

A WEB-BASED DOCUMENT MANAGEMENT SYSTEM FOR EXTENSION OFFICE

* Paul Joseph M. Estrera, Maria Teresa M. Fajardo, Nivea Louwah D. Sermona

* University of Science and Technology of Southern Philippines

For correspondence; Tel. + (63) 9158120273, *E-mail: paul.estrera@ustp.edu.ph

ABSTRACT: *The extension and community relations unit of the university serves as the link between the academe and the communities. It is the unit that ensures that quality extension programs and projects are delivered in a timely manner to community stakeholders who are underserved and underprivileged. As the pandemic had shifted various operations and processes online, the study aims to design and develop an online management system to cater project proposal submission, approval, report generation, and document storage. The online management system is expected to streamline transactions while reducing unnecessary exposure to COVID and cater to the need to keep important extension-related documents accessible and convenient. The design elements include ease of use, accessibility, and the ability to produce downloadable and printable documents for ease of submission to external agencies among others.*

Keywords: File Management, Report Generation, Document Archiving, online transactions

INTRODUCTION

The Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP) emphasized that the extension function makes the institution's presence felt in the community. It involves the application of existing and new knowledge and technology and those generated in the institution to improve the quality of life of the people. Through the extension program, people are empowered with appropriate knowledge, attitudes, and skills. Thus, extension services cater to various aspects of community life, e.g. economic growth, promotion of health, environmental management, and social transformation.

The former Mindanao Polytechnic State College (MPSC) established the Research and Extension Office in 1995 but in 2006, when MPSC was converted to Mindanao University of Science and Technology (MUST), the Extension Services Division was established, separating the office from the Research Division. In 2017, MUST and the Misamis Oriental State College of Agricultural and Technology (MOSCAT) were amalgamated into the University of Science and Technology of Southern Philippines (USTP). This amalgamation brought a change in the organizational structure of USTP and the Extension Services Division was renamed Extension and Community Relations Division for the Cagayan de Oro Campus.

The USTP System has a total of 2 major campuses (Cagayan de Oro City and Claveria) and 5 satellite campuses (Balubal, Villanueva, Panaon, Jasaan, and Oroquieta). The physical distance between these campuses would mean that extension documents for approval would take a considerable time for processing and there are occasional cases of lost documents in transit.

Anchored on the USTP Framework (Figure 1), the vision of the Extension and Community Relations Division (ECDRD) of USTP-CDO is to “empower the underserved and underprivileged communities in its sphere of influence by providing them the technical means and opportunities to support themselves toward a better quality of life. USTP-CDO acts as a major catalyst in the industrialization program of the various industries located in its jurisdiction”.

Extension projects can either be research-based (projects based on the results of a research study) or community-based (training or technical advisories specifically requested by the local government unit or other stakeholders in the community) that are implemented by the University's various colleges that aim to improve the external community. Extension projects are then monitored by the Extension Office in order to assess the performance of the department that conducts the research. Each college in the university is presented with an annual quota of extension projects, measured through a process of computing the points gained based on each individual extension project conducted by a department under a certain college.



Figure 1. Shows the framework of the extension

Statement of the Problem

The office facilitates all 33 vertically-articulated programs of USTP Cagayan de Oro and Clustered (Jasaan, Panaon, and Oroquieta) Campuses. With the limited number of staff, file management is quite difficult. Also, the bulk of hard copies of documents fill the limited space of the office.

In the generation of reports, the ECDRD Director prepares various templates using data spreadsheet software. While some reports had existing templates but considering that various reports had different templates, it takes time to prepare individual reports.

Objectives of the Study

- To design a web application using the requirements gathered based on the inputs from the clients gathered from interviews.
- To develop and implement a system that streamlines the Extension Office's operations and transactions through technological solutions and automation.
- To test the performance of the developed system and fix issues from the feedback of our users

Scope and Limitation

The aim of the study is to develop a system that will aid the Extension Office in its operations. The researchers would like to implement a web-based system that can streamline the Extension Office's operations and transactions which would improve the efficiency of output.

The system would be limited only to the transactions directly involving the Extension office. External transactions would be disregarded and therefore not be considered when creating custom sub-systems inside the system.

Research Framework

The study is a design and development of a web-based document management system for the extension and community relations division following DeLone and McLean's Information System Success Model[1]. It involved two phases, namely; designing and testing the system. For the designing phase, the developers considered the following criterion as the basis of the design.

- Service Quality which is one of the primary antecedents of customer satisfaction
- Information Quality refers to the usefulness or relative importance attributed to it by the user
- System Quality which typically focus on the performance characteristics of the system
- User Satisfaction refers to the net benefits perceived by the information system's stakeholders
- Individual Impact refers to the best measured via improvements in the individual recipient's performance
- Organizational Impact:

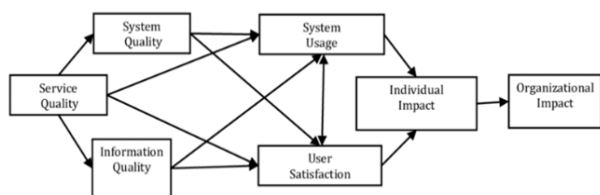


Figure 2. The Conceptual Framework for Electronic Document Management System

IT impact on an organization or industry

REVIEW OF RELATED LITERATURE

Electronic Document Management System (EDMS) can be defined as a group of information containing various types of documents that may exist in different places within a network and support multiple access, update, and modification simultaneously and automatically [2, 3] .

EDMS has been used in governmental and public organizations. EDMS implementation studies in the government sector began to grow in early 2000 [4].

An EDMS component should be tailored to the needs of each organization that requires such a mechanism [5]. Therefore an EDMS should have the ability to create, keep and organize the data in the organization and handle all processes and transactions.

Tags define the columns and contents of the reports to be generated. Tags are the fields that a client inserts into a text document before using that document for report generation. These fields contain information about what clients want to be put into a report. When a document with tag fields is passed to the application, the parser goes through the whole text and reads all the tags. In order for the parser to be able to set aside tags from what is otherwise ordinary text, every tag needs to have the standard construction defined by the application. A tag effectively consists of two parts. The first part is the field that is inserted into a document (the name of the tag), and optionally some values for the tag's attributes (there can be more than one field in the same document referencing the same tag). The second, and main part, is the information stored for each tag in the database.

For a report to be generated, a text file template is imported into the application. After the file is imported and selected for report generation, the application parses the whole text in the file. When a part of the text is recognized as a tag, it is identified by its name and looked up in the ASGRT database. We will be basing our tagging and report generations in relation to this literature. Since tagging is a vital role in generating reports in the Extension Office.

The traditional method of data storage has shown its impact in managing documents from security, retrieval, and monitoring. Many kinds of the literature suggest that this approach would result in low job satisfaction ratings from its clients.

Take for example the case of Leyte Normal University, specifically in the Office of the Registrar where its archive/storage was heavily affected during typhoon Yolanda in 2013. The study [6] revealed that since most of the documents were in hard copies, they were completely damaged during the typhoon and document retrieval was difficult. With this experience, the office sought a practical solution, that is, the development of an electronic document archive and management system (EDAMS).

Decision Support Systems are used extensively in different industries to assist decision-making across a wide spectrum of problem areas. These systems are being developed with much consideration of their enormous benefits, both in time and cost savings and most especially in helping organizations in their decision-making. The researchers have identified the main problem of the Planning and Coordination Unit in the Manila Health Department (MHD) which is its poor use of information resulting in the wrong identification of specific programs for the communities of Manila City [7]. This results in the difficulty of health centers in identifying what barangays need to be prioritized and what nutritional programs have to be implemented.

Based on the results of the study, it was proposed to develop a community-based decision support system which is web-

based that would help MHD in planning and implementing nutrition and health programs to the community in District V of Manila City. Rapid Application Development (RAD) methodology was used to develop the system and PHP, HTML, and My SQL was used as the primary programming language following appropriate programming standards to ensure that all parts and features of the system are working properly. Users from the Manila Health Department and Health District, a Barangay Health Worker, and a Registered Nurse tested, verified, and validated if the developed system met the organizational requirements. The system was able to track and authenticate community information accurately, provide MHD with an overview of health cases in specific communities, provide visual and non-visual reports to MHD, and enable them to keep track of implemented programs in communities. Additional functionalities such as mobile surveys or mobile profiling of the community will be helpful. Presented the development of a Portal with an Electronic Document Management System for the Information Technology Department under the College of Computer Studies of De La Salle University - Manila. [8] The system covers the entire thesis process as well as the document management of the different thesis documents. The main objective of this system is to provide a portal that can help better track and accomplish the thesis cycle.

The researchers have chosen the Rapid Application Development (RAD) methodology for this study. This methodology is composed of four phases such as requirements planning, system design, construction, and cutover. It lets the users be involved from planning to the development of the information system. It speeds up the development process as the users help in providing feedback and comments regarding the system being developed in order to know if the requirements of the users are considered.

The primary goal of this project is to design and develop an Electronic Document Management system with a few sub-systems thrown in to tailor the system to best suit the needs of the client. Systems such as the Project monitoring System and Report Generation are implemented for the convenience of the Extension Office director and his/her staff.

As an Electronic Document Management System, our project edges out against current existing systems because of the implementation of tagging system which would help organize documents. Using tags would be much more convenient for the system's users to sort documents. Most existing systems only implement archiving of a previously existing document through the process of digitization whereas our system would digitize only the existing hard copies. Subsequent documents would automatically archive soft copies taken from the proposals sent by the project leaders.

RESEARCH METHODOLOGY

Information Gathering

Information needed as input to the automated system such as the extension processes, reports, and forms, were gathered from the Extension Office Director and staff. The current mode of operation as well as the problems, issues, and concerns encountered was also collected.

Designing the System

By analyzing the data gathered through interviews, the

researchers designed a system that would address each problem experienced by the client and create a solution for

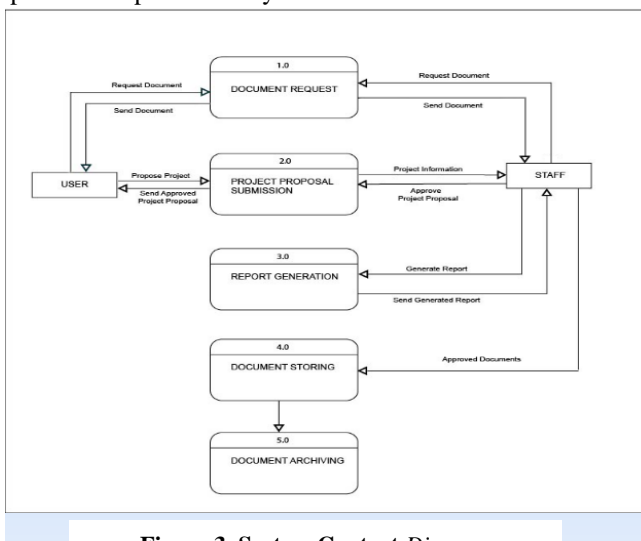


Figure 3. System Context Diagram

each particular area, as well as present a new mechanism and system that would help streamline and automate a few of the client's repetitive tasks. The researchers came up with a system of modules capable of streamlining the operations of the ECRD.

Project Monitoring Module

As a common office environment, the ECRD is tasked with undertaking various transactions relating to each of the College's many Extension Projects, as taken from the interviews, one of their more common problems is the organization of each of their tasks. This problem arises from their lack of personnel which consists only of one (1) office clerk and a full-time faculty member. In light of this dilemma, the researchers came up with a solution that would analyze the importance of each transaction that the Extension Office receives in order to clearly show the prioritization of each transaction.

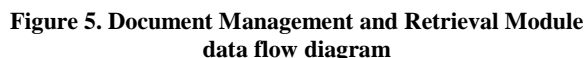
As a solution, the researchers would like to implement a Project Monitoring Module which would automatically manage ongoing project proposals for the Extension Office. Each Project is displayed in the calendar of schedules; the color-coded notifications would then specify which college the project is associated with. Red for the College of Technology (CoT), Green for the College of Science and Mathematics (CSM), Black for the College of Information Technology and Computing (CITC), Maroon for the College of Engineering and Architecture (CEA), and Blue for College of Science and Technology Education (CSTE). Aside from the calendar of transactions directly shown, a separate list would also be provided, showing the activities and transactions received by the office, separated either by a per-day, per-week, or per-month basis.

Project Leaders with approved project proposals would then be notified of the status of their request and the document attached to the transaction would then be tagged and stored in the database for document archiving. Revised project proposals would still get a notification although their proposals would need further revision.

The Report Generation Module's purpose would be to automate report generation using previously collected data that was inputted by each Project Leader upon submission of the Accomplishment Report. Each report, with different formats, would be readily available given that the pertinent information involved with the report is complete.

Based on the client's requirements gathered throughout a series of interviews, the researchers designed a relational database structure that would support the data and information organization of the system. We first created an Entity Relationship Diagram to better picture the basic structure of each entity and its relationship with one another.

Figure 4. Project Monitoring Module



The screenshot shows a code editor on the left with a file named `test.cpp`. The code includes headers for `vector`, `string`, and `algorithm`. It defines a `main` function that calls `get_int` and `get_double`, which then call `is_prime` and `is_palindrome`. The right side of the image displays a dependency graph with nodes representing code elements and edges representing dependencies. The graph shows a complex web of relationships, with nodes for `main`, `get_int`, `get_double`, `is_prime`, `is_palindrome`, and various intermediate variables and functions. The graph is color-coded, with green nodes and edges indicating a specific set of dependencies or a particular execution path.

Figure 7. Entity Relationship

- **HTML** - Builds the Skeleton of the website.
- **CSS** - Changes the look and feel when using the website for better UI/UX and user usability.
- **JAVASCRIPT** - Used to create the behavior of buttons and effects when navigating through the website.
- **ANGULAR**

Codeigniter - To utilize the Model-View-Controller (MVC) architectural pattern. Codeigniter is used as the WEB API of the system.

The developed system was presented to the clients, specifically, the Director and staff of the Extension Office for alpha testing. Alpha testing is concerned with identifying all possible issues and bugs in the performance of the system before releasing the final product to the end users [9].

Overall, the alpha test results indicated that the prototype met the operational requirements of the Extension Office. The accessibility of submitting proposals and uploading accomplishment reports for extension projects or programs, even from the clustered campuses, was one of the positive highlights of the system. The system also serves as a repository of files for extension activities and report generation is more efficient, and can be done with less time and effort from the end. Moreover, monitoring of the extension activities could be done easier with the system. Based on the feedback gathered from the end-users during alpha testing, the following revisions were made:

- Allow signatories to upload their own e-signature to ensure security
- Improve notification to the concerned office through email and provide an easy feedback mechanism
- Revise forms as enrolled in documented procedures manual (DPM)

The graphical user interface of the system is presented below:

Proposal submission from the proponent

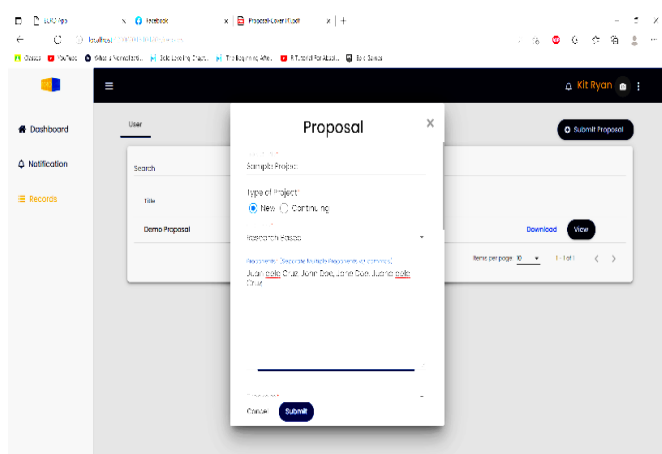


Figure 8. Proposal Submission

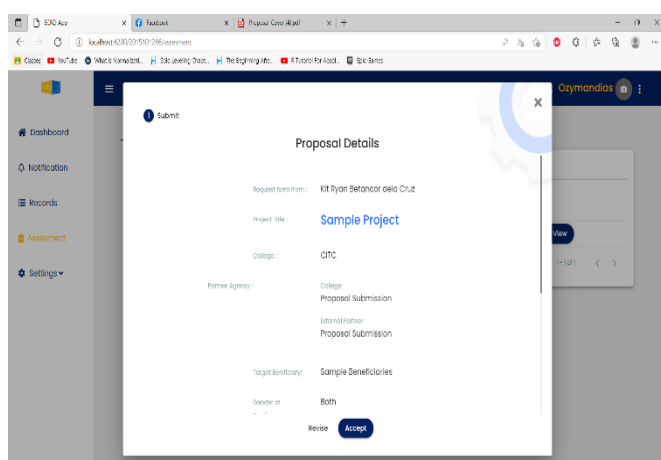


Figure 9. Proposal Assessment

Proposal Assessment upon submission

Updated proposal cover generated from the system

Figure 10. Project Proposal Form

Figure 11 shows the data gathered from the Functionality Test. With all of the questions resulting in "Yes" answers, we, therefore, conclude that our system works properly.

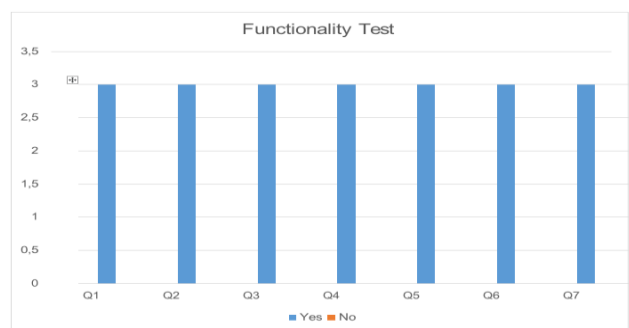


Figure 11. Functionality Test Result

This system will be demonstrated to at least 50 Faculty-extensionists of USTP Cagayan de Oro. These faculty members will also be asked to use the system for will be asked to evaluate system and further suggest an improvement.

CONCLUSION

The main goal of this system is to aid the ECRD Office to conduct their transactions efficiently. As stated, manual transactions require more time and effort to complete. The introduction of the system with a focus on automation greatly diminishes the required time to conduct transactions and tasks such as report generation and extension project proposal approval to monitoring.

Additionally, the system's document sorting and archiving capabilities give the ECRD an efficient way to store their documents and allow easy retrieval for the various users.

REFERENCES

- [1] Yatin, S.F.M., Ramli, A.A.M., Shuhaimi, H., Hashim, H., Dollah, W.A.K.W., Zaini, M.K. & Kadir, M.R.A. *Electronic Document Management System: Malaysian Experience. Australian Journal of Basic and Applied Sciences*, **9 (3)**, 82-89. (2015).
- [2] Brendan. E. Asogwa, The challenge of managing electronic records in developing countries: implications for records managers in sub-Saharan Africa, *Records Management Journal*, **22**, 198- 211(2012).
- [3] Ostroukh, A., Krasnyanskiy, M., Karpushkin S. &Obukhov, A. *Development of automated control system for university research projects. Middle- East Journal of Scientific Research*, **20(12)**, 2014, pp.1780-1784. From [www.idosi.org/mejsr/mejsr20\(12\)14/15.pdf](http://www.idosi.org/mejsr/mejsr20(12)14/15.pdf) (2014,December).
- [4] Julie McLeod, and Catherine Hare, *Development of RMJ: A mirror of the development of the profession and discipline of record management. Records Management Journal*, **20 (1)**. pp. 9-40. ISSN 0956-5698 (2010)
- [5] Arkan Mohamad, and Ibrahim Taner Okumus *Design and Implementation of an Electronic Document Management System*,MAKÜ-Uyg. Bil. Derg., **1(1)**, 9-17 , (2017).
- [6] Las Johansen Balios Caluza, *Development of Electronic Document Archive Management System (EDAMS): A Case Study of a UniversityRegistrar in the Philippines, International Journal of Digital Information and Wireless Communications* **7(2):106-117 (2017)**
- [7] Heidelle Marie Jahnelle Cervantes¹, Calvin Chua², Meladaine Ronquillo³, Iñaki Julian Tolentino⁴ and Ms. Lissa Andrea K. Magpantay, *Community-Based Decision Support System for the Manila Health Department*, p **1-7, 2014**
- [8] Elin Del Rosario, Julian Del Rosaria, Mirro Nieva, Tiara Tan and Marivic Tangkeko, *CollaborateIT: A CCS IT Thesis Portal with Electronic Document Management System*. Research Paper. Manila, Philippines: De La Salle University, (2016)
- [9] Hamilton, T. Alpha Testing Vs Beta Testing –Difference Between Them. Retrieved from <https://www.guru99.com/alpha-beta-testing-demystified.html>. (2022).