

## A Bibliometric Study : Recommendation based on Artificial Intelligence for iLearning Education

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### Abstract

*Since most students begin their studies online, the LMS platform is frequently used. Universities and colleges play a crucial role in adopting many of its LMS platforms. A web-based application software package called Bibliometrics is used to design, test, and evaluate specific learning processes. LMS will be the dominant artificial intelligence-based solution for managing eLearning starting in early 2021. The principal objective of this project is to develop an artificial intelligence-powered LMS portal that enables students to continue studying and receive the most recent lessons from their teachers. Using the Communicate cloud software and Dialog Flow, a chatbot plugin system connected to the Google platform, and based on current needs, research bibliometrics was developed as an LMS project system. Students can interact with the chatbot anytime to satisfy their learning needs as long as they have an internet connection and a student ID card to access the dashboard. The LMS Platform, which was developed utilizing Bibliometrics and Artificial Intelligence approaches to help students access resources and complete teacher tasks, is a novelty in this work, according to earlier publications that have been evaluated.*

**Keywords:** Bibliometrics, LMS, eLearning, Artificial Intelligent, Chatbot

### 1. Introduction

University instructors and students can connect online through a platform called the "Learning Management System" or "LMS." Sharing class materials is simple with the help of the learning management system (LMS). It is a web-based educational platform that enables outside-the-classroom communication and interaction between professors and students. According to Aydin and Trikes, learning technologies can save learning time by 50 percent on average. Students learn best on their own [1] [2] [3].

Word teachers frequently hand out lecture notes for self-discovery in primary and secondary schools instead of one-sided learning. College students must constantly expand



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their knowledge by looking up information on their study subjects. The purpose of this system was to arrange student classrooms [4] [5] [6]. This e-LMS provides access to course modules for students.

View classrooms and grades for assignments, tutors, tests, and courses. Students can take tests, tutors, and quizzes, and teachers can also use this module to grade and submit their answers [7] [8] [9].

## 2. Research Method

The phases and disciplines of the Rational Unified Process (RUP) approach were appropriate for developing this project [10] [11] [12]. Hence it was chosen for it. An agile software development methodology called the Rational Unified Process (RUP) divides a project or software development lifecycle into four phases. Creation, development, building, and migration Figure 1. Shows an iterative RUP lifecycle.

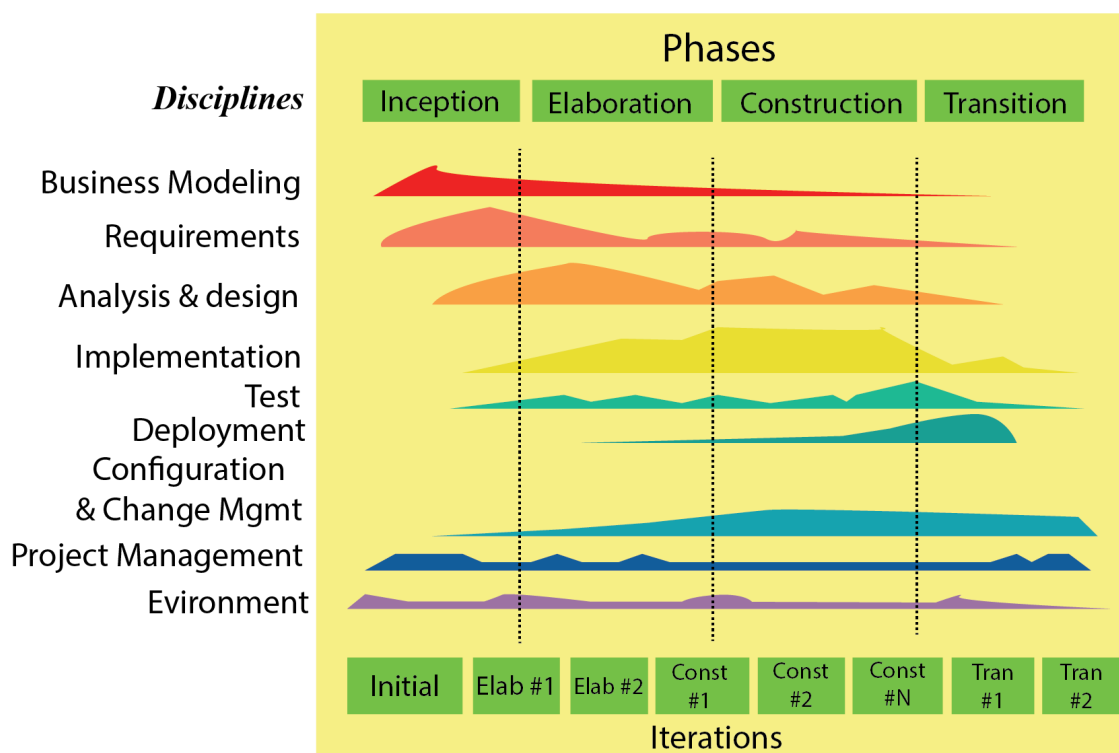


Figure 1. RUP iterative lifecycle

- **Inception phase**

The project's launch is the primary goal of the commencement phase. We created the UML diagrams using Microsoft Visio and the Unified Modeling Language (UML) as the modeling language. According to the evolving requirements of the iterative process, UML diagrams might be changed [13] [14] [15]. By completing this phase, we know the project's status and whether it should move forward. The system architecture of the project is also specified. This phase results in a defined project goal and area, precise requirements for the project, an initial overview of the LMS use cases and domain model that are only ten complete, and a choice of technologies to use. It must be developed in the application [16] [17] [18].

- **Construction phase**

The primary subjects of the engineering phase are the comprehensive creation and implementation of the system design. This step extends the refining stage by establishing a working system in the actual world [19] [20] [21]. Moodle currently has a working system that is available. The module has been tested and put to use. After this stage, the system was beta tested, and the subsequent phase could start. The project objectives have been achieved, the requirements and design have been completed, and as a result of this phase, the AI chatbot module has been tested on an open Moodle platform and received user approval. There were tests run, and project documentation and reports were produced [22] [23] [24].

- **Transition phase**

During the migration phase, the focus was on meeting end-user needs. This result suggests that user feedback is essential for system reviews that address issues such as usability and security. At the end of this phase, you can release your module to your students. At this stage, all bugs were fixed, and a complete user guide for students and teachers was created [25] [26] [27].

- **Keyword analysis**

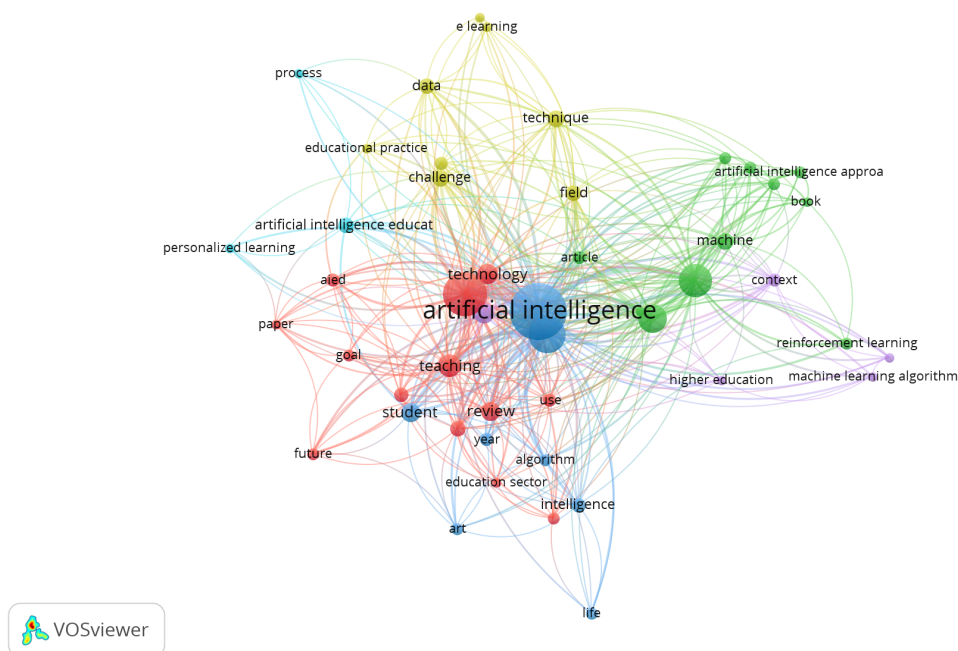


Figure 2. Keyword co-occurrence in the author. The maximum is five appearances in a single version. Based on keyword usage, node size is determined. Additionally, the spacing between nodes reveals how closely related co-occurring keywords are. Generated with VOSviewer and shown as lines connecting nodes.

Figure 2 In a categorized fashion, list the words that are used the most frequently. Geographic distance classifies phrases used in conjunction into colored clusters when used together. Keywords and lines represent connections. There are seven clusters known. Such as the singular and plural forms of the term "smart contract," groups of almost identical terms are produced. This shows how current the research environment is today. For instance, the IoT, AI, and sharing economy (green) clusters combine supply chain tracking and logistics (red). The placement of the two clusters near one another is expected. Other clusters focus

on security, fairness, access control (yellow), privacy related to underlying assets, and game theory (blue). Purple clusters contain keywords associated with cryptocurrencies.

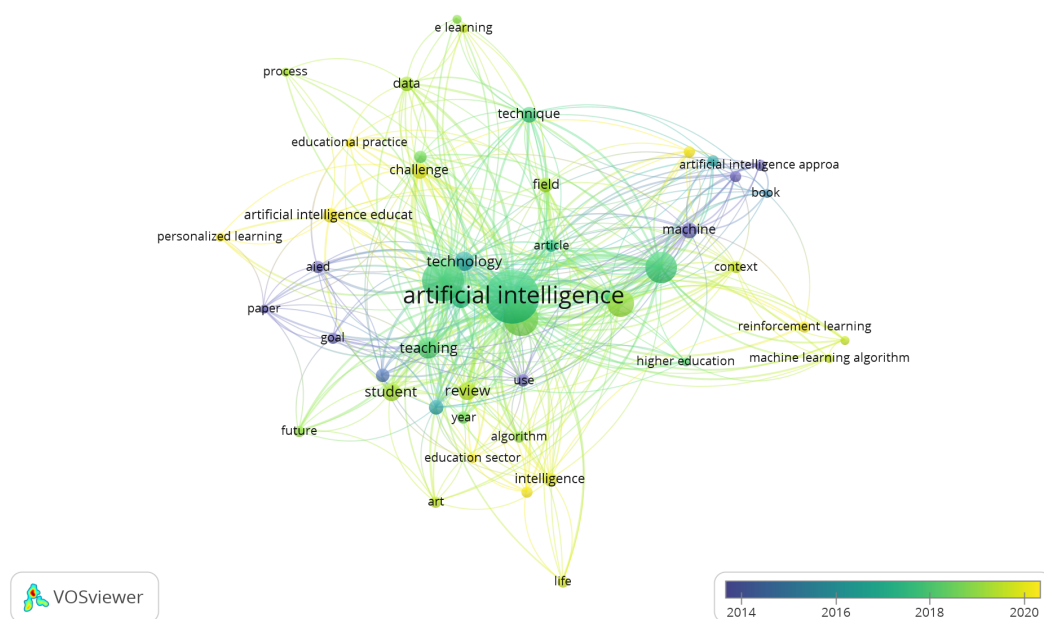


Figure 3. developments from year to year that use the keyword Artificial intelligence as the title of the paper.

Figure 3. Displays a visualization of developments from year to year. Papers use artificial intelligence themes for research and related themes, such as iLearning education, Educational practice, technology, and machine learning algorithms.

## 2.2 Literature Review

- **Moodle learning management system**

Moodle is an open distribution network founded in 2001 with the help of Dr. Martin Dougiamas. Established. As Internet software, Moodle has limited support and extensions. This place is nothing out of the ordinary. This is due to the Moodle implementation. Users interacting with your version of Moodle will perform more clicks than usual, and Moodle will generate multiple SQL queries when developing pages. This is where Moodle excels. However, what it does is very complicated [28] [29] [30]. In other words, as a developer, I want to know what architecture my extension is most likely to be deployed on. It is also helpful if you still remember the impact your coding has on overall performance. Picture. 1 Below are rare stains. Moodle setup in production. Like any other basic PHP software framework, Moodle has many parts. Databases are essential for scalability and can be easily moved to another physical server. Then you can use a load balancer to load the Front Quit Net server. Developers also need a shared garage for Moodle records while using multiple network servers. Session recordings can be both Moodle recordings and databases [31] [32] [33]. The database server has a maximum restriction on how large Moodle can become. In order to scale a database, aging servers must be upgraded by adding faster database servers. Example:

Software Server B.Net. An antiquated method of expanding a single Moodle configuration to numerous Access database servers. You can set up the Moodle software on UNIX cPanel in this exercise. a MySQL server platform with a database configured for Dialog Flow and the Google Cloud Platform (GCP). Technical Support is offered in English during the initial testing phase, enabling administrators to serve as the system's help desk. Koley

Yayasan Pahang uses this challenge, and the computations are provided free of charge. Table 1 [34] [35] [36].

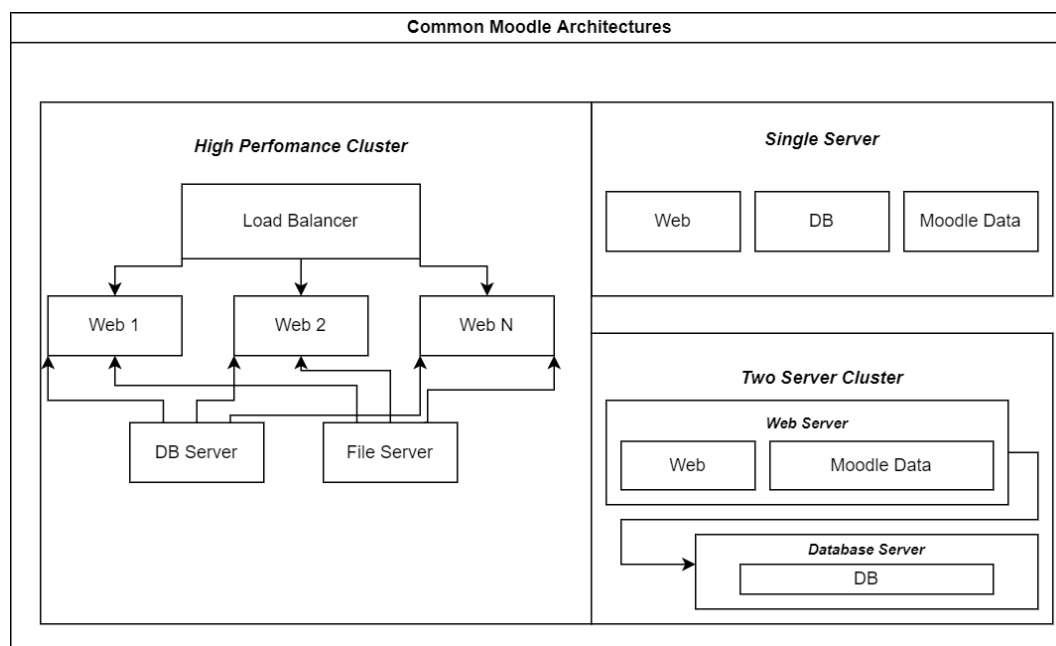


Figure 4. Common Moodle Architecture

Figure 4. Three typical Moodle architectures are displayed. High-Performance Clusters, Dual Server Clusters, and Single Server Clusters. This project uses a two-server cluster since it is compatible with the architecture. There are two separate clusters of servers. The Moodle server is covered by the web server, while the database server covers the Dialog Flow implementation on the Google Cloud Platform.

Hardware\Software	
Client browser Required :	All major web browser work fine.
Database required :	1. MySQL - Installation, 2. Google Cloud Platform (GCP) - Dialog Flow
UNIX server :	UNIX ePanel Server
Windows server :	_____
Technical Support	
Help desk :	Students can access context sensitive help for any tool. The systems includes online tutorials which may help students learn how to use the system
Languages :	English (Malaysia)
Pricing/Licensing	
Company profile :	Kolej Yayasan Pahang, Kampus Indera Mahkota
Cost :	Free
Open source :	OSI-approved licenses.

Table 1. Google Cloud Platform

- **Dialogflow and Communicate integration**

The primary tool used in this project is Dialog Flow. It is a platform for natural language comprehension that makes it simple to develop conversational user interfaces and incorporate them into gadgets, interactive voice response systems, bots, mobile apps, and more. Give your customers fresh and exciting ways to interact with your product using Dialog Flow (Google Cloud, date unknown). In order to give students who have questions about their curriculum access to online material, Dialog Flow has integrated Google Chatbot into his Moodle platform [37] [38] [39]. The goal of the proposed integration is to assist/support higher education institutions in making informed selections and providing prompt (real-time) responses to inquiries and requests of interest. Pay attention to student needs, respond to inquiries, and discuss research, admissions, and student life. Communicate wants to make it possible for companies to develop enduring customer relationships that lead to expansion. Developers can use Communicate to centrally manage customer conversations and develop and integrate chatbots, website chats, support agents, team meetings, and services that increase customer happiness. Increase. I can manage it. To win. Four key activities were involved in integrating a chatbot through a cloud platform. The cloud workflow is displayed in Table 2. The central implementation platform for this system is Dialog Flow, a chatbot training platform. The Communicate platform has been merged with Dialog Flow ES. Training phrases and answers comprise most of chatbot training's two phases. A developer implemented the project's Intent and Entity methods [40] [41] [42].

Platform	Workflow
Kommunicate	<ul style="list-style-type: none"> <li>- Integrate within Moodle and Dialog Flow</li> <li>- Chatbot Training by using Dialog Flow Baseline</li> </ul>
Dialog Flow	<ul style="list-style-type: none"> <li>- Chatbot Integration &amp; Training Baseline</li> <li>- Update training to Moodle through kommunicate platform</li> </ul>
Google Cloud Platform	<ul style="list-style-type: none"> <li>- Provide JSON File</li> <li>- Provide API Key</li> <li>- Database Storage</li> </ul>
Moodle	<ul style="list-style-type: none"> <li>- Receives chatbot update from Dialog Flow through kommunicate.</li> <li>- Response based on training</li> </ul>

Table 2. Dialogflow and Communicate integration

### 3. Findings

#### 3.1 Problem

The primary technological risks encountered frequently in work are the focus of this phase. Approximately half of the user requirements for an LMS system and those contained in the sequence diagram and activity diagram can be finished in this phase. Similarly, roughly half of the plugin modules can be finished, including those for planning and job completion and use cases and domain models [43] [44].

#### 3.2 Research Implementation

This section covers implementing and testing an AI chatbot, a cloud-integrated application that disseminates knowledge on academic subjects. The steps of implementation and testing are critical to the overall process of system development. Students can inquire about this project using intents and entities that developers have trained. Below is an example process that allows students to download their academic calendar directly by clicking a link provided by a chatbot. Chatbots provide answers based on user input, but chatbots answer first. Greet the user before starting the conversation.

#### **4. Conclusion**

The LMS platform is now widely used because most students start their studies online. Many of its LMS platforms used worldwide depend on University/College implementation. Therefore, new features are developed daily and uploaded to the LMS platform. As long as students have an internet connection and a student ID card to access the dashboard, they can communicate with the chatbot anytime, anywhere, to meet their learning needs. They can also explain the results or temptations of the task objectives and the task execution plan. Task designs can be identified, learning objectives and scope can be determined, task-related literature is surveyed, system analysis and development methodologies are determined and discussed, and system implementation and testing are carried out.

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