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WEB-BASED RESEARCH MANAGEMENT REPOSITORY SYSTEM WITH DATA ANALYTICS

An Undergraduate Capstone Project Presented to the Faculty of the
Institute of Computer Studies

In Partial Fulfillment of the Requirements for the Degree of
BACHELOR OF SCIENCE IN AVIATION INFORMATION TECHNOLOGY

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CHAPTER 1

INTRODUCTION

A Web-Based Research Management Repository System with Data Analytics for the Philippine State College of Aeronautics is a system that manages, preserves, collects, and stores the thesis or research documents, and Data analytics can identify the researcher's focus agenda (Okon et al., 2020). It will digitalize the physical copies of research papers that are traditionally stored in physical stores, which are usually disorganized and prone to file loss due to an abundance of papers. This often leads to stress and time-consuming tasks because it's challenging to locate what you need. This improvement will benefit both the researchers and the students who use the Web-Based Research Management Repository System with Data Analytics. Its primary goal is to provide students with specific online access to save their final projects.

Project Context

Research plays an important part in spreading knowledge and accelerating advancement in the field of aeronautics, and the Philippine State College of Aeronautics (PhilSCA) acknowledges this in its mission of academic excellence and innovation. However, in today's academic environment, managing and using research data effectively presents a number of difficulties these are the securing of data, facilitating access to research data for collaboration, replication, and verification purposes, managing the entire lifecycle of research data, from collection and processing to preservation and archiving and mostly the difficulties of managing and using research data are insufficient research storage and time-consuming publishing in physical and disorganized papers. In order to overcome these challenges, the development of an advanced Web-Based Research Management Repository System with

Data Analytics features is proposed.

The significance of this capstone project is the need to improve research procedures, encourage researcher collaboration, and use data analytics to extract important results. The current manual or disconnected procedures for gathering, storing, and evaluating research data make researchers less productive and less able to work together. Thus, the intended system seeks to offer a centralized platform that enables smooth project management for research while providing users with innovative analytical capabilities.

This capstone project's main goal is to provide a user-friendly web platform that meets the specific needs of the research community at the Philippine State College of Aeronautics PhilSCA, which consists of academics, researchers, and students. By acting as one centralized point for arranging, storing, and retrieving research data, this platform will be able to do away with the inefficiencies brought about by using several data storage systems. Through user-friendly interfaces, researchers will be able to submit, track, and manage their projects with greater efficiency, increasing overall productivity in their research.

Moreover, important progress has also been made in research management methods with the integration of data analytics capabilities. Researchers will be able to gain useful insights from their research data through the use of data analytics. Researchers will be able to find patterns, trends, and correlations within their datasets thanks to the system's support for a variety of analytics functionalities, such as descriptive, diagnostic, predictive, and prescriptive analytics.

Furthermore, the proposed approach will also encourage researcher cooperation and knowledge exchange, both inside and outside of the Philippine State College of Aeronautics PhilSCA. The pace of research discovery will speed up and interdisciplinary collaboration will be facilitated by features like commenting, sharing, and collaborative editing. Sensitive

research data will also be protected by the system's assurance of data security and privacy compliance with institutional and regulatory standards.

The project will use agile development approaches as its methodology, designing, developing, and constantly testing the system. To ensure that the system satisfies every need of PhilSCA's research community, requirements, and input will be gathered through stakeholder engagements and needs assessments. To collect user input and continuously enhance the system based on user feedback, user acceptability testing (UAT) will be conducted.

Abdullahi et al. (2021) stated that the purpose of this study is to develop a web-based repository system for graduation projects. The suggested project may improve the ability of the parties involved to manage their graduation projects via a specifically built website, allowing them to organize their activities with less effort.

Similar goals are investigated in my research on Web-Based Research Management Repository Systems with Data Analytics, but in a wider framework that includes many kinds of research projects outside of graduation projects. The goal is to provide a complete platform that makes it easier to manage research activities and data. Web-based technologies are utilized, and data analytics capabilities are included to improve productivity and decision-making.While Abdullahi et al.'s work focuses on a particular subset of academic projects, my study stresses the value of data analytics for drawing conclusions and simplifying research procedures by extending the concept to a larger range of research undertakings. Though their scopes and focuses are different, both studies aim to increase the effectiveness and efficacy of research administration by utilizing web-based technology.

Ho et al. (2020) discussed the current invention pertains to technology for establishing a repository system capable of meeting the demands of a researcher, and a

research institute for maintaining, distributing, and revealing vast volumes of research data in compliance with open science principles. Highlighting the importance of a research data repository system must consist of a user authentication module, a research data submission module, and a management engine. In my studies, I also emphasize the importance of these fundamental elements in the framework of a complete research management platform in my study of the Web-Based Research Management Repository System with Data Analytics. Secure access to the system is ensured via user authentication, protecting confidential research data and upholding responsibility. Researchers may simplify the data intake process by using the research data submission module, which makes it easier to submit and organize research data. As for the system's main components, the management system offers the capabilities and instruments required for administrative control, data governance, and access control.

When it comes to overseeing the storing operations of the research documents inside the university, the research head is important. Considering that the project's objectives and goals have been achieved, the developers worked with the library head as their client. There are a few main objectives that direct the Library Office Research Management System project. One of the goals was to develop a platform that would be easy to use and effective for managing the research repository processes of the library office including arranging, storing, and retrieving research data.

The project also addressed the significance of using a centralized platform to make the managing of projects go smoothly, with the intention of designing the system to meet the fewest operational requirements possible. This ensured that tasks were completed efficiently, contributing to the highly responsive user experience.

Purpose and Description

With a single hub that can be accessed through web browsers, the Web-Based Research Management Repository System with Data Analytics will meet the needs of both the Research Office and the Researchers, allowing them to efficiently oversee their studies from any location with an internet connection. The system operates essentially as a flexible toolset with features for advanced analytics, data storage, and research management. Because of its many organizational features, academics can schedule tasks, keep track of projects, and promote collaboration.

The Institute of Computer Studies at the Philippine State College of Aeronautics is the specific subject of the project, with a focus on the Research Office. The goal of this capstone project is to significantly improve office operations, which will have the following benefits:

Research Office. The Philippine State College of Aeronautics' Research Office has undergone a significant transformation. This innovative project streamlines research paper management, replacing inefficient manual data processing with an efficient system.

It will be capable of providing effective services and managing all research articles that could serve as useful references for teachers and students conducting their studies. Additionally, it can correctly store and arrange the paperwork, which will ease their workload and can be used to keep track of how many students finished their final product.

ICS Students. Students will be able to maximize their research output with the help of the Web-Based Research Management Repository System with Data Analytics. In particular, future researchers will be able to access references for every paper published as part of this project, and current researchers will be able to keep their works properly organized and

prevent paper breakage. Students may process academic documents more quickly as a result of this.

Faculty. Faculty and Research Coordinators reaching out to the Research Office for academic endeavors can leverage the streamlined administrative processes facilitated by the Web-Based Research Management Repository System, which includes advanced Data Analytics capabilities.

Researchers. This project might be useful as a reference for researchers looking to construct a similar system. Since technology evolves and advances in the future, researchers may develop serverless systems to make them better and meet the customers' future demands. The system provides a single repository for organizing and archiving research data, documents, and related resources, making them easily accessible, retrievable, and shareable across researchers and institutions. It aims to increase researcher collaboration by offering a platform for the real-time sharing of research findings, datasets, and status updates.

Overall, the implementation of a Web-Based Research Management Repository System with Data Analytics will assist individuals inside the educational institution, with each receiving efficient service from the project's capabilities.

Conceptual Framework

Three primary steps compose the IPO paradigm: input, processing, and output. The data that is given into the system is known as input. The data is modified during processing in order to produce the desired outcome, which is known as output. The IPO model offers a framework for understanding how information is processed inside a system and is used in many different fields, such as software development, database design, and system analysis.

Input Phase

The input step comes first. Through observation and interview, the developers learned about the workings of the academic, research, and student-run research communities at the Philippine State College of Aeronautics, or PhilSCA. The system's developers supported the demands of the system's clients with ideas, research, and literature.

Input phases can all be improved with user feedback, which also helps identify areas for improvement, delays in the process, and customer problems. It enables the clients to give their opinion and suggestions that will improve and change the system for better functions and execution.

Process Phase

The second frame represents the process phase. Because they need more data for system components and greater flexibility, the developers used the Agile Development Methodology to ensure they meet the client's needs. The process includes planning, design, development, testing, implementation, deployment, and review.

Output Phase

The third frame is the output phase. The Development of a web-based management repository system with data analytics is developed.

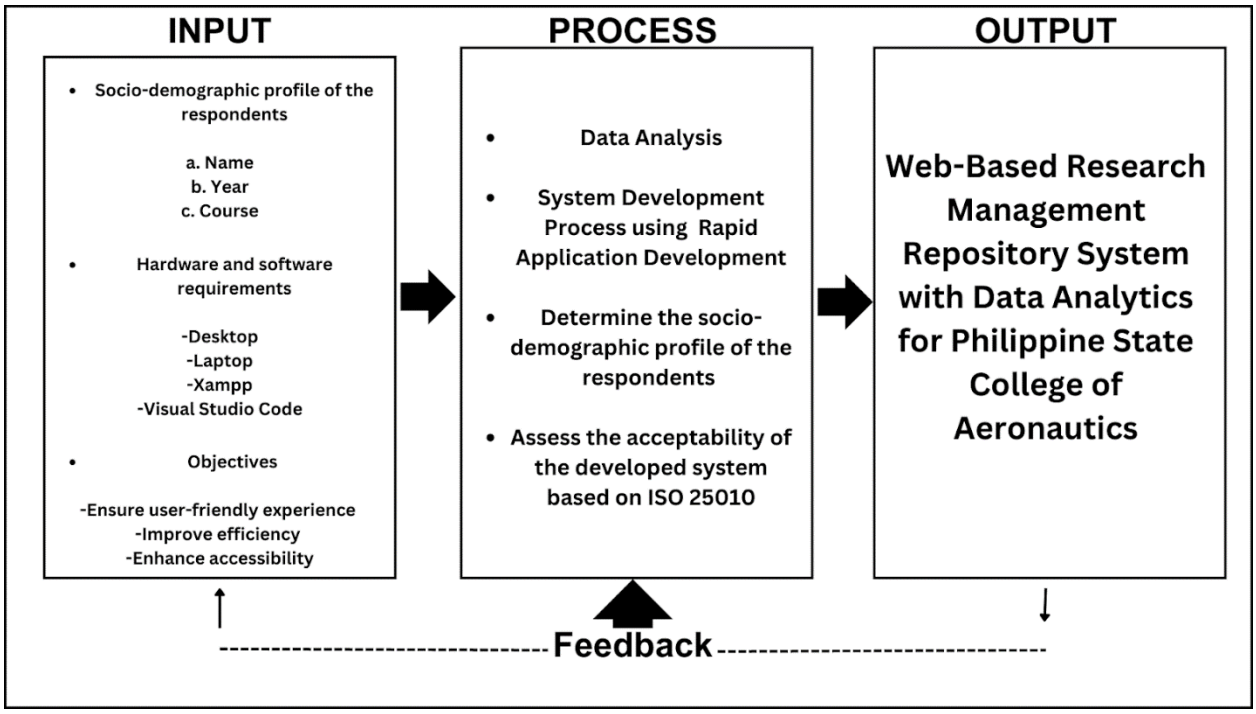

Figure 1. Conceptual Framework

General Objectives

The general objectives of this capstone project are to develop and design a Web-Based Research Management Repository System with Data Analytics for Philippine State College of Aeronautics to offer a centralized platform that enables smooth project management for research while providing users with innovative analytical capabilities and providing a user-friendly experience that makes the system simple and convenient to operate. Additionally, it

serves as a tool for submitting capstone/thesis, thereby reducing the stress and time associated with publishing them to physical repositories.

Specific Objectives

The project's particular objectives are as follows, to help clarify the stated goals:

1. To design and develop the a Web-Based Research Management Repository System with Data Analytics for Philippines State College of Aeronatuics:, specifically it aims to have the following features:

    1.1 Department List

        1.1.1 Create, Delete, Update and Search Department.

    1.2 Program List

        1.2.1 Create, Delete, Update and Search Department.

    1.3 Thesis List

        1.3.1 Approval, Search, View, Delete, Archive and Download Documents.

    1.4 Archive Documents

    1.5 Student List

        1.5.1 Search, Delete, and Approval/Verify Students.

    1.6 Administrator List

        1.6.1 Search and Delete user.

    1.7 Agenda List

        1.7.1 Create, Search, Update, and Delete Agenda.

    1.8 Student User

        1.8.1 Submitting papers;

        1.8.2 Viewing all the capstone/thesis papers;

1.8.3 Update Profile.

1.9 Data Analytics

1.10 Library

1.10.1 Make a variety of information sources accessible for the thesis.

2. To assess the system Implementation Acceptance using system unit testing.
3. To perform acceptability testing such as ISO/IEC 25010 of the system to be developed as to:

3.1 Maintainability;

3.2 Functional Sustainability;

3.3 Compatibility;

3.4 Usability;

3.5 Security;

3.6 Reliability;

3.7 Performance Efficiency; and

3.8 Portability.

Scope and Limitations

A cutting-edge research paper management repository system has been implemented for the Philippine State College of Aeronautics (PhilSCA), specifically for the Information Technology program under the Institute of Computer Studies (ICS). This web-based system with data analytics and features specific instructional materials tailored for students. Key functionalities include the storage and management of thesis and capstone

papers, as well as a comprehensive student list, ensuring accurate processing and tracking of each category.

The system allows for the submission of papers, which are first verified by an administrator before being made searchable, browsable, and downloadable. Once confirmed, the papers are stored, and their status and progress can be monitored in real-time. This enhances the overall effectiveness and accountability of research management at PhilSCA.

This project will be accessible via laptops, desktops, and mobile devices, the primary users of this research management repository system include faculty members, ICS students, and the research management at PhilSCA. Access is restricted exclusively to ICS students. In case of technical issues, it is recommended to hire a professional programmer, as an experienced programmer can quickly identify and resolve problems, ensuring the system remains efficient and reliable.

For research participation, only 4th-year Information Technology and Information System students enrolled in the 2024-2025 academic year at the Philippine State College of Aeronautics – Villamor will be selected as respondents.

CHAPTER II

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter shows Related Literature serves as a key resource, laying the foundation for an understanding of the history and subsequent effects of the Web-based Research Management Repository System. It provides vital background information and analysis, which are central to how the project will progress. The insights gathered from this literature review will directly influence the evaluation phase, as well as the formulation of recommendations for this capstone project. In essence, this literature gives context to the project, ensuring that subsequent steps are informed and aligned with already-established facts and observations about the Web-based Research Repository System.

System Technical Background

The intended capstone project will be developed using Visual Studio Code, XAMPP, PHP with Codeigniter 4 Framework, HTML, CSS with Bootstrap, MYSQL, and JavaScript with the goal of creating a web-based research management repository system with data analytics.

According to Feng et al. (2023), Visual Studio is a strong integrated development environment (IDE) that supports various languages, platforms, and productivity with its powerful tools. They highlight its utility in managing their codebase, running experiments, and debugging their models. XAMPP server was used for hosting the database and testing projects locally. The project was to provide users with easy access to all electronic devices,

as stated by Budhathoki et al. (2020). The researchers adopted these tools because they provide the majority of the necessary characteristics for development, including advanced coding, debugging, and seamless integration capabilities. This option ensures a smooth workflow and quick adoption among team members.

CodeIgniter is a PHP framework designed to streamline the process of creating visually appealing and interactive web applications, allowing developers to build them quickly and efficiently., as stated by Wardana et al. (2023). The researcher chose PHP with CodeIgniter 4 Framework for constructing a social networking platform because of CodeIgniter complete capabilities that make the development process easier. codeigniter has support for complicated features needed for social networking sites, including user authentication, user profiles, buddy connections, activity feeds, alerts, and real-time chat. HTML (Hyper Text Markup Language) has long served as the principal tool for designing and producing web pages. Content and formatting information is combined in an HTML document, according to Atay (2017). Together with CSS with Bootstrap and JavaScript for quicker and more reliable front-end development, utilize the Bootstrap CSS framework. For interactive features like dropdown menus, modals, and carousels, use JavaScript tools, according to Uzayr (2022). The project aims to create a well-designed and functional system that meets user and technical needs. Key features include responsive design, consistent styling, improved UI/UX, accessibility compliance, ease of maintenance, and scalability. JavaScript plays a crucial role by enhancing the functionality, interactivity, and usability of a web-based research management repository system. It enables developers to build a rich, responsive UI, utilize data visualization tools, integrate with APIs, and deliver a seamless experience for both researchers and administrators.

Lastly, the database and storage of the entire system is MySQL, according to Onggo et al. (2018) is known for being able to handle more sensitive data and maintain data consistency effectively in web applications. MySQL functions as an essential component of a web-based research management repository system. This matters due to its capacity to effectively store, arrange, and retrieve research data, which greatly enhances the efficacy and functioning of the system.

Therefore, these are the tools that will be used for the development of the proposed capstone project. The researchers carefully evaluated each best option on their own and carefully worked out which instruments would work best together.

Review of Related Literature and Studies

A new dimension of digital repository

An Institutional Repository is a digital platform that captures, protects, organizes, and provides access to an institution's intellectual work for users. Think of it as a set of services that an institution offers its community members for better management and dissemination of digital content generated within the institution itself.

It's a tool for researchers, faculty members, and authors who are looking for more extensive exposure of their scholarly work - like research papers, technical bulletins, books, and the likes - for broader distribution and further examination.

In the long run, digitally accessible repositories of this sort can lead to cost savings. For the research community, it presents an alternative means for free communication of

research, eliminating lengthy delays and avoiding unnecessary duplication of work. That said, it's important to handle issues related to quality control, such as peer review, Intellectual Property Rights, and copyright, in an appropriate manner. Indeed, an institutional repository can be considered a valuable addition to commercial publishing (Kumar, 2021).

An Institutional Repository is a digital storehouse for an institution's intellectual work, offering better management of content, helping extend the reach of researchers' work, saving costs in the long run, providing a free means for research communication, and requiring prudent handling of quality issues.

The MASi repository service—Comprehensive, metadata-driven and multi-community research data management

These days, a growing volume and complexity of data characterize the daily work of many research communities. As a result, handling, accessing, and using the data to eventually derive scientific insights from it becomes more and more challenging. Domain scientists, however, would like to concentrate on their science rather than IT. Research data management is the answer since it organizes data and makes it simple to find and use for future reference. Using metadata is a key component. It allows data to be accessed not just by name and location but also by content and context. To promote a high level of usefulness, metadata usage must be as automatic and friction less as feasible. The project Metadata Management for Applied Sciences (MASi), which is now developing a comprehensive research data management service, is presented by the researcher along with its architecture and developments. MASi adds a generic graphical online interface and

metadata programming interface to the KIT Data Manager framework. Additionally, ProvONE, a recognized and well-established provenance model, is used by MASi to handle provenance information while being OAI compliant and supporting the OAI-PMH protocol. The researchers show the adoption of initial use cases within the fields of digital humanities, chemistry, and geography to demonstrate the usefulness of the MASi service. The complex and varied requirements will be met in an effective, practical, and sustainable manner with the launch of the MASi research data management service. This future work will contribute to the extension of the MASi research data management service to be efficient, future-proof and with a high user acceptance (Grunzke et al., 2019).

Development of a research project repository

Technology advancements that have led to the widespread use of mobile devices have altered our way of life and made changes to the educational system necessary. This can be used to support students who want to participate in research projects. Through the opportunity to exercise their scholarly abilities, easy access to other students' research projects, collaboration with other students who share their research inclinations, and visibility before school administration or companies interested in awarding scholarships to outstanding works, this study seeks to promote research in universities among students. For the front end of this project, JavaScript, HTML, and CSS are used; for the back end, Node.js, a JavaScript framework, is used; and MongoDB is used for the database. Students can post their research projects, read the research of others, and work together with classmates using this web tool. There is a good chance that this system will increase student involvement in research projects at universities (Somefun et al., 2020).

Lightweight extensible web portal enhancing data management.

Information management requirements from various sources, such as publication policies, funding agency instructions, discipline best practices, and the needs of their own users, are dealt with in biomedical research initiatives. Based on several years of experience implementing data management for the CRC 1002 and CRC 1190, we provide functional and quality requirements. In accordance with the FAIR Guiding Principles, a completely functional data management software should facilitate data storage and sharing, enhance experiment and material documentation, and optimize information security, usability, and software sustainability and reusability. Research data and digital artifact management is shifting from best practices for individual researchers or groups to project- or organization-wide service infrastructures. To enable and support this structural transformation process, a vital ecosystem of open-source software tools is needed. Menoci is a contribution to this ecosystem of research data management tools that is specifically designed to support biomedical research projects (Suhr et al., 2020).

Qualitative data management and analysis within a data repository

Effective data management for regionally widespread and multi-institutional research teams can be facilitated by data repositories. Though little attention has been paid to the considerations of data repositories for qualitative research, their primary purpose is to enable secure access, storage, and sharing of quantitative data. The proponents describe the experiences with a large-scale qualitative nursing research study that used a data

repository. This 15-person team collected data from 83 participants over a 27-month period. The data comprised field notes, audio recordings, transcripts of interviews, and images. Over 1,800 data files may be safely gathered, stored, and managed thanks to the data repository. Nevertheless, difficulties arose during the research that necessitated discussions regarding the procedures and organization of the data store. However, the researchers discuss the benefits and drawbacks of data repositories and present doable methods for creating a data management strategy that is backed by a data repository for qualitative research (Antonio, 2020).

Design and Development of an Online Repository System for Thesis and Special Problem Manuscripts

Based on the study, it can be said that UPMERS will be helpful for students and other university stakeholders in addition to administrators who can keep an eye on and safely preserve digital copies of manuscripts. Users would be able to learn more about the research projects conducted by UP Mindanao graduates by using the system. Overall, the findings demonstrated that UPMERS is relevant, beneficial, and helpful to its users in general, and that it is sufficiently effective in performing its functions. Since the system was easy to use, picking up all its functions wasn't an issue. Moreover, the survey and interviews revealed that consumers were content with the online application's features and functionality. Filling the database presents a much bigger challenge than using the technology. To ensure that every manuscript is kept in the database, it must be mandatory for every department to upload records of manuscripts to the system (Satina, 2017).

Development Of Thesis Repository Application

Information technology can be applied in the field of education to support fellow scholars, facilitate government operations, and disseminate information about the profile of an institution. The Faculty of Science and Technology at UIN North Sumatra, in particular, lacks information technology capable of storing student thesis data. However, there is an application that can be used to search for theses published inside the Faculty of Science and Technology. The electronic storage of thesis manuscripts will facilitate the tracking of the preparation history of individual students and lecturers. Afterwards, this data may also be utilized for academic or accrediting reasons based on the thesis information kept in an application. Researchers using this method make use of the adaptable Vue.js Framework, which can be coupled with other frameworks or libraries like Django, Laravel, and WordPress. One-page application elements can be included into the website to make the application easier to use by utilizing the Vue.js framework in website-based application development (Irhansyah and Nasution, 2023).

Learning analytics and learning objects repositories: Overview and future directions

Investigating the usage and social data generated within the learning repositories might yield promising insights in a Learning Object Economy, where different learning resources are shared, reused, and enhanced. However, several issues about the longevity and quality of these learning objects as well as their repositories have been brought up, which makes more study on metrics and quality assessment possible. Learning object repositories have developed over the past few years, offering engaging collections of

carefully chosen educational materials for a range of purposes. To make the best use of them, one must have a solid awareness of their dynamics, contents, and surrounding communities. In order to guarantee the quality of learning and enhance learning procedures, learning analytics is a collection of approaches and procedures for measuring, gathering, analyzing, and reporting educational data. Although repositories have been the subject of learning analytics applications in the past, the research on the subject is still few and dispersed. Recently, as more online learners become interested in and utilize learning object repositories, their quantity is growing quickly. Additionally, each learning object repository is getting larger and larger, as indicated by the quantity of things that are offered there (Yassine, 2023).

Development of an Institutional Repository for the Storage and Retrieval of Graduate Theses in Computer Science

All the research conducted by universities is consolidated into institutional repositories, which serve to conserve the materials and enable on-demand access to them. Institutional repositories serve as a significant gauge of an institution's academic caliber in addition to capturing, preserving, and disseminating the intellectual capability of a university. The goal of this project was to reduce the possibility of repeating previous research by creating an institutional repository for the archiving and retrieval of data on graduate theses. The study determined the system's functional and non-functional requirements, after which the system's design was detailed using the tools of the Unified Modeling Language (UML). The results of the study showed that the system provided an online institutional repository

which improved the quality of research conducted by graduate students by eliminating duplication (Olusanya et al., 2021).

Online Data Research Repositories and Digital Scholarly Ecosystems

Data from research can be shared and archived online for open science and international study thanks to networked data repositories. Through this sharing, data can now be used with metadata for search, retrieval, and wider opportunities within open academic research ecosystems. These days, data research archives are being used to foster worldwide collaboration, speed global research, and enable previously unthinkable levels of innovation. Additionally, data from online publications and other digital communication and aggregation methods may be linked from research data repositories. This article provides a practical overview of Texas State University Libraries' data- and content-centered ecosystem in the United States. The following stage of ecosystem design and development, which involves larger data possibilities for AI infrastructures enabling researchers, is next covered in the research. In order to explore the potential of global open science, the research leverages new digitized medical imaging datasets for the diagnosis of cancer and melanoma using Deep Learning and Neural Nets. These methods hold great potential for effectively utilizing digital library ecosystems, internet databases, and open data repositories. Several freely accessible online open-source digital library data repositories and ecosystem components have been shown to be useful in recent AI research. Global open science, research, and discovery are accelerated by an online data-centered research environment. Research institutions might simply recreate this software architecture and open-source ecosystem. Future global data and research, collaboration, scientific growth,

and the academic research cycle on networked worldwide levels are made possible by the development of open online data infrastructures for research communities (Uzwyshyn, 2022).

Implementation of a Web-based Digital Repository Information System

Transforming the repository into a digital format enables the centralization of data, making it simpler to find information when necessary. This consolidated data storage system supports the validation process, which includes checking, affirming, and authenticating archives, providing assurance for the legality and integrity of related files. Implementing this repository information system is expected to minimize archiving errors, improve data retrieval, prevent data loss or destruction, and deter data theft. This system also assists in making the monitoring, management, and backup of data easier (M. Susilowati, Y. Kurniawan, and L. Lestari Wilujeng, 2022).

The implementation of this repository information system brings several benefits. It mitigates the risk of archiving errors and advances the efficacy of data retrieval. Moreover, it offers a preventative measure against data loss, damage, or theft, thus enhancing the security of sensitive and valuable information.

Importantly, the system augments the ease of data monitoring, management, and backing up, reducing the burden of these critical tasks and minimizing the possibilities of human error. Ultimately, it shows how effective use of technology can allay operational challenges, as evidenced by the successful implementation of the repository information system for internal documents.

Understanding Institutional Repository in Higher Learning Institutions

Even with the significant and quick expansion of research in this field, not much work has been done to analyze the status of IR research or to carefully review and integrate the results of earlier studies. This paper's main objective is to present a thorough overview and improved understanding of the state of research on IRs now. A systematic literature review (SLR) is used in this study, and a procedure was adhered to to appropriately arrange the material pertaining to institutional repositories. ScienceDirect, IEEE Explorer, Springer, ACM, Taylor and Francis, and Emerald insight are the six main databases from which the data were gathered from original studies published between 2007 and 2018. The findings of these research suggested that two major obstacles to the growth of open access IRs were the lack of awareness of these initiatives among academics and organizations, as well as an inadequate infrastructure for information and communication technology. However, it was shown that the primary advantages of institutional repositories were improved teaching, learning, and research development by the institution's academics as well as higher visibility of the academic institution, improved local and global rankings, increased prestige, and increased public value. Most studies in this field, according to this publication, have concentrated on the "deployment, implementation, and adoption" as well as the “benefits and challenges' ' of institutional repositories (Asadi et al., 2019).

A System for Discovery of Knowledge in Data Repository Education

One difficulty with this kind of research is the variety of repositories that hold data in diverse formats and architectures. Presently, the primary scientific analytic methods on the

output of a group of researchers are characterized by centimetric and bibliometric analyses. The measurement of scientific communication, including the examination of sciences to determine their composition, development, and relationships, is the goal of these studies. With the primary data source for the analyses being the dates of the scientific publications in this set, which were taken from the Lattes Platform's curricula, these analyses aim to provide a broad perspective of the field being studied in Brazil. As a result, it will be possible to determine the characteristics of these researchers, the context in which they operate, the way their collaboration occurs, and the qualitative analysis of their study, making it possible to complete analyses that are comparative with various fields of knowledge. Numerous different sets of people can be analyzed after the case study is validated (Dias et al., 2019).

The repository, the researcher, and the REF:"It's just compliance, compliance, compliance"

Through a series of semi-structured interviews with researchers and repository managers, this study aimed to comprehend the effects of the REF mandate upon researchers, repository workers, and their relationship with the institution. The study found that, despite sharp increases in repository contributions, neither interfaces nor resources have been enhanced to handle the significantly higher demands. Both repository managers and researchers deal with a time-consuming, complex administrative procedure that may take many tries to finish. The study concludes that the mandate is bringing to light unsaid conflicts in the connection between the researcher and the institution because of the pressure it puts on that relationship. There are opportunities being lost to bring participants into alignment, develop new solutions, and produce alternative measures using recently

released data. This has consequences for the management of other deposit-focused mandates in IRs, both inside and outside the UK (Ten Holter, 2020).

A web based digital repository for scholarly publication

To identify research-based universities, institutional repositories are a vital component of their research infrastructure. An institution's exposure through its scholarly outputs can be improved and the effect of its research can be amplified with an appropriately sized institutional repository. The study's goal is to create a web-based digital archive for academic articles and materials in higher education. The purpose of this project is to provide a long-term solution to the need for an efficient, dependable, effective, and easily accessible system for storing and retrieving scholarly materials. This system will reduce the stress and burden of study and research for students and academic staff, allowing them to complete their daily tasks more easily, particularly when it comes to finding pertinent scholarly information quickly. Open-source software and OOADM (Object Oriented Analysis and Design Methodology) will be used in the system's development. Results from system validation tests demonstrate that the system is a workable answer to the main problems with the organization's handling and dissemination of scholarly content (Okon, 2020).

Web based Institutional Repository Futuristic Approach: A Model in Anna University of Technology Tirunelveli

According to Mr. V. Srinivasan and Dr. K. Vinitha (2014), this research advocates for creating an institutional repository in higher learning institutions. The paper illustrates how setting up such a repository in organizations can develop a central hub for compiling data from their corresponding institutional repositories, with a spotlight on online higher learning institutions. It's crucial to promote the sharing of proven strategies and know-how about the deployment and maintenance of an institutional repository, following specific guidelines. This paper is quite timely, focusing on capturing resources instead of the conventional method of sharing resources. Modern higher education institutions are veering towards self-sustainability in gathering advanced knowledge, thus reducing the dependence on traditional libraries' resource-sharing model.

This emphasis aligns with the growing digital trend in higher education, highlighting that these repositories could particularly benefit online higher learning institutions. The suggestion by the study that modern higher education is moving toward self-sustainability in acquiring high-level knowledge marks a change from relying on traditional library resource-sharing modes.

Development of an Online Repository for Academic Research Works in FUTA

The Online-based Repository System is a digital application designed to streamline the management and security of a department's research endeavors. The rationale behind the creation of this digital application is grounded in offering a pragmatic solution to address numerous pre-existing system limitations. Key advantages of this system encompass:

Utilizing the web-based application facilitates centralized data storage, increasing accessibility for all user groups. This effectively simplifies the management of student research contributions within a cohesive database structure. Notably, student utilization of the application demands no special prerequisite training. The application provides a platform where research activities are readily available for public consumption and contributes to immediate environmental awareness. The data residing within the database enjoys enhanced security and safety (Christianah Oluwanifemi Itiola, Babatunde Gabriel Iwasokun,et al., 2021).

The Internet-based Repository System is a strategic digital application devised to enhance the organization and protection of a department's research endeavors, providing solutions to address previous system limitations by offering centralized data storage for increased accessibility, facilitating easier management of student research contributions with no need for specialized training, delivering research outputs for public consumption and environmental awareness, and ensuring heightened data security and safety within the database.

Review of Related Literature / Systems

R2S: A REPOSITORY PLATFORM FOR RESEARCH OFFICES IN THE HIGHER EDUCATION INSTITUTION (HEI's) IN THE PHILIPPINES

The purpose of this study was conducted by C. Cofino, D. Enquilino, and M. Salo (2022) is to create a research repository system that will act as a database for undergraduate and graduate students' theses, providing a safe, efficient, and dependable storage solution.

The primary objectives of C. Cofino, D. Enquilino, and M. Salo (2022) was developing a user-friendly design while ensuring that it met system requirements and standards. To test and validate the application, the development team employed an Agile approach within the Software Development Life Cycle (SDLC). To evaluate the platform's performance, researchers polled students and research coordinators from numerous colleges in Negros Occidental, Philippines. The poll found that respondents agreed with using the technology to improve digital research content management and archiving.

The system developed by C. Cofino, D. Enquilino, and M. Salo (2022) describes how many universities in the Philippines keep records of undergraduate and graduate theses. Some of these files are retained in physical file cabinets or folders, while others are stored digitally using data archiving systems that organize and manage all thesis documents. Universities frequently confront difficulties in collecting files from previous years to check for duplication. There are no established methods for protecting digital data, and academic institutions impose diverse limits. To address this issue, the proposed model makes it easier to electronically manage student thesis files, eliminates thesis title duplication, and streamlines file searching, retrieval, and storage procedures.

Research and Capstone Project Electronic Repository

In this study, Sobejana et al. (2019) found that higher education institutions face the challenge of managing research and capstone project outputs as funders and universities around the world want open access. The study's purpose is to employ information technology practices and theories to improve the dissemination of research findings to the public.Location and Duration: This project looks into the viability of building an online repository for research and capstone projects at the Southern Philippines Agri-Business and Marine and Aquatic School of Technology. The repository is designed to store student outputs, create multiple accounts, track transactions, and host an interactive website.The website's functionalities include reference, data storage, data security, data extraction, and other specialized features. Fifty users received good marks for dependability, functionality, and usability.

Development of an Online Digital Repository of e-Books and e-Journals for PSU-Urdaneta College of Computing

According to Bernisca et al. (2020), students now choose to access learning resources via computers and personal devices rather than traditional books and journals. In response, researchers established an online digital repository for eBooks and e-journals at PSU-Urdaneta College of Computing. This repository has a large number of eBooks and e-journals in PDF format, which students and teachers can access using their computers and mobile devices. This is developmental research, which means that the product was designed and developed deliberately, using appropriate procedures and improved models. Using the Scrum Methodology, the researchers identified both functional and non-functional

system needs before creating an online digital repository of eBooks and e-journals for PSU-Urdaneta College of Computing.

A WEB-BASED DOCUMENT MANAGEMENT SYSTEM FOR EXTENSION OFFICE

According to Estrera et al. (2022), high-quality extension programs and projects are provided on schedule to underserved and underprivileged community stakeholders. With the epidemic causing many activities and procedures to move online, the goal of this study is to design and construct an online management system for project proposal submission, approval, report production, and document storage. This solution is expected to improve transaction efficiency, eliminate needless COVID-19 exposure, and keep key extension-related papers accessible and convenient. Key design components include user-friendliness, accessibility, and the ability to create downloadable and printable papers for quick submission to external agencies, among other things.

Centralized Documents Repository

Dutchi's (2023) Centralized E-document Repository System (CERS) is meant to manage an organization's document and record repositories, increasing office productivity in file management, sharing, and distribution while maintaining document security. Efficient and effective file management in an organization increases productivity by allowing employees to search, access, read, alter, and save documents within their workspace rather than spending time aggregating files. The technology not only saves time for office workers,

but it also eliminates the need for space-consuming file cabinets and storage, which can complicate file access and retrieval. By incorporating a database, the system provides more storage space, increased security, and greater backup and disaster recovery for documents and records.

Repository Information System for the Final Assignment of the South Aceh Polytechnic

According to Rizky et al. (2023), this program was specifically developed to save student final assignments, giving students a handy place to save their project files. The reading room administrator manages these files, authenticating submissions and ensuring that students receive their assignments. Students majoring in a variety of topics can also use this program to find learning resources and recommendations for their final projects. The computerized system strives to provide efficiency and match expectations by developing applications as needed.

Repository System Based on Open Archives Initiative (OAI) for Open Library System

According to Iqbal et al. (2019), the purpose of this study is to adapt existing repository and digital library architectural theories to current knowledge and technological breakthroughs. It uses the Big Data concept and the Open Archive Initiative (OAI) to create a new repository that enables universities to publish online. This new repository solves the

challenges of user limits in publishing management while also enhancing the flexibility of existing repositories and digital libraries.

The proposed system displays publication metadata and repositories that have been fitted with the Open Archive Initiative (OAI) module, allowing indexing machines to crawl them. The study's findings show that pre-development data gathering, development and implementation, and post-development data collection were all completed. The use of this repository can provide benefits such as the ability to send data for indexing on various indexing services.

Synthesis

Studies on institutional repositories and research data management frequently point to the same goal: improving data accessibility, clearing the door for more cooperation, and better management of research output. The institutional repository systematizes storage, management, and dissemination of intellectual output, thereby enhancing research quality, reducing duplication, and increasing researchers' outreach (Kumar, 2021; Olusanya et al., 2021). Notwithstanding their advantages, these systems encounter challenges including a lack of awareness, infrastructural issues, and the intricacies associated with preserving data integrity (Asadi et al., 2019; Satina, 2017). The progression of technology is instrumental in improving these systems, as evidenced by the utilization of frameworks such as Vue.js (Irhansyah & Nasution, 2023) and open-source software (Okon, 2020; Uzwyshyn, 2022), which are frequently employed to create user-centric, secure, and versatile repository systems. The solutions are tailored to meet specific needs, such as biomedical research-

related needs (Suhr et al., 2020) or the management of projects by students (Somefun et al., 2020; Itiola et al., 2021), emphasizing collaboration and ease of use.

Variations in the studies can be seen in the scope of their applications, where some research has wide institutional needs (Kumar, 2021; Srinivasan & Vinitha, 2014) while other research has narrower targets-for example, final-year projects in Rizky et al. (2023) and in research areas in Suhr et al. (2020). The studies are also different in their technological approaches-from modern, web-based frameworks (Irhansyah & Nasution, 2023) all the way to designing free open-source systems that can be shared and collaborated upon with international colleagues (Uzwyshyn, 2022).

In general, these systems evolve to respond effectively to the increasing need for efficient, secure, and accessible digital repositories, but also have to address specific institutional and user challenges in parallel. This will become increasingly crucial with growing outputs and their increasing complexity for effective data management, enabling global research collaborations, and responding to the unique challenges faced by the researchers and the institutions at large in today's digital era.

CHAPTER 3

TECHNICAL BACKGROUND

This technical background information builds a basis for more research management repository system development and study as a part of a capstone project. The research management repository system provides improved management of research papers, templates, and administrative activities, optimizing workflows and meeting strict minimum runtime requirements. By minimizing administrative costs. The research management repository system can deliver a dependable and responsive service thanks to its architecture, technological stack, and design principles.

Process Flow

As presented in figure 2 and 3 is the process flow. The system role is to manage, preserve, collect, and store the thesis or research documents.

As presented in figure 2, The process begins by verifying the student accounts registered on the platform, ensuring that only legitimate and authorized users are submitting their theses. Once student accounts are confirmed, the administrator reviews the submitted thesis documents to ensure they are complete and meet the required standards. After verifying both the student's account and the thesis submission, the thesis is officially approved. Upon approval, the thesis is displayed in the system's library, where it becomes accessible for others to view, reference, and use in the future. Additionally, the administrator can access data analytics related to the submission process, allowing them to track the number of submissions by agenda and department, and overall trends in student

performance and submission history. This data helps optimize and improve the thesis management process.

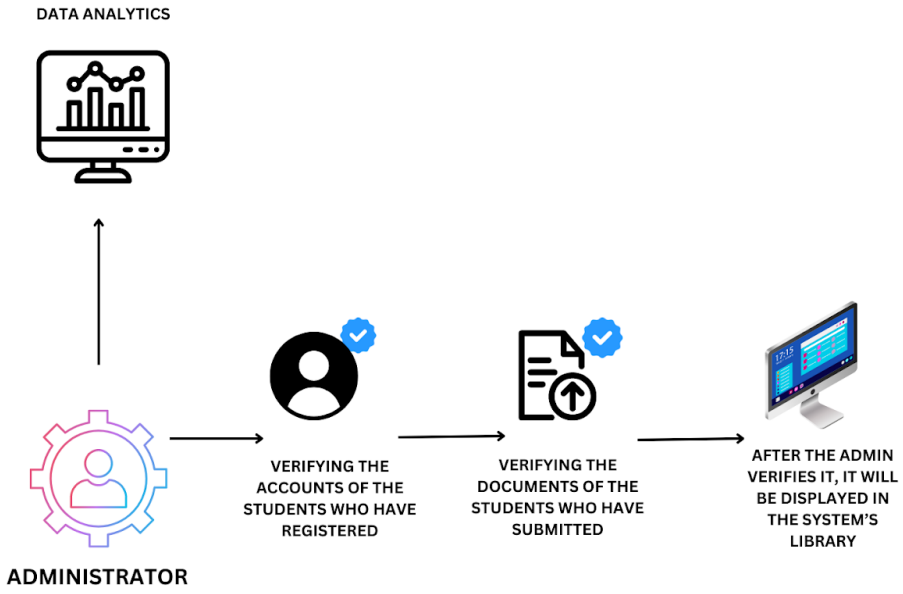

Figure 2. Process Flow

As presented in figure 3, The process begins by uploading your thesis documents through an online platform. Once submitted, you can easily view all the thesis you've previously uploaded, keeping track of your work. Additionally, you have the option to update your personal profile information on the platform, ensuring that your details are always current.

On the admin side, once you've submitted your thesis, the administrator steps in to review and approve the document. They ensure everything meets the necessary standards, and once approved, your thesis is officially stored and published in the system's library, making it accessible for future reference.

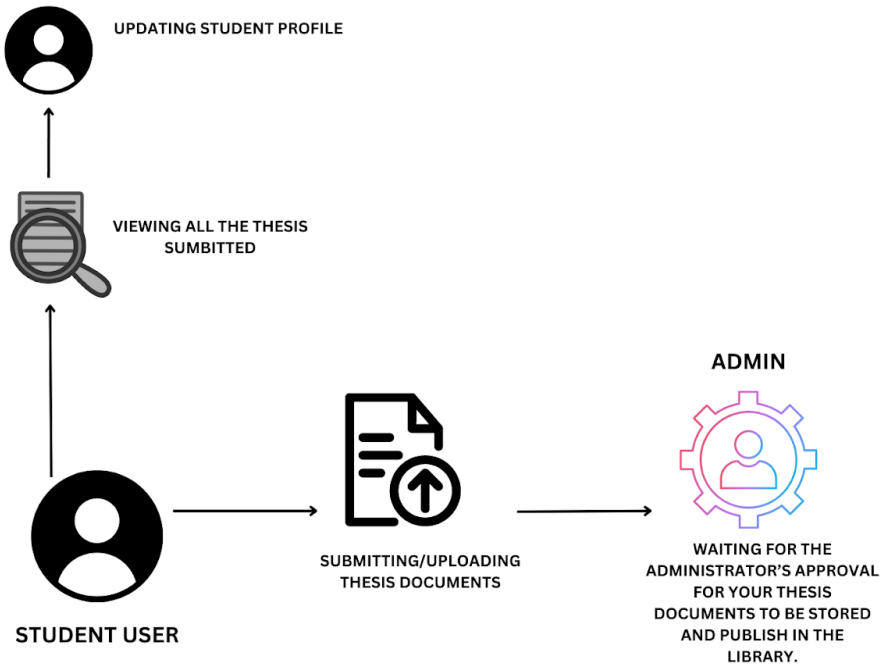

Figure 3. Process Flow

Descriptive Analytics

According to Wolniak (2023), descriptive analytics is a type of data analytics concerned with the examination and the interpretation of historical data to get insights into what has occurred in a business or institution. It entails gathering, summarizing, and presenting historical data in a form that allows firms to see patterns, trends, and relationships. The researchers apply descriptive analytics to identify the most submitted agenda and how many papers were submitted to the department, make informed decisions, and gain a deeper understanding of their data. This approach allows them to systematically analyze historical data, uncover patterns and trends, and derive actionable insights that support strategic planning and operational improvements.

CHAPTER 4

(Methodology, Results, and Discussion)

Research Methodology

The developers used a descriptive methodology to improve the user experience and functionality of the research management repository system. Descriptive research is an appropriate choice when the research aim is to identify characteristics, frequencies, trends, and categories. (Shona McCombes, 2023) The descriptive technique entailed gathering and examining user interaction data from the research management repository system. This information was gathered using various techniques, including user surveys and interviews. The user experience and functionality of the research management repository system were evaluated, and areas for improvement were identified and put into practice using the developing process. This repeating pattern of Observation, assessment, and modernization has produced a productive and effective research management repository system.

Software Development Methodology

SDLC or the Software Development Life Cycle is a process that produces software with the highest quality and lowest cost in the shortest time possible. SDLC provides a well-structured flow of phases that help an organization to quickly produce high-quality software that is well-tested and ready for production use. (Alexandra 2024).

The Software Development Life Cycle is a basis or framework for structuring, planning, and executing tasks involved with developing an information system. Due to the difference in requirements of systems along with numerous other differences, variations

SDLC has been developed. The Life of Software Development Software development life cycle (SDLC) and Rapid Application Development (RAD) are two methods that are used. SDLC is a traditional method that includes the following stages: requirements gathering, design, deployment, testing, maintenance, and implementation.

However, the second method used is the Rapid Application Development (RAD), RAD is a method of developing software that places a focus on the quickness and effectiveness of the process. The following phases are involved in RAD Model

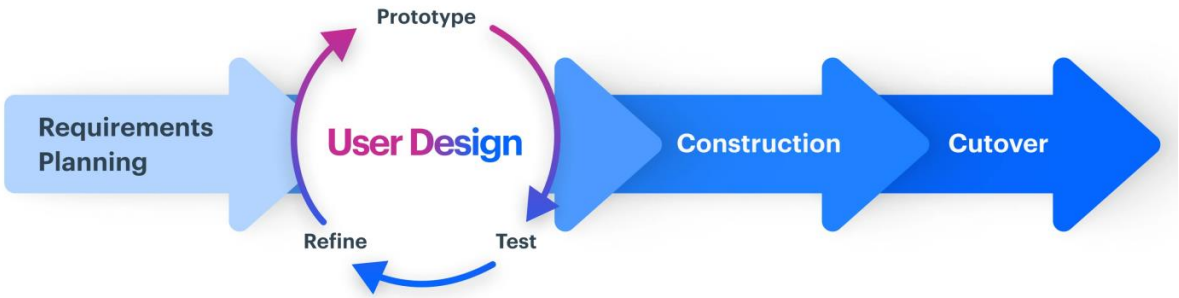

Figure 4. Rapid Application Development Model

As represented in Figure 4, A typical Rapid Application Development (RAD) has clearly defined phases: requirements gathering, rapid development, and prototyping. Several workshops and interviews are conducted with the direct participation of the stakeholders to elicit needs and expectations from concerned stakeholders. The rapid growth of quick prototypes and prototyping are reviewed, and the requirements are changed based on user feedback. The implementation phase primarily deals with the development of the application, which includes writing the programs and integrating the components according to refined requirements. The final phase, which is deployment, involves thorough

testing and maintenance for continuing support to fix the bugs before the finished software is released to real end-users. According to (Sagala, 2018), RAD is a system development framework that consists of several levels with short, fast, and short time cycles. We used the Rapid Application Development requirement gathering, rapid prototyping, construction, and deployment. We initiated the project by collaboratively defining the purpose and goals of the new software, while quickly gathering and documenting business and user requirements to accelerate the preparation phase for the proposed software. Then we used all related production tasks in the SDLC, such as design, architecting, and coding. Then when the development went smoothly, the stakeholders were happy with the project's first iteration. Before release, the project must go through a quality assurance check or testing method. Once it is tested it is ready for implementation, then it can be deployed to the stakeholders.

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