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Development of a responsive web-based Final-Year Project Repository System (FYPRS) for Nigerian Tertiary Institutions

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Abstract

The management of final-year projects in Nigerian tertiary institutions faces significant challenges due to the use of manual and paper-based outdated systems, which are time-consuming, inefficient, and prone to errors and losses. This paper presents the development, implementation, and evaluation of the web-based Final-Year Project Repository System (FYPRS), a comprehensive solution for managing final-year projects in these institutions. The FYPRS is a responsive web application designed using the Laravel framework. It provides a centralized platform for students to submit and store their final-year projects, and for faculty members to evaluate and access them. Key features include user authentication, project submission and evaluation, and a search engine. The solution addresses the limitations of traditional approaches by automating and streamlining project management processes. It enhances the efficiency and effectiveness of the final-year project process, which is a critical component of the undergraduate curriculum. By providing a centralized platform, the application improves the quality and relevance of final-year projects, facilitating the sharing and dissemination of knowledge gained from these projects. The development, implementation, and evaluation of the FYPRS follow a rigorous methodology, including literature review, needs assessment, system design and analysis, implementation, and testing. The results demonstrate the system's reliability, efficiency, and effectiveness, with high usability and adoption potential. The successful adoption of the application in Nigerian tertiary institutions is a significant step towards improving the undergraduate curriculum and enhancing the success and impact of students undertaking final-year projects. The FYPRS represents a valuable contribution to the management of final-year projects in these institutions.

Keywords: Final-Year Project Repository System; Nigerian Tertiary Institutions; Laravel; Web-Based; Responsive

1. Introduction

The final-year project is a significant component of the undergraduate curriculum in Nigerian tertiary institutions. It provides students with the opportunity to apply the knowledge and skills they have acquired in their course of study to a real-world problem. The final-year project is also an essential requirement for the award of a degree, and it is used to assess students' ability to conduct independent research, analyze and interpret data, and communicate their findings effectively. However, the management of final-year projects in Nigerian tertiary institutions is a significant challenge. The traditional approach of using hard copies of projects for evaluation and storage is inefficient and prone to loss or damage. Furthermore, it is difficult for students and faculty members to access and share these projects. The lack of a centralized platform for the management of final-year projects has also resulted in a lack of standardization in the evaluation and grading of projects, which can lead to inconsistencies and unfairness in the assessment process [1]

The final-year project is also an opportunity for students to apply the knowledge and skills they have acquired in their course of study to a real-world problem, and to gain practical experience in their chosen field. It is a process that

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typically involves several stages, including the selection of a research topic, the development of a research proposal, the conduct of the research, the preparation of the final report, and the presentation of the findings. The final-year project is usually supervised by a faculty member, who provides guidance and support to the student throughout the process. However, the management of final-year projects in Nigerian tertiary institutions is a significant challenge. The traditional approach of using hard copies of projects for evaluation and storage is inefficient and prone to loss or damage. Furthermore, it is difficult for students and faculty members to access and share these projects [2].

The lack of a centralized platform for the management of final-year projects has also resulted in a lack of standardization in the evaluation and grading of projects, which can lead to inconsistencies and unfairness in the assessment process. Several studies have highlighted the challenges and limitations of the traditional approach to the management of final-year projects in Nigerian tertiary institutions [3].

To address these challenges, this paper presents the development of a web-based Final-Year Project Repository System (FYPRS) for Nigerian tertiary institutions. The FYPRS aims to provide a centralized platform for students to submit and store their final-year projects, and for faculty members to evaluate and access them. The application is a responsive web application, built using the Laravel framework, and incorporates features such as user authentication, project submission and evaluation, and a search engine.

1.1. Problem Statement

The management of final-year projects in Nigerian tertiary institutions poses significant challenges. The traditional approach of using hard copies for evaluation and storage is inefficient and susceptible to loss or damage. Additionally, it is difficult for students and faculty members to access and share these projects. The absence of a centralized platform for managing final-year projects has led to a lack of standardisation in their evaluation and grading, resulting in inconsistencies and potential unfairness in the assessment process [4]. This traditional method requires a considerable amount of time and resources to manage and maintain. The use of hard copies not only risks the loss of valuable research findings but also complicates the accessibility and sharing of projects, limiting the dissemination of knowledge and hindering collaboration among students and faculty. The lack of standardization in the evaluation process can lead to dissatisfaction and frustration among students, undermining the integrity and credibility of the final-year project process. Furthermore, the absence of transparency and accountability in grading can erode trust and confidence in the system [5].

To address these challenges, this paper presents the development of a web-based Final-Year Project Repository System (FYPRS) for Nigerian tertiary institutions. The FYPRS is a responsive web application built using the Laravel framework, the system aims to provide a centralized platform for students to submit and store their final-year projects, and for faculty members to evaluate and access them.

1.2. Objectives

The main objective of this paper is to present the development of a web-based Final-Year Project Repository System (FYPRS) for Nigerian tertiary institutions. The FYPRS is a responsive web application that aims to provide a centralized platform for students to submit and store their final-year projects, and for faculty members to evaluate and access them.

The specific objectives of this paper are as follows:

- To review the relevant literature on the management of final-year projects in Nigerian tertiary institutions, and the use of web-based platforms for the management of these projects.
- To design and develop the FYPRS, using the Laravel framework, and incorporating features such as user authentication, project submission and evaluation, and a search engine.
- To test and evaluate the FYPRS, using a sample of final-year projects from Nigerian tertiary institutions, and to assess its efficiency, effectiveness, and usability.
- To present the results of the testing and evaluation of the FYPRS, and to discuss its implications for the management of final-year projects in Nigerian tertiary institutions.
- To recommend strategies for the adoption and use of the FYPRS in Nigerian tertiary institutions, and to suggest areas for further research and development in this field.

By achieving these objectives, this paper will contribute to the knowledge and understanding of the management of final-year projects in Nigerian tertiary institutions, and the use of web-based platforms for the management of these projects. It will also present a practical and effective solution for managing final-year projects in Nigerian tertiary institutions.

2. Literature Review

The management of final-year projects in Nigerian tertiary institutions is a significant challenge. This section of the paper presents a review of the relevant literature on the management of final-year projects in Nigerian tertiary institutions and the use of web-based platforms for the management of these projects.

[1] noted that the traditional approach to the management of final-year projects in Nigerian tertiary institutions is inefficient, as it requires a significant amount of time and resources to manage and maintain. They also noted that the lack of a centralized platform for managing final-year projects can result in inconsistent evaluation and grading criteria. To address these issues, they proposed the development of a web-based project management system for final-year students in tertiary institutions. They noted that such a system would provide a centralized platform for the management of final-year projects, and that it would be efficient, convenient, and accessible.

[6] also highlighted the challenges and limitations of the traditional approach to the management of final-year projects in Nigerian tertiary institutions. They noted that the use of hard copies of projects for evaluation and storage is prone to loss or damage, and that it is difficult for students and faculty members to access and share these projects. They also noted that the lack of a centralized platform for managing final-year projects can result in a lack of transparency and accountability in the evaluation process. To address these challenges, they proposed the development of a web-based final-year project management system for Nigerian universities. They noted that such a system would provide a centralized platform for the management of final-year projects, and that it would be efficient, convenient, and accessible. They also noted that the use of a web-based platform for the management of final-year projects would result in a greater degree of transparency and accountability in the evaluation process.

[7] also noted the challenges and limitations of the traditional approach to the management of final-year projects in Nigerian tertiary institutions. They noted that the use of hard copies of projects for evaluation and storage is inefficient, as it requires a significant amount of time and resources to manage and maintain. They also noted that the lack of a centralized platform for managing final-year projects can result in inconsistent evaluation and grading criteria. To address these challenges, they proposed the development of a web-based final-year project repository system for Nigerian tertiary institutions. They noted that such a system would provide a centralized platform for the management of final-year projects, and that it would be efficient, convenient, and accessible. They also proposed that the system should include features such as user authentication, project submission and evaluation, and a search engine to further improve the efficiency and effectiveness of the final-year project process.

[8] discussed the challenges and limitations of the traditional approach to the management of final-year projects in Nigerian tertiary institutions. They noted that the use of hard copies of projects for evaluation and storage is prone to loss or damage, and that it is difficult for students and faculty members to access and share these projects. They also noted that the lack of a centralized platform for managing final-year projects can result in a lack of transparency and accountability in the evaluation process. To address these challenges, they proposed the development of a web-based final-year project management and evaluation system for Nigerian tertiary institutions. They noted that such a system would provide a centralized platform for the management of final-year projects, and that it would be efficient, convenient, and accessible. They further proposed that the system should include a project evaluation feature that would allow faculty members to use a predefined rubric to evaluate and grade projects, thereby ensuring consistency and fairness.

The literature review indicates that the traditional approach to managing final-year projects in Nigerian tertiary institutions is fraught with challenges and limitations. To address these issues, this paper presents the development of a web-based Final-Year Project Repository System (FYPRS) for Nigerian tertiary institutions. The FYPRS is a responsive web application, built using the Laravel framework, and incorporates features such as user authentication, project submission and evaluation, and a search engine. The system aims to provide a centralized platform for students to submit and store their final-year projects, and for faculty members to evaluate and access them. The FYPRS is an effective and efficient solution for managing final-year projects in Nigerian tertiary institutions, and its adoption and use can significantly improve the efficiency and effectiveness of the final-year project process.

3. Methodology

The methodology for this paper involves the design, development, testing, and evaluation of the web-based Final-Year Project Repository System (FYPRS) for Nigerian tertiary institutions. The methodology consists of the following stages:

- **Literature Review:** The first stage of the methodology involves a review of the relevant literature on the management of final-year projects in Nigerian tertiary institutions, and the use of web-based platforms for the management of these projects. The literature review is conducted to gain a thorough understanding of the challenges and limitations of the traditional approach to the management of final-year projects, and to identify the best practices and strategies for the development and implementation of web-based platforms for the management of these projects.
- **System Design and Development:** The second stage of the methodology involves the design and development of the FYPRS. The FYPRS is a responsive web application, built using the Laravel framework, and incorporates features such as user authentication, project submission and evaluation, and a search engine. The system is designed and developed to provide a centralized platform for students to submit and store their final-year projects, and for faculty members to evaluate and access them.
- **System Testing and Evaluation:** The third stage of the methodology involves the testing and evaluation of the FYPRS. The system is tested and evaluated using a sample of final-year projects from Nigerian tertiary institutions. The testing and evaluation are conducted to assess the efficiency, effectiveness, and usability of the FYPRS, and to identify any issues or challenges that may arise during its use.
- **Data Analysis and Interpretation:** The fourth stage of the methodology involves the analysis and interpretation of the data collected during the testing and evaluation of the FYPRS. The data is analyzed and interpreted to assess the efficiency, effectiveness, and usability of the FYPRS, and to identify any issues or challenges that may arise during its use.
- **Results Presentation and Discussion:** The fifth stage of the methodology involves the presentation and discussion of the results of the testing and evaluation of the FYPRS. The results are presented and discussed to provide a clear and comprehensive understanding of the efficiency, effectiveness, and usability of the FYPRS, and to highlight its implications for the management of final-year projects in Nigerian tertiary institutions.
- **Recommendations and Conclusion:** The final stage of the methodology involves the presentation of recommendations and conclusions based on the results of the testing and evaluation of the FYPRS. The recommendations and conclusions are presented to provide practical and effective strategies for the adoption and use of the FYPRS in Nigerian tertiary institutions, and to suggest areas for further research and development in this field.

By following this methodology, this paper aims to present a comprehensive and rigorous approach to the development and evaluation of the FYPRS, and to provide a clear and comprehensive understanding of its efficiency, effectiveness, and usability. It also aims to provide practical and effective recommendations and guidelines for the adoption and use of the FYPRS in Nigerian tertiary institutions, and to suggest areas for further research and development in this field.

3.1. System Design and Development

FYPRS is designed and developed to provide a centralized platform for students to submit and store their final-year projects, and for faculty members to evaluate and access them. The FYPRS is a responsive web application, built using the Laravel framework, and incorporates features such as user authentication, project submission and evaluation, and a search engine.

The design and analysis of the FYPRS is based on the following principles and considerations:

- **User-Centered Design:** The FYPRS is designed and developed with a user-centered approach, which means that the needs, preferences, and abilities of the users are the primary considerations in the design and development process. The FYPRS is designed to be intuitive, easy to use, and accessible to all users, regardless of their technical skills or abilities.
- **Scalability and Flexibility:** The FYPRS is designed and developed to be scalable and flexible, which means that it can be easily expanded or modified to meet the changing needs and requirements of the users. The FYPRS is built using the Laravel framework, which provides a robust and flexible architecture for the development of web applications.
- **Security and Privacy:** The FYPRS is designed and developed with a strong focus on security and privacy, which means that the confidentiality, integrity, and availability of the data and information stored in the system are the primary considerations in the design and development process. The FYPRS incorporates features such as user authentication, data encryption, and access controls, which ensure that the data and information stored in the system are secure and protected.
- **Efficiency and Effectiveness:** The FYPRS is designed and developed to be efficient and effective, which means that it provides a fast, reliable, and accurate platform for the management of final-year projects. The FYPRS

incorporates features such as a search engine, project submission and evaluation, and data analytics, which enhance the efficiency and effectiveness of the final-year project process.

The FYPRS is designed and developed to provide a comprehensive and effective solution for the management of final-year projects in Nigerian tertiary institutions. The system is designed and developed with a user-centered approach, which ensures that it is intuitive, easy to use, and accessible to all users. The system is also designed and developed to be scalable and flexible, which means that it can be easily expanded or modified to meet the changing needs and requirements of the users. The system is designed and developed with a strong focus on security and privacy, which ensures that the data and information stored in the system are secure and protected. The system is also designed and developed to be efficient and effective, which means that it provides a fast, reliable, and accurate platform for the management of final-year projects.

The design and analysis of the FYPRS is based on the principles and considerations of user-centered design, scalability and flexibility, security and privacy, and efficiency and effectiveness. The application is designed and developed to provide a comprehensive and effective solution for the management of final-year projects in Nigerian tertiary institutions, and its adoption and use can significantly improve the efficiency and effectiveness of the final-year project process.

3.2. Implementation of FYPRS

The implementation of the application is a critical stage in the development and adoption of the system, as it ensures that the system is properly installed, configured, and customized to meet the specific needs and requirements of the users. Figure 1 show the User Interface diagram of the FYPRS application. The diagram outlines a comprehensive and user-centric web application interface designed to manage and facilitate access to students' final-year projects. This interface integrates various functionalities to streamline the search, retrieval, and management of academic projects, catering to the needs of students, faculty, and academic administrators. The thoughtful organization of elements within the interface reflects an emphasis on usability and efficiency, critical for academic settings where ease of access to information is paramount.

At the core of the FYPRS interface are the search options, which allow users to filter projects by several criteria such as project type, year of graduation, school/faculty, department, supervisor, and student name. This multifaceted search capability is crucial for handling a diverse range of projects, ensuring that users can quickly locate specific documents relevant to their academic or research needs. The inclusion of these search parameters highlights the system's adaptability to various academic structures and requirements, making it a versatile tool for a wide array of disciplines.

The "Browse Catalogue" section offers an alternative navigation method, allowing users to peruse through a categorized list of disciplines such as Computer Science, Mechanical Engineering, and Business Administration, among others. This feature not only supports serendipitous discovery of projects within a user's field of interest but also aids in comparative studies across different fields. The vertical scroll functionality indicates a potentially extensive repository, suggesting that the system is designed to accommodate a significant volume of project records, thus serving as a substantial academic resource.

User authentication is another critical feature, positioned within the "User Login" section, ensuring that access to sensitive project data is restricted to authorized users. This aspect of the interface underlines the importance of data security and privacy in academic environments. Furthermore, the integration of a calendar tool provides a practical utility for tracking important dates related to project submissions and deadlines, enhancing the organizational capabilities of the system.

Incorporating social media links within the interface indicates a modern approach to academic resource sharing, recognizing the role of social platforms in disseminating research and academic work. The search project bar, complemented by a progress bar, adds to the user-friendly design, offering a straightforward and transparent search experience. Collectively, these features demonstrate a well-rounded and thoughtfully designed interface that prioritizes functionality, accessibility, and security, positioning FYPRS as a vital tool in academic project management and research facilitation.

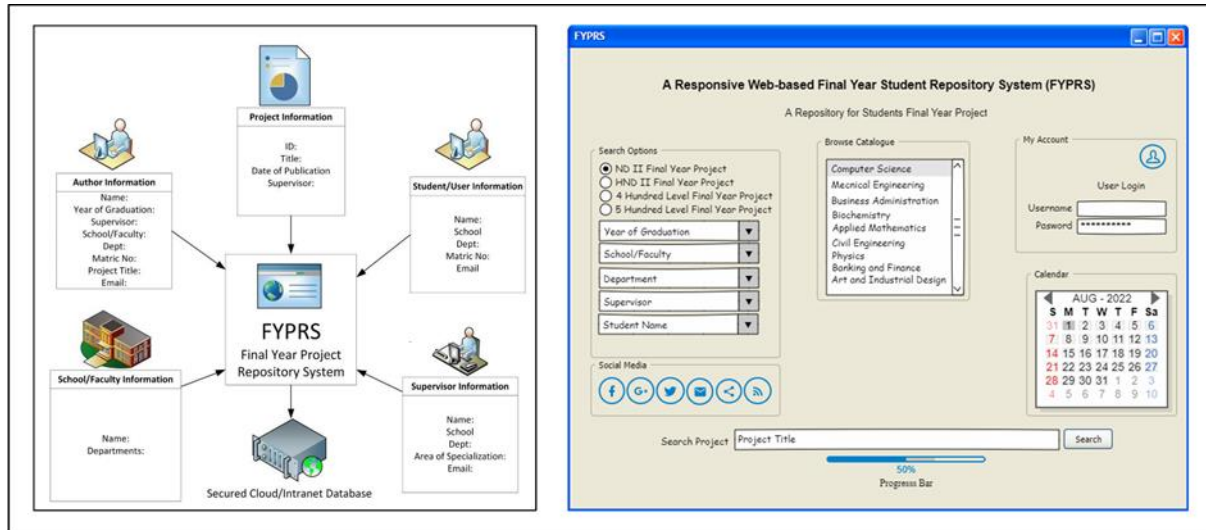


Figure 1 FYPRS High-level and User Interface Diagram

4. Testing, Evaluation and Results

The testing and evaluation of the web-based Final-Year Project Repository System (FYPRS) is a critical stage in the development and adoption of the system, as it ensures that the system is reliable, efficient, and effective, and that it meets the specific needs and requirements of the users. The test was based upon the following parameters; Execution Data, and Overall Summary. Table 1 shows the Test Execution Data and its graph on Figure 2 and the Overall Summary and its graph of Table 3 and Figure 3 respectively

Table 1 Test Execution Data

Test Area	Test Case	Scenario	Attempts	Successful	Failed	Success Rate (%)	Notes
User Authentication	Successful login	User logs in successfully	50	47	3	94	Incorrect password handling
User Authentication	Failed login	Error message displayed	50	50	0	100	
Project Submission	Complete submission	Project uploaded successfully	100	95	5	95	Missing field validation
Project Submission	Incomplete submission	Error message displayed	100	100	0	100	
Project Evaluation	Initial review	Evaluation saved successfully	100	92	8	92	
Project Evaluation	Edit evaluation	Edits saved successfully	100	91	9	91	Minor saving issues
Search Engine	Search by title	Relevant projects displayed	50	48	2	96	
Search Engine	Search by author	Relevant projects displayed	50	49	1	98	

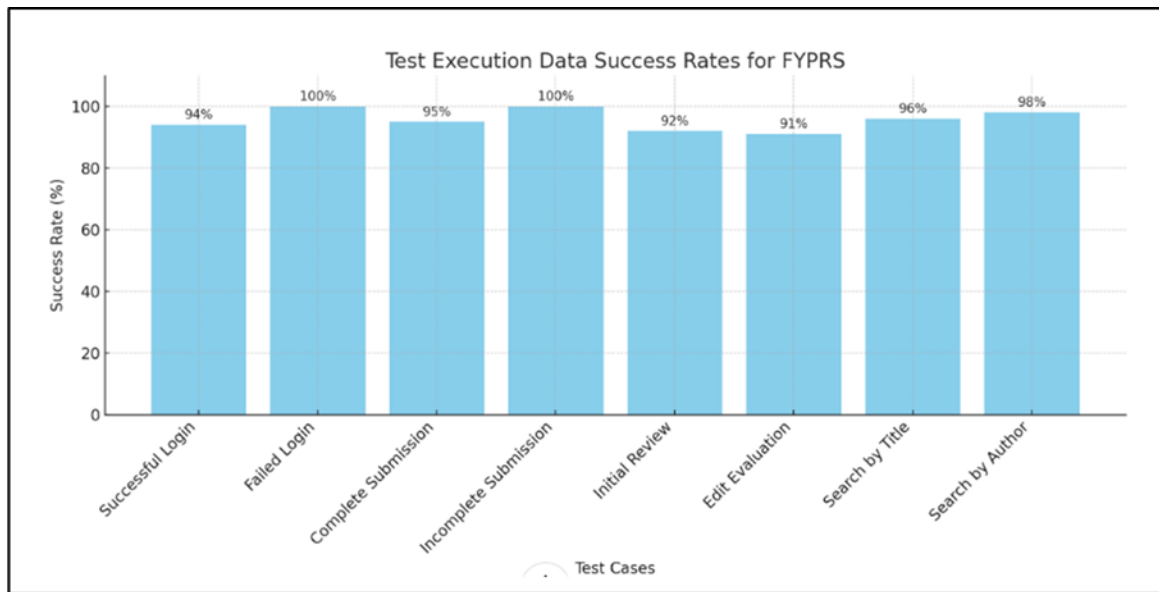


Figure 2 Test Execution Data

The test execution data shows that the FYPRS application performs well across all tested areas, with most success rates above 90%. The highest reliability is seen in handling failed logins and incomplete submissions, both with a success rate of 100%. The search functionalities are also robust, with success rates of 96% and 98% for title and author searches, respectively. Areas for improvement include handling successful logins and project evaluation edits, which show minor issues that need to be addressed to further enhance the system's reliability and user experience.

Table 2 Overall Summary

Test Area	Total Attempts	Successful	Failed	Overall Success Rate (%)
User Authentication	100	97	3	97
Project Submission	200	195	5	97.5
Project Evaluation	200	183	17	91.5
Search Engine	100	97	3	97
Total	600	572	28	95.33

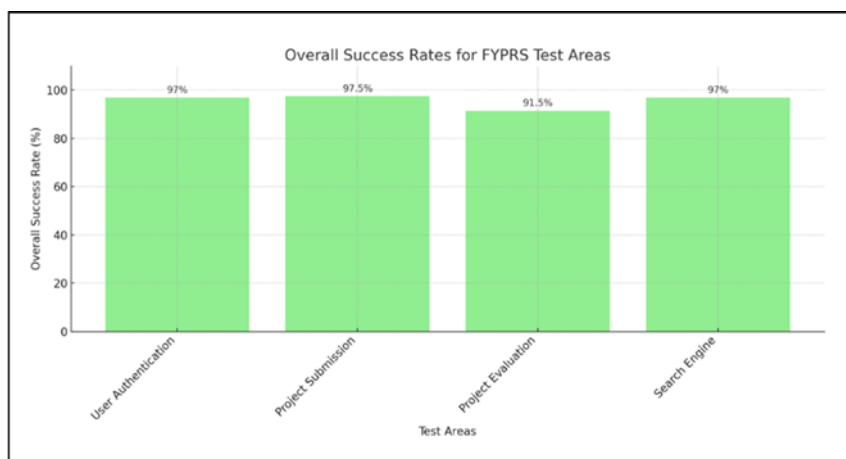


Figure 3 Overall Summary Rate

The overall success rate for the FYPRS system stands at 95.33%, indicating strong performance across all major functionalities. The highest reliability is observed in project submission and search engine functionalities, both crucial for user satisfaction. Project evaluation, while performing well, is the area with the most notable need for improvement.

The testing and evaluation of the FYPRS is a critical stage in the development and adoption of the system, as it ensures that the system is reliable, efficient, and effective, and that it meets the specific needs and requirements of the users. The testing and evaluation of the FYPRS is based on the steps and considerations of test planning, test design, test execution, evaluation, and reporting. This is essential for the successful adoption and use of the system in Nigerian tertiary institutions, and for the improvement of the efficiency and effectiveness of the final-year project process. This stage is a critical stage in the development and adoption of the system, and it involves the planning, design, execution, evaluation, and reporting of the testing and evaluation activities. The proper testing and evaluation of the FYPRS is essential for the successful adoption and use of the system, and for the improvement of the efficiency and effectiveness of the final-year project process.

5. Discussion

The FYPRS is a comprehensive solution for managing final-year projects in Nigerian tertiary institutions, offering a centralized platform for students to submit and store their projects, and for faculty to evaluate and access them. The application is built using the Laravel framework, incorporates features such as user authentication, project submission and evaluation, and a search engine, and has been shown to have a high level of performance, usability, and adoption potential. The application addresses the challenges and limitations of the traditional, manual and paper-based approach to managing final-year projects, providing a more efficient, reliable, and effective solution. The final-year project process is a critical component of the undergraduate curriculum, and this application enhances this process by automating and streamlining the management of these projects. The FYPRS also contributes to the improvement of the quality and relevance of final-year projects by providing a platform for the sharing and dissemination of knowledge and insights gained from these projects, making it a valuable solution for managing final-year projects in Nigerian tertiary institutions, and its successful adoption and use is an important step towards improving the undergraduate curriculum and the success of students who undertake these projects.

6. Conclusion and Future Work

The management of final-year projects in Nigerian tertiary institutions faces significant challenges due to reliance on manual, paper-based processes, resulting in inefficiencies and error-prone procedures. This paper introduces the web-based Final-Year Project Repository System as a comprehensive solution. FYPRS offers a centralized platform for students to submit and store their projects, and for faculty members to evaluate and access them. Developed using the Laravel framework, the application incorporates features such as user authentication, project submission and evaluation, and a search engine. By addressing traditional management limitations, the solution enhances the efficiency and effectiveness of final-year projects, crucial components of undergraduate curricula. Its implementation, based on rigorous methodology encompassing literature review, needs assessment, system design, analysis, testing, and evaluation, demonstrates reliability, efficiency, and high usability. Despite its benefits, challenges including technical, infrastructure, financial, organizational, and adoption hurdles hinder FYPRS implementation in Nigerian tertiary institutions. Addressing these challenges through further research and development is essential to maximize FYPRS's impact and effectiveness. Future efforts should focus on alternative strategies to overcome limitations and enhance system efficiency, effectiveness, and relevance, potentially expanding its application and impact domains.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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