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Research Article

EduArchive: A Digital Repository for Academic Resources

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Abstract – The swift development of technology has transformed how educational institutions administer and access academic resources. But there have been a lot of obstacles to academic resource sharing and collaboration, including the present non-standardised process for storing resources, limited access because of physical limitations, and more. The lack of a standardised storage protocol results in disorganized arrangements, hindering users' ability to efficiently locate materials. Academic resources are available exclusively in physical format, which limits access and requires the presence of learners and instructors in particular places. This study proposed a specific repository online platform intended for academic and university use. The platform will serve as a main repository application for the storage and retrieval of e-books, Final Year Project (FYP) reports, and indexed academic publications. It will assist administrators, scholars, and students in administering and distributing the academic resources. The system intends to address ease of access issues in improving resource management, collaboration, and the overall academic experience among faculty members. The development of the system follows the standard System Development Life Cycle (SDLC) from user requirement to implementation and testing. A Software Usability Scale (SUS) is used as a testing tool to confirm that the system meets usability standards. Thirty participants were involved in the testing. The result shows that the system achieved an average SUS score of 91.83, with a median of 91.25, a minimum of 72.5, and a maximum of 100.0, placing it in the "excellent" usability range. These results confirm that the system not only meets but exceeds user expectations in terms of usability and user experience. This study demonstrates that the proposed repository system is both practical and highly usable, suggesting strong potential for wider adoption in academic environments. It contributes significantly to enhancing resource accessibility, collaboration, and academic productivity within higher education institutions.

Keywords: System Development, SDLC, Repository, Academic System, SUS

1. INTRODUCTION

Organising digital resources depends on repositories and provides simple access to resources. From basic file storage, it has developed into complex systems containing search engines and indexing techniques. Institutional repositories have become a favoured platform for higher education institutions striving to enhance their reputation, visibility, and learning opportunities [1]. Most importantly in learning environments, repositories support knowledge sharing and teamwork, allowing students to

study at their convenience, free from schedule constraints [2]. This advantage has helped digital learning to gain some prominence.

Despite the recognised benefits of digital resources, many universities currently rely on a blend of traditional and nascent digital methods for managing their academic assets. This often involves physical libraries with extensive print collections, where resources are accessed through manual borrowing systems and card catalogues. These traditional methods inherently impose physical accessibility limitations, requiring users to be physically present at the library, and lead to limited simultaneous use, as a single physical copy can only be borrowed by one individual at a time [3]. While some institutions have adopted Learning Management Systems (LMS) or basic digital file storage solutions, these are often departmentalized or lack comprehensive integration, leading to fragmented access and difficulty in tracking diverse resource types [4]. For instance, e-books might be available through separate vendor platforms, and Final Year Project (FYP) reports may be stored on local servers or even individual faculty computers. Academic publications, while increasingly digital, are typically accessed through subscription-based databases, which can be fragmented and costly. These varied approaches, while providing some digital access, frequently result in siloed information, inconsistent archiving practices, and a lack of interoperability, hindering a truly unified and efficient resource management ecosystem.

Student engagement with institutional repository platforms is significantly influenced by their perceptions of the system. A positive attitude, believing the platform is beneficial, useful, and meets their needs, strongly predicts their intention to use it [5]. A key finding in this area highlights the substantial impact of performance expectancy on student usage intentions [6]. Performance expectancy refers to the extent to which an individual believes that using a particular technology will help them achieve their performance objectives. Students frequently describe institutional repositories as valuable resources for accessing academic materials like research papers, theses, and e-books, recognising their role in improving academic performance and enhancing the learning process. Another critical factor is effort expectancy, which describes the perceived simplicity of using a given technology [5 – 6]. Studies indicate that students who find institutional repositories user-friendly and easy to access are more likely to adopt them. This scenario underscores the importance of intuitive structures and accessible designs in encouraging student engagement with vital academic resources.

In the dynamic environment of higher education, academic faculty members are usually committed to creating an atmosphere that supports the success of both students and instructors. However, traditional methods of archiving and accessing academic resources are often insufficient, necessitating a more effective and collaborative approach [7]. One significant challenge is the lack of a uniform system for resource storage, leading to disorganised and inconsistent academic content cataloguing across departments [8]. This inconsistency hinders students' ability to efficiently locate and utilise specific resources, causing unnecessary delays and frustration. Disparate storage methods across different departments result in a fragmented structure, compromising the reliability and accessibility of crucial academic resources.

Further complicating these issues is the limited availability of academic resources, often constrained by their physical nature [8 – 9]. Many resources are confined to specific locations, requiring physical presence for access. This not only restricts information access but also limits the engagement of staff and students in research and learning activities at their convenience, thereby diminishing their academic potential. These challenges also negatively impact institutional collaboration and the efficient distribution of academic resources. The current system complicates the ability of students and lecturers to efficiently access and share academic reports, which are critical for academic research and reference. Reliance on manual processes and outdated online platforms slows the flow of information and obstructs collaboration, ultimately affecting the overall quality of academic work and diminishing institutional productivity.

The primary issue with the existing repository is the complicated process of storing academic resources [10 – 11]. Lecturers often struggle to keep track of their resources, resorting to storing them in hardcopy or on personal devices. This not only leads to inefficiencies but also hinders collaboration and sharing of resources. Additionally, limited access to resources due to borrowing restrictions poses a challenge for students, who may have to wait to access materials that are being used by others [12]. Consequently,

this work develops a repository system designed to rectify these deficiencies by creating a centralised, web-based repository for the storage and retrieval of diverse academic resources, including Final Year Project (FYP) theses, scholarly papers, and complimentary e-books. By providing a centralised repository, this study aims to enhance collaboration and knowledge sharing among students, lecturers, and administrators within the faculty.

The usability results of this study suggested that the system has greatly enhanced its effectiveness, hence rendering it ideal for use for academic purposes. This paper is organised as outlined below: This study describes the methodology and materials in Section 2, followed by the results of the system test in Section 3. This Section 3 also includes a discussion of the findings and the limitations of the study. Ultimately, Section 4 outlines the conclusion and potential avenues for further investigation of the study.

2. METHODOLOGY

This study adopts the waterfall model in developing and testing the repository system. The methodology was chosen because it follows a general system development method that was usually used worldwide. The developer follows a stepwise approach from gathering user requirements, designing and developing the system application, and conducting system testing.

Developers work closely with the end user to get as many as possible of the system's requirements during the user requirement phase. In this phase, researchers conducted individual physical interviews with one clerical staff member, one academic staff member, and two students. The students were from two distinct faculties. The interview was scheduled in advance at their convenient time and in a formal setting. Based on the findings from the interview, current practice was evaluated, and the flow of the system was scrutinised for a better system implementation. All requirements were then documented, and after that, developers produced the system design in the designing phase.

The design phase focuses on establishing a user-friendly interface and structuring the database to efficiently store and retrieve material. By designing a system design, system features can be confirmed further. It helps the developers in completing the system functionality. Developers were then developing the system according to the system design in the implementation phase.

The implementation phase translated the design specifications into a functional website using PHP, HTML, and CSS for the frontend and MySQL for the backend database. This phase also involved integrating features such as user authentication, content categorisation, and search functionality. Systems went through several tests, including unit testing, integration testing, system testing, and user testing, in the testing phase. The testing phase rigorously evaluated the system to ensure it met the specified requirements and was free of errors. Finally, the maintenance phase was highlighted, emphasising the importance of ongoing support and updates to ensure the system remains functional and relevant.

2.1 System Requirement, Design and Application

The developed repository system in this study was purposely designed for use by the academic department. The repository system was designed to provide a simple, effective platform that allows users to easily navigate and access the repository's resources. The synthesised requirements collected during the requirement phases were converted into design and implementation. This iterative process involved developing high-fidelity UI designs and conducting discussions between the developer and designer. The discussion aimed to ensure that the requirements were adequately translated into the design whereby the user interface is functional, aesthetically pleasing, and user-friendly, enabling users to interact with the system effortlessly.

The UI places an emphasis on intuitive navigation components, such as clear and consistent menus, buttons, and icons that guide users through the various sections of the repository. For instance, the

dashboard offers quick access to key features like searching for e-books, viewing FYP reports, and uploading academic articles. The sidebar menu provides a structured and easy-to-understand layout, helping users to locate different categories and functionalities with minimal effort.

There are a few important functions developed for the repository system. As the main objective of the system was to enable the academic ecosystem to centralise their academic resources in one easy-access platform, the platform will mainly connect the people to share and access the resources. The platform will allow 1) the lecturer to share by uploading the resources into the system and personalising access to the resources, 2) the student to access the shared resources and utilise them accordingly, and 3) the admin to monitor activities in the system and to produce reports on platform activities. Any academic resources can be uploaded into the system, for instance, articles, FYP reports, activity reports, e-books, etc., as long as these resources do not complicate publication and authorisation issues.

To ensure the system reaches its full potential, we summarise the system requirements and processes in advance. This summary is based on the system requirements gathered during the initial phase of the system development process.

Firstly, there is the lecturer module. This module facilitates resource contribution and retrieval. Lecturers can upload academic materials such as research papers and e-books, tagging them with metadata for improved discoverability. The module's search and retrieval system allows lecturers to locate relevant resources efficiently. They may also change a collection's status to 'archived' to store it privately without granting access to other users. According to a case study, enabling faculty members to contribute resources enhances collaborative learning and creates a culture of shared academic knowledge [13]. Figure 1 shows the system's UI screenshot for lecturers to understand the function that they will be able to perform in the system.

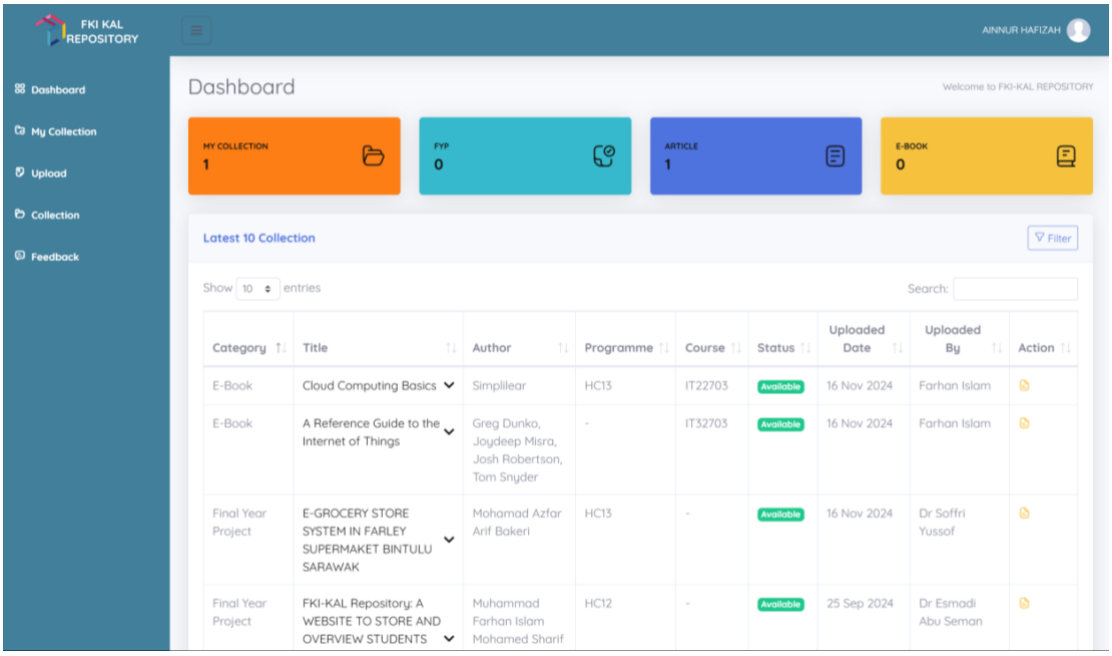

Figure 1: The interface of the lecturer's dashboard.

The second module is the student module. This module emphasises resource retrieval and exploration. Students can access categorised academic materials, including research papers and e-books, through intuitive search and filtering functionalities. Advanced filtering options allow students to locate resources based on categories, authors, or publication years. Research consistently shows that when systems are easy to use, it makes a big difference whereby people are more likely to engage with the content and can access what they need without frustration [14]. Figure 2 shows the system's UI screenshot for the student to understand the task that they will be able to perform in the system.

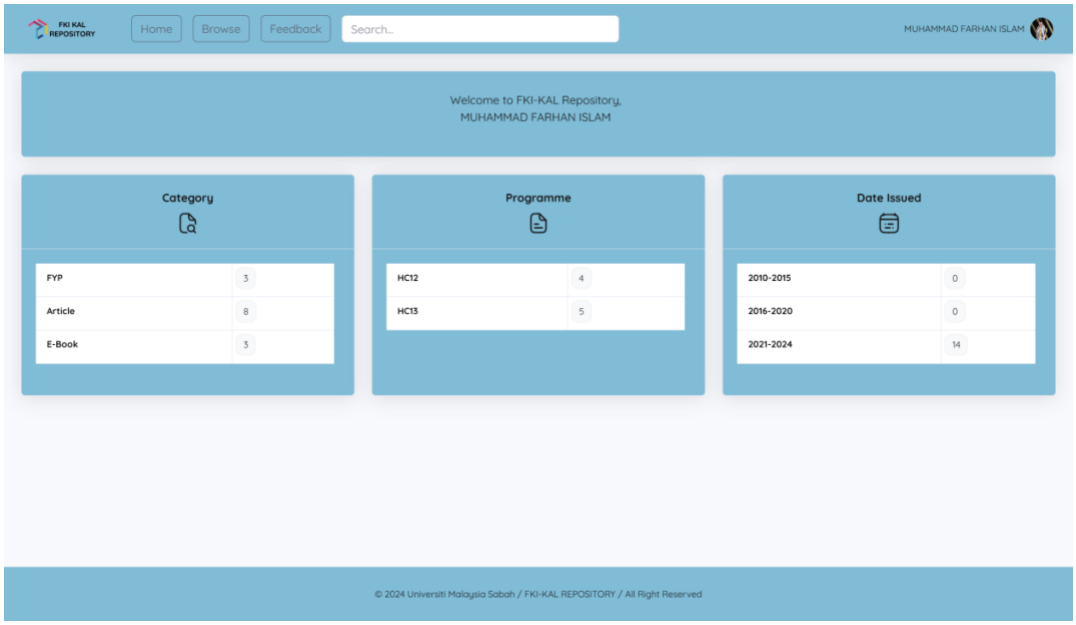

Figure 2: The interface of the student's dashboard.

The last module is the admin module. This module is pivotal in managing user access, maintaining the repository's resources, and overseeing the system's overall functionality. Admins can create, update, and manage user profiles, ensuring that only verified individuals access the system. This module also provides the capability to upload and categorise academic resources, such as final year projects, academic articles, and e-books. A centralised admin module significantly reduces workload and streamlines the operational process for repository systems, ensuring secure and efficient management [15]. Figure 3 shows the system's UI screenshot for the admin to comprehend the task that they are able to perform in the system.

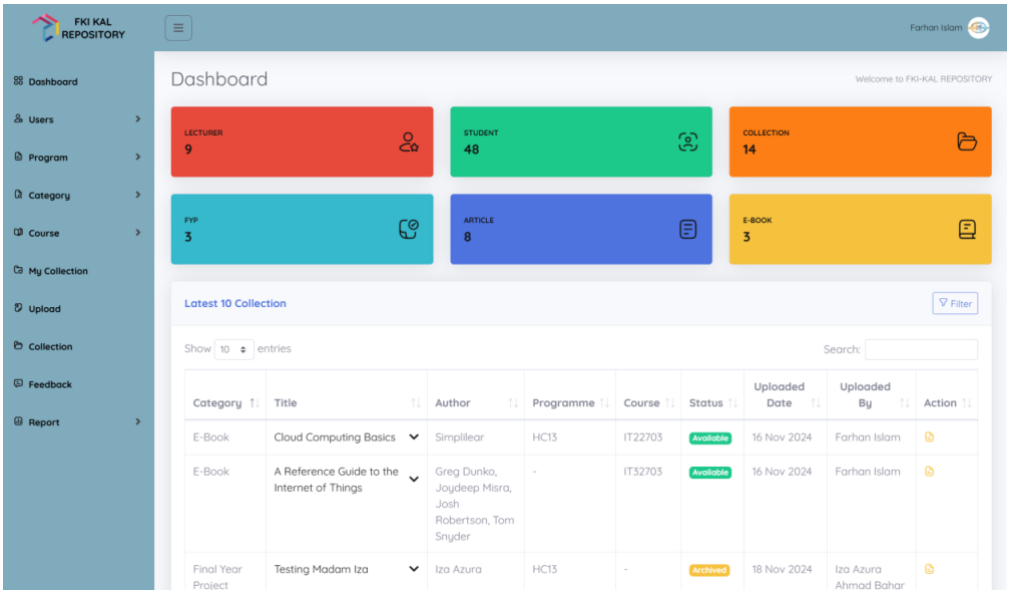

Figure 3: The interface of the admin's dashboard

2.2 Development and Testing Material

The system was developed using an Apache server and MySQL databases and coded using PHP languages. These tools were selected due to their availability, being open source-based, and being easy to use and maintain. For the testing purposes, we conduct two tests: 1) pilot testing and 2) user testing.

The pilot testing was conducted to assess the initial implementation of the system in a controlled environment and to identify potential issues before full-scale deployment. It is conducted on fifteen samples to evaluate the feasibility, effectiveness, and potential limitations of the system, ensuring that risks are minimised and processes are optimised for successful implementation. They are academic staff members, administrators, and students who have chosen to verify features including user management, collection management, system feedback, report generation, and search with filtering capabilities. To determine the average percentage of issues in system deployment, at least five experts are needed [17]. For a pilot tester, these samples can therefore be regarded as acceptable. Feedback from the pilot test highlighted minor usability issues, which were promptly addressed to enhance the overall user experience. This step significantly contributed to the refinement and reliability of the system, ensuring that it meets user expectations and functional requirements.

For the user usability testing, we used the standard Software Usability Scale (SUS) questionnaire tool in order to collect the user's feedback on the applicability of the system. The SUS was given to the users at the end of the testing session, after they had finished all the given tasks. The SUS questionnaire has ten items where odd items are related to positive questions and even items are about negative questions. The tool uses a 5-point Likert scale ranging from 1 to 5, where 1 is towards disagreement and 5 is towards agreement. Each of the respondent scores will be totalled up and multiplied by 2.5 to convert the scores into 100%.

The testing was arranged and executed with 30 participants in individual sessions between the researcher and the respondent. The number of participants was deemed sufficient to facilitate the detection of a substantial fraction of issues in heuristic usability [18]. The system was uploaded to the server and tested before the testing event. Each respondent was asked to provide their consent in the specified form. Respondents were advised that involvement is entirely voluntary, and they may withdraw at any time without any consequences if they choose not to continue. The researcher provided the respondent with an explanation of the system and the tasks that were needed. Upon readiness, individuals may commence by completing the pre-testing questionnaire, thereafter exploring the system with the provided instructions. The instructions were provided for convenience of reference. Upon completion, the participants were requested to fill out the post-testing questionnaire (SUS).

3. RESULTS & DISCUSSIONS

The pilot test was conducted on 15 individuals, which include administrators (N = 2), lecturers (N = 3), and students (N = 10). Table 1 summarize the participant's demographic.

Table 1: The Summary of Pilot Test Participant's Demographic

Age			**Gender**		**Level of Tech Savvy**		
21 – 30	31 – 40	41 – 50	Male	Female	Beginner	Intermediate	Advanced
10	3	2	5	10	2	10	3

According to the pilot testing, participants did not encounter any specific concerns relating to the system's user interface or functions. No errors were detected throughout the test. The participants concur that the system is highly comprehensible for new users, and they appreciate the availability of a user manual for reference at all user levels. Several UI observations deserve further refinement, namely with font size adjustments, colour schemes utilised in the dashboard, and the organisation of feedback. Nevertheless, all participants reached an agreement that the system can be deemed plausibly acceptable.

The usability testing involved 30 individuals randomly invited among administrators, students and lecturers. The usability testing was conducted to assess their experiences with the system. Table 2 shows the SUS participant demographics.

Table 2: The summary of SUS participant's demographic.

Gender	
Male	16
Female	14
Age	
21 – 25	19
26 – 30	3
31 – 35	1
36 – 40	1
41 – 45	4
46 – 50	2
Level of Technology Savvy	
Beginner	6
Intermediate	14
Advanced	9
Expert	1

The testing revealed that all system functions operated as intended, with participants navigating the system flow without any issues. No errors were identified during the evaluation. The result provides insights into the system's usability. Table 3 shows the mean and standard deviation (SD) for each question.

Table 3: The Mean and SD of SUS.

No	Questions	Mean	SD
1	I think that I would like to use this system frequently.	4.80	0.41
2	I found the system unnecessarily complex.	1.70	1.24
3	I thought the system was easy to use.	4.87	0.35
4	I think that I would need the support of a technical person to be able to use this system.	1.73	0.79
5	I found the various functions in this system were well integrated.	5.00	0.00
6	I thought there was too much inconsistency in this system.	1.20	0.48
7	I would imagine that most people would learn to use this system very quickly.	4.80	0.41
8	I found the system very cumbersome to use.	1.10	0.40
9	I felt very confident using the system.	4.87	0.35
10	I needed to learn a lot of things before I could get going with this system.	1.87	0.82

The perceived usability of the system was found to be reliable, as measured by the SUS questionnaire. Based on the responses, the positive questions (Q1, Q3, Q5, Q7, Q9) achieved a mean value of 4.87, indicating strong agreement with positive statements about the system. Meanwhile, the negative questions (Q2, Q4, Q6, Q8, Q10) had a mean value of 1.52, reflecting minimal agreement with negative statements. The SUS score offers a quantitative measure of user satisfaction, where a score above 68 generally indicates good usability and user acceptance [16]. The results revealed a SUS score of 91.83, which falls within the "excellent" range, indicating that the repository exceeds the usability expectations of its target users. This feedback was instrumental in refining the system's design to ensure a better user experience prior to deployment. The median SUS score was 91.25, with a minimum score of 72.5 and a maximum score of 100.0. Figure 4 shows the boxplot of the SUS score.

Table 3 indicates that participants concurred on their desire to continue utilizing the repository system if implemented in a practical context. They perceived the system as user-friendly, necessitating no technical support for operation. This suggests that beginner users will encounter no difficulty when utilizing the system. The system operations were effectively integrated, and the user interface was aesthetically created. Consequently, they felt more assured when utilizing the system.

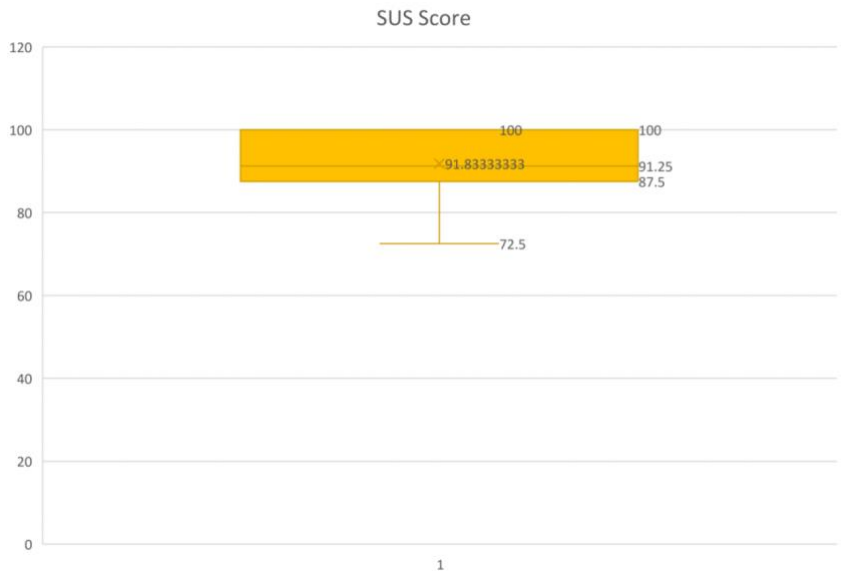

Figure 4: The boxplot of the SUS scores.

Nevertheless, since a repository system is not new and many academic departments have their own ways to store their academic resources, personalising the system function according to a specific user's requirements will be the best option if the system is going to practically be used in a real environment. It's not about placing everyone into the same system, but it's about knowing that people across the campus need different things. Faculty researchers might need advanced tools for tracking citations and exchanging data, while undergrads merely want an easy way to collect their readings and locate templates for their projects. Personalisation can develop in numerous ways, such as configurable dashboards that present relevant news, recently used resources, or popular information based on a user's academic discipline or function [19 – 20]. It might also involve adaptive search filters that learn user preferences over time or the ability for individual departments to configure specific metadata fields and workflows for their unique resource types, ensuring that the system truly integrates into their existing practices rather than imposing new, rigid ones [20]. Such customised elements are vital for stimulating deeper connection and ensuring the system's utility across the varied scholarly pursuits inside an institution [21].

Despite the successful development of the repository system, certain limitations could affect the overall system's usability and user satisfaction. One significant limitation is the lack of optimisation for mobile devices. While the repository is accessible on mobile platforms, its user interface and functionality are primarily meant for desktop use. Users that rely on smartphones or tablets may experience less smoothness, resulting in navigating challenges on smaller screens or restricted responsiveness of certain functionalities. Given the increasing emphasis on mobile access for ease and portability, this constraint could inhibit widespread adoption and optimal user engagement. Addressing this essential issue through a completely responsive design, specifically targeted for mobile devices, will considerably boost both usability and accessibility.

As for future work, a recommendation for future development is the adoption of dashboard data analytics and reporting tools. These scientific data technologies will enable the faculty, administrator and lecturers to see what's truly being used, which resources students keep coming back to, or how people are engaging with the system. So, they can recognise what's working and what's not and make substantial improvements over time. With the right information, the faculty's management can make decisions like changing material, enhancing how they support the students, or making better use of resources. It's this kind of constant feedback that makes the system flexible and useful as the demands of students and staff continue to change.

4. CONCLUSIONS

The development of the repository website tailored for academic and university usage addresses critical challenges associated with non-standardised resource storage, restricted access, and limited academic collaboration. By providing a centralised storage hub for Final Year Project (FYP) reports and indexed academic articles, the proposed system enhances the accessibility, organisation, and dissemination of academic resources within the faculty. Through the implementation of a structured system development life cycle, the website was designed to ensure usability, functionality, and efficiency. SUS findings show that the method is feasible and may be applied in an academic environment rather successfully. Apart from better resource management, the platform promotes a more technologically driven learning environment and increased teamwork. This research advances the field of system development by proving how well repository systems solve academic resource management issues. Future developments might be adding artificial intelligence for tailored recommendations, increasing security protocols to safeguard intellectual property, and extending the capacity of the system to interact with current university management systems. Academic institutions can maximise knowledge distribution for management and lecturers as well as for students by constantly refining and enhancing the repository.

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