COLLEGE OF COMPUTER STUDIES

Concept Paper
A. Basic Information
Project Title: Knowledge Management (KM) Information System for Laguna State Polytechnic University
Topic: Knowledge Management, Information Systems, Artificial Intelligence, Machine Learning, Data Management, Educational Technology, System Integration, Higher Education Innovation
Proponent: Jerahmeel A. Badillo Jan Reinnen S. Calapao Dexter D. Rebong
B. Technical Description
The study aims to design and develop a Knowledge Management (KM) Information System for Laguna State Polytechnic University (LSPU) that will help improve how knowledge and institutional information are collected, organized, shared, and managed across the university. The system aims to foster a culture of knowledge creation, sharing, and application across academic, research, and administrative units within the university. It leverages advanced AI and collaborative technologies to enhance institutional performance, aligned with national educational priorities. The project's goal is to create a centralized online platform that serves as a digital knowledge hub for the university, where users can store and retrieve important institutional data, such as research outputs, teaching materials, policies, extension projects, and administrative files. Through this system, we hope to promote a stronger culture of knowledge sharing and digital collaboration within LSPU, while also aligning with CHED's goals for higher education digital transformation. The platform will support collaboration through discussion forums, communities of practice, and annotation tools that enhance research collaboration, pedagogical innovation, and extension projects coordination. Advanced AI functionalities include virtual assistants for FAQs and navigation, predictive analytics dashboards for monitoring resource usage and research impact in alignment with Commission on Higher Education (CHED) key performance indicators.

Knowledge Management Systems (KMS) are already being used by many universities around the world to organize research outputs and improve collaboration between academic communities. In the Philippines, digital transformation in state universities is still developing, and most institutions still rely on traditional, file-based management. Our proposed KMIS aims to address that gap by providing an accessible, AI-powered platform tailored specifically to the

needs of a Philippine university context.

Statement of the Problem:

Universities produce a large amount of information every day, from research studies and lesson materials to policies and reports. However, much of this information is scattered across different offices and personal storage devices, making it difficult to retrieve or share efficiently. At Laguna State Polytechnic University, this challenge affects how knowledge is accessed, reused, and passed on between students, faculty, and administrators. The lack of a centralized information system leads to problems such as duplicated research, outdated data, and lost institutional knowledge. Furthermore, most existing repositories lack intelligent features such as AI-based search or document tagging, which could help users find relevant materials more effectively.

With this, the study aims to answer the following questions:

1. How can a centralized Knowledge Management Information System help improve the sharing and organization of information within the university?
2. How can AI tools like machine learning and natural language processing be used to support smarter search and content recommendations?
3. How can we design a secure and user-friendly KMIS that fits the needs of students, faculty, and administrators at LSPU?

Objectives: General and Specific General Objective:

To design and develop an AI-powered Knowledge Management Information System that will serve as a centralized platform for managing, storing, and sharing institutional knowledge within Laguna State Polytechnic University.

Specific Objectives:

- To design a secure, campus-wide document management platform that centralizes storage, applies role-based access, and uses metadata tagging and encryption to organize and protect research, academic, and administrative records.
- To implement AI-powered intelligent search and automated tagging to facilitate efficient information retrieval. It enables secure document sharing among authorized users and institutional entities.
- To integrate collaborative tools such as discussion forums, document commenting, and research collaboration.
- Provide advanced AI functionalities such as virtual assistants and predictive analytics dashboards.
- To test and evaluate the system's usability, reliability, and performance through pilot implementation at LSPU.

How did others solve the problem?

Several recent studies have explored how Artificial Intelligence (AI) and Knowledge

Management Systems (KMS) can transform higher education institutions by improving access

to institutional knowledge and supporting academic collaboration. For instance, Mai (2025) in "Adoption of Artificial Intelligence and Organizational Performance in Higher Education Institutions in China" found that AI adoption enhances both academic and administrative performance by strengthening knowledge management practices within universities. The study highlights how intelligent systems can help streamline decision-making and promote innovation across departments.

Similarly, Saxena and Gautam (2025) in their work "AI in Smart Universities: Issues and Challenges with Special Reference to Higher Educational Institutes in India" discussed how AI- powered systems, such as adaptive learning platforms and automated information management tools, can make universities more efficient and responsive to student needs. However, they also noted the need for better infrastructure, faculty training, and clear institutional policies to ensure smooth adoption of these technologies.

In another study, Aljuwaiber (2025) explored how AI-driven knowledge management practices support organizational innovation under Saudi Arabia's Vision 2030 framework. The research emphasized that while AI tools significantly improve knowledge sharing and repository accuracy, many institutions still face barriers like limited technical expertise, high implementation costs, and resistance to digital transformation.

In addition, Khan et al. (2025) in "The Rise of AI in Academia" examined how developing countries are adapting AI for education. They pointed out that AI systems can enhance research, teaching, and administrative processes, but warned that ethical issues, bias in algorithms, and unequal access to technology remain major challenges, especially in regions with limited digital infrastructure.

A study by Acevedo-Correa et al. (2024) highlights the challenges HEIs face in consolidating institutional memory and the benefits of a centralized and collaborative KM system that supports multiple stakeholders in decision-making and knowledge sharing. The research underscores that well-structured KMS (Knowledge Management System) contributes to improved organizational effectiveness by facilitating continuous knowledge exchange and application tailored to various institutional levels.

Lin et al. (2023) discuss how AI technologies can transform traditional KM (Knowledge Management) by providing personalized, context-aware knowledge delivery, which improves both user experience and institutional knowledge utilization. Their study also addresses the challenges of implementing trustworthy AI models within educational contexts to support faculty and students alike.

Bautista et al. (2024) conducted an experimental study involving elementary pupils, finding that collaborative learning strategies outperformed individualized learning in science achievement. The research emphasizes the importance of embedding collaborative platforms within educational systems to foster engagement and deeper understanding, especially when transitioning back to face-to-face modalities post-pandemic.

Kabier et al. (2023) propose a privacy-preserving educational system using RBAC (Role-based Access Control) combined with multi-factor authentication to secure online learning environments during and after the COVID-19 pandemic. The study outlines mechanisms that assign hierarchical roles for administrators, teachers, and students to protect

sensitive information while maintaining usability.

Lastly, A recent review by Hernandez and Lopez (2025) identifies requirements for mobile KM (Knowledge Management) solutions, emphasizing offline capabilities, lightweight design, and user-friendly interfaces to enhance accessibility for students and staff. Their work aligns with global trends pushing educational institutions to adopt mobile-first KM platforms to support decentralized learning and knowledge dissemination.

How do you intend to solve the problem?

Our proposed Knowledge Management Information System (KMIS) will combine web technologies, AI algorithms, and database management to create a centralized and intelligent platform.

The system will include the following core modules:

- Centralized Repository – A comprehensive database where users can upload, organize, and retrieve all institutional documents and records, including research outputs, course materials, administrative files, policy documents, and other campus-related materials.
- AI-Powered Search Engine – Uses Natural Language Processing (NLP) to understand user queries in both English and Filipino and return relevant results.
- Automated Tagging and Classification – Machine learning algorithms will automatically categorize documents based on content and keywords.
- Collaboration Tools – Forums, commenting, and annotation tools will help faculty and students share ideas and feedback.
- Role-Based Access Control (RBAC) – Ensures security by assigning permissions based on user roles (Admin, Faculty, Student, External Partner).
- Analytics Dashboard – Generates reports about document usage, research visibility, and collaboration activity.
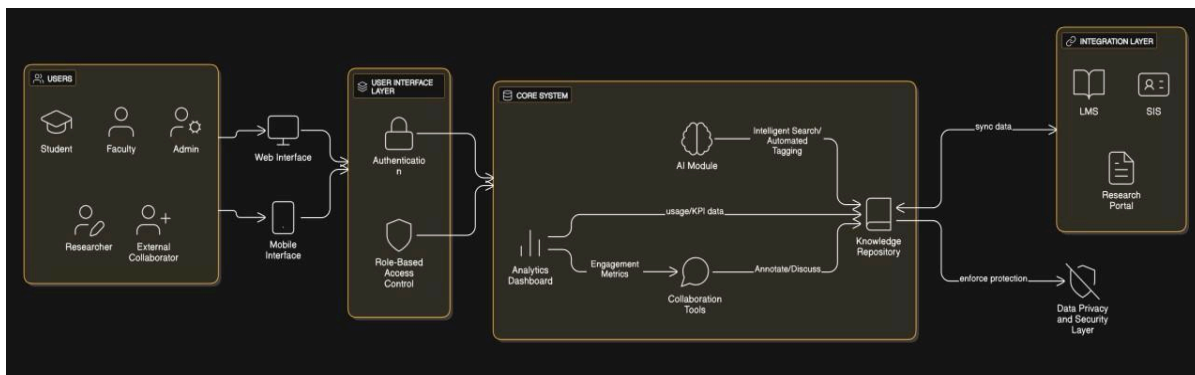

Figure 1. System Architecture Diagram

The proposed platform consists of an integrated knowledge repository accessible via web and mobile interfaces, allowing secure storage, organization, and retrieval of all campus documents. Its architecture ensures seamless authentication, role-based access, intelligent search, analytics, collaboration features, system integrations, and robust data privacy.

Sample Use Cases:

- Faculty Uploading Research: A faculty member authenticates using university credentials, then uploads a research paper. The system automatically tags and stores it in the repository, making it available to authorized users.

- Student Accessing Course Material: A student logs in, searches for their course syllabus, and instantly retrieves it using the AI-powered search. Access is limited to pertinent resources as determined by their role.
- Administrator Managing Policies: An admin uses the platform to update and share institutional policy documents, protected by role-based controls and tracked for compliance.
- Collaborative Research: Researchers and external collaborators jointly annotate a dataset, with engagement tracked by analytics to measure project activity.
- Secure Data Sync: The repository synchronizes with campus LMS and SIS, ensuring consistent data while enforcing protection through the privacy layer.

Target users / Beneficiaries:(Describe each Beneficiary)
- Faculty Members and Researchers – They can upload, share, and access academic resources more easily, enhancing collaboration and knowledge reuse
- Students – Gain easier access to research materials, references, and study resources within the university.
- University Administrators – Can monitor research output, institutional performance, and compliance with data management policies.
- External Partners – May access selected resources, helping strengthen collaboration and community partnerships.

Significance of study:
This project will contribute to digital transformation in higher education by helping LSPU establish a structured and intelligent way to manage institutional knowledge. By using AI tools, the system will make knowledge retrieval faster and more accurate while reducing redundancy and manual effort.

The proposed KMIS supports the university's goal of being a smart campus promoting efficiency, transparency, and innovation through technology. It also empowers both students and faculty by making academic materials more accessible and encouraging collaboration.

Most importantly, the system will strengthen LSPU's commitment to continuous learning and information sharing, making it a model for other Philippine state universities aiming to digitize their knowledge management processes.

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