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The Implementation of Research Development and Extension Office Online Record Management System with Interactive Map Visualization

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Abstract

With storage rates decreasing and capacity increases, the problem of how and where to save files and documents has been solved for most ordinary users. Indeed, with the growing quantity of files that a user maintains, the key issue currently is efficient and effective file management. By "management," we mean a system that allows users to easily access, organize, and retrieve their files, as well as the capacity to do certain functions automatically. The goal of implementing a research development and extension office online record management system with interactive map visualization is to help it become a centralized spatial database for archiving data, collecting, querying, and storing historical data in a single repository known as a data store, and then automatically locate where you conducted extension programs, as a result, using the interactive map. It will help the Research Development Extension office transition from manual transactions to data development and centralized data storage. Furthermore, the Agile Model Approach demonstrates methodical techniques for developing a system. As a result of the research, it can fully utilize them to conduct transactions without fuss and deliver data that is secure, dependable, and easily retrieved and maintained.

Keywords: Record Management System, Map Visualization, Centralized data storage

Introduction

In modern society, technology plays a significant role. It quickly changes work, particularly in terms of making tasks simpler. The development of techniques to pave the way for convenience in every transaction in a specific office is included in ICT modernization. As an office expands, it becomes necessary to deal with a large number of paper-based transactions and to begin a large amount of paperwork in hard copies to maintain proper records [1].

In the present time, since we are in the information age, developing interactive map visualization is a more efficient way to view your office's data. You can keep track of where you conduct extension programs in other places by utilizing an interactive map visualization [2].

In this project, the researcher developed the implementation of a Research Development and Extension Office online record management system with interactive map visualization is a system for receiving, tracking, managing, and storing documents to reduce paper usage and to be a centralized record [3].

To ensure that all records and files are consolidated and safeguarded while still being easily accessible by

authorized users, an organization requires a management procedure that will protect information and data. With the use of an online records management system, the Research Development and Extension office will be able to establish centralized policy management for information and records, filing plans, legal protection holds, and monitoring [4].

According to Keakopa "Computers have brought in new dynamics in the administration of archives and records management. The transition from traditional record-keeping systems to computerization and electronic record management is clear. Data has expanded as a result of increased government activity, and computerization will assure timely services and easy data storage". By utilizing an implementation of an online record management system, all documents will be consolidated into a single data file [5].

This research is intended to assist decision-makers in any organization, particularly in the transition from manual transactions to implementing online record management systems in the Research Development and Extension Office, where having a manual transaction form for printing output research and filing hardcopy is inconvenient and time-consuming. Employees do not have to spend as much time searching through cabinets or drawers for paperwork. They can also be readily notified anytime new documents are received. The goal of this research is to design, develop, and implement an online record management system for the Research Development and Extension Office that will allow them to save data in a centralized system rather than manually collecting data and producing outputs [6].

Purpose and description

The system is most suited to personnel in the offices of Surigao State College of Technology, who perform a significant amount of manual transactions and move information between numerous people in the offices under strict security restrictions.

The researcher aims the implementation of Research Development and Extension Office Online Record Management System with Interactive Map Visualization. This study is designed to quickly package the unique documentation requirements of SSCT's file storage/archiving documents in terms of developing research and extension/extension cum research for community engagement and serving as a centralized spatial database and information querying and publication. It allows users to analyze information from multiple database systems at the same time and is designed to do queries and analyses, and they frequently contain large amounts of historical data that allow Research Development and Research to maintain their data in a consolidated centralized system. It is a big problem for the RDE office to have a manual transaction from printing output research and filing hardcopy since it is very inconvenient and time-consuming.

The purpose of this study is to implement online records management system with interactive map visualization for the Research Development and Extension Office that will allow them to maintain their data in a centralized system rather than manually gathering data and printing results and it will see location data mapped and used in visualizations to follow where they conduct extension programs in other areas by utilizing interactive map visualization.

Objectives of the Study

The general objective of this study is the Implementation of a Research Development and Extension Office Online Record Management System with interactive Map Visualization that can serve as a one-stop centralized spatial database that supports analytical reporting, structured queries, decision making, and mapping. The study specifically aims for the following:

The study has the following specific objectives:

1. To create a data-gathering system that would allow them to store and maintain their data in a centralized system rather than manually collecting data and printing results.
2. Design and develop an interactive map visualization to monitor the locations where the extension program was conducted.
3. To evaluate the system's accessibility, functionality, maintainability, efficiency, and satisfaction with the system.
4. To develop a research and extension program online record management system with inter to overcome the problem of paperwork's manually filing documents in the Research Development and Extension office.

Scope and Limitation of the Study

The study focuses on The Implementation of Online Record Management Systems with Interactive Map Visualization in Research Development and Extension Offices. It was conducted at the Main Campus of Surigao State College of Technology during the second semester of the school year 2021-2022.

In addition, the study's scope is as follows:

1. The system must be capable of performing queries and analyses, and it frequently stores amounts of historical data.
2. The system can be stored data such as consolidation and summarization to make it easier and more coordinated to use.
3. The system has an integrated system for storing and viewing documents or data, as well as the ability to generate printable papers and a data summary view.
4. The system can track the places where the extension program was undertaken using interactive map visualization.
5. The system can use a keyword for a query.
6. The system can provide remain secure, and reliable, and can be easily retrieved and managed.
7. The system can be stored for a long time.

The following are the limitations of the study:

1. The system does not support highly bulky or voluminous data, like big data.
2. The system does not store information in different file formats.
3. The system does not support volatile data.

Related Literature and Systems

The characteristics, capacities, and limitations of relevant works, algorithms, or software to the proposed project are discussed in this chapter. This is a list of relevant material that the researchers may use to further their research on "The Implementation of Research Development Extension Office Record Management System with Interactive Map Visualization."

As expressed by Pagayonan [1], the research aimed to develop a new method for storing and retrieving documents in digital form in the Records Office, as well as a computerized leave management system customized for employees. This research aimed to design and create a Record Management System with Document Control, as well as assess its usability and performance as viewed by the target audience.

The study by Alegado et al [2], developed a Record Management System for Guidance and Counseling aimed to provide a software application that will manage the record of student and provides fast and easy

access to their personal information of students. The functions focused on adding and updating students' information/profiles by using the application. The user can produce a printed copy of the record of the student. The development of the Record Management System underwent the phases of the System Development Life Cycle.

According to Adedeji et al [3], the study was aimed at developing a Web-based profile record management system that can be adapted for personal use by construction firms. A use case diagram and an activity block diagram helped to understand the users' capabilities and functionalities of the Web-based profile record management system. In addition, using the different user interfaces and a database system including a programming language to connect them, the study developed a Web-based profile record management system for construction firms using the model view controller (MVC) model. The MVC model comprised of using MySQL, HTML, and PHP, respectively, in the design. Data was inputted into the Web-based profile record management system while results were presented using screenshots of the Web-based platform.

As emphasized by Amina [4], the research entails automated records storage and retrieval. This research aims to change the storage method at silent ocean cargo to improve its services to its clients and in this, it is to find out the types of records found n silent ocean cargo, challenges of records storage and retrieval in the company, solutions to the challenges faced in the records storage and retrieval. The problem of the study was the misplacement of records and loss of client records.

As stated by Uka et al [5], this paper was borne out due to the problems associated with student academic record management which include improper course registration, late release of students' results, reconciliation of students' results, malpractices at various students clearing units, inaccuracy due to manual and tedious calculation and record retrieval difficulties in the institution.

In the paper of Ahishakiye et al [6], developing countries are still using the traditional system – pen and paper, to keep track of their records. This system takes a long to finish a single transaction; this has led to the loss of information in some cases (crimes files), insecurity, and data redundancy. Similarly, some cases have been reported where some prison staff connives with clients (victims) to change and hide some information or files hence leading to compromising the evidence of the matter. This has consequently resulted in time wastage to handle cases, increased corruption, and insecurity of important files hence making the whole process costly. Also, when reports are needed especially about prisoners, it takes a long time and therefore makes it hard for Prison Management to take urgent decisions.

According to Gligorijevic et al [7], this paper presents a system that uses interactive maps for presenting data and services for integrating healthcare data and combining it with other external sources. The purpose of this system is to show the presence of some disease in the country, how many patients with that diagnosis had to travel to some other location to get the medical examination, and how far they had to go. Such information can be valuable in process of organizing and optimizing healthcare resources and creating models for cheaper and more optimal healthcare both from the system's and patient's perspective.

The paper by Lu et al [8], his paper focuses on the visualization problem of the big air quality monitoring data of all main cities on a nationwide scale. To achieve the intuitive visualization of this data set, this study develops two novel visualization tools for multi-granularity time-series visualization (timezoom.js) and a dynamic symbol declutter map mashup layer for thematic mapping (symadpative.js) This application shows us significant air pollution findings at the nationwide scale. These results give us clues for further studies on air pollutant characteristics, forecasting, and control in China. As the tools are invented for general visualization purposes of geo-referenced time series data, they can be applied to other environmen-

tal monitoring data (temperature, precipitation, etc.) through some configurations.

As cited by Seon-hui et al [9] Due to the acceleration of the 4th industrialization, the data around us rapidly increased. Therefore, it is necessary to be able to more easily grasp the nature and meaning of data obtained through data analysis than to collect data and apply it flexibly to the value judgment of data. Visualization technology is now attracting attention in many fields. Visualization allows the user to more easily grasp the information of the data with graphs, charts, etc. so that the data analysis result can be understood more easily so that the user can make an immediate judgment and make a quick decision. Among them, there is a high degree of interest in visualization using public data, which is highly useful to users. In this paper, we implemented R - library and R Studio to visualize public data at the installation sites of bicycle storage sites among various software that can express visualization.

As stated by Casadesus De Mingo [10] Record Management System facilitates the incorporation of transparency obligations into a record (lifecycle transparency by design) to prevent the occurrence of any risk of corruption associated with the management of the information created by a public administration (missing or disappearance of information, lack of evidence, modification of documents, etc.).

According to Mishra et al [11] The Health Record Management System is a web application-based project that allows a hospital to effectively store and manage patient data. The project's major goal is to create a system that allows data to be readily saved and retrieved. aims at establishing a simple system that allows the doctor to upload and retrieve patient data.

In the study of Koizumi et al [12] The purpose of the project is to create a web application that visualizes UNOS data and makes summary statistics accessible to a wide range of transplant community participants. Methods To show graphs, choropleth, and kriging maps, this highly interactive online application was created using UNOS data between 2006 and 2014 and modern Javascript-based technologies such as Vue.js and Google Maps. Users can visualize different statistics for different geographic granularity levels (i.e., Transplant center, OPO's donor service area, and UNOS region) either by directly selecting locations on the USA map or by selecting an option from a drop-down menu. Several statistics for various years and heart-only or multi-organ transplants are displayed. The interactive maps are a useful tool for a wider audience, including patients, OPOs, transplant surgeons, and policymakers, to gain a better visual grasp of heart transplant information.

According to Ugale et al [13], Paperless Document Management System is used to eliminate the losses that businesses suffer because of physical paper files and filing systems just like in NFA. This paper addresses some of the technologies that are helping professionals shift toward a paperless business world, a DMS based on organizing digital documents to search and store documents and to reduce paper. Most workplaces consist of a variety of documents having a mixture of handwritten and printed text. The detection of such documents is a crucial task for Optical Character Recognition (OCR) developers. This paper describes different steps for processing different documents using scanning, tagging, and indexing for effective data retrieval with OCR and Indexing techniques.

Synthesis of Review

In terms of maintaining the system's data, the relevant literature described above has certain commonalities. The Implementation of a Research Development and Extension office online record management system with interactive map visualization offers a variety of features that improve the security of data, files, queries, and records. Furthermore, the system includes interactive map visualization tools that make it easier to find out where you conducted your extension program.

Additionally, the system has the potential to save data in a centralized system that will provide information on the status of documents.

Technical Background

Figure 1: System Architecture of the Study

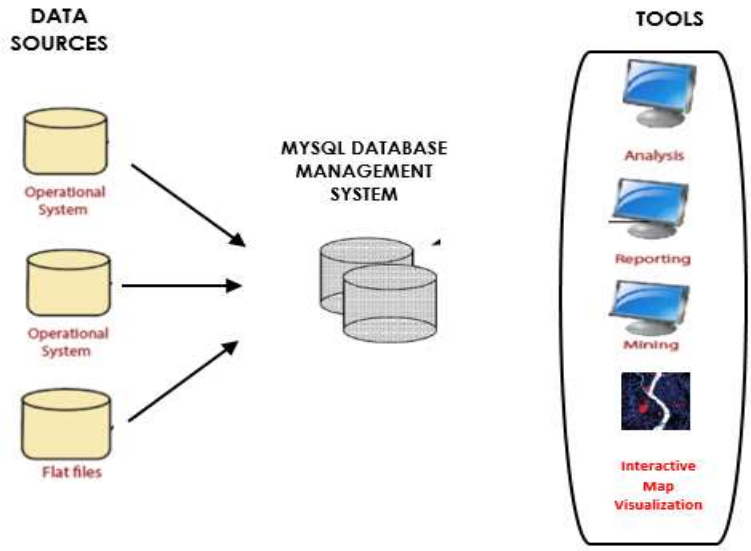


Figure 1 illustrates the database management system is a relational database that is geared for query and analysis, as opposed to transactional processing. It is usually the organization's data system for storing transactional data, but it is not limited to that. The primary goal of the Research Development and Extension office's implementation is to create a consolidated spatial database for archiving, collecting, querying, and storing data to conduct analytics and view reports based on the data in the database.

The system architecture is divided into three parts: (1) Data Sources; (2) MYSQL Database Management System; and (3) Tools. These parts were already identified in the aforementioned introduction to this chapter.

First, Data sources that consist of the operational system is to refer to a system that is used to process an organization's day-to-day transactions, and A Flat file system is a system of files in which transactional data is stored, and each file in the system must have a different name. The researchers used interviews and observation as the primary means of acquiring information for this study.

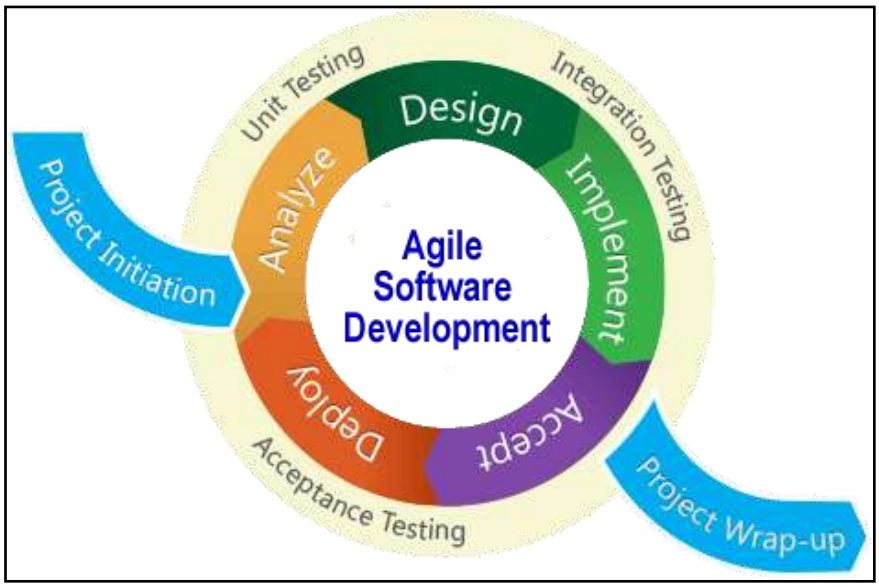
The second is the MYSQL database management system, which is data that can be analyzed for analysis and can be used to analyze and evaluate data. Its objective is to provide an easy and efficient way to store and retrieve database information. It helps management and researchers to get insight into data by allowing them to access data quickly, consistently, and interactively.

Analysis, reporting, and mining, which include text mining and interactive map visualization, are the tools in the third category. To issue reports, dynamically analyze information, and simulate possible scenarios, the analysis of integrated data is efficiently and flexible accessed. It should have aggregate information navigators, complicated query optimizers, and user-friendly graphical user interfaces. Text mining refers to the process of searching hidden information from a huge amount of data for queries through an algorithm and reporting that can be given a result or summary. Lastly, the purpose of this interactive map visualization is to keep track of where you are conducting extensions in different locations.

Methodology of the Study

The illustration shows the Agile Model Approach's software development process, which includes methodical techniques for creating the system. It explains how the researcher gathered data and analyzed the requirements for creating a design to create a fully functional system. The AGILE model's schema is shown in Figure 2.

Figure 2: AGILE METHODOLOGY



Project Initiation Phase

In this phase, the researcher has gathered all the data and information needed in the system. Planning of the possible way how the system is going to build and how the user will use the system.

Interview

Face-to-face interviews with the Research Development and Extension employees were done by the researcher. An interview schedule was created, as well as guiding questions that served as a data collection tool. In the Research Development and Extension, interviews were performed with the research population. Because it is dependable, accurate, and produces satisfactory results, the interview approach was chosen. It aids in determining how people think and feel about an issue and why they hold specific viewpoints.

Analysis Phase

In this phase, the researcher has analyzed the gathered data and considered what will be the design of the system on how it interacts with the user and includes only the important aspects of the system.

Table 1. illustrates the researcher's first project schedule. Time intervals for relevant tasks were defined. The researcher next conducted interviews and actual observations to acquire data and information on the current manual transaction system in use in the offices.

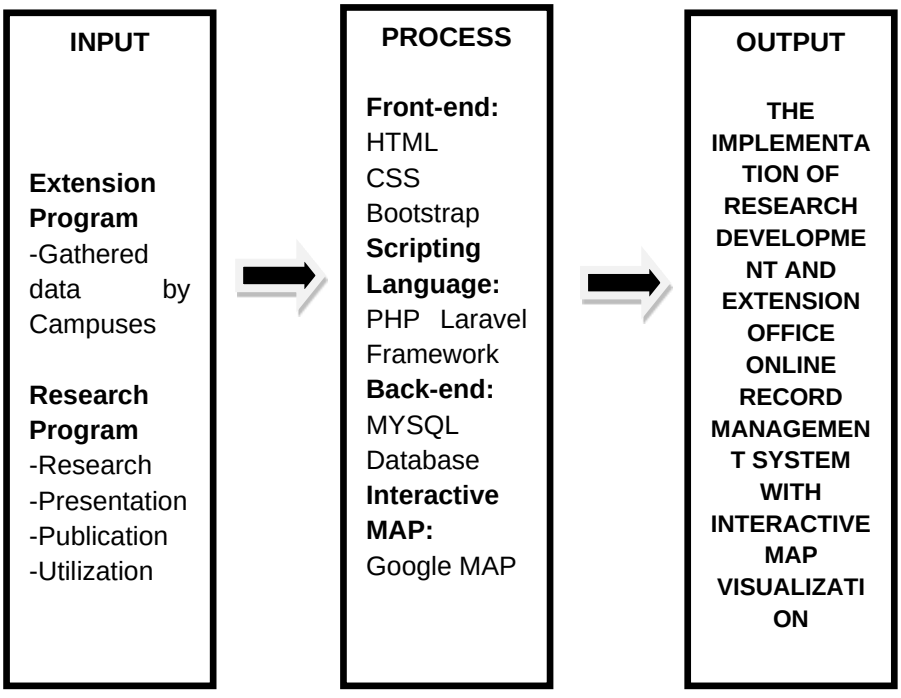
Table 1: Gantt Chart of the System

No.	ACTIVITIES	JANUARY				FEBRUARY				MARCH				APRIL				MAY			
		WEEK1	WEEK2	WEEK3	WEEK4	WEEK1	WEEK2	WEEK3	WEEK4	WEEK1	WEEK2	WEEK3	WEEK4	WEEK1	WEEK2	WEEK3	WEEK4	WEEK1	WEEK2	WEEK3	WEEK4
1	Preliminary research																				
2	Data gathering/ Observation and Interview																				
3	Planning																				
4	Analysis																				
5	Design																				
6	Documentation																				
8	Building and coding the system																				
9	Debugging and testing																				
10	oral defense preparation																				
11	Final defense preparation																				
12	Revision of documents and system																				
13	Submission of hardcopy																				

Design Phase

During this phase, the researcher is designing the flow of the study and designing a layout that could give a friendly user easy to manipulate the system. The researchers design a substantial database that could easily access by the user. Also, here are defined the technologies used in the project, limitations, and timeframe of the system.

Figure 3: Flow of the Study



Implement Phase

In this phase, implementation takes place and the researcher includes the debugging process. All the code flaws missed during the development are detected here, documented, and passed back to fix the error during

this implementation. The testing process repeats until all the critical issues are removed and the software workflow is stable.

Accepting Phase

In this phase, the researcher integrates all the flaws and errors in the system during the implementation phase. During this phase, the researchers deal with the improvement of the system based on the result from the user's view and suggestions; there is now an enhancement of the system.

Deployment Phase

The researcher finalized the system and has no critical issues; it is time to launch it for the end-users. In this phase, the researchers provide user feedback; consult and support users during the time of manipulation. Moreover, the update of selected components is included in this phase, to make sure, that the system is up-to-date and is invulnerable to a security breach.

System Evaluation Phase

System evaluation is a process of comparing the overall performance of a system to its requirements and determining the opportunities for development and improvement. The descriptive research design and survey methods were used in this study. It concentrates on the system, which determines its usability, functionality, maintainability, and efficiency. The researcher went through the procedure of determining its validity to guarantee that the instruction provided is appropriate for the study's aims.

Table 2. Scale of Evaluation

Scale	Verbal Interpretation	Scale Range (Mean)
5	Very Satisfied (VS)	4.2 - 5.0
4	Satisfied (S)	3.4 – 4.1
3	Indifferent	2.6 – 3.3
2	Dissatisfied (D)	1.8 – 2.5
1	Very Dissatisfied (VD)	1.0 -1.7

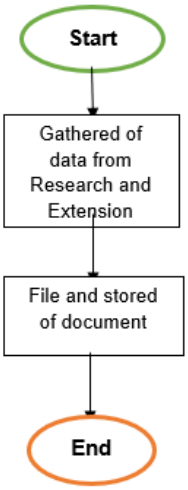
Frequency counts, mean, and percentages were used in MATLAB to statistically treat the received evaluation results. The data was then evaluated and interpreted. "Very Satisfied" (5) for average values of 4.2 - 5.1; "Satisfied" (4) for average values of 3.4 – 4.1; "Indifferent" (3) for weighted means of 2.6 – 3.3; "Dissatisfied" (2) for 1.8 – 2.5; and "Very Dissatisfied" (1) for 1.0 – 1.7.

Results And Discussion

Problems encountered in the current Record Management system of the Research Development and Extension office:

Collecting and updating records is difficult. The research and extension documents were stored in folders with filing manuals and kept in a cabinet. It appears that it is difficult for the assigned staff to locate a specific file or record of the school if it is urgently required.

Figure 4. The Manual Process



As a result, several transactions and documents were delayed in processing. Furthermore, there was no guarantee that the files would be kept or updated for future use.

The assigned personnel have a difficult time searching for and updating records due to the manual process. It may take a long time to find what you're looking for. The manual approach of updating records takes one or two hours to complete.

Files that are not password-protected. All documents and data were exposed to thieves and unauthorized document searches when filing cabinets were used. Furthermore, human errors could cause important data and files to be damaged or crumpled.

The Requirements and Design of Online Record Management System with Interactive Map Visualization

Use Case Diagram of the System

The use case diagram shown in Figure 4 depicts the various user roles and how they use the system to capture the system's requirements. It shows the system's interaction with the user.

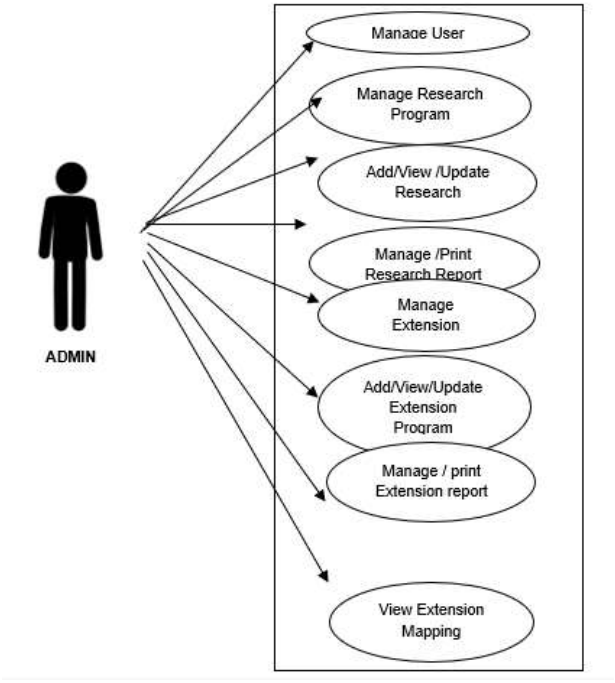


Figure 5. Use Case Diagram

The admin in the office of Research Development and Extension is shown in Figure 4 Use case diagram. Managed users, managing research programs, adding/viewed/updated research programs, and managing/printed reports are some of the system's identified use cases. It can manage extension programs, add/view/update extensions, manage/print reports, and view extension mapping in extension programs.
The Manage User can make changes to the organization. The system administrator can create and manage users. The functionality is required to ensure that their data is maintained in a centralized and secure system.
Manage research program the admin collects and manages data into a centralized system to guarantee that records and files are safe and easy to access. The administrator can manage documents, search for files, and recover things.
Add/view/update research program admin can add research title, presentation, publication, and output of the research, as well as view and update research from the system.
Manage/print research program the admin can manage the consolidated document and the research program summary, as well as print the summary files.
Manage Extension Program provides system functionality for system administrators to manage extension program files, manage partnerships, academic programs, and training to consolidate all files and ensure system security.
Add/View/Update Extension Program the system administrator can add, view, and update documents for every transaction in the system.
The Manage / Print Extension Report feature allows the system admin to print and manage extension program transaction records from the system.
View Extension Mapping Using map visualization, the admin can locate where you conducted extension programs in other areas.

Hardware and Software Requirements

The following are the hardware and system specifications required for the system's development and implementation.

Table 3. Hardware Specification

HARDWARE	SPECIFICATION
Monitor	ACER 24”
Processor	Intel Core i7
Memory	8GB DDR4
HDD	500GB SATA 7200rpm HDD
Motherboard	H110M Supports DDR4 USB 3.1 Motherboard
Mouse / Keyboard	Keyboard and Mouse USB
AVR	DTS AVR 500w

A system's Hardware Requirements should include technical specifications regarding the computer's components and hardware capabilities, such as to monitor, CPU, memory, HDD, motherboard, mouse/keyboard, and AVR.

Table 4. Software Specification

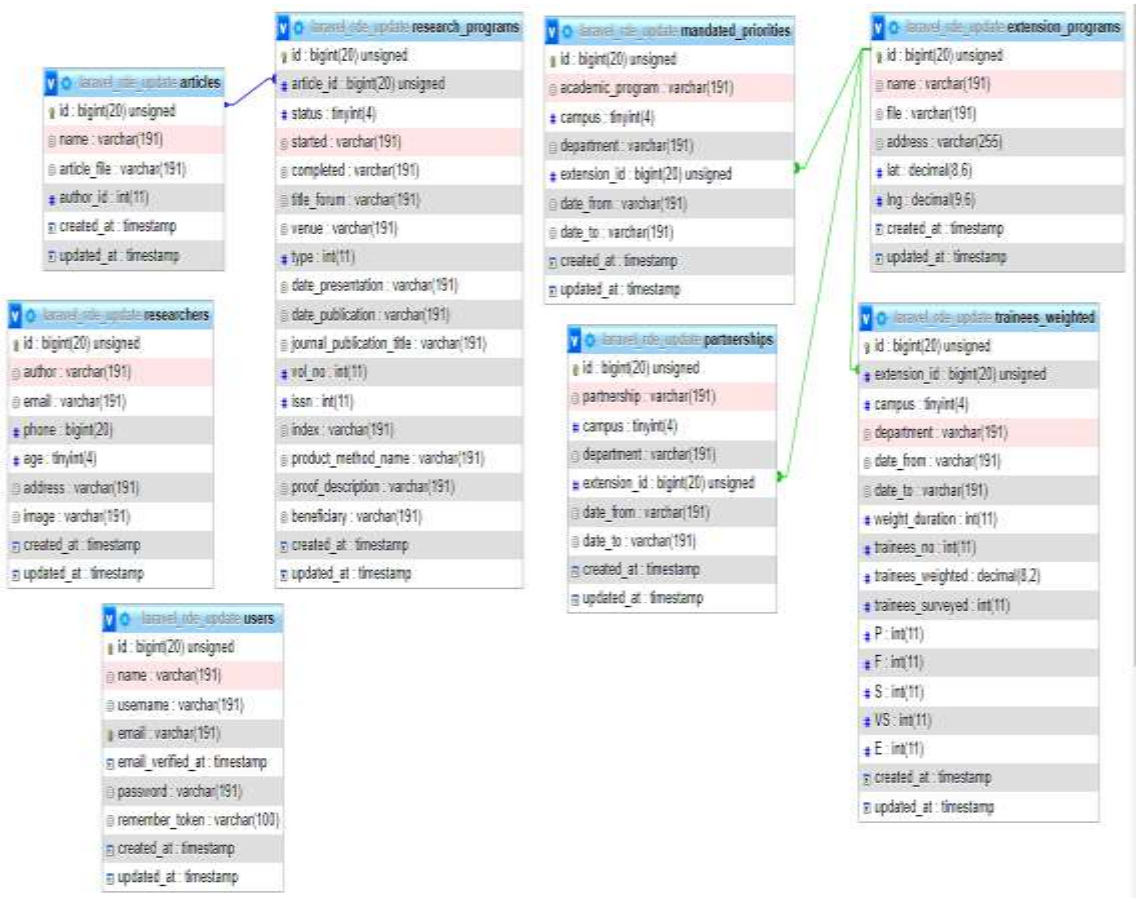
SOFTWARE	SPECIFICATION
Front – end	HTML, CSS, Bootstrap
Programming Language	PHP Laravel Framework
Database	MYSQL Database

The system's software requirements are listed in Table 4. Front end such as HTML, CSS, and Bootstrap, PHP Laravel Framework is an open-source framework for developing a wide range of custom online applications, and the database for developing the system is MYSQL Database.

Class Diagram

The class diagrams in Figure 6, show the relationships between each class, attribute, and entity in the database. Many files and records are accessible to the system administrator. Only the system administrator has complete control over the system's operations. Multiple files can be consolidated and retrieved based on office transactions.

Figure 6. Class Diagram of the System



Financial / Cost Requirements

Pilot testing of the system was planned at Surigao State College of Technology's Research Development and Extension Office. Table 5 shows the system's initial development and implementation cost of the system.

Table 5. Development and Implementation Cost

Description	Specification	Amount
Hardware	Desktop Processor: Intel Core i7 Memory: 8GB DDR4 Storage: ITB SATA, 120GB to 30.72TB SSD Monitor: 24” Printer Peripheral	40, 000 6,000 10,000 10,000
Licensed Software	OS: Windows 10 Application Software: MS Office 2016 Programming Language: PHP Laravel Framework	5, 000 5,000
	TOTAL:	P 76,000

The system's hardware and software tools were identified. The specifications were also chosen for the system's ease of maintenance and consistent performance.

System Development

This section explains how to use the different interfaces accessible in System Development. It would provide both a detailed description of each interface and a screenshot of the interface. The system application was developed using PHP Laravel framework as programming languages and HTML, CSS, and Bootstrap for the front-end. MySQL is also utilized as a database to ensure that information and scalable data are delivered efficiently and reliably.

Admin Log-in Form

The login interface is the same for all users and administrators. The system should provide access to this interface. The system determines the type of user based on the user ID at the time of logging in. Only the admin has access to the system, which is protected by a username and password.

Admin Dashboard

The Administrative Dashboard gives administrators quick and easy access to key Encompass features for better community administration. The Dashboard is an administrative home page that gives you access to important aspects of your system.

Figure 7. Log in Form

Figure 8. Admin Dashboard

Figure 9 . Faculty Profile module form for Research Program

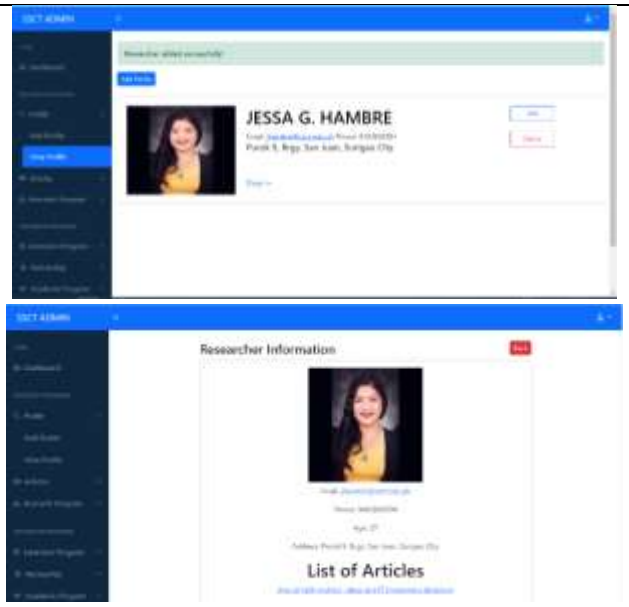


Figure 10. View of Research Article

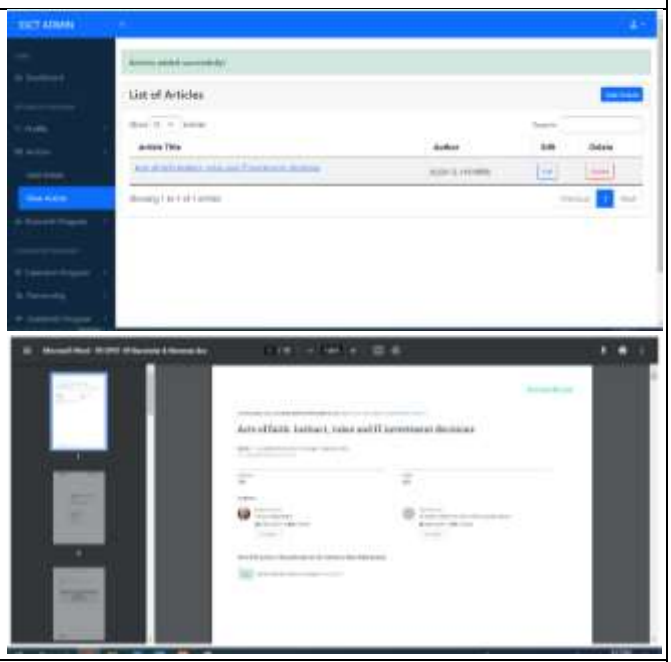


Figure 11. Admin View Research program

Figure 12. Generate A Summary Of The Research Title

In this figure, the admin can add extension programs, upload files, and find the address where the extension program is located by utilizing the map visualization. The red pin indicates the location of the extension program; when the user clicks the red pin, it displays information about the extension program, including its name and address.

Figure 13. Add Extension Program with Map visualization

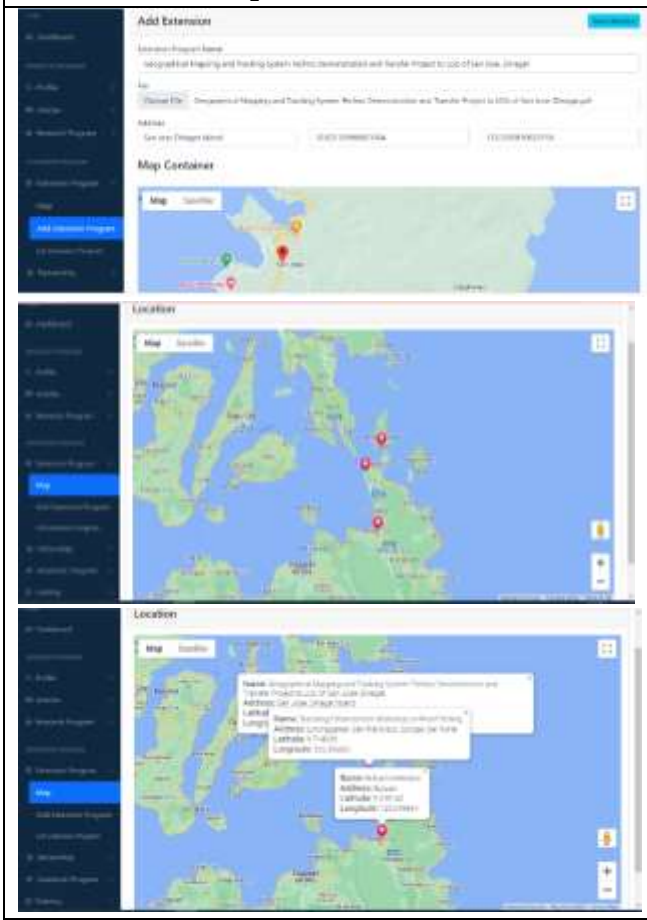


Figure 14. Add Extension Program with Map visualization

Figure 15. View of List Extension Program Number of Active Partnership Generate a List of Extension Partnership

Figure 16. View and Generate Summary of Training Program

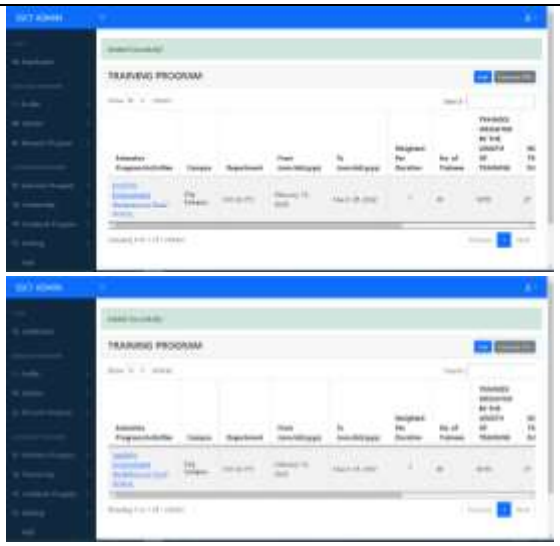


Figure 17. Admin Total Data Dashboard

Figure 18. Admin Total Extension Program

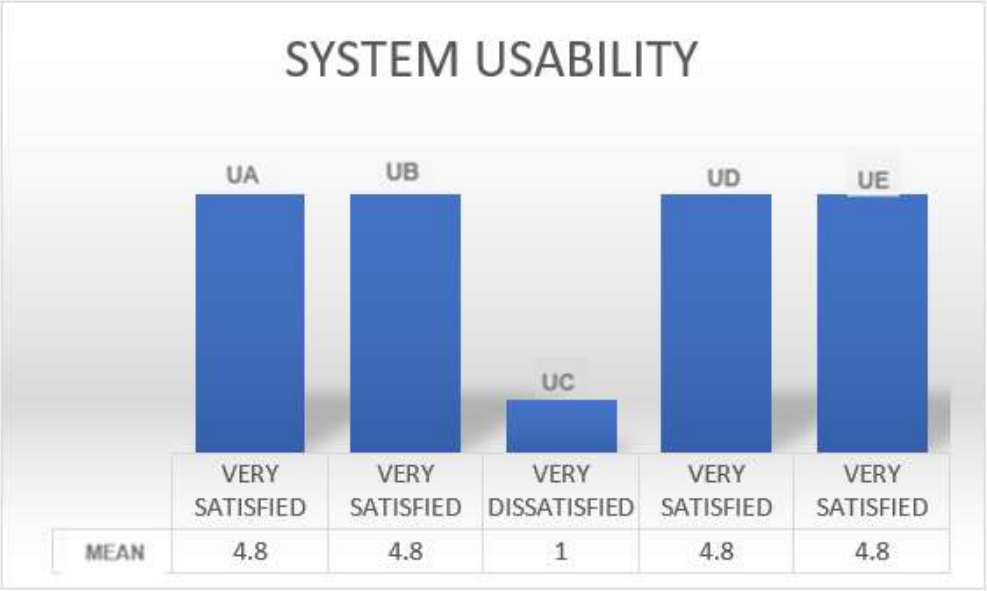
System Evaluation

The system become developed and evaluated the usage of the regulatory standard evaluation standards set by the International Association (ISO). It would determine the functionality, efficiency, usability, maintainability, and portability of the system. Appendix C indicates the Research Instrument, that was turned into given to the end-users to evaluate and examine system capability and overall performance upon giving the system assessment studies tool form to five respondents in the Research Development and Extension office. The outcomes of the evaluation are as follows.

System Usability

Usability refers to the quality of a user's experience when interacting with products or systems, including websites, software, devices, or applications. Usability is about effectiveness, efficiency, and the overall satisfaction of the user. The System Usability Scale is a reliable tool for measuring usability.

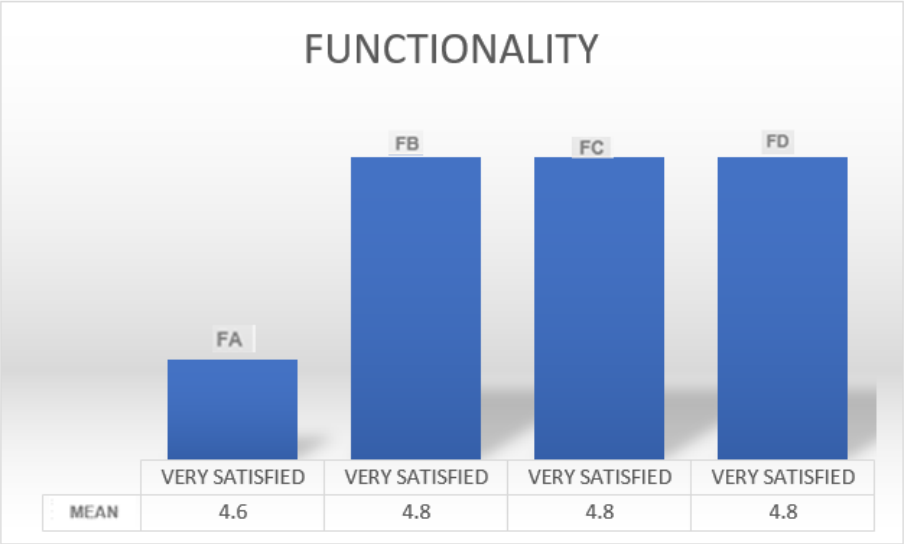
Figure 19. System Usability



The study indicated that the majority of employees were quite pleased with the system's usefulness. The system creates a friendly design that is simple to use and accessible to most employees.

The System's Functionality

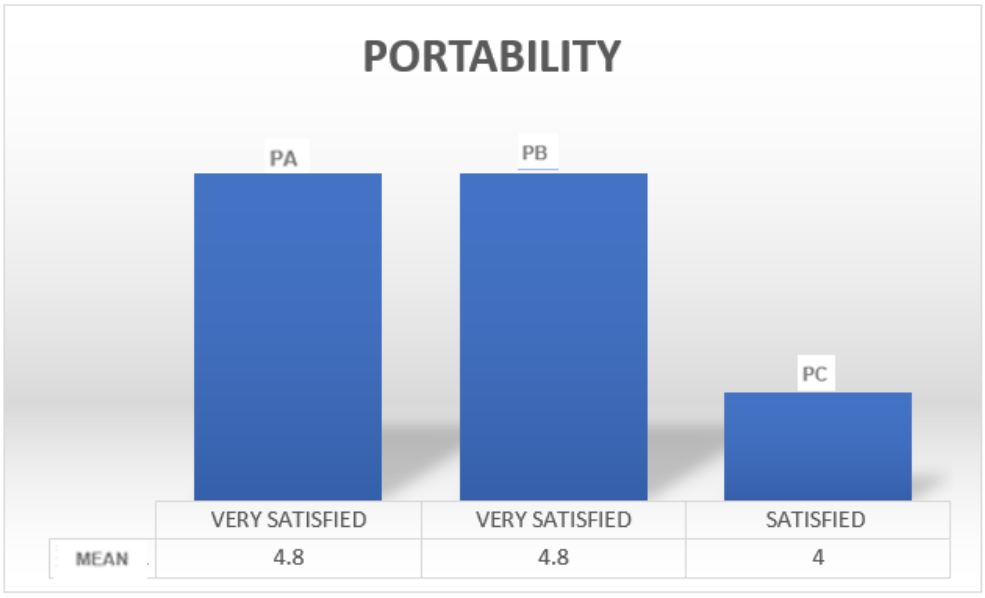
Figure 20. The functionality of the system



The ability of a system to perform the work for which it was designed is known as functionality. The employee is very satisfied with the system, and it is effectively integrated and functioning, according to the results of the system's functionality. Other employees or staff are satisfied with the security features of the software function to prevent unauthorized access, the system meets the guidelines and is appropriately needed by the user and the user's essential suitable function. Overall, the system's functionality is very satisfactory to the employee.

The System's Portability

Figure 21. Portability of the system



The system's portability was assessed as satisfactory by the majority of respondents, and the system is ready for database and user interface software enhancements. The system is simple to manage in terms of installation and uninstallation in the system unit, and it can be easily installed. Overall, the respondent's rating of 4 in portability indicates that the system is user-friendly and can be carried out effortlessly.

The system's Efficiency / Maintainability

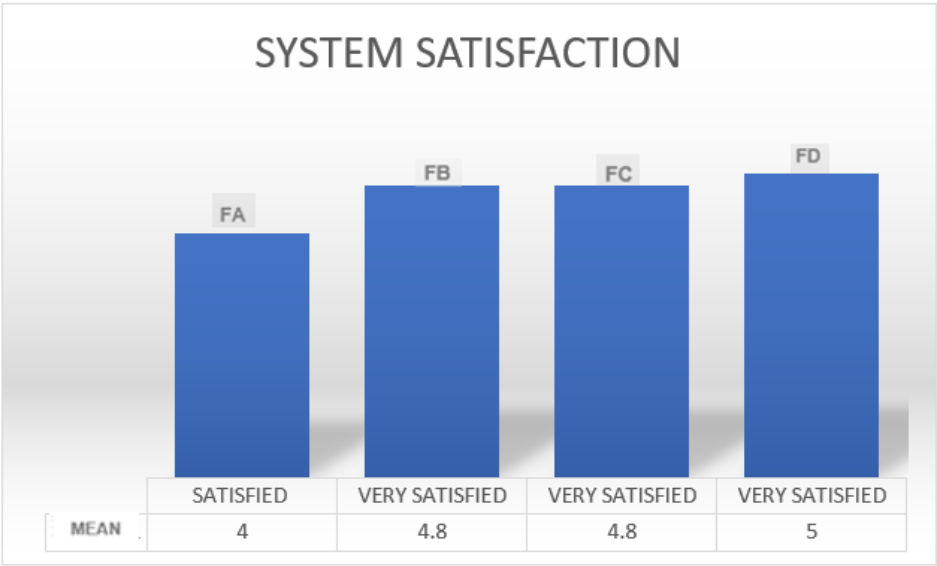
Figure 22. Efficiency/Maintainability of the system

The weighted mean of the item scores for maintainability and efficiency is shown in the figure. The system is ready for software evolution, efficient and easy to maintain, the system executes its functions according to requirements, and the system is reliable and efficient in completing work, according to the majority of the employees. A high maintainability rating indicates that users still believe the system can handle data updates and modifications. In terms of efficiency, the system should be trusted to finish the task quickly. Because the schemas are well-planned, the capacity to operate at a high speed is evident.

System's Satisfaction

System satisfaction is measured by the employee's happiness with the system's overall performance, which allows them to feel at ease and comfortable in completing tasks quickly. Users believe that using the system to make their work easier has reduced their workload.

Figure 23. System Satisfaction of the System



Summary of system evaluation

According to the employee, the system's performance is very satisfactory, and the total mean of the system's performance is 4.55 "Very Satisfied."

Table 6. Summary of System Evaluation

System Evaluation	**MEAN**	**DESCRIPTION**
Usability	4.04	SATISFIED
Functionality	4.75	VERY SATISFIED
Portability	4.53	VERY SATISFIED
Efficiency/Maintainability	4.8	VERY SATISFIED
System Satisfaction	4.65	VERY SATISFIED
Total Mean:	4.55	VERY SATISFIED

Conclusion

When we first started, the problem we set out to solve was to help the institution. Users may quickly locate files, avoiding the need to undertake time-consuming tasks. We all know that the main issue nowadays is having a manual transaction, which is quite obsolete. The implementation of a research development and extension office online record management system with interactive map visualization is designed to efficiently package the unique documentation requirements for file storage, and archiving documents which will allow them to maintain their data in a centralized system rather than manually gathering data and printing results. The use of a visualization map allows you to locate where you conducted the study extension program and make it easier to locate the locations. The outcome would be employed as a key component of the system, supported by very positive feedback from respondents.

Recommendations

For furtherance, the developers recommend the following:

1. On the technical side, the deployment of recommended hardware and software specifications should be examined, and monthly system maintenance should be performed to ensure the system's effectiveness.
2. Future researchers should create a user manual to help users understand how to utilize a system.
3. Future enhancement should have an offline system that they can use when they are not connected to the internet.

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