ASUP-BD Journal of Multidisciplinary Research and Innovation (JMRI)
Volume 1, Issue 1, 2024 | ISSN: 2004-2008
https://jmri.example.com | Email: editor@jmri.example.com
Original Research Article

DEVELOPMENT OF A WEB BASED STUDENTS' PROJECTS REPOSITORY SYSTEM (A CASE STUDY OF FEDERAL POLYTECHNIC BIDA)

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Received: 11/1/2024 | Accepted: N/A | Published: 12/1/2024
DOI: 10.2451/jmri/01

ABSTRACT

The Federal Polytechnic Bida annually graduates students from its National Diploma (ND) and Higher National Diploma (HND) programs, requiring them to complete final year project. Currently, these projects are submitted as hard copies to the school library as well as the department libraries as references for future research. Often, the process of applying to accessing a copy of these research works is cumbersome, as students have to go through time-consuming procedures to access these documents. This paper proposes the design and implementation of a student project repository system to digitize and centralize the storage of these final year projects. The proposed system will enable students to upload, view, and retrieve project works from all departments under the institution's various schools, transforming these project papers into readily accessible research documents. The Frontend will be designed using HTML, CSS and JavaScript and the backend will be designed using PHP within the AdminLTE3 framework and MySQL for database management. This approach ensures an easy to navigate and user-friendly platform that enhances the availability of academic resources, promotes knowledge sharing, and supports academic research. The designed system not only addresses the inefficiencies and limitations of the current system but also provides a scalable, secure, and user-friendly platform for students and researchers.

Keywords: *Student, Project, Graduate, Web-Based, Repository*

INTRODUCTION

A repository refers to a digital archive that collects, preserves, and disseminates academic works such as journal articles, conference papers, theses, and dissertations (Daiyabu et al., 2023). The purpose of an academic repository is to provide a systematic and organized way for researchers to access and share scholarly materials (Abdelrahman, 2021). This type of repository plays a crucial role in ensuring that valuable research is preserved and made accessible to the academic community and beyond. It helps in managing the large volume of research output generated by universities, research institutions, and individual scholars.

An online final year student project repository takes this concept further by leveraging the internet to provide global access to final year student projects (Nwachi & Idoko, 2021). Unlike traditional repositories that might require physical access or localized networks, online repositories make it possible for anyone with internet access to search, retrieve, and read final year student projects from anywhere in the world. This greatly enhances the dissemination of knowledge, fostering a more inclusive and interconnected global academic community.

The Federal Polytechnic Bida annually graduates students from its National Diploma (ND) and Higher National Diploma (HND) programs, requiring them to submit final year project papers. At present, these projects are submitted as hard copies to both the school library and the department library, serving as references for future research. However, the process of accessing these research works is often cumbersome and time-consuming, requiring students to navigate lengthy procedures.

A final year student project is a formal document written by students to present original research, findings, reviews, or theoretical insights (Khan et al., 2023). These projects undergo rigorous peer review to ensure the credibility and accuracy of the information presented. Final year student projects are essential for the advancement of knowledge in various fields, contributing to the ongoing discourse within academic and scientific communities (González et al., 2020). This paper proposes the design and implementation of a web-based repository system to digitize and centralize the storage of these final year projects.

OBJECTIVES OF THE RESEARCH

- 1. Developing a robust database system to securely store digitized final year projects and ensure efficient retrieval.
- 2. Designing an intuitive user interface for easy navigation and access to final year project papers.
- 3. Implementing the designed authentication mechanisms to regulate access and maintain the confidentiality of academic materials.

REVIEW OF RELATED WORKS

Adegbile et al., (2018) underscores the utilization of a Project Repository System in educational administration as a viable alternative to the manual storage method for past project documents and class materials. The Federal College of Animal Health and Production Technology serves as a case study for this implementation. The focus of the Project Repository System application is on archiving past project works within the institution, aiming to mitigate the challenges such as stress, errors, loss, and damage inherent in manual record-keeping practices. Specifically tailored to address the needs for designing a project repository system, this project is presented succinctly, covering essential background information. Utilizing Visual Basic programming language and Windows form application, the software development process aims to alleviate the difficulties associated with the previous manual system. The envisioned software solution is expected to streamline operations, rendering them more efficient, timely, and reliable. While Visual Basic programming language and Windows form application offer initial solutions, they pose limitations regarding scalability and compatibility with emerging technologies. This potentially hinder long-term adaptability with other systems, necessitating consideration for future upgrades and expansions.

Okon et al., (2020) crafted a web-based digital repository tailored for scholarly materials and publications within a tertiary institution. The motive behind this endeavor stems from the necessity to address the persistent demand for an efficient, reliable, and easily accessible system for storing and retrieving scholarly materials. Such a system is envisioned to alleviate the burdens faced by academic staff and students, facilitating smoother day-to-day activities, particularly in swiftly obtaining relevant scholarly information. Leveraging open-source software and Object- Oriented Analysis and Design Methodology (OOADM), the system development process aims to deliver a sustainable solution. Validation tests indicate that the developed system effectively addresses key challenges encountered in managing and sharing scholarly information within the institution.

Olusanya et al., (2021) research focused on developing an institutional repository tailored for storing and retrieving information on graduate theses, thereby mitigating the risk of duplicating existing studies.

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Functional and non-functional requirements were identified, guiding the system's design using Unified Modeling Language (UML) tools. Web 2.0 technologies were employed for implementation. The study's outcomes demonstrate that the system furnishes an online institutional repository, enhancing the quality of graduate research by preventing redundancy.

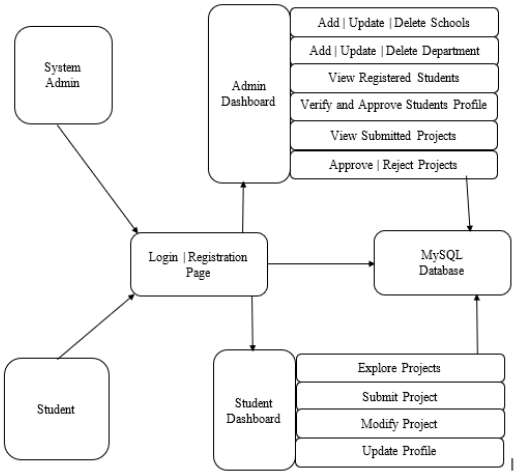
Tsolakidis et al., (2023) study detailed the adaptation of VIVO by the University of West Attica in Greece, wherein existing systems are integrated, and research-related data from various online sources is aggregated. The resultant solution functions as an academic research repository, ensuring consistency and enhancing the visibility of the university's research outputs. The novelty of this paper lies in its presentation of an ontology-based system for documenting institutional research, which can be customized to suit the specific needs of an institution. Additionally, it highlights the significance of web interface and information visualization in maximizing the utility of the repository.

Pushpendra (2024) outlined the creation and deployment of a Virtual Library System (VLS), an online platform intended to update and improve conventional library services. Employing cutting- edge technologies, the system delivers a smooth and engaging user experience by integrating functionalities like online cataloging, management of digital resources, user verification, and collaborative utilities.

METHODOLOGY

SYSTEM ARCHITECTURE

Figure 1 outlines the system architecture for the online student final year project repository system.



Figure

Fig 1. The System Block Diagram

The architecture includes several key components and their interactions, offering a detailed understanding of the system's functionality.

At the heart of the system are the System Administrators, responsible for managing various aspects, including schools, departments, projects, and user accounts. They access the platform through the Login/Register Page and navigate to the Admin Dashboard, where they can add, update, or delete information about schools and departments, view submitted projects, approve or delete projects, and manage user accounts.

Student Users, on the other hand, focus on submitting and managing their projects. They also enter the system through the Login/Register Page and utilize the User Dashboard for their activities. This dashboard allows them to submit projects for approval, search and view existing projects, and edit or delete their submitted projects.

The Login/Register Page serves as the entry point for both System Administrators and Student Users, providing essential authentication and authorization services. Upon successful login, users are redirected to their respective dashboards. The Admin Dashboard for administrators and the User Dashboard for students.

The Admin Dashboard is equipped with functionalities that enable System Administrators to efficiently manage the system. They can add, update, or delete information about schools and departments, view all projects submitted by students, approve or delete projects, and manage user accounts by adding new users, updating user information, and deleting users when necessary.

The Student Dashboard offers Student Users the tools to manage their projects. They can submit new projects for review and approval, search for and view existing projects, and make modifications to their submitted projects.

Central to this system is the MySQL Database, which serves as the repository for all data, including information about schools, departments, projects, users, and their interactions. The database interfaces with both the Admin Dashboard and the User Dashboard, ensuring that all actions performed by users are accurately stored and updated.

The interaction flow within this architecture begins with System Administrators logging in through the Login/Register Page and accessing the Admin Dashboard to manage system elements. Similarly, Student Users log in and access the User Dashboard to handle their project submissions. Both dashboards interact with the MySQL Database to perform data storage and updates, maintaining consistency and integrity across the system.

REQUIREMENT ANALYSIS

Users should be able to search for student final year project based on keywords, authors, publication dates, journals, and other relevant metadata. Advanced search filters should be provided to facilitate precise searching and filtering of results. Users should have the ability to easily submit their student final year project to the repository. The submission process should include fields for title, authors, abstract, keywords, and affiliations. Support for uploading file formats (PDF) should be provided.

Administrators should have the ability to manage the content of the repository, including adding, editing, and deleting student final year project. Administrators should be able to manage user accounts, including creating, editing, and deactivating accounts. User roles and permissions should be configurable to control access to certain features or administrative functionalities.

SYSTEM DESIGN

Unified Modeling Language (UML) diagrams, such as use case diagrams, were utilized to illustrate the system's functionality from the perspective of the users. This means that it detailed individual system features and available functionalities as seen by the users. Figure 2a and 2b presents the use-case diagram of the proposed system.

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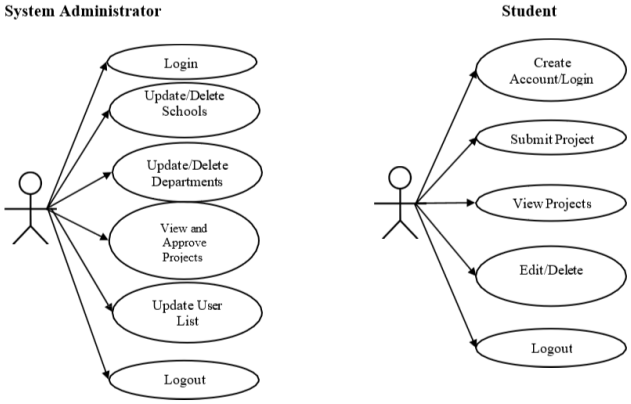

Fig 2a Fig 2b

Figure

Fig 2 Use Case Diagram

On the left side (Fig 2a), the use case diagram depicts a system administrator with six actions. The system administrator can log in, add, update and delete schools, add, update and delete departments, view submitted project works, approve and delete project works, add, update and delete user, and log out. On the right side of (Fig 2b), the diagram shows a student user with five actions. The student user can register or log in, submit project for approval, search for or view projects, edit/delete submitted project and log out.

Database Structure

The database structure shown in Table 1 features relationships where users have many search history entries (one-to-many), and projects have many authors and vice versa through a project-authors association (many-to-many).

Table Name	Column Name	Data Type	Description
User	user_id	INT (Primary Key)	Unique identifier for each user
	username	VARCHAR(255)	Username of the user
	password_hash	VARCHAR(255)	Hashed password
	email	VARCHAR(255)	User email address
	role	ENUM('admin', 'user')	Role of the user
	created_at	TIMESTAMP	Account creation timestamp
	updated_at	TIMESTAMP	Account update timestamp
Project	project_id	INT (Primary Key)	Unique identifier for each project
	title	VARCHAR(255)	Title of the project
	abstract	TEXT	Abstract of the project
	publication_date	DATE	Date of publication
	keywords	TEXT	Keywords associated with the project
	file_path	VARCHAR(255)	Path to the uploaded PDF file
	created_at	TIMESTAMP	Record creation timestamp
	updated_at	TIMESTAMP	Record update timestamp
Authors	author_id	INT (Primary Key)	Unique identifier for each author
	name	VARCHAR(255)	Name of the author
	project_id	INT (Foreign Key)	Reference to the project
Search	search_id	INT (Primary Key)	Unique identifier for each search
	user_id	INT (Foreign Key)	Reference to the user
	search_query	TEXT	The search query used by the user
	search_date	TIMESTAMP	Date and time when the search was made

Figure

Table 1: Database Structure of the Repository System

User submission fields include title, authors (linked to the Authors table), abstract, keywords, affiliations, publication date, journal, and an option to upload a PDF file. Administrators can manage projects (add, edit, delete), user accounts (create, edit, deactivate), and configure user roles and permissions.

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RESULT

Home Page

Figure 3 shows the home page of the repository system that provides easy navigation for user to access the contents of the system.

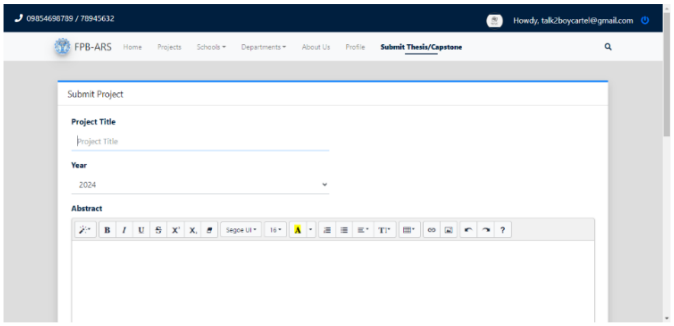
Figure

Fig 3: Home Page

From the home page, student can navigate through the project section and filter by schools and departments as well login or register an account. Students can create an account selecting a username and password. The system verifies whether the details being entered already exist in the database. If a match is found, the user will be notified of an existing account. Otherwise, the registration process will proceed, pending administrator approval before the student can log in.

Project Submission Page

The Project Submission Page shown in figure 4 is where students upload their project files and provide necessary details for submission.



Figure

Fig 4: Project Submission Page

This page typically includes fields for entering the project title, description, and any relevant tags, as well as options to upload documents or other media files. The page ensures that students can submit their projects efficiently and that all required information is provided for review and assessment.

Admin Dashboard

The Admin Dashboard Page as shown in figure 5 serves as the main interface for administrators after logging in, offering streamlined navigation to various essential sections.

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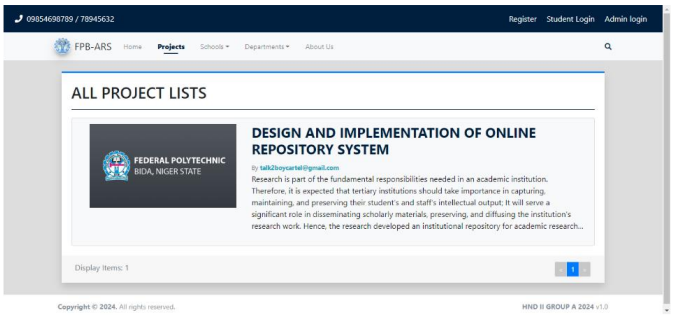
Figure

Fig 5: Admin Dashboard Page

Administrators can access the school list to manage and update information about the schools within the system. The department list section allows for the addition and modification of departmental details under each school. The student list provides a comprehensive view of registered students, enabling administrators to manage student profiles, approve or deny registrations, and track their progress. Additionally, the project submitted list allows administrators to review, sort, and filter student project submissions, providing feedback or approvals as needed.

Project Explore Page

The All-Project Lists page displayed in figure 9 is a comprehensive list of all submitted and approved projects within the academic repository system.



Figure

Fig 9: All Project Lists

This page typically includes project titles, authors, submission dates, and brief descriptions, along with filtering and sorting options to help users find specific projects or view them by category. This page allows both students and administrators to browse and access the repository's collection of projects efficiently.

For the implementation, HTML, CSS, and JavaScript are employed for the frontend design to create a responsive and interactive user interface. PHP, alongside AdminLTE3, was used for the backend to handle server-side logic and user management functionalities. AdminLTE3 provides a modern and flexible framework for building the administrative interface, ensuring that system administrators can efficiently manage the repository. MySQL was used for the database to store and manage all the academic papers, user information, and other relevant data securely and efficiently. The combination of these technologies ensures a robust, scalable, and user-friendly system, capable of handling complex queries and providing reliable data management.

CONTRIBUTION TO KNOWLEDGE

This research contributes to the academic community by developing a comprehensive online repository system that digitizes and centralizes final year projects, specifically designed for the Federal Polytechnic Bida. The repository enhances accessibility and usability of academic resources, addressing the limitations of the current manual system. By integrating modern technologies such as HTML, CSS, JavaScript, PHP, and MySQL, the system provides a scalable and efficient solution for managing academic works, facilitating easier access for students and administrators, and preserving valuable research outputs for future reference.

CONCLUSION

The design and implementation of an online academic repository system for final year student projects at the Federal Polytechnic Bida represents a significant advancement in the management and dissemination of academic research. This system will not only address the inefficiencies and limitations of the previous manual processes but also provides a scalable, secure, and user-friendly platform for students, faculty, and researchers. In view of this, leveraging modern web technologies, the repository enhances accessibility, preservation, and the overall management of final year projects, thereby contributing to the broader academic and research communities.

RECOMMENDATIONS

- 1. Explore integration opportunities with existing learning management systems (LMS) to streamline access to academic resources and enhance user experience.
- 2. Conduct tutorials to familiarize users, especially students and new administrators, with the system's features and best practices for efficient utilization.
- 3. Actively promote the use of the repository system within the institution. Conduct workshops, seminars, and awareness campaigns to encourage students and faculty to utilize the platform for their research and academic needs.

AREA OF FUTURE WORK

This research has successfully developed an online repository system, several areas were not covered and could benefit from further exploration and development: Future work could explore integrating the repository with other academic systems, such as learning management systems (LMS) and institutional research databases, to create a more comprehensive academic ecosystem. Implementing advanced search functionalities using artificial intelligence (AI) and machine learning algorithms could further enhance the retrieval process, providing users with more relevant and precise search results. Developing a mobile application version of the repository would increase accessibility for users who prefer accessing academic materials on mobile devices, thereby expanding the system’s reach and usability.

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