

## Implementation of HLMS to Support the Development of Digital Education Services

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**Keywords:** HLMS;  
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**Abstract.** The rapid growth of digital education services requires organizations to adopt integrated and adaptive learning systems. However, PT Unggul Mediatama Indonesia, as a digital-based startup, did not yet have an internal learning platform, and learning activities were conducted using fragmented tools such as separate communication platforms and non-centralized content distribution. This condition caused difficulties in managing learning materials, monitoring participant progress, and ensuring consistent service delivery, highlighting the urgency of implementing a centralized system. This community service activity aims to implement a Hybrid Learning Management System (HLMS) to support digital education services and improve the partner's digital readiness. The activity applied a technology-based participatory approach combined with an Agile-oriented development process, including needs analysis through observations and interviews, system design, frontend development using React JS, backend integration using Laravel via API, testing, and validation. The results show that the HLMS was successfully developed as a web-based platform integrating structured and self-directed learning. Evaluation using a Likert-scale questionnaire involving five respondents (one company leader and four IT team members) resulted in an average score of 4.30, categorized as "very appropriate". The implementation improved learning management, enhanced digital readiness, and transformed learning practices into an integrated system, demonstrating the effectiveness of HLMS in supporting digital education services.

**Katakunci:** HLMS;  
Pembelajaran  
digital;  
Learning  
Management System.

**Abstrak.** Pesatnya perkembangan layanan pendidikan digital menuntut organisasi untuk memiliki sistem pembelajaran yang terintegrasi dan adaptif. Namun, PT Unggul Mediatama Indonesia sebagai startup berbasis digital belum memiliki platform pembelajaran internal, dan proses pembelajaran masih dilakukan secara terpisah menggunakan berbagai media komunikasi serta distribusi materi yang tidak terpusat. Kondisi ini menyebabkan kesulitan dalam pengelolaan materi, pemantauan progres peserta, dan konsistensi layanan, sehingga diperlukan sistem terpusat. Pengabdian ini bertujuan mengimplementasikan Hybrid Learning Management System (HLMS) untuk mendukung layanan pendidikan digital dan meningkatkan kesiapan digital mitra.

Metode yang digunakan adalah pendekatan partisipatif berbasis teknologi dengan pengembangan Agile, meliputi analisis kebutuhan melalui observasi dan wawancara, perancangan sistem, pengembangan frontend menggunakan React JS, integrasi backend Laravel melalui API, pengujian, dan validasi. Hasil menunjukkan HLMS berhasil dikembangkan sebagai platform berbasis web yang mengintegrasikan pembelajaran terstruktur dan mandiri. Evaluasi menggunakan kuesioner skala Likert dengan melibatkan lima responden (1 pimpinan dan 4 tim IT) menghasilkan skor rata-rata 4,30 dengan kategori sangat sesuai. Implementasi ini meningkatkan pengelolaan pembelajaran, kesiapan digital, serta mengubah proses pembelajaran menjadi lebih terintegrasi, sehingga efektif dalam mendukung pengembangan layanan pendidikan digital.

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## 1 Introduction

The rapid advancement of information technology has accelerated digital transformation across various sectors, including education. The adoption of digital learning platforms has become a strategic solution to enhance flexibility, accessibility, and efficiency in learning processes (Almaiah et al., 2020; Cahyani & Aminudin, 2025; Dhawan, 2020). In this context, Learning Management Systems (LMS) play a crucial role as integrated platforms that facilitate content management, interaction, and evaluation in digital learning environments (Furqon et al., 2023; Turnbull et al., 2021; Wulandari et al., 2023). Recent studies highlight that LMS implementation significantly improves learning effectiveness, user engagement, and satisfaction, particularly when supported by proper system design and organizational readiness (Al-Fraihat et al., 2020; Martin & Bolliger, 2019; Salloum et al., 2019).

However, the implementation of LMS in organizational and corporate contexts still faces several challenges. (Yulia Basri et al., 2025) emphasize that the lack of system integration and structured digital strategies can reduce the effectiveness of educational technology adoption. Similarly, (Sun & Chen, 2019) found that fragmented learning systems limit the ability of organizations to monitor learning activities and ensure consistency in content delivery. These findings indicate that the success of digital learning systems is not only determined by

technology adoption but also by how well the system is integrated into organizational processes.

Along with the evolving demands of modern learning, educational models are shifting toward more flexible and self-directed approaches. The Hybrid Learning Management System (HLMS) emerges as an advanced model that integrates structured learning (instructor-led training) and independent learning (self-paced learning) within a unified system (Hrastinski, 2019; Rofiuddin & Aulia, 2025). Conceptually, HLMS consists of several key components, including (1) centralized learning management, (2) multi-role user access (admin, instructor, student), (3) integration of synchronous and asynchronous learning activities, and (4) monitoring and evaluation features. This model enables organizations to deliver scalable and adaptive learning services while maintaining control over learning processes.

PT Unggul Mediatama Indonesia is a digital-based startup operating in the field of information technology and IT consultancy, with a team consisting of developers, system analysts, and project managers involved in digital product development. In 2025, the company began expanding its services into the education and research sectors as part of its business diversification strategy. However, based on preliminary observations and interviews conducted with the company's management, it was identified that the organization has not yet implemented an integrated internal digital learning platform.

The existing learning practices were still conducted using fragmented tools, such as separate communication platforms and non-centralized content sharing. This condition resulted in difficulties in managing learning materials, monitoring participant progress, and ensuring consistency in service delivery. Similar conditions were identified during the needs assessment process, indicating low digital readiness in terms of system integration, structured learning management, and user activity monitoring (Sumardi et al., 2021; Zhang et al., 2020). This gap between the increasing demand for digital education services and the organization's current technological capability highlights the urgency of implementing an integrated learning system.

Based on this problem analysis, the implementation of a Hybrid Learning Management System (HLMS) is proposed as a strategic solution. Unlike conventional LMS, HLMS not only centralizes learning management but also integrates structured and independent learning processes, thereby addressing the issues of fragmentation, lack of monitoring, and limited scalability. This analytical relationship shows that HLMS is not merely a technological tool but a solution that aligns with the organization's operational needs and service development goals.

Therefore, this community service activity aims to implement and develop a web-based HLMS to support the digital transformation of PT Unggul Mediatama Indonesia in the education sector. The specific objectives include (1) developing an integrated learning platform, (2) enabling structured and independent learning within a single system, (3) improving learning monitoring and management processes, and (4) enhancing the partner's digital readiness in delivering education services.

The novelty of this study lies in the implementation of HLMS within a startup environment using a participatory and Agile-based approach, which not only produces a functional digital learning system but also contributes to organizational transformation in managing digital education services. This approach provides a fresh perspective on technology-based community service by integrating system development, capacity building, and digital transformation within a single framework.

## 2 Method

This community service activity applied a technology-based participatory approach combined with an Agile-oriented system development process. This approach emphasizes collaboration with partners and iterative development to ensure that the system meets real organizational needs. The method was systematically structured into six main stages, namely requirements analysis, system design, frontend development, backend integration, functional testing, and system validation, as illustrated in Figure 1.

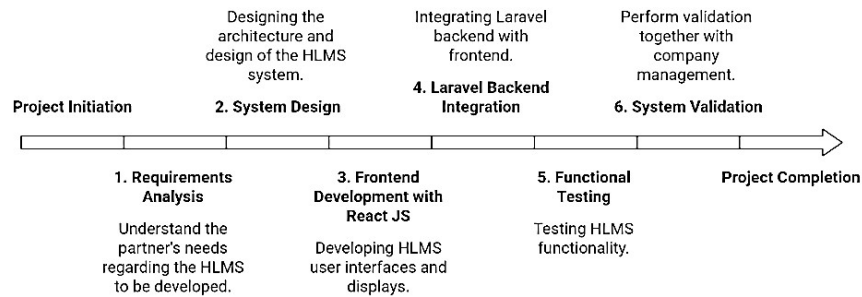


Figure 1. Flow of Community Service Activity Stages

The first stage was requirements analysis, which aimed to identify the partner's needs related to the development of the Hybrid Learning Management System (HLMS). Data were collected through observations and interviews with the partner's management to understand existing problems, system requirements, and expected features.

The second stage was system design, which involved designing the system architecture and user interface of the HLMS. At this stage, the system structure, user roles (admin, instructor, and student), and workflow of learning activities were defined to ensure alignment with the partner's business needs.

The third stage was frontend development using React JS. This stage focused on developing user interfaces and interactive components of the HLMS, including dashboards, course pages, and learning modules, to provide a responsive and user-friendly experience.

The fourth stage was backend integration, which involved integrating the frontend with the Laravel-based backend system provided by the partner. The integration was conducted through Application Programming Interfaces (APIs) to ensure real-time data exchange and system synchronization.

The fifth stage was functional testing, which aimed to verify that all system features operated according to the defined requirements. Testing was conducted on core functionalities such as user authentication, course management, learning modules, and assignment features.

The sixth stage was system validation, which was carried out together with the partner's management to evaluate the overall system performance and its suitability with the initial design. This stage ensured that the HLMS was ready to be implemented as a digital education service platform.

Following the implementation stages, an evaluation phase was conducted to assess the effectiveness of the HLMS. The evaluation used a questionnaire method to measure the level of conformity between the system implementation and the development blueprint designed by PT Unggul Mediatama Indonesia. The instrument employed a five-point Likert scale ranging from 1 (strongly inappropriate) to 5 (strongly appropriate).

The questionnaire consisted of five main indicators representing the core components of HLMS implementation, namely: authentication system and dashboard layout, instructor portal features, student portal features, frontend-backend integration, and overall system implementation suitability. The questionnaire was distributed to the partner's management and internal team members who were directly involved in the development and testing process.

The collected data were analyzed using descriptive statistical methods by calculating the mean score for each indicator and the overall mean score. The mean scores were then interpreted using a Likert scale classification to determine the level of system suitability. The analysis results were used to determine the level of success of the HLMS implementation within this community service activity.

### 3 Results

The results of this community service activity are presented by comparing the partner's condition before and after the implementation of the Hybrid Learning Management System (HLMS), followed by a description of the system implementation, features, and its impact on organizational capacity and learning practices.

Before the implementation, PT Unggul Mediatama Indonesia did not have an integrated digital learning system. Learning activities were

conducted using fragmented tools, such as separate communication platforms and non-centralized content distribution. This condition resulted in difficulties in managing learning materials, monitoring participant progress, and ensuring consistency in service delivery.

After the implementation, the HLMS was successfully developed and deployed as a centralized digital learning platform. The system enables the integration of structured and self-directed learning within a single platform, thereby improving the efficiency and effectiveness of learning management.

### Community Service Activities and Technical Actions

The implementation of HLMS is carried out through a series of structured technical activities aimed at addressing partner issues related to the absence of an integrated digital learning platform.

The initial stage focused on identifying the digital education service requirements of PT Unggul Mediatama Indonesia. This process was conducted through discussions with the partner's management to determine the HLMS concept, system user types, and required features to support both structured and independent learning.

Based on the needs analysis, the HLMS was designed with three primary user roles: admin, instructor, and student, each with distinct functions and access rights according to the digital learning service requirements.

Table 1. User Roles and Access Rights in the HLMS

No	User Role	Main Access Right	Role Description
1	Admin	User management, course management, configuration of free and paid courses, system activity monitoring	Responsible for overall HLMS management
2	Instructor	Managing materials (videos, articles, quizzes), creating assignments,	Acts as content manager and

		facilitating forums	discussion	learning facilitator
3	Student	Accessing completing the modules, taking quizzes and participating in discussion forums	courses, learning assignments, discussion	Acts as the end user in the digital learning process

The service team developed the HLMS interface using React JS to produce a responsive and user-friendly design. The interface was structured to support digital learning activities such as course access, learning modules, assignments, and discussion forums.

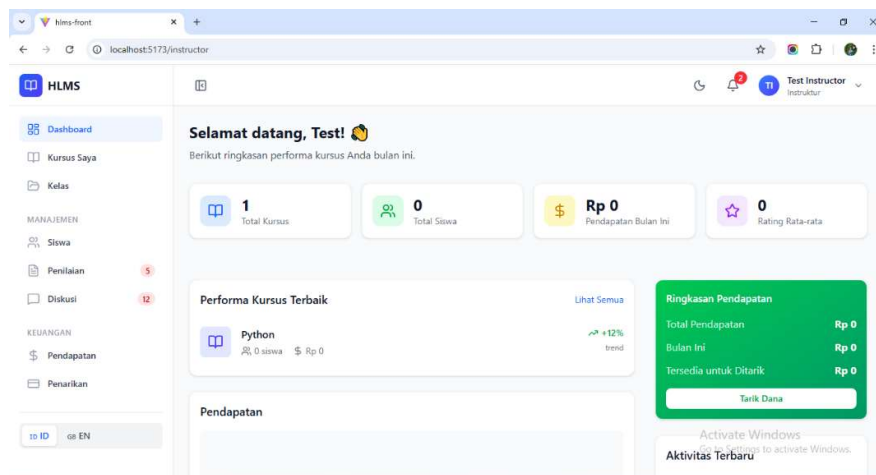


Figure 2. HLMS Instructor Dashboard Interface

The next stage involved integrating the HLMS frontend with the Laravel backend provided by the partner. This integration was conducted through an API to ensure synchronization of course data, learning modules, user accounts, and learning activities. This process was essential to ensure that the system could function as a digital education service product of the company.

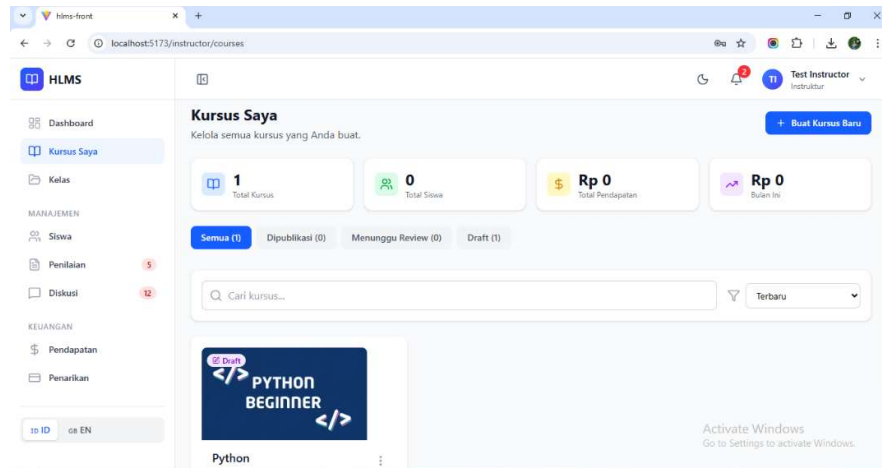


Figure 3. HLMS Course Page Interface

The service team implemented several core HLMS features, including video-based learning modules, articles, quizzes, assignment features for practical tasks, discussion forums for interaction, and management of free and paid courses. The implementation of these features represented a concrete action in developing an integrated hybrid learning system.

After development was completed, functional testing was conducted to ensure that all features operated according to the partner's requirements. Validation was carried out jointly with the management of PT Unggul Mediatama Indonesia by reviewing system conformity with the planned digital education service concept.

### Evaluation of HLMS Implementation

The success of the HLMS implementation was evaluated using a five-point Likert scale questionnaire administered to PT Unggul Mediatama Indonesia. The instrument aimed to measure the level of conformity between the HLMS frontend implementation and the system blueprint designed by the company.

Based on questionnaire data completed by four respondents, the overall mean score was 4.30, which falls within the "very appropriate" category. This result indicates that the HLMS implementation carried out through the community service activity met the partner's needs and aligned with the established system design.

Table 2. Evaluation Results of HLMS Implementation Suitability

No	Evaluation Indicator	Mean Score	Category
1	Authentication system and dashboard layout implementation	5.00	Very Appropriate
2	Instructor portal features	4.25	Very Appropriate
3	Student portal features	4.25	Very Appropriate
4	Frontend–backend integration	4.00	Appropriate
5	Overall HLMS implementation suitability	4.00	Appropriate
<b>Overall Mean Score</b>		<b>4.30</b>	<b>Very Appropriate</b>

The evaluation results were also visualized in the form of a satisfaction score graph as shown in Figure 5.

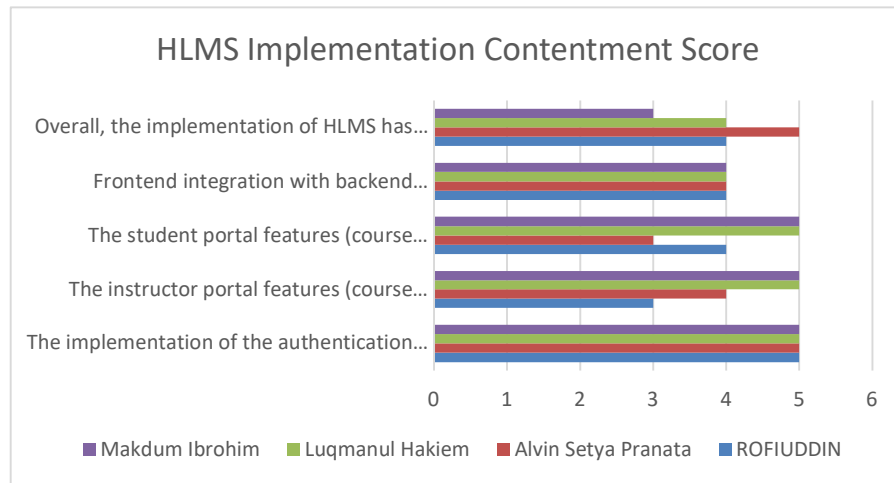


Figure 4. HLMS Implementation Score Graph

Based on the graph, the authentication system and dashboard layout indicator achieved the highest score, indicating that the core frontend components were optimally implemented. The instructor and student portal indicators also demonstrated high scores, suggesting that the primary digital learning features functioned effectively within the hybrid learning framework.

Meanwhile, the frontend–backend integration and overall HLMS implementation indicators achieved a mean score of 4.00, indicating that the system performed well, although there remains room for further optimization and development in future stages.

In addition to technical outcomes, the implementation of HLMS also generated significant impacts on the partner's organizational capacity. The partner is now able to manage learning activities in a more structured and centralized manner, monitor user progress effectively, and deliver scalable digital education services. This indicates an improvement in digital readiness, particularly in system integration and learning management capabilities.

Moreover, there was a noticeable change in the partner's perspective toward digital learning systems. Prior to the implementation, learning activities were conducted in a fragmented and unstructured manner. After the implementation, the partner demonstrated increased awareness of the importance of integrated digital systems and showed readiness to adopt technology-based learning as a core component of their service model.

#### 4 Discussion

The questionnaire evaluation results indicate an overall mean score of 4.30 (very appropriate category). This score suggests that the HLMS implementation has successfully aligned with the system blueprint designed by the partner. From a conceptual perspective, this finding reinforces the effectiveness of technology-based community service approaches, where the developed solution is not only technically functional but also contextually relevant to the organizational needs of the partner. Similar findings have been reported in previous studies, which emphasize that the success of e-learning systems is highly dependent on system quality, usability, and alignment with user needs (Al-Fraihat et al., 2020; Almaiah et al., 2020).

The highest score was obtained for the authentication system and dashboard layout indicator (5.00), indicating that the fundamental system components were developed in a stable and reliable manner. This

aspect is essential in digital learning platforms, as system usability and interface design significantly influence user experience and system adoption (Martin & Bolliger, 2019). A well-designed interface not only improves accessibility but also enhances user engagement in digital learning environments (Sun & Chen, 2019).

Furthermore, the high scores for the instructor and student portals (4.25 each) indicate that the core learning features, such as course management, learning dashboards, and assignment submission, effectively support hybrid learning activities. This finding is consistent with studies highlighting that LMS features play a crucial role in facilitating interactive and flexible learning processes (Furqon et al., 2023; Wulandari et al., 2023). The integration of these features within the HLMS reflects the concept of hybrid learning, which combines structured and self-directed learning into a unified system (Hrastinski, 2019; Rofiuddin & Aulia, 2025).

From a system development perspective, the implementation demonstrates that a technology-driven and collaborative approach can effectively support HLMS deployment (Waizenegger et al., 2020). The use of a structured development process, supported by Agile principles, enables iterative improvements based on continuous user feedback. This is consistent with previous studies indicating that Agile methodologies enhance system adaptability and support user-centered design in software development (Haider Ali et al., 2025; Ramadhan, 2025; Rath et al., 2025). In addition, participatory approaches in system development have been reported to improve system acceptance and help ensure that the resulting system aligns with actual user needs (Kara, 2020; Riswan & Beegom, 2021).

The implementation of HLMS also generated significant impacts on the partner's organizational capacity. The establishment of an internal digital learning system represents a shift from fragmented and manual processes toward a centralized and integrated learning management approach. This transformation reflects an increase in digital readiness, particularly in terms of system integration, learning management, and user activity monitoring (Bozkurt & Sharma, 2020). These findings support previous studies that highlight the importance of digital

transformation in improving organizational efficiency and innovation in education services (Cahyani & Aminudin, 2025; Nazyrova et al., 2025).

Moreover, the observed changes in organizational work patterns indicate a shift in mindset toward the adoption of digital learning technologies. Prior to the implementation, learning activities were conducted in an unstructured and decentralized manner. After the implementation, the organization demonstrated a stronger commitment to adopting technology-based learning systems as part of its core services (Bond & Bedenlier, 2019; Sumardi et al., 2021), moving beyond temporary or emergency-based digital learning practices toward more structured online learning systems (Hodges et al., 2020). This shift is in line with the Technology Acceptance Model, which suggests that perceived usefulness and ease of use influence user acceptance of new technologies (Salloum et al., 2019).

The role of leadership within the partner organization also contributed significantly to the successful implementation of HLMS. Active involvement from management ensured that the system development process remained aligned with organizational goals and long-term strategies. Previous research has emphasized that leadership plays a critical role in facilitating digital transformation and technology adoption within organizations .

To further clarify the relationship between field findings and theoretical perspectives, Table 3 presents a comparison between the results of this community service activity and relevant literature.

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Table 3. Relationship Between Community Service Findings and Theoretical Perspectives

No	Community Service Aspect	Field Findings	Theoretical Perspective	Reference
1	Integration of structured and self-directed learning	HLMS successfully combined mandatory and independent courses in one system	HLMS enhances flexibility in digital learning	(Rofiuddin & Aulia, 2025)
2	Digital education service transformation	PT UMI established an internal learning platform after the program	Digital transformation drives efficiency and innovation in education services	(Turnbull et al., 2021)
3	Organizational work pattern change	Learning management shifted to an integrated system	LMS improves effectiveness in digital learning management	(Bond & Bedenlier, 2019)
4	Role of local leader	Partner leadership actively directed HLMS development	Digital leadership is critical for successful technology adoption	(Al-Fraihat et al., 2020)
5	Awareness of digital transformation	HLMS positioned as a core service product	Technology adoption increases organizational readiness in education	(Furqon et al., 2023)

The implications of this community service activity demonstrate that HLMS development provides not only technical benefits but also strategic value for PT Unggul Mediatama Indonesia. The HLMS can serve as the foundation for expanding digital education service products,

including independent courses, professional training programs, and client-based learning services.

From an academic perspective, these findings reinforce previous research indicating that HLMS implementation in non-formal educational environments, such as startups, can serve as an alternative model for industry-based digital learning service development.

## 5 Conclusion

The implementation of the Hybrid Learning Management System (HLMS) in this community service activity has successfully addressed the partner's initial challenges related to fragmented learning processes and the absence of an integrated digital learning platform. The developed system was able to integrate structured and self-directed learning within a single platform, resulting in improved efficiency, better learning management, and enhanced monitoring of user activities. The evaluation results, with an average score of 4.30 categorized as "very appropriate," indicate that the system meets the partner's functional and design requirements. In addition to producing a functional digital learning platform, the implementation also contributed to increasing the partner's digital readiness, transforming organizational work patterns toward a more integrated system, and strengthening awareness of the importance of technology-based learning services. Therefore, it is recommended that future development of the HLMS focus on enhancing system scalability, improving feature optimization, and strengthening system security, as well as expanding its implementation to support broader digital education services in similar organizational contexts.

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