

# Implementation of a Knowledge Management System to Enhance Innovation and Collaboration in Higher Education

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## Abstract

*This research addresses the growing need for effective knowledge management in higher education to foster innovation and collaboration. It focuses on designing and implementing a Knowledge Management System (KMS) for universities using a hybrid method that combines Waterfall and Agile approaches. Data were collected through surveys, interviews, and observations with lecturers, students, and staff. The system, built with the MERN stack and integrated with AI and Big Data analytics, includes three main modules: a centralized knowledge repository, collaboration tools, and an AI-based recommendation engine. User testing showed positive results—82% satisfaction with usability, 76% improved collaboration, and 85% accurate recommendations. The KMS enhances knowledge sharing and innovation, with future work targeting scalability and predictive analytics.*

**Keywords:** Knowledge Management System; Higher Education; Innovation; Collaboration; Artificial Intelligence

## 1. Introduction

In the current era of digital transformation, higher education institutions serve as the primary centers for knowledge production and dissemination, bearing a crucial responsibility in fostering innovation and collaboration among academic communities. To remain competitive, organizations must leverage knowledge management to digitally transform their operations [1]. However, the readiness of academics to adopt Knowledge Management (KM)-based technologies remains a challenge, particularly in embracing digital ecosystems that can comprehensively facilitate knowledge interactions [2][3]. Effective knowledge management is no longer optional but a strategic necessity to ensure that scientific insights are disseminated effectively and that academic collaboration is productive rather than stagnant [4][5].

Despite this importance, the current situation in many universities reveals significant obstacles. In practice, much academic knowledge is either undocumented or fragmented across various platforms, making it difficult to retrieve and hindering productive collaboration [6]. Fan et al. (2024) explain that undocumented tacit knowledge is at risk of being lost, while fragmented explicit knowledge often causes information silos that undermine institutional effectiveness. Furthermore, psychological factors and workplace incivility can negatively impact knowledge-sharing intentions, creating barriers to a healthy academic exchange. This condition negatively affects the pace of innovation and reduces the effectiveness of cooperation among lecturers, students, and academic staff. Without a structured digital ecosystem, universities struggle to maintain their role as globally competitive centers of innovation [7].

Previous studies have explored the development of KMS in educational settings, though most relied on conventional approaches. For instance, Halimatuzzahra (2020) employed the Waterfall model to develop a student-oriented KMS [8], while Yumhi et al. (2024) utilized the Rapid Application Development (RAD) method. However, these approaches did not integrate artificial intelligence or big data analytics [9]. Meanwhile, Gupta et al. (2024) highlighted the role of psychological factors in knowledge-sharing behavior [10], and Mazorodze and Mkhize (2022)

identified infrastructural limitations as a major barrier to knowledge sharing in developing countries [11].

To bridge this gap, this study proposes a state-of-the-art Knowledge Management System developed using a hybrid framework that combines the structural rigors of Waterfall with the flexibility of Agile methodologies. Unlike previous systems, this research integrates the MERN stack with AI and Big Data analytics to create a responsive and intelligent ecosystem. The rationale for this approach is that while Waterfall ensures a solid architectural foundation, Agile allows for iterative refinement based on user feedback, addressing the "resistance to change" often seen in static system implementations. Furthermore, the integration of AI enables knowledge personalization, while Big Data analyzes interaction patterns to provide accurate recommendations, ensuring the system is not just a repository but an active driver of innovation.

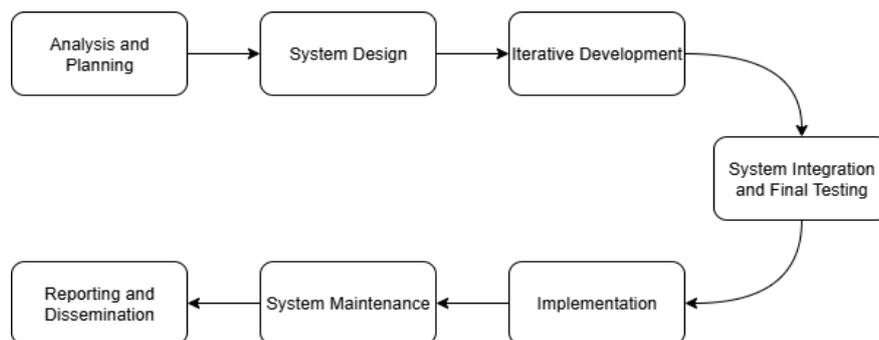
As a solution, the Knowledge Management System (KMS) is regarded as a strategic approach to overcoming these challenges through an integrated digital platform [12][13]. A KMS enables the collection, storage, distribution, and utilization of knowledge more efficiently and adaptively. Previous studies confirm that the implementation of KMS can enhance organizational innovation [10], strengthen knowledge-sharing behavior among academics [14][15], and foster cross-disciplinary collaboration [16][17]. Nevertheless, KMS implementation in higher education still faces obstacles, including resistance to change, a lack of awareness of the importance of knowledge sharing, and limited technological infrastructure [18][19].

This research contributes novelty by implementing this socio-technical and hybrid approach to build a digital knowledge-sharing ecosystem that is adaptive, contextual, and sustainable. Based on this framework, the study addresses three key research questions: (1) how to design and develop a technology-based KMS that meets the needs of higher education institutions, (2) what features are required within the KMS platform to drive academic innovation and collaboration, and (3) how the integration of Artificial Intelligence (AI) and Big Data can enhance the effectiveness of KMS in supporting a comprehensive knowledge-sharing ecosystem.

**2. Research Method**

**2.1. Research Design**

This study employs a Research and Development (R&D) approach to design, develop, and implement a Knowledge Management System (KMS) in higher education institutions. The R&D method was chosen because it allows for the creation of a tangible product in the form of a functional system, which can be tested and refined through iterative cycles. The research framework follows a hybrid model that integrates Waterfall for the initial stages of analysis and design, and Agile for iterative development and continuous improvement.



**Fig 1. Research Stages**

The research process in this study was carried out through seven interrelated stages to ensure that the Knowledge Management System (KMS) could be designed, developed, and implemented systematically.

The first stage was needed analysis and planning, where the research team identified challenges faced by higher education institutions in managing knowledge. At this stage, data were collected through literature reviews, surveys, interviews, and direct observations involving lecturers, students, and administrative staff. The results of this process were consolidated into a System Requirement Specification (SRS) document, which served as the foundation for system design.

The second stage was system design, which focused on translating the identified requirements into technical specifications. This process included designing the overall system architecture, developing the database schema, creating UI/UX prototypes, and preparing supporting diagrams such as use case diagrams, data flow diagrams, and entity-relationship diagrams. The purpose of this stage was to ensure that the system was designed not only to be technically feasible but also to be user-friendly and aligned with the needs of the academic community.

The third stage was iterative development, where the Agile approach was applied. Development was carried out in short cycles (sprints), with each cycle producing a prototype that could be tested and evaluated by users. This iterative process allowed the system to evolve gradually based on continuous feedback, ensuring that features such as the knowledge repository, discussion forum, search engine, and AI-based recommendation system met user expectations.

The fourth stage was system integration and final testing. After all modules were developed, they were integrated into a single, functional system. Several testing methods were carried out to ensure quality and stability, including Black Box Testing to validate functional requirements, White Box Testing to evaluate program logic, and performance testing to measure system scalability and response speed. This stage ensured that the system was robust and ready to be implemented in the real environment.

The fifth stage was implementation, which involved deploying the system in selected faculties as a pilot project. Training sessions and workshops were conducted to help lecturers, students, and administrative staff adapt to the new system. During this stage, feedback from early adopters was collected to refine the system further. Monitoring was also carried out to measure the level of adoption and identify barriers to system usage.

The sixth stage was system maintenance, which focused on ensuring the sustainability of the KMS. Maintenance activities included fixing bugs, improving system performance, updating features, and adapting to new academic requirements. Continuous feedback mechanisms were established to maintain system relevance and ensure that it remained useful in the long term.

Finally, the seventh stage was reporting and dissemination of results. At this stage, the research findings were compiled into comprehensive documentation that included system development processes, implementation results, user evaluations, and lessons learned. In addition, the outcomes were disseminated through academic publications, recommendations for policy development, and practical guidelines for other higher education institutions that intend to implement similar systems.

Through these seven stages, the research was able to ensure that the developed KMS was not only technically functional but also relevant, sustainable, and impactful for enhancing innovation and collaboration in higher education.

## **2.2. Data Collection**

Data collection in this study was designed to capture both qualitative and quantitative insights from multiple stakeholders within the university environment. The goal was to obtain a comprehensive understanding of the existing challenges, user expectations, and institutional requirements for the Knowledge Management System (KMS). Four complementary methods were employed: literature review, surveys, interviews, and observations.

The literature review served as the first step in identifying best practices, challenges, and opportunities related to the implementation of KMS in higher education institutions. Through an extensive review of academic journals, conference proceedings, and institutional reports, the research team analyzed how knowledge management has been addressed in previous studies, what technologies were commonly applied, and what gaps still remain.

The surveys were designed to collect quantitative data from a large sample of stakeholders, including lecturers, students, and administrative staff. The survey items covered several dimensions such as current practices in knowledge sharing, perceived challenges, desired features in a digital knowledge platform, and attitudes toward adopting new technologies. Using Likert-scale questions, the survey generated numerical data that could be statistically analyzed to identify trends, user needs, and readiness levels. The results helped the research team prioritize system features that were most critical for end-users.

The interviews were conducted with key stakeholders, including faculty leaders, IT administrators, and knowledge managers. This qualitative method provided deeper insights into the institutional strategies, policy constraints, and cultural aspects of knowledge sharing that could not be fully captured through surveys alone. The semi-structured interview format allowed flexibility in exploring specific themes, such as resistance to change, infrastructure limitations, or the role of leadership in fostering collaboration. These discussions validated the requirements identified in the survey and revealed additional functional needs, such as the necessity for integration with existing university platforms like Google Workspace.

Finally, direct observation was employed to examine the existing practices and limitations in managing institutional knowledge. The research team observed how lecturers currently stored and shared teaching materials, how students accessed resources, and how administrative staff archived institutional documents. These observations revealed gaps between formal knowledge-sharing policies and the actual practices on the ground. For example, many lecturers relied on personal storage (e.g., cloud drives) rather than institutional repositories, which caused fragmentation and difficulties in long-term access.

The findings from all four methods were triangulated to strengthen validity and reliability. The combined results were consolidated into a System Requirement Specification (SRS) document. This document detailed both functional requirements—such as repository management, AI-based recommendation, and discussion forums—and non-functional requirements, including system security, scalability, and usability. The SRS acted as the blueprint that guided the system design and ensured that the development process was firmly aligned with the real needs of the academic community.

### 2.3. System Development Method

The development of the Knowledge Management System (KMS) in this study adopted a hybrid framework that combined the strengths of the Waterfall model and the Agile methodology. The choice of this hybrid approach was motivated by the need to balance stability and structure in the early stages of development with flexibility and adaptability during implementation and refinement.

In the initial phases, the Waterfall model was applied, particularly during the needs analysis and system design stages. This model was chosen because of its structured and sequential process, which ensured that all requirements identified during the needs assessment were formally documented before development began. By following Waterfall principles, the research team was able to produce clear deliverables such as system requirement specifications, architectural designs, database schemas, and user interface prototypes. This provided a strong technical foundation and reduced the risks of overlooking critical requirements.

Once the foundational design was established, the Agile methodology was adopted for the development and testing phases. Agile emphasizes incremental progress through short development cycles, known as sprints. Each sprint resulted in a working prototype of the system that could be tested directly by users. This iterative process allowed the system to evolve based on continuous feedback from lecturers, students, and administrative staff. For instance, during one sprint, the team might focus on developing the knowledge repository, while the next sprint could add discussion forums or AI-based personalization features. The frequent interactions with end-users not only improved system usability but also ensured that the KMS responded effectively to the actual needs of the academic community.

This hybrid approach also incorporated continuous evaluation and refinement. At the end of each sprint, feedback sessions were conducted to review the functionality and usability of the developed modules. If users reported difficulties—for example, in navigating the repository or retrieving relevant materials—the design and features were immediately revised in the following iteration. Such responsiveness was crucial for overcoming common challenges in KMS adoption, such as user resistance and low engagement.

To support development, the research team employed the MERN stack (MongoDB, Express, React, Node.js), which provided scalability and responsiveness for a web-based platform. Additionally, TensorFlow Lite was integrated to enable Artificial Intelligence (AI)-driven personalization, allowing the system to recommend content tailored to users' academic interests. The system also employed Big Data analytics to examine patterns of knowledge-sharing behavior and to generate insights on collaboration trends across departments. These

technological choices aligned with the Agile principle of adaptability, ensuring that the KMS could incorporate advanced features without disrupting the overall architecture.

By combining Waterfall and Agile, the development method provided both rigor and flexibility. The Waterfall stages ensured that the project began with a comprehensive blueprint, while the Agile iterations guaranteed that the system remained dynamic, user-centered, and aligned with the evolving needs of the institution. This methodological synergy increased the likelihood of producing a robust, sustainable, and widely accepted Knowledge Management System.

#### **2.4. Testing and Evaluation**

To ensure that the Knowledge Management System (KMS) developed in this study met the required quality standards, a comprehensive testing and evaluation framework was applied. The purpose of this stage was not only to verify the technical performance of the system but also to validate its usability, functionality, and overall alignment with user needs in higher education. Several complementary methods were used, including Black Box Testing, White Box Testing, User Acceptance Testing (UAT), and the application of specific evaluation metrics.

The first method, Black Box Testing, was used to examine whether the system's functions operated as specified in the requirements document. This testing approach focused on the inputs and outputs of the system without considering the internal code structure. For example, when a user uploaded a teaching document, the test verified whether the system correctly stored the document in the repository, generated appropriate metadata, and made it searchable by others. By systematically testing each feature, such as knowledge search, discussion forums, and AI-driven recommendations, the research team ensured that the functional specifications were fully satisfied.

The second method, White Box Testing, concentrated on the internal logic, workflows, and algorithms within the system. Unlike Black Box Testing, this method allowed the research team to examine the underlying code, data flows, and control structures. Particular attention was given to the AI module powered by TensorFlow Lite, ensuring that recommendation algorithms provided accurate and relevant suggestions for users. The database interactions were also tested to confirm that queries were executed efficiently and that no logical errors occurred during information retrieval or storage. This method helped to guarantee that the system was not only functional on the surface but also logically sound at its core.

The third method, User Acceptance Testing (UAT), directly involved end-users such as lecturers, students, and administrative staff. The purpose of UAT was to validate the system's readiness for real-world use by evaluating usability, accessibility, and user satisfaction. Users were asked to perform typical tasks, such as uploading lecture materials, searching for specific content, participating in discussion forums, and retrieving archived documents. Feedback from UAT sessions highlighted practical issues, such as the clarity of the user interface, the ease of navigation, and the responsiveness of the platform. Incorporating these insights into the refinement process ensured that the final system was intuitive and well-accepted by its target users.

In addition to the testing methods, the evaluation phase employed a set of metrics to measure the effectiveness of the KMS. The first metric was the frequency of knowledge-sharing activities, including the number of documents uploaded, discussions initiated, and collaborative interactions conducted through the platform. The second metric was user participation and satisfaction, which was assessed through surveys measuring ease of use, perceived usefulness, and overall satisfaction with the system. The third metric focused on system performance, particularly in terms of speed, scalability, and stability. This was measured by recording the system's response time under different loads and its ability to handle concurrent users without performance degradation.

The results of these tests and evaluations were used as the basis for refining the KMS before its wider deployment across the institution. Issues discovered through testing were addressed iteratively, with system updates and bug fixes implemented prior to full-scale adoption. By combining technical validation with user-centered evaluation, this research ensured that the developed KMS was not only reliable and efficient but also meaningful and impactful for enhancing innovation and collaboration in higher education.

### 3. Results and Discussion

#### 3.1. User Requirements Analysis

Before the Knowledge Management System (KMS) was developed, a comprehensive user requirement analysis was conducted to ensure that the system design aligned with the actual needs of stakeholders in the university. Data were collected through surveys, interviews, and observations involving lecturers, students, and administrative staff. This analysis revealed several critical challenges that highlighted the necessity of a more integrated and intelligent knowledge management platform.

The survey results showed that 78% of lecturers reported difficulties in storing and reusing teaching materials. Many lecturers relied on fragmented storage solutions such as personal computers, external drives, or individual cloud accounts. This fragmentation not only made it difficult for lecturers themselves to retrieve materials across semesters but also limited the ability of colleagues and students to access valuable academic resources. For example, a lecturer's research paper or teaching module often remained inaccessible to other faculty members, leading to duplication of effort and inefficiencies in knowledge utilization.

Meanwhile, 65% of students indicated that they faced challenges in accessing reliable and up-to-date academic resources. Instead of obtaining materials directly from institutional repositories, many students turned to external platforms or informal sharing networks such as messaging groups. While these practices partially addressed their needs, they often resulted in inconsistency, lack of quality control, and potential risks regarding the credibility of resources. This finding underscored the importance of establishing a centralized and trustworthy digital repository where students could confidently access validated learning materials.

On the administrative side, 72% of staff members emphasized the urgent need for structured documentation and archiving tools. Administrative knowledge, such as policy documents, procedural guidelines, and institutional reports, was often dispersed across different departments and stored in formats that were not standardized. This condition led to difficulties in retrieving documents for audits, decision-making, or cross-departmental collaboration. The absence of a unified archiving mechanism reduced institutional efficiency and weakened organizational memory.

Collectively, these findings validated the necessity for a **comprehensive KMS** that integrates three key functions:

1. **Knowledge Storage** – ensuring that academic and administrative materials are stored systematically in a centralized repository.
2. **Collaboration Tools** – enabling lecturers, students, and staff to share, discuss, and co-develop knowledge in real time.
3. **Intelligent Search and Recommendations** – powered by AI and Big Data analytics to provide users with personalized access to relevant information.

In addition, interviews and focus group discussions revealed that stakeholders expected the system to integrate seamlessly with existing digital tools such as Google Workspace, which many faculties were already using for teaching and collaboration. This expectation reinforced the need for interoperability as a non-functional requirement of the system.

**Table 1.** User Requirements Analysis

<b>Stakeholder</b>	<b>Current Practices / Challenges</b>	<b>Ideal Requirements</b>
<b>Lecturers</b>	Store teaching materials in fragmented repositories (PCs, external drives, personal cloud). Difficult to reuse or share across semesters.	Centralized digital repository with metadata tagging, easy access, and reusability of teaching and research materials.
<b>Students</b>	Rely on informal networks (e.g., messaging groups) and external platforms for resources. Issues with reliability and quality control.	Reliable institutional repository with quality-validated academic resources and intelligent search features.
<b>Administrative Staff</b>	Documents dispersed across departments, non-standard formats, difficult to retrieve during audits or decision-making.	Structured digital archive with standardized formats, easy retrieval, and cross-departmental accessibility.

### 3.2. Knowledge Management System Results

The development of the Knowledge Management System (KMS) followed the hybrid framework described in Chapter 2. The system was designed and built using the MERN stack (MongoDB, Express, React, Node.js), with additional integration of TensorFlow Lite for artificial intelligence (AI) and Big Data analytics. The final prototype of the KMS consisted of three main modules:

- 1) **Knowledge Repository** – a centralized digital library where lecturers and students could upload, store, and access academic materials, including lecture notes, research papers, and multimedia resources. Metadata tagging and search functions were implemented to improve accessibility.
- 2) **Collaboration Tools** – a set of features designed to enhance interaction, including discussion forums, group workspaces, and knowledge-sharing threads. These tools encouraged both formal and informal knowledge exchange across disciplines.
- 3) **AI-Powered Recommendation Engine** – a personalization module that provided suggestions for relevant learning resources, research articles, or collaboration opportunities based on user behavior and academic interests.

The architecture ensured that the system was modular, scalable, and adaptable to future institutional needs.

#### 1) KMS Login View

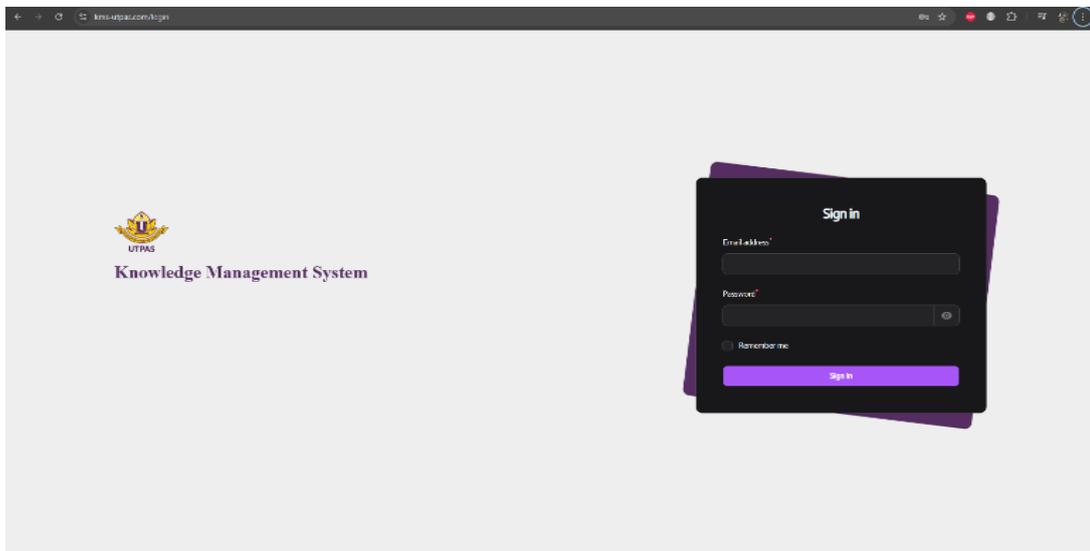


Fig 2. KMS Login

**Figure 2. KMS Login View:** This object serves as the system's security gateway to ensure that only verified users (lecturers, students, and staff) can access the content. The operational mechanism involves inputting university credentials, which are integrated with a centralized database for authentication.

2) Document Repository

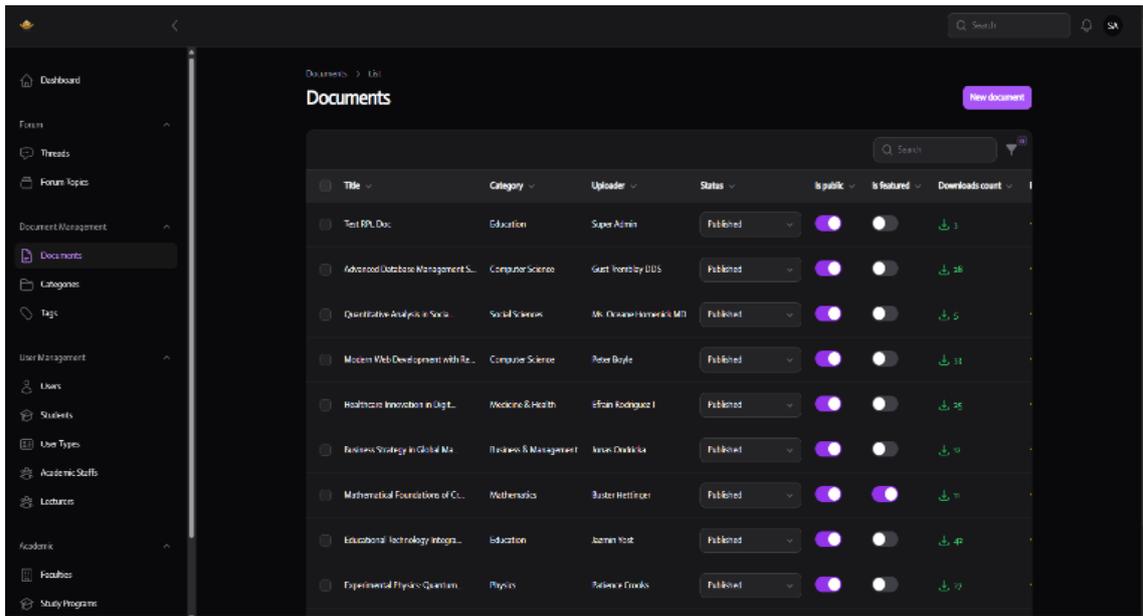


Fig 3. Document Repository

**Figure 3. Document Repository:** This functions as a centralized digital library for storing lecture materials and research outputs. The operational mechanism includes file uploading with manual or automatic metadata entry to ensure stored documents are easily searchable through indexing features.

3) Forum Group Discussion

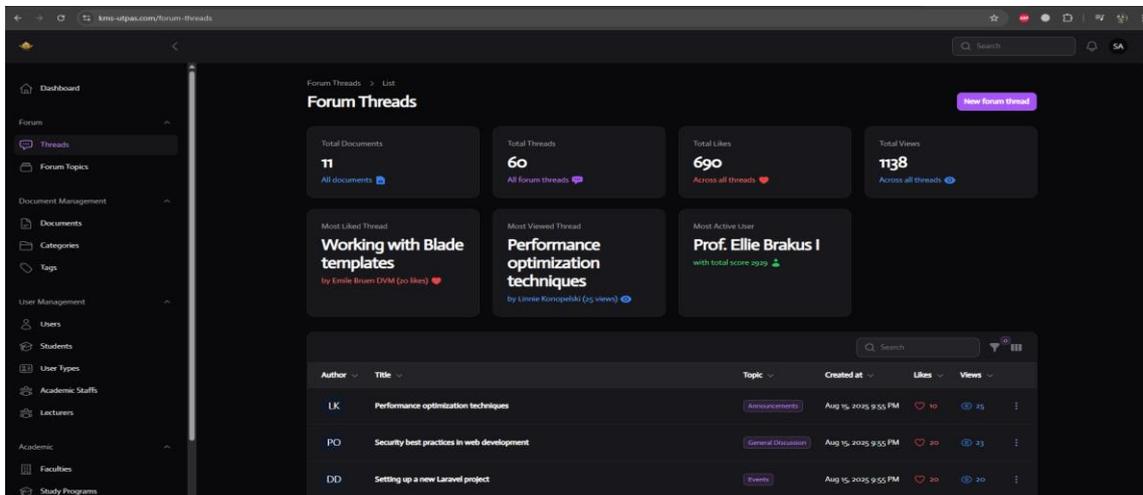


Fig 4. Forum Group Discussion

**Figure 4. Forum Group Discussion:** The purpose is to facilitate two-way communication and tacit knowledge sharing among academic members. Users can create new threads, respond to posts, and collaborate within group workspaces in real-time.

#### 4) Recommended Content

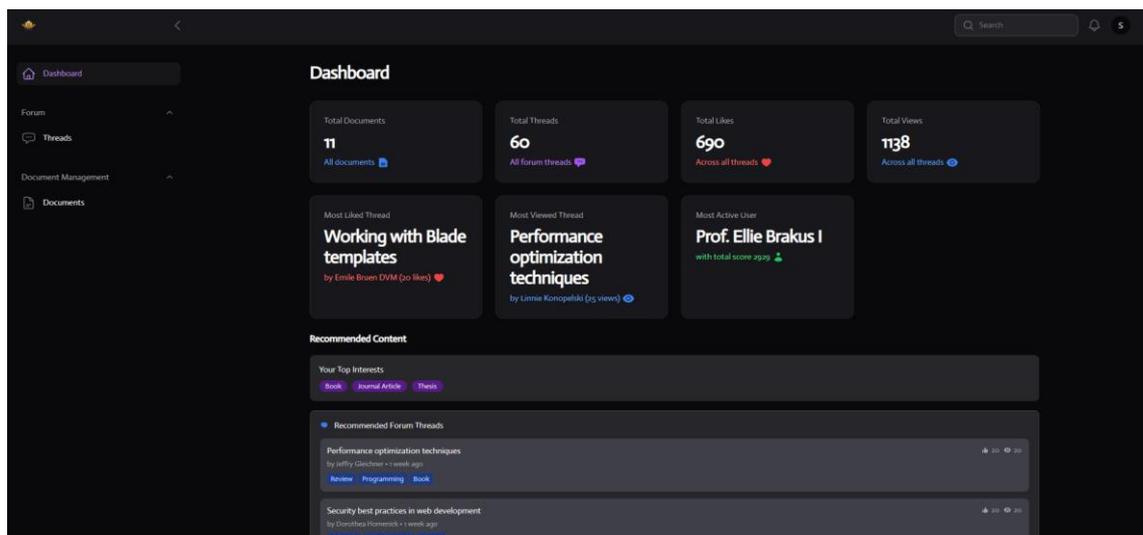


Fig 5. Recommended Content using AI and Big Data

**Figure 5. Recommended Content:** This module utilizes **TensorFlow Lite** and **Big Data** to personalize the user experience. The mechanism works by analyzing user behavior patterns and academic interests to automatically provide relevant suggestions for documents or collaborations.

### 3.3. User Acceptance Testing (UAT) Results

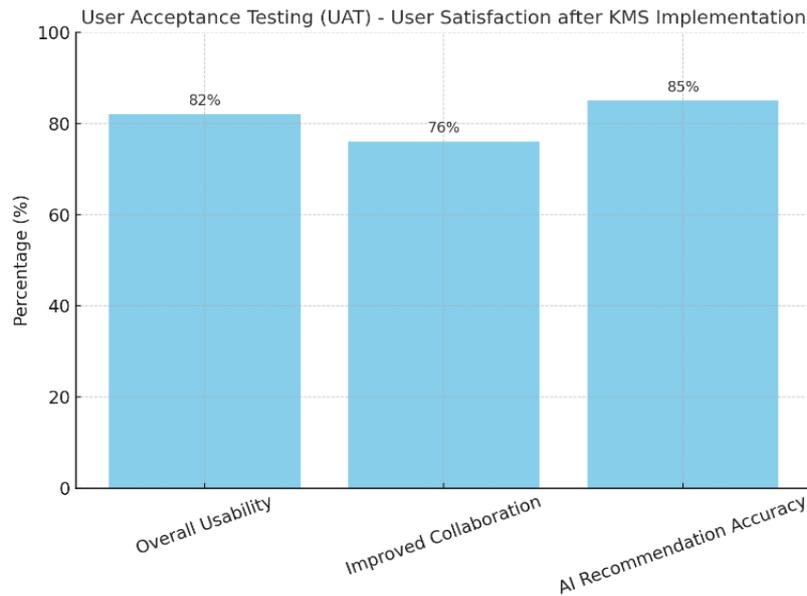
The results of the User Acceptance Testing (UAT) revealed a generally positive response from users regarding the implementation of the Knowledge Management System (KMS). The evaluation focused on three primary aspects: overall usability, improved collaboration, and AI recommendation accuracy.

First, the aspect of overall usability received a satisfaction rate of 82%. This indicates that the majority of users found the system easy to use, intuitive, and well-designed in terms of user interface and navigation. The high usability score suggests that the design decisions made during the development stage—particularly the user-friendly interface and the integration of standardized metadata—were effective in supporting users' needs.

Second, the dimension of improved collaboration achieved a satisfaction level of 76%. While this score is slightly lower compared to other aspects, it still reflects a strong acceptance among users. The implementation of discussion forums, group workspaces, and document-sharing features successfully encouraged interaction between lecturers, students, and staff. However, the slightly lower percentage also indicates that further enhancements are needed, particularly in creating incentives for active participation and ensuring smooth integration with existing collaborative practices.

Third, the AI recommendation accuracy emerged as the highest-rated aspect, with a satisfaction score of 85%. Users reported that the recommendation engine provided relevant and personalized suggestions for learning materials, research articles, and collaboration opportunities. This demonstrates the added value of integrating artificial intelligence into the KMS, as it not only improved efficiency but also increased user engagement by delivering tailored content.

Overall, the UAT results demonstrate that the KMS was well-received by its intended users. The system effectively addressed critical challenges in knowledge management by offering a centralized repository, enhancing collaborative practices, and introducing intelligent recommendation features. While the collaboration aspect shows room for improvement, the high levels of satisfaction across all categories confirm that the system has strong potential to enhance knowledge sharing, innovation, and academic collaboration within higher education institutions.



**Fig 6.** User Acceptance Testing

### 3.4. Discussion

This study aimed to develop a Knowledge Management System (KMS) to overcome the challenges of knowledge fragmentation and limited collaboration in higher education. The results indicate that the proposed system has effectively addressed these issues through its functional capabilities. The high user satisfaction rate regarding AI recommendation accuracy (85%) demonstrates that the integration of Artificial Intelligence and Big Data significantly solves the problem of information retrieval. This finding supports the argument by Sumbal [18], who posited that integrating AI into organizational knowledge bases enhances decision-making and information retrieval efficiency. Unlike static repositories, the AI-driven personalization in this system allows for a more relevant user experience, thereby mitigating the issue of "information silos" identified by Fan [7] as a major barrier to institutional effectiveness.

Furthermore, the implementation of the hybrid development method (Waterfall and Agile) has proven effective in ensuring system sustainability and adaptability. The iterative nature of Agile allowed the system to evolve based on user feedback during the UAT process, resulting in a usability score of 82%. This finding extends the work of Santos [4], who emphasized that sustainable enablers are critical for KM strategies. By incorporating continuous feedback loops, this study confirms that technical flexibility is a key driver in increasing user acceptance, offering a practical solution to the rigidity often found in conventional KMS implementations observed in previous studies.

In terms of collaboration, the system achieved a 76% improvement rating. While positive, this score indicates that technological availability alone ensures something other than immediate cultural transformation. This aligns with the findings of Gupta [10], who highlighted that psychological factors and workplace environment play a mediating role in knowledge-sharing intentions. Although the platform facilitates interaction, the "readiness" of academics remains a critical factor. As noted by Abdulmuhsin [6], the adoption of new technologies in higher education is often hindered by the users' psychological readiness and perceived complexity. The reluctance observed in a minority of users in this study validates Abdulmuhsin's observation, suggesting that future implementations must be accompanied by stronger institutional policies and cultural incentives to foster a "knowledge-sharing" mindset.

Therefore, the contribution of this research lies in demonstrating that a socio-technical approach—combining advanced MERN-stack technology with a user-centered hybrid development process—creates a more resilient knowledge ecosystem. The system does not merely store documents but actively promotes knowledge discovery through AI. This supports the perspective of Bereznoy [12] regarding the intertwining of knowledge sharing and creation in digital ecosystems. The successful deployment of this system implies that for higher education institutions to fully leverage digital transformation, they must move beyond simple repositories

and embrace intelligent, adaptive systems that cater to the dynamic needs of the academic community.

## 5. Conclusion

This research has successfully designed, developed, and evaluated a Knowledge Management System (KMS) tailored for higher education institutions. Through a hybrid methodology that combined the structured planning of the Waterfall model with the adaptability of Agile practices, the system was able to address diverse user needs while remaining flexible to continuous refinement.

The results demonstrated that the KMS significantly improved knowledge management practices across three key stakeholder groups: lecturers, students, and administrative staff. Lecturers benefited from a centralized repository that reduced redundancy and facilitated reuse of teaching materials. Students gained improved access to validated and reliable academic resources, reducing their reliance on external platforms with inconsistent quality. Administrative staff were able to manage institutional documentation more efficiently through structured archiving features.

User Acceptance Testing (UAT) further confirmed the effectiveness of the system, with satisfaction levels of 82% for usability, 76% for collaboration, and 85% for AI-driven recommendation accuracy. These results highlight the system's ability to enhance knowledge sharing, foster collaboration, and promote innovation within higher education. Moreover, the integration of Artificial Intelligence and Big Data analytics provided a personalized and scalable solution that distinguished this system from conventional knowledge management platforms.

Overall, the study confirms that the implementation of a well-designed KMS has the potential to strengthen institutional knowledge ecosystems, improve collaboration among stakeholders, and contribute to long-term innovation in higher education.

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