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Development of E-Document Management System for Higher Education Institution

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Abstract
The aim of this paper is to address the existingissues on record keeping and document control mechanism of a university based on ISO 9001:2015 Quality Management System. It discovered a number of interesting things: disparities in tracking, preserving, forwarding of Memoranda and files are moved from one office to another. These documents came from a variety of sources and events like document loss and redundancy were evident. It is in this context, that E-Document Control Management System was materialized. Its usability and performance were evaluated by a total of 165 participants. A developmental-descriptive research design was used in this study. The information was acquired using a modified version of the PSSUQ instrument for usability and a researcher-created survey questionnaire for performance efficiency based on the ISO/EIC 9126 criteria. In addition, the system prototype was created using Rapid Application Development.The results revealed that the functionality of the system product, the level of usability as well as its performance were all interpreted as "Very Good". This significant result implied that the respondents were impressed by the system features of the developed system.

Keywords:*Document Control, Record Management, E-records, Rapid Application Development, Quality Management System*

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I. INTRODUCTION

In this day and age of rapidly advancing technology and abundant information, it was evident that one of the most important pieces in the daily function of a private or public organization was the record that it generates and receives on a daily basis, as it supports business activity associated with the workflow and provides a foundation for efficient service delivery. The landscape of record management has altered as businesses increasingly incorporate information and communication technologies (ICTs) into their daily operations, resulting in a new version of records that includes both digitally born and paper-based data.

Records Office was one of the primary organizational components in Northern Iloilo State University (NISU). It served as the University's official repository for all important records. One of its missions was to give clients with timely frontline assistance. It supports NISU's mission to maintain its commitment to excellence in teaching and learning on its campuses. Currently, the office uses a manual method to process and recordadministrative files, organizational documents, memoranda, faculty documents, instruction manuals, library files, laboratory documents, infrastructure and procurement plan as well as community involvement outputs.

The volume stacks of papers kept by the records officer were one of the activities that caused delays in the management of documents and personnel records. Frequently, the records officer has difficulties accessing specific files in response to an employee's concern since she had to turn one page after another just to locate these documents. It can be noted that there is no master list for all files. Moreover, the files were disorganized because of the limited space available in the office.

A survey of the literature on quality management in higher education has come to identify that a number of environmental pressures were driving change within and between countries, resulting in the quality management issue firmly establishing itself on the agenda of many higher education institutions. The most common reaction from HEIs was to test or apply quality management approaches developed by industry, according to the study. Benefits and constraints connected to the application of these models were identified from empirical investigations presented in the literature and analyzed by the writers. The adoptions of a strategic approach to quality measurement and management, as well as the determination of quality enhancement priorities, were among the positives; constraints were mostly connected to the issue of applying research or teaching and learning[1].

Human Resource Management System is an information system that intends to lessen the administrator's effort in keeping track of everyday occurrences such as attendance, projects, works, and appointments. It also covers identifying personnel, tracking their hourly attendance, and determining their payable hours or days. It also keeps track of each employee's time spent in the company, which can be utilized for performance evaluation. On this basis, transfers, removals, and promotions can be made[2].

SeRIA Staff Movements Management System (SSMMS) is a system that uses the System Development Life Cycle (SDLC) approach to track employees' attendance at work and leave requests. Staff can use this system to register daily attendance, apply for leave, read their profile, and track the status of their leave applications, while the coordinator can examine and generate attendance reports for the staff. The application is managed by the administrator, who can accept or reject the staff leave request. SSMMS also saves time and money in terms of management. The deployment of this system reduces the use of traditional systems while increasing the use of computers in the company [3].

In [4], a study that determines the extent to which 14 out of 15 barangays in Quezon City complied with the relevant laws, rules, and regulations on archives and records administration. In the process of collecting data, survey questionnaires were distributed and follow-up interviews were conducted. The findings revealed that, in order to effectively serve their constituents, barangays in Quezon City must modernize and standardize their archives and records management systems in compliance with Republic Acts.

In [5], an exploratory study of how the Quality Management System (QMS) principles help develop Quality Culture (QC) in maritime education and training institutions (METIs) under the Philippine jurisdiction. Maritime education and training (MET) governance has quality, quality assurance, and management challenges. Fostering institution-specific QC has received much attention, but practical tools or approaches to capture this essential component are lacking despite the increased interest in QC. The study identified the principles of the QMS, different understanding of quality in MET, constructs of quality assurance approaches, and styles of QC. The researcher conducted a qualitative research method and utilized online survey questionnaires to garner data on the research topic. Online survey questionnaires were disseminated to METIs' Quality Champions and MARAD Evaluators to gather their viewpoints about quality, QMS, quality assurance and QC. Examination of the data exposed that QMS principles motivate and stimulate QC practices and that these conceptions significantly impact organisational performance. The research also unfolds METIs' standpoint that quality in MET can be classified under the fitness for purpose category. Further, the study revealed that the Philippine METIs portray a Regenerative type of QC. The findings of this study indicate that when a QC is well-established within an organisation, it will improve organisational efficiency while also impacting core functions. As a result, it is necessary to advocate that both of these principles are mutually advantageous.

The adoption and use of ICT to enhance and facilitate KM has brought to focus the urgent need to come out with new methods, tools and techniques in the development of KM systems frameworks, knowledge processes and knowledge technologies to promote effective management of knowledge for improved service deliveries in higher education. To succeed in KM, higher education institutions must endeavor to effectively link KM initiatives and processes with their ever-changing needs to advance their goals. Addressing these challenges call for a new conceptual framework and expanded research agenda to ensure success in the utilization of ICT in KM. Using the synergies from Stankosky's (2005) KM pillar for enterprise learning together with the task/technology fit theory (Goodhue and Thompson, 1995) to form the basis for defining our approach; this paper proposes a conceptual framework for enhancing KM using ICT in higher education. In addition, the paper identifies several research issues to bridge the gap that currently exists between the requirements of theory building and testing to address the different emerging challenges in KM using ICT in higher education [6].

In this context, this study is aimed at developing a web-based management information system called E-Document Management System which would take advantage of advances in information technology to manage records and files available in the university. It also sought to ascertain the level of usability of the proposed features as regarded by user groups and to assess their performance in terms of information dependability and time efficiency as viewed by their target users.

1.1 Conceptual Framework of the Study

Figure 1 presented the conceptual framework of the study. The inputs were the essential part of the system in order to produce relevant output of reports such as the following: administrative files, organizational documents, memoranda, faculty documents, instruction manuals, library files, laboratory documents, infrastructure and procurement plan as well as community involvement outputs. The data inputs were securely processed and managed by the E- Document Management System for a better output of records. The system's outputs included organized electronic records, quick retrieval of relevant papers, and a methodical approach to record keeping and archiving.

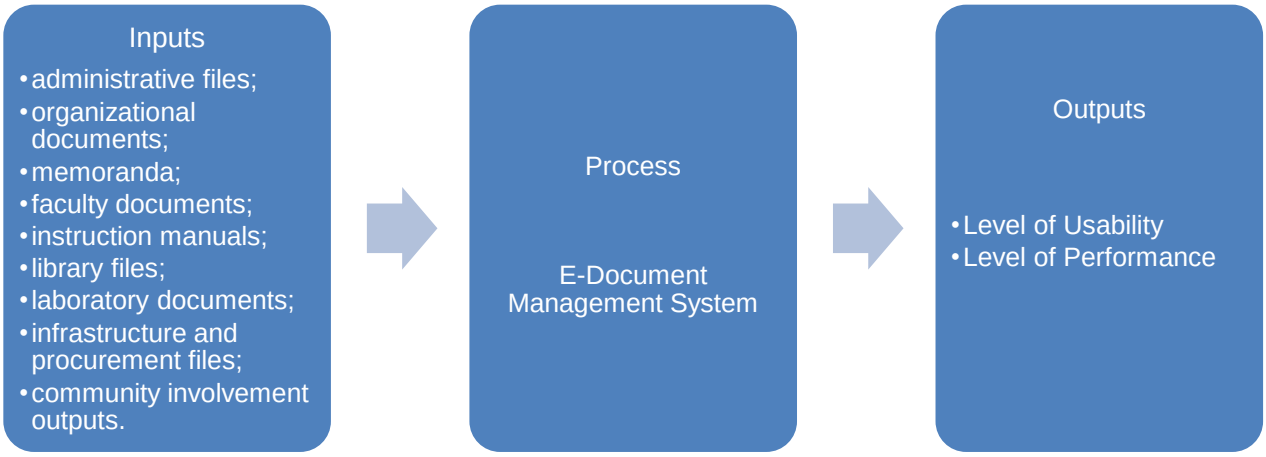

Figure 1. The Conceptual Framework of the Study

1.2 Objectives of the Study

The main objective of the study is to design and develop a web-system that is simple and complete for the convenience of Record Officer and employees of Northern Iloilo State University, Estancia, Iloilo, Philippines in pursuit in achieving quality services offered to clienteles.

The researcher also determines the level of functionality,usability and performance of the E-Document Management System.

II. METHODOLOGY

2.1 Software Development Life Cycle Model

For the software development activities, the study used the Rapid Application Development (RAD) paradigm as the software development life cycle. Prototypes are used in the RAD model as a working model that is integrated into the final product [7]. Prototyping and iterative development are required. The planning required for building the product is included in the process of writing the program. A prototype is an essentially equivalent functioning model of a product component [8]. Users are given the prototype to test and provide feedback, after which it is re-analyzed and changed, and a second prototype is created. The cycle repeats itself until users and developers agree on a final system [9].

The RAD model consisted of four phases namely requirements planning phase, user design phase, rapid construction phase and cutover phase [10]. At each phase, the researcher performs specific activities leading to the phase's deliverable. Figure 2 shows the RAD model.

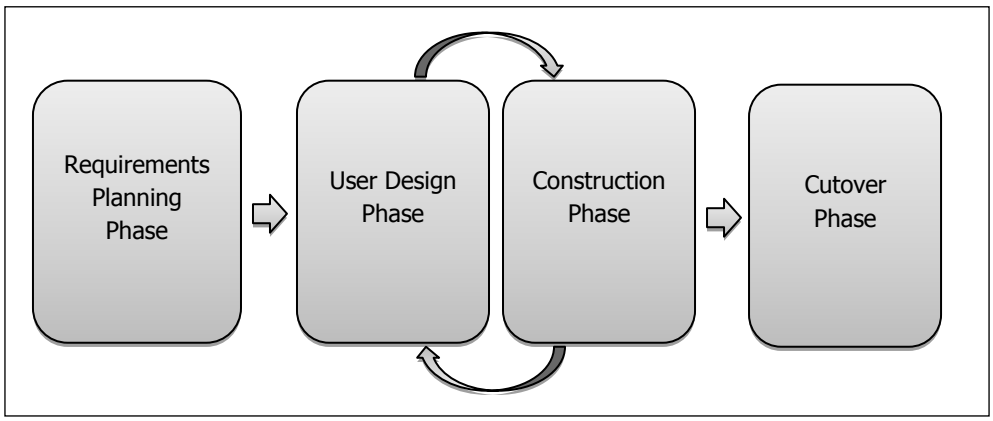

Figure 2. The Rapid Application Model

2.2 Physical Network Topology

The physical network topology visualized the communication schemes of physical networks and its arrangement. The physical network topology illustrates the placement of the components in the network. It showed the configuration of cables, computers, and other devices.

Since the system was a web-based system. It can run on one or more computer in a network and can be accessed via a web browser using an assigned Internet Protocol (IP) Address of the server where the program and manipulation of data were stored. Figure 3 shows the physical network topology of the system.

Figure 3. Physical Network Topology of the System.

2.3 Application Architecture Model

The application architecture model describes the recommended layouts for the core functions. The diagram depicted the hierarchy of the proposed system's primary logical components. Logical architecture identifies the software components required to implement a solution, displays their interdependencies, and distributes them along logical levels. The physical distribution of components and functions on servers, computers, networks, and remote sites was the focus of tiers. The N-tier architecture was used in this research. Client–server architecture divides the system's functionality into services, each of which is offered by a separate server. Clients are those who use these services and must connect to servers in order to do so [11]. It consists of four layers namely the presentation layer, the application and logic layers also known as the business layer, the data manipulation layer, and the database layer.

The presentation layer, often known as the graphical user interface (GUI), integrated the functionalities that allowed the user to interact with the system. The display layer was executed at the web browser via local hosting in the server version of E-Document Management System. The business layer enclosed the required business logic and implemented the system's principal functionality. The suggested system's data manipulation layer implemented the procedures involving the maintenance of records. The database, tables, and records were all handled by the My Structured Query Language (MySQL) database server. Figure 4 shows the application architecture model of the system.

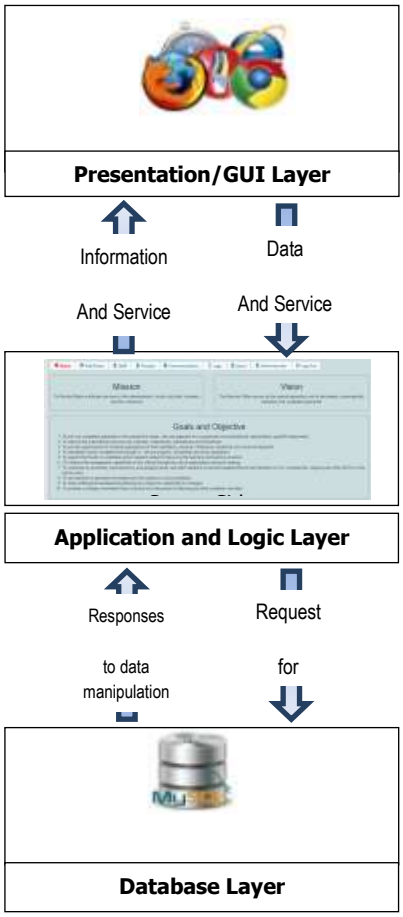

Figure 4. Application Architecture Model of the System.

III. RESULTS AND DISCUSSION

The results obtained are as discussed below:

3.1 Functionality of the System Product

The table below shows the result of the respondent's feedback on the functionality of the system product in terms of functional appropriateness, functional correctness, and functional completeness. On the extent of designing the system product to end-users, the functional appropriateness (M= 4.81), functional correctness (M=4.71) and functional completeness (M=4.75) were described as "Very Good".

These findings simply suggested that with the system product when implemented, the delivery of incoming and outgoing communication, as well as the recording and retrieving of personal (201) files to target end-users, had a high level of suitability. The recording and retrieving of records in electronic format were provided in a fast and efficient way. As needed by the users, the system product should enhance the day to day transactions being provided to the clienteles. This requirement was employed in a sequence of handy components. The NISU Record Officer also stated that through this system, her works became organized and it caters her daily activities. Table 1 shows the results.

Table 1. Respondents' Feedbacks on the Functionality of the System Product.

Implementation Indicators	Mean	Verbal Interpretation
a. functional appropriateness	4.81	Very Good
b. functional correctness	4.71	Very Good
c. functional completeness	4.75	Very Good

***Legend**: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good);*

3.2 Level of Usability

Usability features is the ability of the system product to be understood, learned, operated, accessed and provides visual appearance, under specified settings of the system. The level of usability of the system was evaluated in terms of understandability, learnability, operability, accessibility, and user interface aesthetics. The

respondents' feedbacks for the level of usability in terms of understandability (M=4.75), learnability (M=4.79), operability (M=4.70), accessibility (M=4.69), and user interface aesthetics (M=4.78) were all interpreted as "Very Good". Findings revealed that the system product, when utilized, possessed a high level of usability wherein end-users were able to easily understand due to its simple design and features. Table 2 shows the result.

Table 2. Respondents' Feedbacks on the Usability of the System Product.

Implementation Indicators	Mean	Verbal Interpretation
a. understandability	4.75	Very Good
b. learnability	4.79	Very Good
c. operability	4.70	Very Good
d. accessibility	4.69	Very Good
e. user interface aesthetics	4.78	Very Good

***Legend**: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good);*

3.3 Performance Evaluation of the System Product

Performance is the capability of the system product to provide total effectiveness in relation to the utilization of resources. The performance of the system was evaluated in terms of reliability and efficiency. The results showed that the performance of the system product in terms of reliability (M=4.76) and time efficiency (M=4.65) were all interpreted as "Very Good".

Findings revealed that the system product upon evaluation was able to manage records in the day to day transactions of the Record office. The respondents believed that the throughput procedure and response time were outstanding. The system product was able to deliver actual results and capable of assisting in the day to day transactions of the office. The most important transactions such as receiving and releasing of incoming and outgoing communication, updating of employees' records primarily catered the daily activities of the Record Office. Table 3 shows the performance evaluation of the system product.

Table 3. The Performance Evaluation of the System Product.

Implementation Indicators	Mean	Verbal Interpretation
a. reliability	4.76	Very Good
b. time efficiency	4.65	Very Good

***Legend**: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good);*

IV. CONCLUSION

In view of the results of the study, the following conclusions were arrived:

The Document Management System was able to handle daily records, which was judged to be an important aspect of the university's quality management system in providing excellent services to its clients.

Furthermore, due to its straightforward design and features that are simple to comprehend, access, and apply, the E-Document Management System proved to be extremely user-friendly.

Employees' information was made conveniently and rapidly available for use by the individual in need, which was an excellent organizational practice.

In terms of accuracy and timeliness of information given to clients, the system met the expectations of the Record Officer and the Faculty and Staff of NISU Estancia, Iloilo, Philippines.

V. RECOMMENDATIONS

From the findings and conclusions of the study, the following recommendations were strongly suggested:

1. Since automation and computerization were adapted and used in most offices and schools, it may be suggested that the E-Document Management System shall be implemented and used by Northern Iloilo State University to help the Record Officer in managing records of employees, administrative files, organizational documents, memoranda, instruction manuals, library files, laboratory documents, infrastructure and procurement plan as well as community involvement outputs.
2. Since NISU is composed of seven campuses, it is highly recommended that the University replicates the system for better practice of the organization.
3. The university may continue to update the system which may help to maximize its potential and improve its functionalities, usability, and efficiency.
4. A similar study should be made with the integration of Short Messaging Systems (SMS) Tecchnologyfor notifications.

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