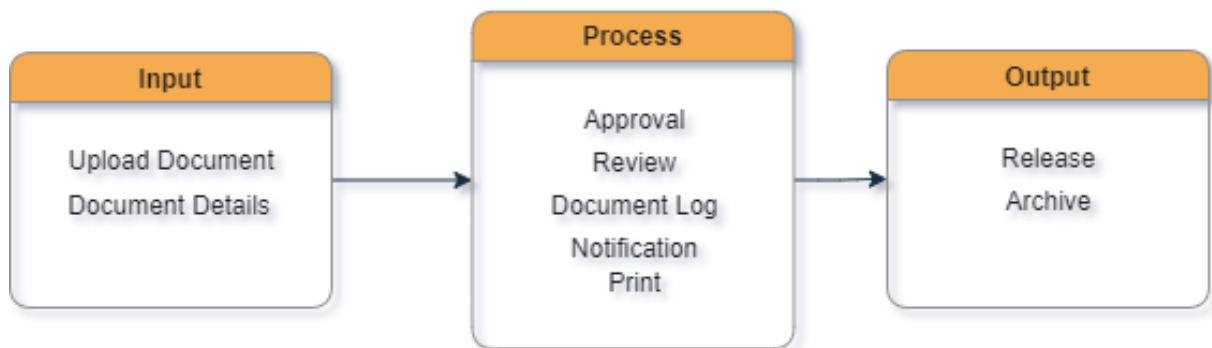


Figure 3.2.5.4 Processing Document IPO

3.2.6 Use Case Diagram

The following use cases pertain to the functionalities that will be available to the users.

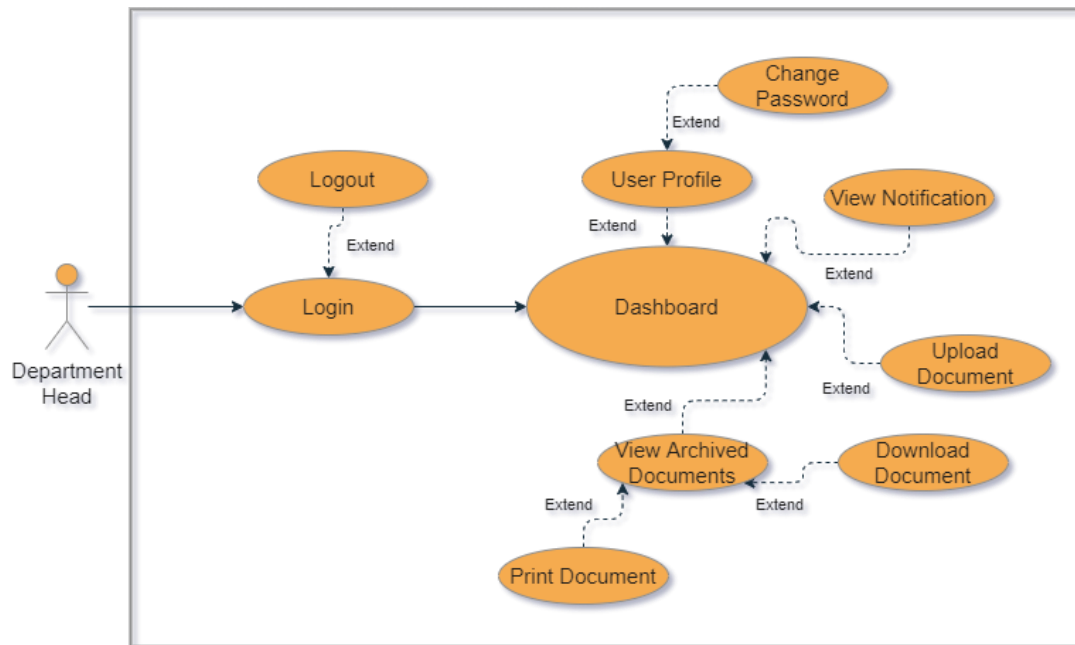


Figure 3.2.6.1 Department Head Use Case

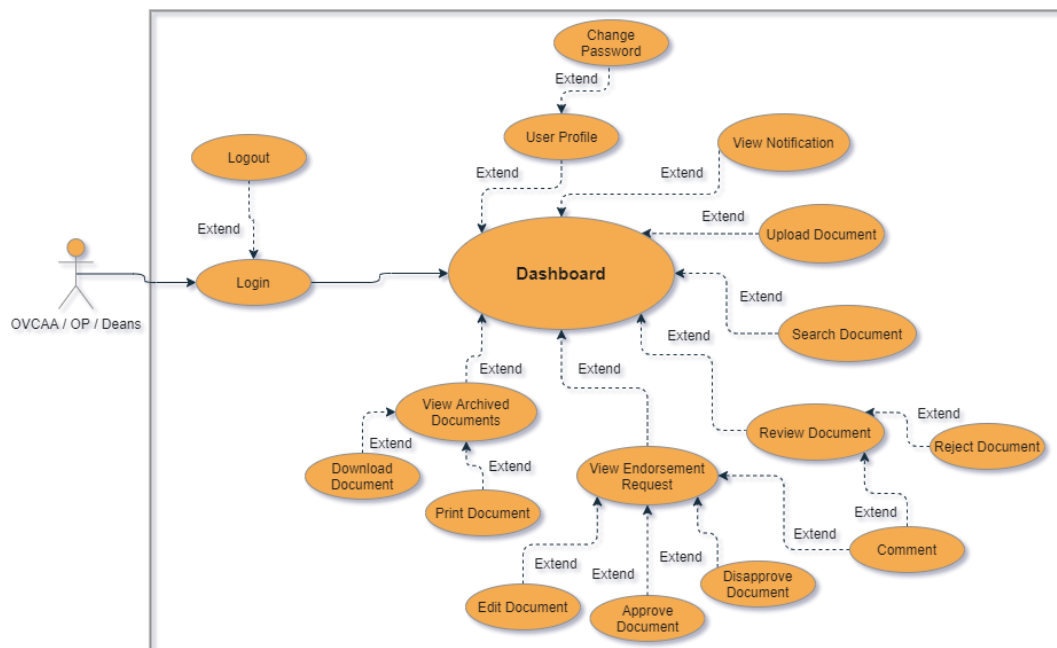


Figure 3.2.6.2 OVCAA or OP Use case

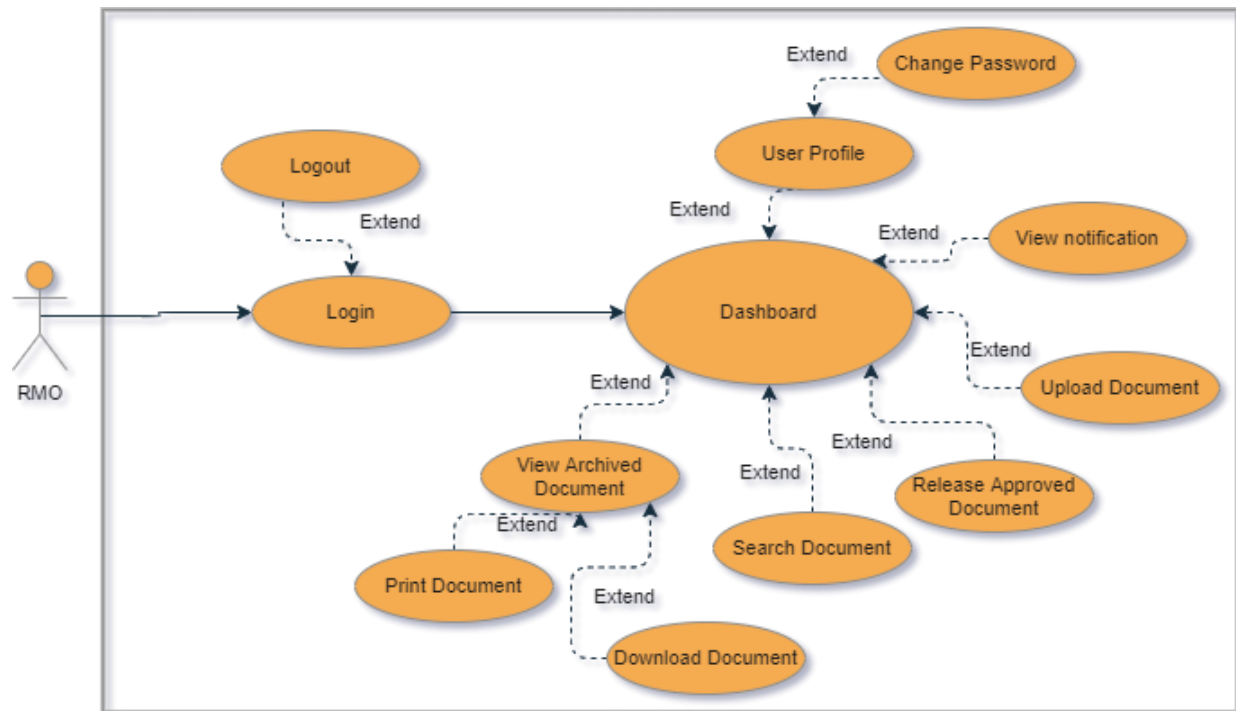


Figure 3.2.6.3 Record Management Office Use Case

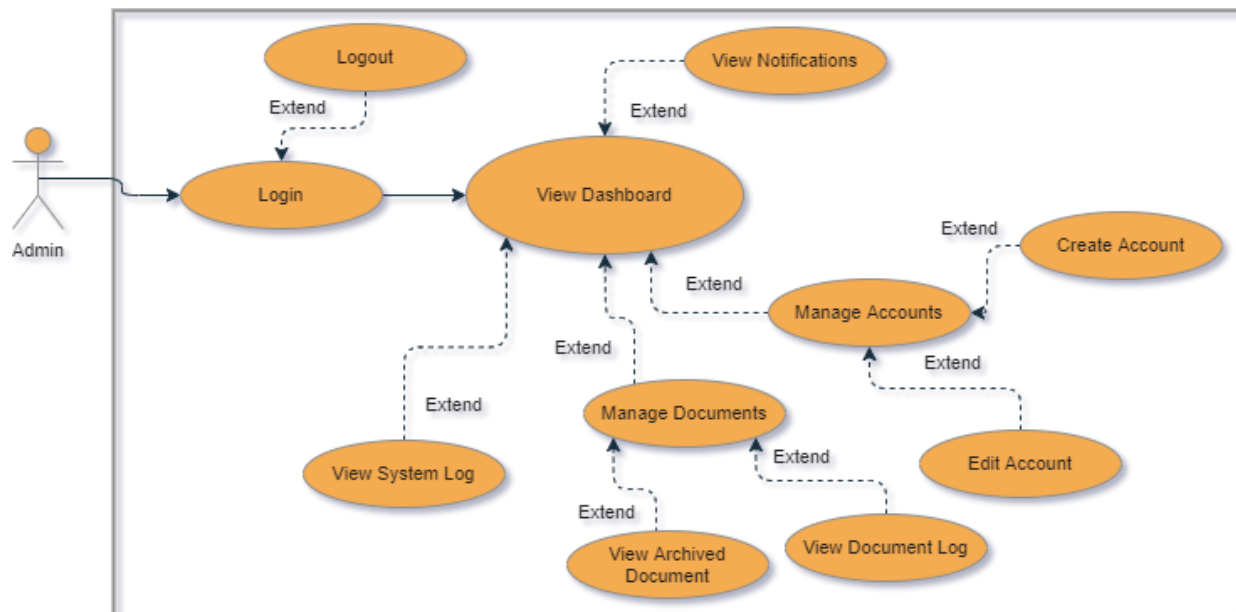


Figure 3.2.6.4 Administrator Use Case

3.2.7 Architectural Design

This section shows the architectural design of Electronic Document Approval and Archive Management System that consists of 4 different types of users; Administrator, Record Management Office User (RMO User), Office of the President and Office of Vice Chancellor for Academic Affairs (OP / OVCAA Users), and Department Head Users (DH Users). Since the system is web-based, all users must be connected to the internet. All users get access to the archive allowing them to add document to be processed, store and retrieve data.

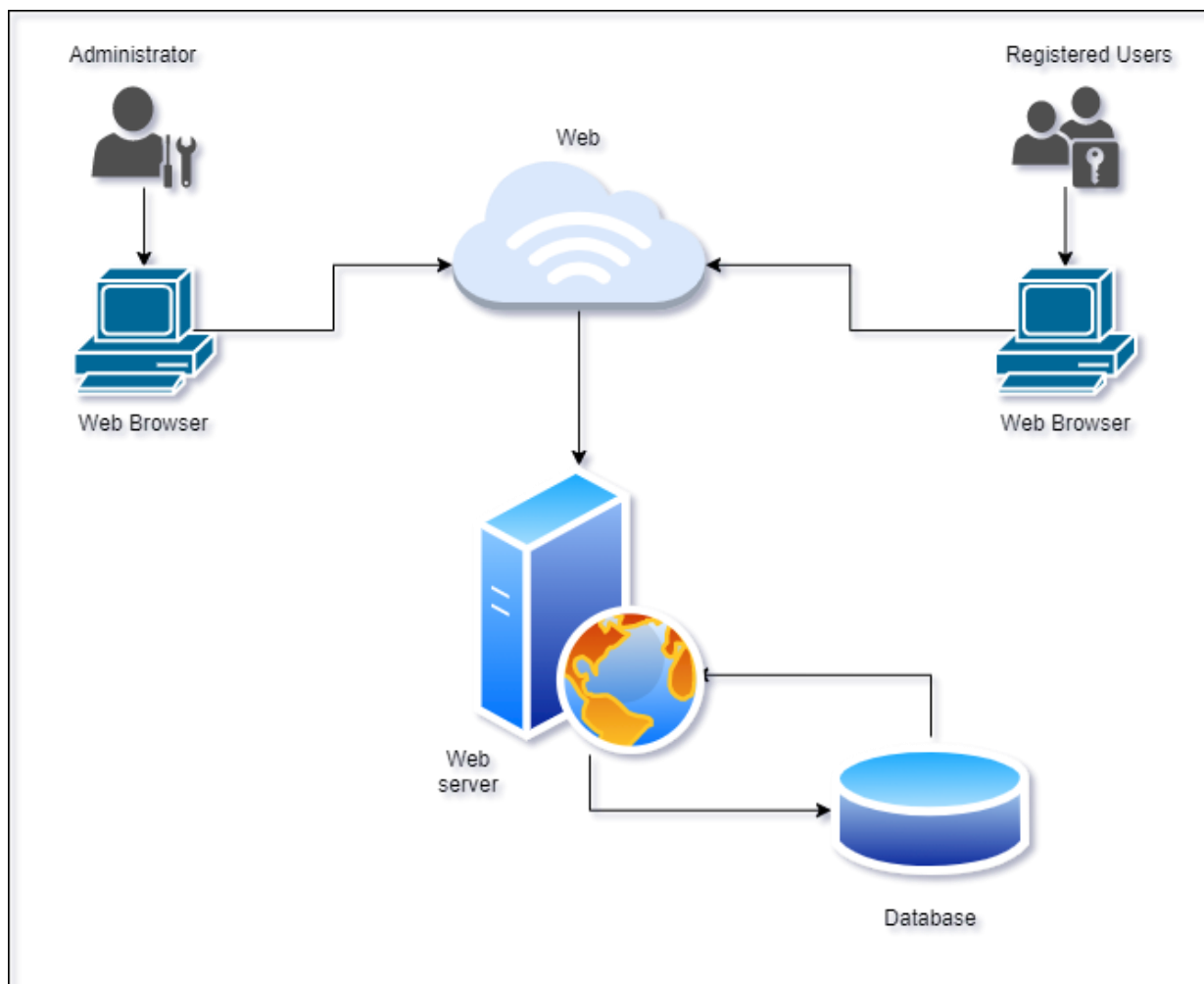


Figure 3.2.7.1 Architectural Design

3.2.8 Entity Relationship Diagram

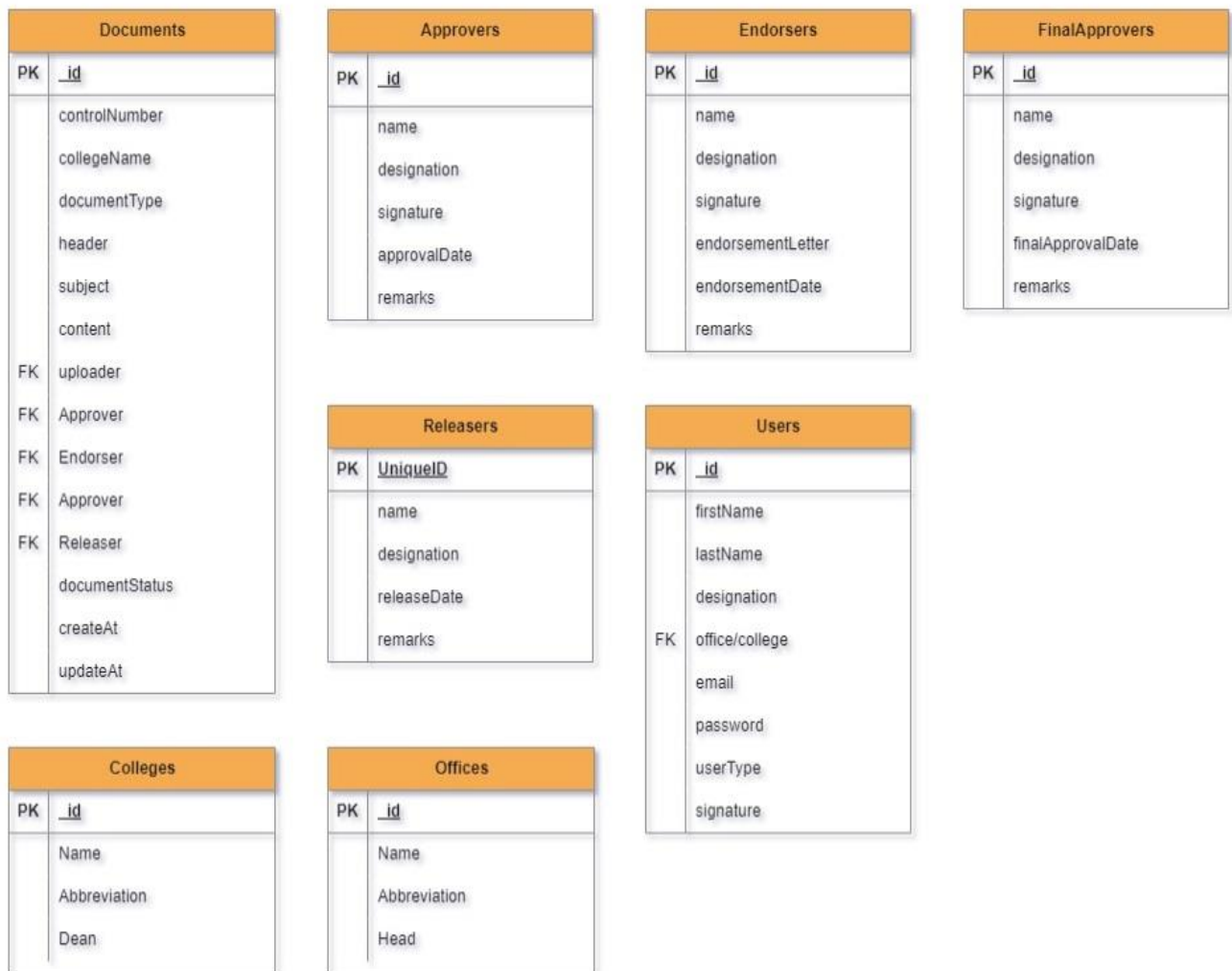


Figure 3.2.8.1 EDAAMS ERD

3.3 Development Model

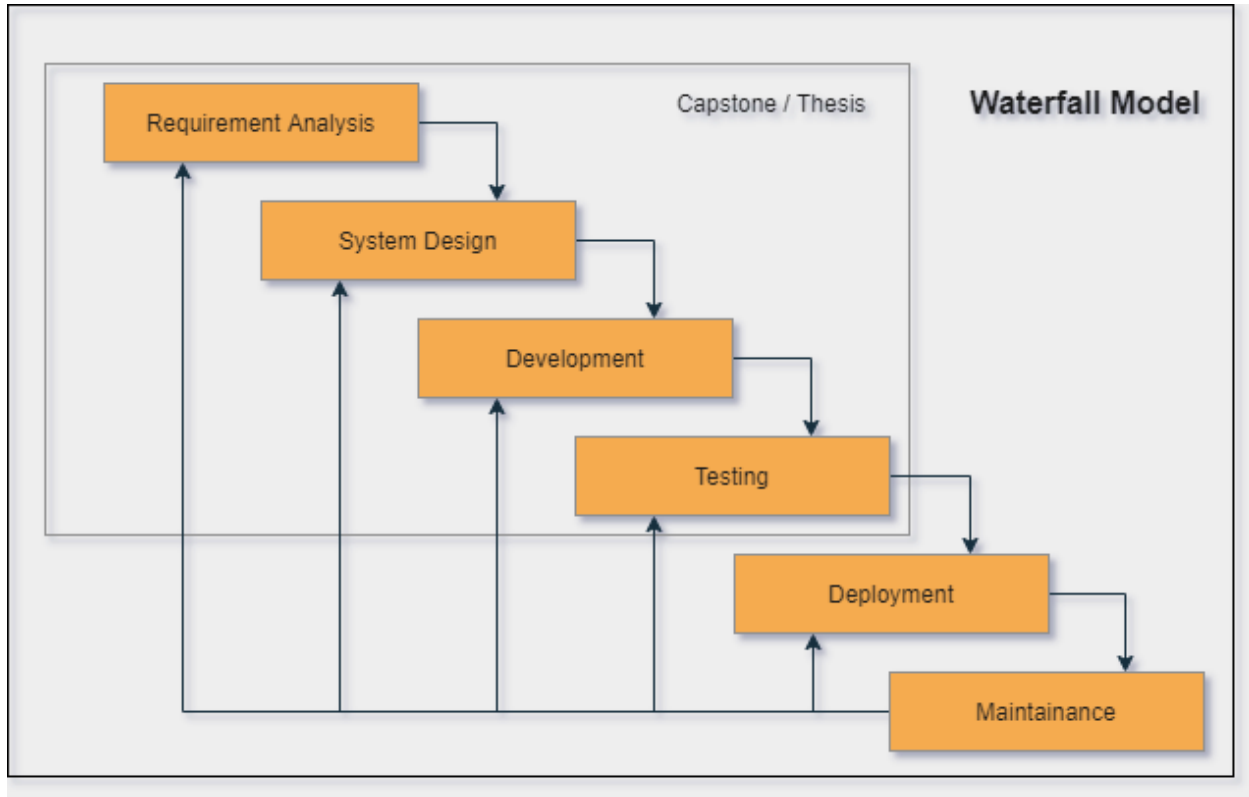


Figure 3.3.1 SDLC – Waterfall Model

The researchers have decided to use the Conventional Waterfall Model which is a classical model used in system development life cycle to create a system with a linear and sequential approach. Often used in software development processes, in which progress is are flowing steadily downwards like a waterfall through the phases of conception, Initiation, Analysis, Design, Construction, Testing, Deployment/ Implementation and Maintenance.

Thus, the waterfall model maintains that one should move to a phase only when its preceding phase is completed and perfected. Meaning the waterfall model is a breakdown of project activities into linear sequential phase, they are passed down onto each other, where each phase depends on the deliverables of the previous one and

corresponds to a specialization of tasks. The approach is typical for certain areas of software development.

3.4 Development Approach

The researchers have decided to use the bottom-up development approach. When approaching project objectives from the bottom-up, a team will collaborate across all levels to determine what steps need to be taken to achieve goals. The bottom-up approach is newer and more flexible than the more formal top-down strategy, which is why it's more commonly found in industries where disruption and innovation are a priority.

Bottom-up approach follows the modular approach to develop the design of the system. It is called so because it starts from the bottom or the most basic level modules and moves towards the highest-level modules.

In this technique:

- The modules at the most basic or the lowest level are identified.
- These modules are then grouped together based on the function performed by each module to form the next higher-level modules.
- Then, these modules are further combined to form the next higher-level modules.
- This process of grouping several simpler modules to form higher level modules continues until the main module of system development process is achieved.

3.5 Software Development Tools

Frontend:

- **HTML** – (Hypertext Markup Language) is the most basic building block of the Web. It defines the meaning and structure of web content.
- **Cascading Style Sheets (CSS)** – is the language for describing the presentation of Web pages, including colors, layout, and fonts. It allows one to adapt the presentation to different types of devices, such as large screens, small screens, or printers. CSS is independent of HTML and can be used with any XML-based markup language.
- **JavaScript** - (often shortened to JS) is a lightweight, interpreted, object-oriented language with first-class functions, and is best known as the scripting language for Web pages, but it's used in many non-browser environments as well.

Backend:

- **PHP** - is an acronym for "PHP: Hypertext Preprocessor" PHP is a widely-used, open-source scripting language. PHP scripts are executed on the server. PHP is free to download and use.
- **Java** - is a widely used object-oriented programming language and software platform that runs on billions of devices, including notebook computers, mobile devices, gaming consoles, medical devices and many others.
- **MySQL** - is an open-source relational database management system. As with other relational databases, MySQL stores data in tables made up of rows and

columns. Users can define, manipulate, control, and query data using Structured Query Language, more commonly known as SQL.

Application:

- **Visual Studio Code** – is a free source-code editor from Microsoft. Visual Studio Code provides support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.
- **MySQL Workbench** – is a unified visual tool for database architects, developers, and DBAs. MySQL Workbench provides data modeling, SQL development, and comprehensive administration tools for server configuration, user administration, backup, and much more. MySQL Workbench is available on Windows, Linux and Mac OS X.
- **Figma** - is a powerful design tool that helps you to create anything: websites, applications, logos, and much more. By learning to use Figma, you'll take your first steps into User Interface Design and User Experience Design.

3.6 Schedule and Timeline

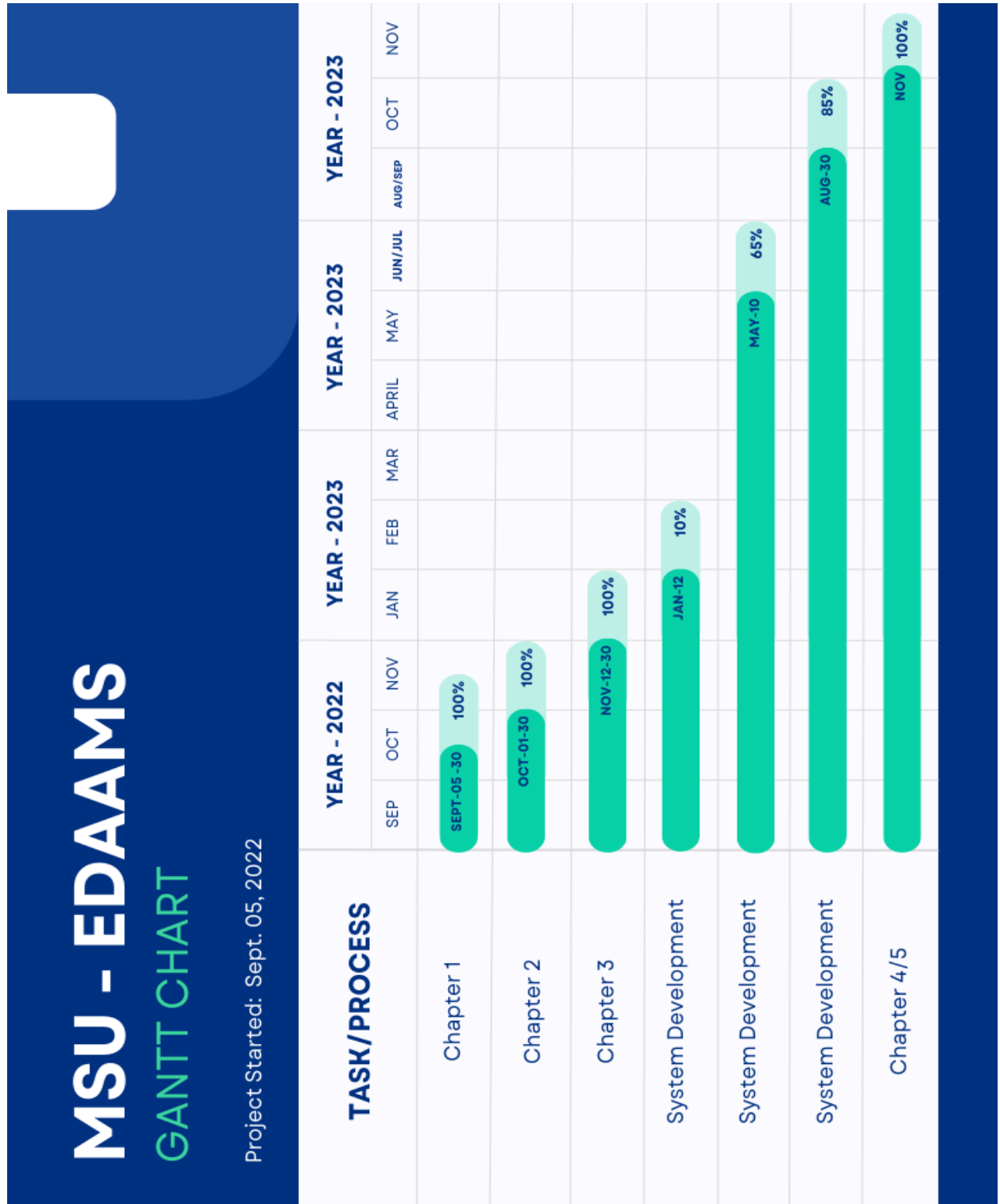


Figure 3.6.1 Gantt Chart

3.7 Project Team and their Responsibilities

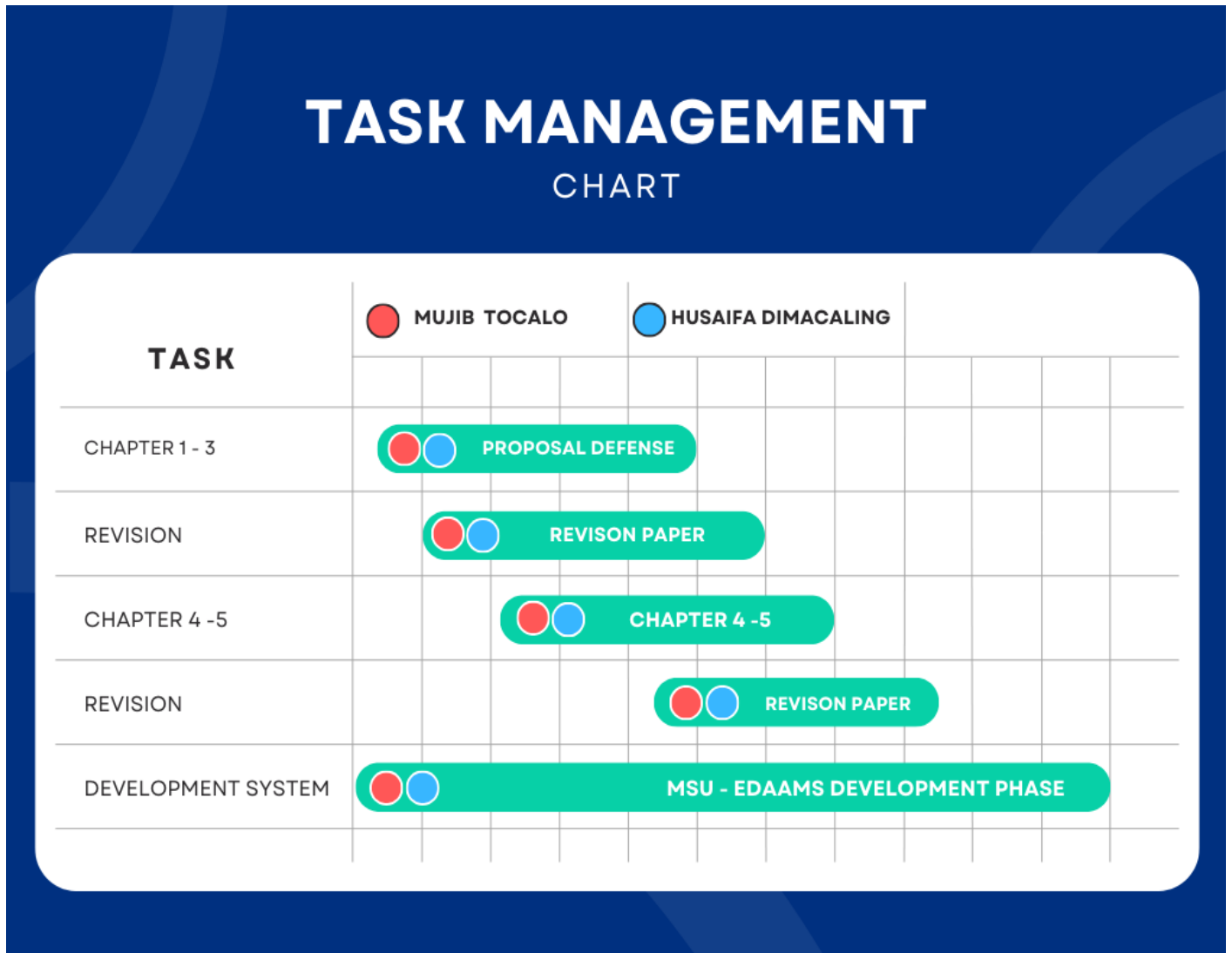


Table 3.7.1 Project Team's Responsibilities

3.9 Verification, Validation and Testing Plans

The proposed system will be tested with the identified staff and faculties and will be asked for their feedback after the testing. Two types of testing will conduct: Alpha Testing and Beta Testing, to find out how well the system and how it can be improved. The feedback helps in improving the application performance and user experience, minimizing or eliminating the issue arising from the production (Patel, 2019)

- **Alpha Testing** – Alpha testing is used to determine the product in the development testing environment by a specialized tester team usually called alpha testers.
- **Beta Testing** – Beta testing is used to access the product by exposing it to the real end – users, usually called beta testers in their environment. Feedback is collected from the user experience.

CHAPTER 4

RESULT AND DISCUSSIONS

After conducting a thorough review of the issues identified during interviews with the Director of the Record Management Office and other staff members, the researchers advocate for the development of an Electronic Document Approval and Archive Management System. The proposed system aims to address specific challenges: first, identifying inherent difficulties in the current process of approving MSU Academic Special Orders and Memoranda within the existing system; second, developing a system to effectively tackle these identified challenges associated with the current approval process; and third, evaluating the efficiency of the proposed "Electronic Document Approval and Archive Management System" in comparison to the current system.

In alignment with the goal of enhancing file organization and management, the researchers have outlined a set of objectives. They plan to commence by gathering data and information, with a primary focus on the MSU Records Management Office, ensuring a comprehensive understanding of existing processes and requirements. Subsequently, their aim is to design the database structure and implement a system capable of electronically storing MSU Academic Special Order and Memorandum documents, highlighting the importance of creating an organized and accessible digital repository.

The next phase involves the development of a web-based system, specifically designed to enable members of MSU Main Campus to efficiently store, process, and retrieve academic Special Orders and Memorandum documents through an electronic platform. Finally, the researchers intend to conduct thorough testing of the system, actively involving identified staff and faculties. The actual and honest observations of these stakeholders during the testing phase will be crucial, as their feedback will serve as valuable input for refining and improving the system based on practical user experiences.

Scientific Generalizations

From the comprehensive examination of the challenges identified in the current process of approving MSU Academic Special Orders and Memoranda, as well as the proposed development and testing of the Electronic Document Approval and Archive Management System, a scientific generalization emerges. It can be generalized that the integration of a web-based system, designed to electronically store and manage academic documents, has the potential to significantly enhance file organization and management within academic institutions. This generalization is based on the observed aim to address inherent difficulties in the approval process and the subsequent development of a system tailored to the specific needs of MSU Main Campus. The proposed system, if efficiently implemented and refined based on stakeholder feedback, stands as a scientific generalization demonstrating the positive impact of technologically advanced solutions on the organization and accessibility of academic records.

Articulation of novel contributions

The proposed Electronic Document Approval and Archive Management System offer several novel contributions to the realm of academic record management. Firstly, the identification and systematic addressing of inherent difficulties in the current approval process represent a significant contribution. By acknowledging and tackling these challenges, the system aims to streamline and enhance the efficiency of approving MSU Academic Special Orders and Memoranda.

Secondly, the emphasis on gathering data and information specific to the MSU Records Management Office contributes to a more nuanced understanding of existing processes and requirements. This meticulous approach ensures that the design and implementation of the database structure align precisely with the unique needs of the academic institution, thereby contributing to a more tailored and effective solution.

The third novel contribution lies in the development of a web-based system designed explicitly for members of MSU Main Campus. This digital platform is engineered to facilitate the electronic storage, processing, and retrieval of academic Special Orders and Memorandum documents. Such a system represents a modern and efficient approach to document management, contributing to the evolution of academic record-keeping practices.

Lastly, the commitment to conducting thorough testing with identified staff and faculties, and the incorporation of their actual and honest observations into the system refinement process, signifies a novel contribution. This approach recognizes the importance of user feedback in improving the system based on practical experiences,

contributing to the ongoing enhancement and optimization of the proposed solution. Overall, the articulation of these novel contributions underscores the innovative nature and potential impact of the Electronic Document Approval and Archive Management System on academic record management at MSU.

Presentation and Precise Analysis of results

Validation:

User Document Creation

- Validation Objective: Confirm that users can successfully create documents (e.g., special orders, memoranda) using the system.
- Validation Steps:
 - Ensure that all required fields are present and correctly captured during document creation.
 - Verify that users can attach necessary files or additional information to the document.
 - Confirm that document creation adheres to predefined formats and standards.

Document Approval Workflow

- Validation Objective: Ensure the system effectively manages the approval workflow for documents.

Validation Steps:

- Test the system's ability to assign and notify approvers based on predefined rules.
- Verify that users can view the status of their documents (approved, disapproved, or pending approval).
- Confirm that the system prevents unauthorized access to documents during the approval process.

3. Document Tracking:

- Validation Objective: Verify that users can track the progress and status of their submitted documents.
- Validation Steps:
 - Confirm that users receive real-time updates on the approval status of their documents.
 - Test the system's notification mechanism to inform users about changes in document status.
 - Ensure that the tracking feature is user-friendly and easily accessible.

Testing:

- Testing Objective: Validate the functionality of individual components.
- Testing Steps:
 - Test document creation, ensuring all fields are captured correctly.
 - Validate the approval workflow at each step, from initiation to final approval.
 - Confirm that tracking features function as expected.

Integration Testing

- Testing Objective: Verify the seamless interaction between system components.
- Testing Steps:
 - Test the integration of document creation with the approval workflow.
 - Confirm that data is correctly transferred between different stages of document management.
 - Validate the integration of the tracking system with the document approval process.

System Testing

- Testing Objective: Evaluate the system as a whole.
- Testing Steps:
 - Conduct end-to-end testing of document creation, approval, and tracking.
 - Test system performance under different loads to ensure scalability.

- Verify the security of the system, ensuring that unauthorized access is prevented.

User Acceptance Testing (UAT)

- Testing Objective: Confirm that the system meets user expectations and requirements.
- Testing Steps:
 - Engage end-users to perform tasks related to document creation, approval, and tracking.
 - Collect feedback on the usability and user-friendliness of the system.
 - Ensure that the system aligns with the workflow and needs of the Record Management Office.

Interpretation / Discussion of results

The validation and testing procedures conducted on the Electronic Document Approval and Archived Management System have yielded promising results. The user document creation process was successfully validated, ensuring that users can create documents, such as special orders and memoranda, efficiently. The system accurately captures all necessary information, allows for file attachments, and adheres to predefined formats and standards. This user-friendly document creation process enhances efficiency and reduces errors. The approval workflow was effectively validated, showcasing the system's ability to manage the sequential approval process. It assigns and notifies approvers, provides real-time updates to users about the status of their documents, and prevents unauthorized access during the approval process. An efficient approval workflow is crucial for timely decision-making, and real-time updates ensure transparency.

Furthermore, the document tracking feature was successfully validated, allowing users to monitor the status of their documents in real-time and receive timely notifications about changes. Document tracking is essential for users to stay informed about the progress of their submissions, contributing to a responsive and user-centric system. Unit testing confirmed that individual components, including document creation, approval workflow, and tracking, function correctly. This ensures that each component operates as intended, facilitating the identification and resolution of issues at an early stage. Integration testing successfully validated the seamless flow of data between document creation, approval, and tracking, ensuring a smooth and cohesive user experience.

System testing provided a holistic view of the system's performance, including end-to-end processes, performance under different loads, and security measures. The successful system testing indicates that the system is robust and can handle various scenarios while maintaining optimal performance and adhering to security standards. User Acceptance Testing (UAT) further validated that end-users find the system to meet their expectations in terms of functionality, usability, and alignment with workflow needs. Positive feedback from UAT suggests that the system is ready for deployment and use. In summary, the Electronic Document Approval and Archived Management System has demonstrated reliability, user-friendliness, and alignment with specified requirements through the comprehensive validation and testing processes.

CHAPTER 5

Summary

In response to the evolving landscape of document management, the capstone project, titled "Mindanao State University Main Campus E-Document Approval and Archive Management System," emerges as a solution to the challenges faced by institutions in organizing and managing files efficiently. The introductory section highlights the historical transition from manual document management to computerized systems and emphasizes the need for organizations to adapt to technological advancements. Recognizing the significance of Electronic Document Management Systems (EDMS), the project aims to streamline file organization and management, addressing the challenges associated with traditional methods of handling piles of documents.

The statement of the problem identifies key issues, focusing on the current process of approving MSU Academic Special Order and Memorandum documents. It poses critical questions about the difficulties encountered in the existing system, proposes the development of a system to address these challenges, and seeks to measure the efficiency of the proposed "Electronic Document Approval and Archive Management System" compared to the current system. The problems outlined stem from interviews with the Director of the Record Management Office and other staff, motivating the researchers to advocate for the creation of a comprehensive EDMS.

The researchers have a general aim of designing and developing a web system to function as a centralized platform for efficient file organization and management. More specifically, the objectives of the study are as follows:

- To gather data and information specifically within the MSU Records Management Office.
- To design the database structure and a system for the electronic storage of MSU Academic Special Order and Memorandum documents.
- To develop a web system enabling members of MSU Main Campus to electronically store, process, and retrieve academic Special Orders and Memorandum documents.
- To conduct testing of the system with the identified staff and faculties, seeking their feedback after the testing phase.

Conclusions

The capstone project, "Mindanao State University Main Campus E-Document Approval and Archive Management System," is a proactive response to the evolving challenges faced by institutions in the realm of document management. The project's genesis lies in the historical transition from manual to computerized document management systems, underscoring the imperative for organizations to adapt to technological advancements. Recognizing the critical role of Electronic Document Management Systems (EDMS), the project sets out to streamline file organization and management, offering a solution to the inefficiencies associated with traditional methods of handling voluminous documents.

The statement of the problem illuminates key issues, specifically focusing on the approval process for MSU Academic Special Order and Memorandum documents. By posing critical questions about the existing system's difficulties, proposing a systematic solution, and aiming to measure the efficiency of the proposed EDMS against the current system, the researchers establish a foundation for addressing document management challenges. These challenges are not theoretical but stem from real-world interviews with the Director of the Record Management Office and other staff, reinforcing the project's practical relevance.

Aligned with the identified issues, the study's objectives form a structured pathway. The overarching goal to design a centralized web system for file organization and management, tailored to the needs of MSU Records Management Office, guides the specific objectives, including data gathering, database design, system development, and

testing with end-users. These objectives not only establish a clear direction for the research but also articulate a practical approach to addressing the identified problems.

The synthesis of methodologies reveals a comprehensive approach, integrating interviews, data gathering, database design, system development, and user testing. This meticulous methodology serves as the backbone for the project, ensuring a thorough investigation and development process. As the findings and methodologies converge, the Electronic Document Approval and Archive Management System emerges as a viable solution, promising to advance efficient document management at MSU Main Campus.

In essence, the conclusions drawn from this study reflect a micro to macro perspective, encapsulating the specific solutions proposed for the approval process of MSU Academic Special Order and Memorandum documents within the broader context of evolving document management practices. The capstone project's significance lies not only in its practical application but also in its potential to contribute to the broader discourse on efficient document management within academic institutions.

Recommendations

Building on the insights gained from this study, several recommendations emerge for the enhancement of the Electronic Document Approval and Archive Management System:

- **User Training:** Implement comprehensive training sessions for users to ensure they are proficient in utilizing the system's features, promoting efficient adoption across MSU Main Campus.
- **Continuous Feedback Mechanism:** Establish a continuous feedback mechanism to gather insights from users, facilitating ongoing system refinement based on practical experiences and evolving needs.
- **Scalability Considerations:** Anticipate future growth and system demands by designing the system with scalability in mind, ensuring it can accommodate increased data and user loads.
- **Cybersecurity Measures:** Prioritize robust cybersecurity measures to safeguard sensitive documents and user data, addressing potential vulnerabilities and ensuring the integrity of the system.
- **Integration Opportunities:** Explore possibilities for integrating the EDMS with other existing systems at MSU, promoting a seamless flow of information and enhancing overall organizational efficiency.

Definition of Terms

Retrieval – the process of obtaining information system resources that are relevant to an information need from a collection of those resources.

Streamline – make (an organization or system) more efficient and effective by employing faster or simpler working methods.

Flash drive – a small electronic device containing flash memory that is used for storing data or transferring it to or from a computer, digital camera, etc.

Centralized – systems that use client/server architecture where one or more client node is directly connected to a central server.

Platform – typically includes analytics, database, and data management, tools for application development and extension, integration, and intelligent technologies.

Developer/s – is an individual that builds and create software and application. Writes, debug and execute the source code of a software application.

RMO – Record Management Office

High Specs - Computer and mobile device tech specs include the size and weight of the unit, operating system, processor type and speed, amount and type of RAM and storage as well as the type of display technology, screen size and number of pixels.

High End - High technology (high tech), also known as advanced technology (advanced tech) or terotechnology, is technology that is at the cutting edge: the highest form of technology available. It can be defined as either the most complex or the newest technology on the market.

Bibliography

NARA, U. (2003). National Archives and records administration. *Industrial Union of Marine and Shipbuilding Workers of America Archives*.

Ayaz, A., & Yanartaş, M. (2020). An analysis on the unified theory of acceptance and use of technology theory (UTAUT): Acceptance of electronic document management system (EDMS). *Computers in Human Behavior Reports*, 2, 100032.

Swartz, N. (2008). Revising DoD 5015.2, the de facto RM software standard. *Information Management*, 42(4), 26.

DoD (Department of Defense, U. S. (2002). Design Criteria Standard for Electronic Records Management Software Applications: DoD 5015.2-STD.

Flynn, K. C., Grasso, C. E., & Boorum, E. W. (2010). *Paperless Contract Folder's (PCF) DoD 5015.2 certification*. NAVAL POSTGRADUATE SCHOOL MONTEREY CA.

Shah, M. H., & Siddiqui, F. A. (2006). Organizational critical success factors in adoption of e-banking at the Woolwich bank. *International Journal of information management*, 26(6), 442-456.

Cain, P. (2002). Model Requirements for the Management of Electronic Records (MoReq): a critical evaluation. *Records Management Journal*.

Azad, A. K. (2003, October). Importance of Migrants' Remittance for Bangladesh Economy. In *International Conference on Migrant Remittances: Development Impact and Future Prospects*, London.

Jones, A., & Heathfield, A. (Eds.). (2012). *Perform, repeat, record: Live art in history*. Intellect Books.

Forbes-Pitt, K. (2006). A document for document's sake: A possible account for document system failures and a proposed way forward. *Records Management Journal*.

Cho, V. (2010). A study on the impact of organisational learning to the effectiveness of electronic document management systems. *International Journal of Technology Management*, 50(2), 182-207.

Kain, N., & Koshy, O. (2013). Electronic document management systems: benefits and pitfalls. *British Journal of Healthcare Management*, 19(4), 173-177.

Ožalienė, A., & Šaparnienė, D. (2009). Management of electronic documents in public sector: Analysis of possibilities and trends of development. *Socialiniai tyrimai*, (3), 50-59.

McLeod, J., & Childs, S. (2013). A strategic approach to making sense of the “wicked” problem of ERM. *Records Management Journal*.

Appendices

Relevant Source Code

```
server >  index.js > ...
1  import express from "express";
2  import cors from "cors";
3  import dotenv from "dotenv";
4  import bodyParser from "body-parser";
5  import mongoose from "mongoose";
6  import cookieParser from "cookie-parser";
7  import path from "path";
8  import multer from "multer";
9  import { fileURLToPath } from "url";
10 import { register } from "../controllers/user.js";
11 import userRouter from "../routes/user.js";
12 import documentRouter from "../routes/document.js";
13 import { Server } from "socket.io";
14
15 // CONFIGURATION
16 const app = express();
17 dotenv.config();
18
19 // Middleware
20 app.use(
21   cors({
22     origin: ["http://127.0.0.1:5173", "http://localhost:7000"],
23     credentials: true,
24   })
25 );
26
27 app.use(express.json());
28 app.use(cookieParser());
29 app.use(bodyParser.json({ limit: "20mb", extended: true }));
30 app.use(bodyParser.urlencoded({ limit: "20mb", extended: true }));
31
32 // File upload configuration
33 const __filename = fileURLToPath(import.meta.url);
34 const __dirname = path.dirname(__filename);
35
36 const storage = multer.diskStorage({
37   destination: (req, file, cb) => {
38     const dest = path.join(__dirname, "/assets");
39     cb(null, dest);
40   },
41   filename: (req, file, cb) => {
42     const uniqueSuffix = Date.now() + "-" + Math.round(Math.random() * 1e9);
43     cb(
44       null,
45       file.fieldname + "-" + uniqueSuffix + path.extname(file.originalname)
46     );
47   }
48 });
```

```

47     },
48   });
49
50   const upload = multer({ storage });
51
52   app.use("/assets", express.static(path.join(__dirname, "/assets")));
53
54   app.use((req, res, next) => {
55     console.log(req.path, req.method, res.json);
56     next();
57   });
58
59   // ROUTES
60   app.use("/document", documentRouter);
61   app.use("/user", userRouter);
62   app.post("/user/register", upload.single("signature"), register);
63
64   // DATABASE CONFIGURATION
65   const PORT = process.env.PORT || 2300;
66
67   // mongoose
68   // .connect(process.env.MONGODB_URI, {
69   //   useNewUrlParser: true,
70   //   useUnifiedTopology: true,
71   // })
72   // .then(() => {
73   //   app.listen(PORT, () => console.log(`Server Port: ${PORT}`));
74   // })
75   // .catch((error) => console.log(`${error} did not connect`));
76
77   let onlineUsers = [];
78
79   const addNewUser = (username, socketId) => {
80     !onlineUsers.some((user) => user.username === username) && onlineUsers.push({ username, socketId })
81   }
82
83   const removeUser = (socketId) => {
84     onlineUsers = onlineUsers.filter((user) => user.socketId !== socketId);
85   };
86
87   const getUser = (username) => {
88     return onlineUsers.find((user) => user.username === username);
89   };
90

```

```

91
92 mongoose
93 .connect(process.env.MONGODB_URI, {
94   useNewUrlParser: true,
95   useUnifiedTopology: true,
96 })
97 Complexity is 7 It's time to do something...
98 .then(() => {
99   const httpServer = app.listen(PORT, () => console.log(`Server Port: ${PORT}`));
100
101   const io = new Server(httpServer, {
102     cors: {
103       origin: ["http://127.0.0.1:5173", "http://localhost:7000"],
104       credentials: true,
105     },
106   });
107
108   Complexity is 5 Everything is cool!
109   io.on('connection', (socket) => {
110
111     socket.on('onlineUser', (username) => {
112       // Add the user to the onlineUsers list
113       addNewUser(username, socket.id);
114       console.log('User connected:', socket.id);
115     });
116
117     socket.on('disconnect', () => {
118       // Remove the user from the onlineUsers list
119       removeUser(socket.id);
120       console.log('User disconnected:', socket.id);
121     });
122
123     socket.on('sendNotification', ({ senderName, receiverName, type }) => {
124       const receiver = getUser(receiverName);
125       if (receiver) {
126         // Send the notification to the receiver
127         io.to(receiver.socketId).emit('getNotification', {
128           senderName,
129           type,
130         });
131       }
132     });
133   });

```

Evaluation Tool

The scaling or rating system employed in this study is a Likert scale, a widely used tool for gauging respondents' perceptions and attitudes. It consists of a set of statements or questions, each accompanied by a scale that ranges from "Strongly Disagree" to "Strongly Agree," with intermediate options like "Disagree," "Neutral," and "Agree." Respondents select their level of agreement or disagreement with each statement, allowing for the quantitative assessment of their views. The Likert scale is a valuable instrument for researchers to collect and analyze data on various subjects, providing insights into the degree of consensus or divergence among respondents' opinions.

	<i>SD</i>	<i>D</i>	<i>N</i>	<i>A</i>	<i>SA</i>
<i>11. I think that I would like to use this MSU – EDAAMS frequently.</i>					
<i>12. I found the MSU - EDAAMS unnecessarily complex.</i>					
<i>13. I thought the MSU – EDAAMS was easy to use.</i>					
<i>14. I think that I would need the support of a technical person to be able to use this MSU – EDAAMS</i>					
<i>15. I found the various functions in this MSU – EDAAMS were well integrated.</i>					
<i>16. I thought there was too much inconsistency in this MSU – EDAAMS.</i>					

17. I imagine that most people would learn to use this MSU – EDAAMS very quickly.					
18. I found the MSU – EDAAMS very cumbersome to use.					
19. I felt very confident using the MSU – EDAAMS.					
20. I needed to learn a lot of things before I could get going with this MSU – EDAAMS.					

Sample Input / Output / Reports

The screenshot shows a web browser window with the URL `127.0.0.1:5173/createDocument`. The page title is "MSU EDAAMS". On the left is a dark blue sidebar with a menu containing: Dashboard, Document, Approve Document, Endorse Document, OP Approval, Releasing Document, Archive, Manage Users, and Logout. The main content area is titled "Create Document". It features three input fields: "Select Document Type" with a dropdown menu showing "Memorandum", "Control Number" with a text input field containing "This is where controller Number goes", and "Select College" with a dropdown menu showing "College of Information and Computing Sciences". Below these fields are three text input areas: "Header" with the placeholder "This part where Header goes", "Subject" with the placeholder "This part where Subject goes", and "Content" with the placeholder "this is where content of the documents". A green "SUBMIT" button is located at the bottom right of the form.

The screenshot shows a preview of a "Memorandum" document. The title "Memorandum" is at the top. The content includes: "Control No. This is where controller Number goes - CICS", "Date: 2023-11-08", "To: This part where Header goes", and "Subject: This part where Subject goes". The main body of the document contains a paragraph: "School policies are a set of rules and guidelines established by educational institutions to maintain order, safety, and a conducive learning environment. These policies cover a wide range of areas, including attendance, behavior, dress code, grading, and more. They are designed to ensure that students, teachers, and staff can engage in effective teaching and learning while promoting fairness and equity. School policies are essential in fostering a positive school culture and helping students develop responsible citizenship and a strong sense of community within the educational institution." The document is signed by "husaifa dimacaling" and "student". At the bottom, there are three buttons: "APPROVE DOCUMENT" (green), "REJECT DOCUMENT" (red), and "CLOSE" (grey).

User Guide

Welcome to the Electronic Documents Approval and Archive Management System (EDAAMS) for Mindanao State University Main Campus in Marawi City.

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2. Dean College Approval

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4. Office of the President Approval

6. Document Release and Dissemination

1. Record Management Office (RMO)

1. Introduction

Welcome to EDAAMS, the Electronic Documents Approval and Archive Management System designed to streamline the approval process for memoranda and special orders at Mindanao State University Main Campus in Marawi City. This user guide will help you navigate the system efficiently.

2. Getting Started

A. Landing Page

Upon accessing the system, you will be directed to the landing page. Here, you can find important announcements, system updates, and quick links to essential functions.

B. Login Page

To access the system, use your credentials to log in as a Chairperson. The Chairperson and other users has the authority to create documents and track their progress.

3. Document Creation

As a Chairperson, you can initiate the creation of memoranda and special orders. Follow the on-screen instructions to fill in the necessary details and attach any required documents. Save your progress if needed, and submit the document for approval when ready.

4. Document Tracking

After document submission, you can track its progress through the system. The system provides real-time updates on the status of your document, whether it is pending approval, approved, or rejected.

5. Document Approval Workflow

A. Chairperson Approval

Once submitted, the document will be routed to the Dean of the College for approval. The Chairperson can monitor this progress.

B. Dean College Approval

After Dean College approval, the document will be endorsed to the Office of the Vice Chancellor in Academic Affairs (OVCAA) for further evaluation.

C. OVCAA Approval

Upon OVCAA approval, the document will be sent back to the Chairperson for verification and then forwarded to the Office of the President.

D. Office of the President Approval

The final approval stage involves the President's Office, where the document will undergo a final review. Once approved, it moves to the Record Management Office (RMO).

6. Document Release and Dissemination

A. Record Management Office (RMO)

The RMO is responsible for releasing approved documents and disseminating information to the relevant stakeholders. Once the RMO releases the document, it becomes accessible to the intended recipients.

Congratulations! You are now equipped with the knowledge to navigate and utilize the EDAAMS effectively. If you encounter any issues or have further questions, please contact the system administrator for assistance. Thank you for your commitment to a more efficient document approval process at Mindanao State University!

Other Relevant Documents

Grammarian's Certification

Curriculum Vitae