

**A KNOWLEDGE MANAGEMENT SYSTEM
FOR ASSESSING LECTURER COMPETENCE
IN INDONESIAN HIGHER EDUCATIONAL
INSTITUTIONS**

UNDANG SYARIPUDIN

**ASIA e UNIVERSITY
2025**

A KNOWLEDGE MANAGEMENT SYSTEM FOR ASSESSING
LECTURER COMPETENCE IN INDONESIAN HIGHER EDUCATIONAL
INSTITUTIONS

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A Thesis Submitted to Asia e University in
Fulfilment of the Requirements for the
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ABSTRACT

Government Regulation No. 37 of 2009 concerning Lecturers emphasizes that lecturer competency development and coaching must be conducted periodically and continuously. However, in the current era of global development, as the world of education enters the Industrial Revolution 4.0, the primary challenge facing higher education institutions is how to adapt lecturer competency development to current trends. Higher education institutions still face limitations in their knowledge management systems, resulting in slow knowledge transfer and collaboration between lecturers. The goal of developing lecturer competencies is to support their career advancement. The role of the Knowledge Management System (KMS) in developing lecturer competencies is very important because it is practically easy to access and allows independent competency development. There are several stages in developing a KMS, namely compiling data requirements for the four lecturer competencies: pedagogical competency, professional competency, personality competency, and social competency. Next, crawling of all applications related to the Tridharma of higher education, namely education, research, and community service, is carried out using web services methods. Competency development is carried out on this KMS by downloading lecturer competency materials as needed and conducting discussion forums among colleagues. Lecturer competency measurement is carried out by first checking employee status using the SVM algorithm with an accuracy value of 72.28%, then using a hybrid SVM and PSO algorithm with an accuracy value of 100%. The comparison results show an increase in accuracy of 27.91% using the hybrid SVM and PSO algorithm. The next stage involves measuring lecturer competency by having 20 lecturers input answers to 24 essay questions, each with a 150-word limit. The results of the LSA algorithm combined with the OpenAI algorithm are compared with the results of expert assessments. Based on this comparison, the RMS value is 8.2%. This means that the accuracy of the developed system in measuring lecturer competency is 91.8%.

Keywords: Knowledge management system, lecturer competency development, SVM, PSO, LSA, OpenAI, RMS, Tridharma of Higher Education

APPROVAL

This is to certify that this thesis conforms to acceptable standards of scholarly presentation and is fully adequate, in quality and scope, for the fulfilment of the requirements for the Degree of Doctor of Philosophy.

The student has been supervised by: **Professor Ts Dr Titik Khawa Abdul Rahman & Professor Dr Muhammad Ali Ramdhani**

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Chairperson, Examination Committee

(17 June 2025)

DECLARATION

I hereby declare that the thesis submitted in fulfilment of the requirements for the Degree of Doctor of Philosophy is my own work and that all contributions from any other persons or sources are properly and duly cited. I further declare that the material has not been submitted either in whole or in part, for a degree at this or any other university. In making this declaration, I understand and acknowledge any breaches in this declaration constitute academic misconduct, which may result in my expulsion from the programme and/or exclusion from the award of the degree.

Name: Undang Syaripudin

A handwritten signature in black ink, appearing to be 'Syaripudin', written in a cursive style.

Signature of Student:

Date: 17 June 2025

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LIST OF ABBREVIATIONS

KM	Knowledge Management
KMS	Knowledge Management System
SVM	Support Vector Machine
PSO	Particle Swarm Optimization
LSA	Latent Semantic Analysis
SECI	Socialisation, Externalisation, Combination, Internalisation
RMS	Root Mean Square Error
HEIs	Higher Education in Indonesia
CBR	Case-Based Reasoning
LMS	Learning Management Systems
AI	Artificial Intelligent
ERP	Enterprise Resource Planning
NLP	Natural Language Processing
GPT	Generative Pre-trained Transformer
RNN	Recurrent Neural Network
MFEP	Multi-Factor Evaluation Process

CHAPTER 1

INTRODUCTION

In Chapter 1 the researcher explained the background of the study, problem statement, objectives, research questions, justifications, and significance of the study and chapter summary.

1.0 Background of Study

Current education in the 21st century is based on the development of the Industrial Revolution 4.0, which is characterized by the integrated use of digital technology. To deal with this change, the Indonesian government has designed a Road Map with the name Making Indonesia 4.0, as a strategy to enter the current digital era and keep abreast of developments in the industrial world 4.0 (Mubyarto et al., 2019).

The higher education curriculum in Indonesia is determined by the Indonesian National Qualifications Framework (KKNI). In the Regulation of the Minister of Education and Culture (PERMENDIKBUD) No. 49 of 2014, KKNI is a guide used to unify, competence, and integrate between the fields of education and the fields of job training and work experience to provide recognition of work competencies by the structure of work in various sectors (Sinaga et al., 2020).

Government Regulation of the Republic of Indonesia Number 37 of 2009 Concerning Lecturers Article 2 states that lecturers must have academic qualifications, competencies, educator certificates, good physical and mental health, and meet other qualifications determined by the educational institution where the lecturer works and have the ability to realize national education goals (Peraturan Pemerintah (PP) Nomor 37 Tahun 2009).

Based on the Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers Article 69 paragraph (2), coaching and professional development for lecturers includes pedagogic competence, personal competence, professional competence, and social competence. Article 10 Paragraph (1) Explains that the ability to manage student learning is referred to as pedagogical competence. The ability to have a strong personality, have a noble character, be wise, and have dignity as well as be a role model for students is called personality competence. The ability to master subject matter broadly and deeply is referred to as professional competence. The ability to communicate and interact effectively and efficiently with students, other teachers, parents/guardians of students, and the surrounding community is referred to as social competence (Undang-undang (UU) Nomor 14 Tahun 2005).

Based on the Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers Chapter I article 12 Educator certificates are formal evidence as recognition given to teachers and lecturers as professionals. Then in chapter 4, it is explained that:

- 1) Lecturers must take a competency exam to obtain an educator certificate.
- 2) The competency test as referred to in paragraph (1) is carried out in the form of a portfolio assessment.
- 3) The portfolio assessment as referred to in paragraph (2) is an assessment of the academic and professional experience of the lecturer, conducted using a collection of documents related to the lecturer's portfolio.
- 4) The assessment of the lecturer's portfolio as referred to in paragraph (3) is carried out to determine recognition of the lecturer's professional abilities, through an evaluation of documents that describe:

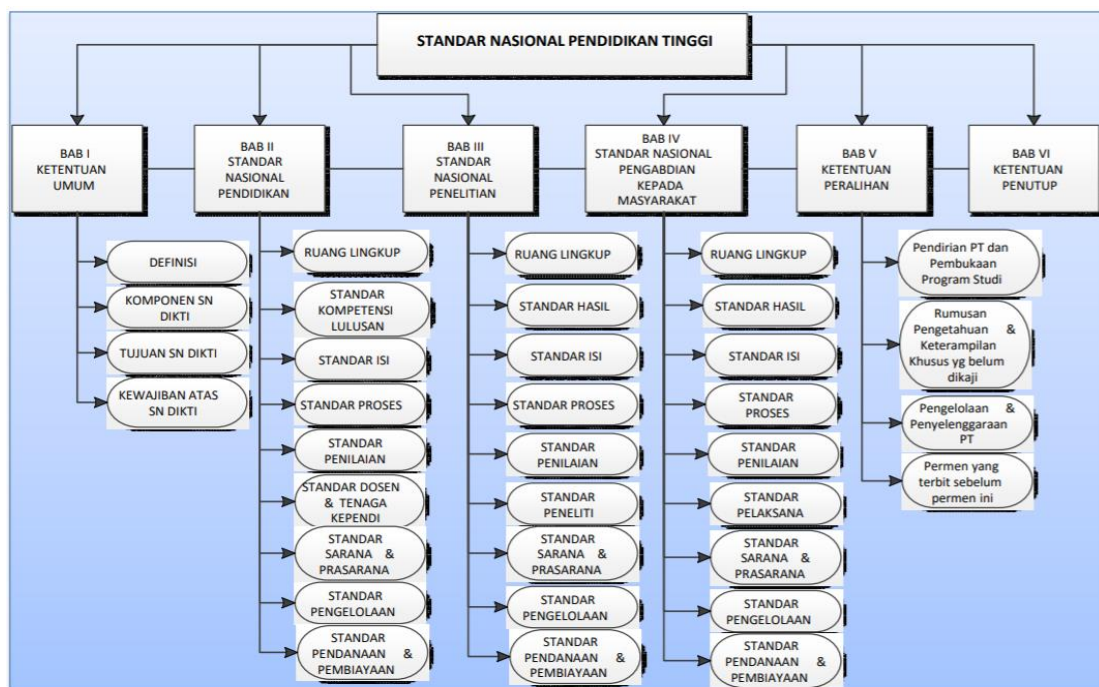
- a. Assessment of academic qualifications and work achievements in the fields of education, research, and community service in higher education.
- b. Evaluation of the views of superiors, colleagues, students, and self-assessment regarding the ability in terms of education, profession, social skills, and personality; and
- c. The lecturer's statement regarding their contribution to implementing and developing the three pillars of higher education (Undang-undang (UU) Nomor 14 Tahun 2005).
- d. According to the Regulation of the Minister of Research, Technology, and Higher Education No. 44 of 2015, education/learning is a process of interaction between students, lecturers, and learning resources. Research is an activity conducted using scientific methods to obtain information and data related to branches of science and technology. Meanwhile, community service is an activity that uses science and technology to advance the welfare of society and improve national education. These activities are called the three pillars of higher education or the national standards for higher education (Menristekdikti RI, 2015).

Article 2 (1) The National Standards for Higher Education consist of: a. The National Standard for Education; b. The National Standard for Research; and c. The National Standard for Community Service. (2) The National Standard for Education, the National Standard for Research, and the National Standard for Community Service as referred to in paragraph (1) are inseparable parts of carrying out the three pillars of higher education.

Article 3 (1) The National Standards for Higher Education aims to: a. Ensure that the goals of higher education are achieved, play a strategic role in advancing

understanding and knowledge, and strengthen Indonesian culture and nation-building continuously; b. Ensure that the learning, research, and community service conducted by universities throughout the territory of the Unitary State of the Republic of Indonesia meet the quality standards specified in the National Standards for Higher Education; and c. Encourage universities throughout Indonesia to exceed the national standards for higher education in the quality of learning, research, and community service sustainably (Menristekdikti RI, 2015).

Figure 1.1: National Standard for Higher Education



Then in the Regulation of the Minister of Research, Technology and Higher Education number 50 of 2018 it is explained that lecturers have academic qualifications to teach at the lowest Bachelor level master's as evidenced by a diploma from their study program and have educator competence as evidenced by an educator certificate, and/or professional certificate according to the study program. Within the last 5 years, a researcher must have produced at least 1 scientific paper published in an accredited national journal or a reputable international journal. In addition, researchers

must have the ability to master research methodologies by their scientific fields, and research objects, as well as the level of complexity and depth of research. The ability of this researcher is determined based on his academic qualifications and the research results he has achieved. Likewise, community service implementers must have mastery of the methodology of applying knowledge by their field of expertise, type of activity, as well as the level of complexity and depth of activity objectives. This ability is also determined based on academic qualifications and the results of community service that have been achieved (Menteri Riset, Teknologi dan Pendidikan Tinggi Republik Indonesia, 2018).

The academic development in higher education is closely related to the development of science, technology, and the needs of society that are in line with the improvement of quality of life. Therefore, higher education is expected to produce human resources who have academic, professional, ethical, and leadership skills, and can respond to the development of science and technology. The three pillars of higher education, which are education, research, and community service, must be able to produce quality and beneficial products for society. Community service programs must be directed towards the application of research and education results in higher education for the progress and welfare of society (Fitriana et al., 2021; Lian, 2019).

The current paradigm shift in higher education requires universities to be able to compete in the era of globalization, one of which is by introducing higher education from other countries in the territory of the Republic of Indonesia. Universities must be able to overcome challenges such as innovation collaboration, adaptation and mastery of technology, and management of intellectual property. This has led to the need for knowledge management implementation. The implementation of knowledge management is expected to assist universities in knowing the strength of their

resources and accelerate the creation of new knowledge from existing knowledge (Turmidzi, 2019).

As demonstrated by several studies on knowledge management in education in Indonesia, few educational institutions apply knowledge management as a strategic vision and use it as a tool to achieve comprehensive goals (Sopandi & Sa'ud, 2016) Some organizations in Indonesia that have already implemented knowledge management include:

Table 1.1: Knowledge-Based Organization 2013

NO	ORGANIZATION
1	Anugrah Argon Medica
2	Bank Mandiri
3	Bank Syariah Mandiri
4	Bank CIMB Niaga
5	Binus University
6	Daya Adicipta Mustika
7	Federal International Finance
8	GMF Aero Asia
9	Medco Energi International
10	Pembangkitan Jawa Bali
11	Pertamina
12	Perusahaan Listrik Negara
13	Sinar Mas Argo Resources & Technologies
14	Telkom Indonesia
15	Tigaraksa Satria