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Implementation of A Learning Management System using Prompt Engineering Horizon Artificial Intelligence in State Senior High School 1 Siau Barat

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ABSTRACT

Prompt in artificial intelligence is one of the terms in technology that is currently often discussed by academics, becoming a weapon in producing a digital work and has an important role in artificial intelligence. Prompt is a command spoken by humans to machines to produce digital work. In a broad view, prompt is the art of designing science and a compass to guide humans in using artificial intelligence. This study aims to maximize Prompt Engineering Horizon Artificial Intelligence to create a learning management system in SMA Negeri 1 Siau Barat. This study uses the method This study uses the Research and Development (R&D) method with the ADDIE development model. The application of the learning management system to Teachers and Students of SMA Negeri 1 Siau Barat is the result of this research, where the prompt is made into a programming language coding arrangement and becomes a neat and ready-to-use web-based learning management system application. The implementation of this application is new and the first for teachers and students of SMA Negeri 1 Siau Barat and has a positive impact on the understanding and use of technology. On the other hand, this system also allows teachers and students to use smartphones optimally in the school environment for learning.

Keywords: horizon artificial intelligence, learning management system, prompt engineering, research and development, technology.

INTRODUCTION

The rapid development of information and communication technology in today's digital era has brought significant changes in various fields, including education. Previously conventional learning has now transformed into digital-based learning, where technology has become the primary medium supporting the teaching and learning process. One form of technology implementation in education is the use of web-based Learning Management Systems, which enable teachers and students to interact, manage materials, and conduct online learning evaluations.

However, in practice, many schools and educational institutions have not yet optimally utilized the potential of Learning Management Systems. Some frequently encountered obstacles include limited interactive features, a lack of personalization to student needs, the geographic location of an area, and minimal integration with artificial intelligence technology that can assist teachers in designing, managing, and evaluating the learning process adaptively and efficiently. This situation impacts the effectiveness of learning, particularly in terms of increasing student engagement and achieving optimal learning outcomes.

With the advancement of artificial intelligence technology, various intelligent platforms, such as Horizon Artificial Intelligence, have emerged, offering capabilities to support various digital activities and design web-based applications. One key technology that can be utilized in this context is Prompt Engineering, a technique for designing effective instructions or prompts to produce relevant and useful output from artificial intelligence models. By utilizing Prompt Engineering, teachers can develop learning materials, exercises, and assessments more quickly, precisely, and tailored to student needs. Prompt Engineering technology in Horizon Artificial Intelligence is expected to create a more intelligent, adaptive, and interactive learning system. This system functions not only as a means of distributing materials and assignments, but also as an intelligent assistant for teachers and students in designing meaningful learning experiences.

The use of artificial intelligence in learning also opens up opportunities for learning data analysis (learning analytics), allowing teachers to understand student development and learning needs more deeply. Based on this description, the development of a web-based Learning Management System utilizing Prompt Engineering in Horizon Artificial Intelligence is relevant and urgent. Through a Research and Development (R&D) approach, this research will produce a system product whose feasibility and effectiveness in improving the quality and effectiveness of learning are tested. Therefore, the results of this research are expected to make a tangible contribution to educational technology innovation, particularly in supporting modern, adaptive learning processes oriented toward the development of 21st-century competencies.

While various previous studies have discussed the use of Learning Management Systems to support digital learning, most of this research has focused on their use as a medium for material distribution, assignment management, and basic communication between teachers and students. Research related to the integration of artificial intelligence in Learning Management Systems has also been conducted, but its application is generally limited to specific features such as material recommendations, learning chatbots, or student learning behavior analysis. In other words, studies on the process of creating Learning Management Systems have not yet referenced Prompt Engineering. There is still very little research specifically incorporating Prompt Engineering as a systematic approach

to leveraging artificial intelligence capabilities to create learning management systems. Prompt Engineering is generally studied in the context of application development, rather than in the operational context of education, particularly as part of a Learning Management System (LMS) that teachers can use directly to produce materials, assessments, and learning analysis.

In addition to conceptual gaps, there is also a gap in educational product development (Educational R&D). Most studies on Learning Management Systems only assess the effectiveness of existing systems, rather than developing new systems integrated with modern artificial intelligence technology and comprehensively testing them for feasibility, usability, and effectiveness. Thus, there is a clear research gap: the lack of research that has developed and tested a web-based Learning Management System created with Prompt Engineering Horizon Artificial Intelligence to enhance learning.

METHOD

Research Model

This research uses the Research and Development (R&D) method, which aims to develop and test the feasibility and effectiveness of an educational product, in this case a web-based Learning Management System utilizing Prompt Engineering and Horizon Artificial Intelligence. According to Borg and Gall (1983), the R&D method is a process used to develop and validate educational products through the stages of research, development, and evaluation. This approach was chosen because it aligns with the characteristics of research, which aims not only to generate theory but also to produce tangible products that can be applied in learning, specifically at SMA Negeri 1 Siau Barat. This research uses the Research and Development (R&D) method, which aims to develop and test the feasibility and effectiveness of an educational product, a web-based Learning Management System, utilizing Prompt Engineering and Horizon Artificial Intelligence. This method was chosen because this research is oriented not only toward hypothesis testing but also toward developing an innovative product that can be directly used in learning practices at SMA Negeri 1 Siau Barat. According to Borg and Gall (1983), research and development is a systematic process used to develop and validate educational products through the stages of research, design, testing, revision, and implementation. This approach is relevant to the research objectives, which focus on creating a pedagogically and technically sound artificial intelligence-based learning management system. The development model used in this research is the ADDIE model, systematically introduced by Robert M. Branch (2009), which consists of five main stages: Analysis, Design, Development, Implementation, and Evaluation.

Analysis Phase

The analysis phase was conducted to identify user needs (needs assessment), teacher and student characteristics, technological infrastructure readiness, and learning challenges at SMA Negeri 1 Siau Barat. The analysis was conducted through field observations, teacher interviews, and documentation studies of the existing learning system. The needs analysis also included identifying the need for artificial intelligence integration into the Learning Management System, specifically how Prompt Engineering could be utilized to generate code structures, interface designs, and adaptive learning features.

Design Phase

The design phase developed the basic framework for the Learning Management System, including web-based system architecture design, database structure design using Supabase, user interface and user experience (UI/UX) design, and prompt scenario design to generate system features. This phase also developed research instruments, including teacher and student response questionnaires and system effectiveness testing instruments.

Development Phase

The development phase implemented the system design into a web-based Learning Management System application using Prompt Engineering in Horizon Artificial Intelligence. The designed prompts are translated by the artificial intelligence system into programming language code and system structure. Validation testing is then conducted by educational technology experts, artificial intelligence practitioners, and teachers as potential users. Validation is conducted to assess technical feasibility, pedagogical feasibility, feature suitability, and usability.

Implementation Stage

The implementation stage involves implementing the Learning Management System for teachers and students of SMA Negeri 1 Siau Barat in real-life learning activities. Teachers use the system to upload materials, create assignments, conduct assessments, and manage classes. Students use the system to access materials, submit assignments, and participate in discussions.

Product eligibility criteria are determined based on expert assessment and user responses.

Evaluation Stage

Evaluation takes two forms: formative evaluation (conducted at each stage of development to improve the system) and summative evaluation (conducted after implementation to assess the system's effectiveness in improving the quality of learning). Data analysis uses quantitative descriptive analysis for questionnaire data and qualitative analysis for interview and observation data. Product eligibility criteria are determined based on expert assessment and user responses.

With this ADDIE model R&D approach, the resulting Learning Management System product is not only technologically innovative, but also academically, systematically and applicably tested in the context of secondary education in the archipelago region.

RESULTS AND DISCUSSION

This study aims to create a web-based Learning Management System developed using Prompt Engineering Horizon Artificial Intelligence technology as an effort to present a smarter, adaptive, and effective learning process at SMA Negeri 1 Siau Barat. This study also aims to test the feasibility of the resulting product and assess its effectiveness in improving the quality of learning. In addition, this study intends to analyze the responses of teachers and students to the use of the developed Learning Management System to obtain a comprehensive picture of the usefulness and readiness of the

Application implementation. This web-based learning management system application has several menus generated using Prompt Engineering Horizon Artificial Intelligence, the menus are as follows: login menu, Dashboard Menu, School Menu, User Menu, Class List Menu, Assignment Menu, Grade Menu, Attendance Menu and Discussion Room Menu. See figure 1

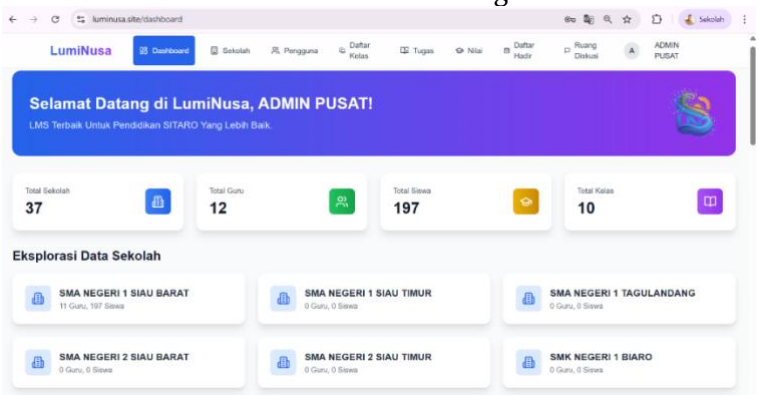

Figure 1. Learning Management System Application Display

All existing menus are generated with Prompt Engineering Horizon Artificial Intelligence. Just by entering a command (Prompt) in Horizon Artificial Intelligence, artificial intelligence will design the web programming language coding and present it according to the input prompt. In this study, the initial input prompt is "Create a LEARNING MANAGEMENT SYSTEM for a school with the name LEARNING MANAGEMENT SYSTEM "Luminusa" which means "Light of Hope of the Islands". Create a Login menu that will be accessed by Admin, Teachers, and Students. Create a Logo (Image that I uploaded). The existing menus are as follows: User List Menu (Admin Only), Teacher and Student Name Input Menu (Admin Only), Material Input Menu (Teachers and Admin Only), Assessment Menu (Teachers and Admin Only), View Material Menu, View Grade Menu, Discussion Room. Create a Menu on the left. Combine the colors according to the logo color that I sent ". During the process, after this prompt is entered, the artificial intelligence will translate the request into code according to the programming language used in Horizon Artificial Intelligence. The artificial intelligence will recommend the display format, menu layout, base color, and logo according to the request. If it doesn't meet expectations, there will be a further prompt to adjust it accordingly. See Figure 2.

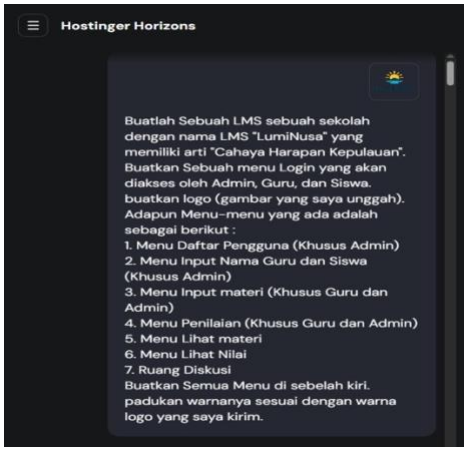

Figure 2. Horizon Artificial Intelligence Prompt View

Login Menu Creation Prompt

"Create a login menu containing an email textbox for username and password, a login button, and a new account registration button. On the new account registration button, create a data entry form for teacher or student role/choice, full name, email address, and password."

Dashboard Menu Creation Prompt

"Create a dashboard menu containing information on the total number of schools, total teachers, total students, total classes, and information on recent activity."

School Menu Creation Prompt

"Create a school menu containing information on registered schools. Also create edit and delete buttons (icons).

User Menu Creation Prompt

"Create a user menu containing a list of all registered users. Create a table with table items: username, school, role, action (edit, change password, delete). Also create a filter at the top for user role and school role, as well as a data search textbox."

Class List Menu Prompt

"Create a Class List Menu containing class cards. Each card contains the class name and teacher name, along with buttons to view the number of students and materials. Also create buttons for student input and material input. In this menu, create an add button to create a new class. This add button contains a class add form with the options for school name (taken from the school data), grade level, subject name, and teacher name (taken from the teacher data)."

Create an Assignment Menu Prompt

"Create an Assignment Menu containing Assignment cards. Create a create new assignment button containing class selection (taken from the class list), description, and attachment. Each

assignment card contains the class name, description, student assignment progress, a view button to view student assignments and due dates, a delete assignment icon, and the assignment creation date."

Create a Grade List Menu Prompt

"Create a Grade List Menu containing all student assignments that will be graded by the teacher. Also create a school filter and a search text box based on school, subject, and student name."

Attendance Menu Creation Prompt

"Create an Attendance Menu. The menu contains a create attendance button containing a form with options for school name (taken from the school menu), class selection (taken from the assignment menu), and date. Also display the attendance list in a clickable format. Icons include the letters H, I, S, and A. Also create a delete attendance button."

Prompt: Creating a Discussion Room Menu

"Create a Discussion Room Menu. The menu contains a button to create a new discussion containing a form for entering discussion topics and messages. The discussion is displayed as a chat."

Discussion and Interview Results

Following the implementation of the Prompt Engineering Horizon Artificial Intelligence-based Learning Management System at SMA Negeri 1 Siau Barat, focus group discussions and interviews with teachers and students were conducted. Interviews were conducted with eight teachers who had been using the system for four weeks. Interview results indicated that teachers felt the system facilitated the distribution of materials and assignments. The assessment feature expedited the grade recapitulation process. The dashboard helped teachers monitor student activity. The system was deemed relevant to the school's needs. One teacher stated, "This application really helps us organize our classes and assignments. We used to take notes manually, but now everything is structured and organized." The majority of teachers (87.5%) stated that the Learning Management System is suitable for continued use with the development of additional parent communication features. See table 1.

Table 1. Results of the Teacher Eligibility Questionnaire

No.	Assessment Aspects	Average Score	Category
1	Ease of use	4.62	Very Worthy
2	Features' suitability to learning needs	4.50	Very Worthy
3	UI clarity	4.37	Worthy
4	Assessment menu effectiveness	4.75	Very Worthy
5	System access speed	4.25	Worthy
6	Benefits to teacher work efficiency	4.80	Very Worthy

Overall average teacher score: 4.55 (Very Good)

Student Interview Results

Interviews were conducted with 20 students from various classes. Results indicated that students found it easier to access materials via smartphones.

The discussion room feature enhanced learning engagement. The interface was considered simple and easy to understand, and the system helped them be more disciplined in submitting assignments. Ninety percent of students stated that the application was helpful in learning and worth using. See Table 2.

Table 2. Results of the Student Eligibility Questionnaire

No.	Assessment Aspects	Average Score	Category
1	Easy access via smartphone	4.70	Very Worthy
2	Easy to understand the display	4.45	Very Worthy
3	Helps understand the material	4.30	Worthy
4	Helps submit assignments on time	4.65	Very Worthy
5	Increases discussion interaction	4.40	Worthy

Overall average student score: 4.50 (Very Good)

Product Feasibility Analysis

Based on the Likert scale interpretation criteria:

- 4.21 – 5.00 = Very Feasible
- 3.41 – 4.20 = Feasible
- 2.61 – 3.40 = Sufficient
- 1.81 – 2.60 = Less Feasible
- 1.00 – 1.80 = Not Feasible

Therefore, it can be concluded that this learning management system application is categorized as Very Feasible. Teacher and student responses indicate high acceptance. The system is effective for use in digital-based learning.

The results show that the integration of Prompt Engineering in the development of the learning management system significantly impacts the effectiveness of the system design and ease of implementation. This finding aligns with the theory that artificial intelligence can support personalized learning and efficient classroom management. Furthermore, in the context of an island school like SMA Negeri 1 Siau Barat, this system helps optimize the use of smartphones as a productive learning medium. Pedagogically, this Learning Management System application supports independent learning, increases student engagement, facilitates learning monitoring, and strengthens a culture of digital literacy. Thus, the results of the qualitative and quantitative evaluations show that the products developed through the ADDIE model and R&D methods meet the standards for the feasibility of educational implementation.

CONCLUSION

In this study, the strength of the prompts significantly determines the results presented by artificial intelligence. Artificial intelligence learns from the input prompt data from the first prompt at the beginning of the learning management system development. The completed application will then be studied by users to gain the best experience when using the learning management system

application. The users in this case are teachers and students, as well as practitioners with expertise in artificial intelligence and learning management system applications who provide input regarding the feasibility of the application. The implementation of the Learning Management System Application at SMA Negeri 1 Siau Barat is the final result of the research, and overall, teachers and students who have used this application have found it very helpful in the learning process. Some teachers recommended that this application be developed in terms of menus and features that can connect with parents. To access the application, users can register using an active username and email address at the following link: https://luminusa.site/.

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