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## Optimizing Learning with a Learning Management System for Mathematics Education Students at Universitas PGRI Silampari

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**Abstract:** This community service aims to optimize the learning process for students of the Mathematics Education Program at Universitas PGRI Silampari through the implementation of a Learning Management System (LMS). In line with the rapid development of educational technology, LMS has become an effective solution to enhance the quality of learning that is more structured and interactive. In this activity, intensive training was conducted for both faculty members and students on the use of the LMS to access course materials, interact with instructors, and complete assignments online. The method used in this service is a participatory approach, involving faculty members and students directly in training and utilizing the LMS. The results of this service show that the use of LMS can improve the digital skills of both faculty and students and accelerate the learning process more flexibly and efficiently. Additionally, students can easily access course materials anytime and anywhere, while instructors can provide direct feedback and manage assignments more

**Abstrak:** Pengabdian kepada masyarakat ini bertujuan untuk mengoptimalkan proses pembelajaran bagi mahasiswa Program Studi Pendidikan Matematika di Universitas PGRI Silampari melalui penerapan *Learning Management System* (LMS). Seiring dengan pesatnya perkembangan teknologi pendidikan, LMS menjadi solusi yang efektif untuk meningkatkan kualitas pembelajaran yang lebih terstruktur dan interaktif. Pada kegiatan ini, dilakukan pelatihan intensif bagi dosen dan mahasiswa mengenai penggunaan LMS untuk mengakses materi kuliah, berinteraksi dengan dosen, serta menyelesaikan tugas secara daring. Metode yang digunakan dalam pengabdian ini adalah pendekatan partisipatif dengan melibatkan dosen dan mahasiswa secara langsung dalam pelatihan dan pemanfaatan LMS. Hasil pengabdian ini menunjukkan bahwa penggunaan LMS dapat meningkatkan keterampilan digital dosen dan mahasiswa, serta mempercepat proses pembelajaran yang lebih fleksibel dan efisien. Selain itu, mahasiswa dapat dengan mudah mengakses materi kuliah kapan saja dan di mana saja, sementara dosen dapat memberikan umpan balik secara

efficiently. The outcomes of this service are expected to make a positive contribution to improving the quality of education in the digital era and prepare students to face future educational challenges.

**Kata Kunci:** Learning Management System; Instructional; Mathematics.

langsung dan mengelola tugas dengan lebih terorganisir. Hasil dari pengabdian ini diharapkan dapat memberikan kontribusi positif dalam peningkatan kualitas pembelajaran di era digital, serta mempersiapkan mahasiswa untuk menghadapi tantangan pendidikan di masa depan.

**Keywords:** Learning Management System; Pembelajaran; Matematika.

## A. Introduction

In the era of digital transformation in higher education, the demand for adaptive, flexible learning systems capable of effectively reaching students has become increasingly urgent (Esteve-Mon et al., 2023; Lockee & Clark-Stallkamp, 2022; Mexhuani, 2025). At Universitas PGRI Silampari, particularly within the Mathematics Education Study Program, conventional learning processes remain largely dependent on face-to-face interactions and traditional material delivery. This situation results in limited access to materials outside the classroom, constrained interaction between lecturers and students, and insufficient monitoring of students' learning activities. Many students report difficulties in independently accessing lecture materials beyond scheduled class hours, while lecturers face challenges in providing timely feedback and efficiently managing assignments. These issues are further exacerbated by the variability in digital literacy skills among both students and lecturers in utilizing educational technologies.

Based on the literature review, the use of learning management systems (LMS) has been shown to enhance the effectiveness of higher education learning (Alotaibi, 2024; Kaewsaiha & Chanchalor, 2021; Oguguo et al., 2021). A meta-analytic study indicates that the implementation of technology positively impacts students' mathematics achievement (Cartwright et al., 2025; Chang et al., 2022; Nguyen, 2023). Other studies note that LMS can improve lecturers' digital literacy and facilitate more

intensive interaction between lecturers and students (Ali et al., 2024; Costley et al., 2022; Kayaduman et al., 2023). However, various studies also report that the success of LMS implementation heavily depends on infrastructure readiness, the preparedness of lecturers and students, and the pedagogical strategies that accompany it (Alshammari & Alshammari, 2022; Bokolo et al., 2020; Mirata & Bergamin, 2023).

Thus, the challenges faced by the university include the suboptimal utilization of LMS, limited familiarity of lecturers and students with LMS features, and the absence of a structured strategy to systematically integrate LMS into mathematics instruction. To address this situation, this community service program proposes a solution in the form of intensive training for both lecturers and students on LMS usage, accompanied by the implementation of an LMS-based mathematics learning model tailored to the context of the Mathematics Education Study Program at Universitas PGRI Silampari. Accordingly, this solution not only applies existing science and technology knowledge (LMS technology and digital pedagogy) but also adapts it to the local context to enhance digital literacy, expand access to course materials, strengthen interaction and learning monitoring, and promote students' independent learning.

The objective of this community service program is to optimize mathematics learning within the Mathematics Education Study Program at Universitas PGRI Silampari through the structured and participatory implementation of an LMS. The expected benefits include enhancing digital literacy among lecturers and students, improving the flexibility and accessibility of learning materials, strengthening interaction and feedback between lecturers and students, and ultimately improving the quality of both the process and outcomes of mathematics learning (Alotaibi, 2024; Gaddis, 2020; Lehong et al., 2024).

## **B. Method**

The implementation method of this community service program is designed systematically and structurally through several stages to ensure the successful implementation of the *Learning Management System* (LMS) in improving the quality of

learning within the Mathematics Education Study Program at Universitas PGRI Silampari. The first stage is the preparation stage, which includes needs identification and infrastructure preparation. At this stage, an analysis is conducted regarding the existing facilities and infrastructure within the university environment, including hardware such as computers and internet networks, as well as software in the form of the LMS used or selected as the learning medium (Abid et al., 2024; Chugh et al., 2023; Garcia et al., 2021). This evaluation aims to ensure both physical and technical readiness for LMS implementation. In addition, the digital competencies of lecturers and students are mapped through surveys to determine their level of ability in utilizing online learning technologies so that LMS implementation can be optimized (AL-Nuaimi et al., 2022; Çakiroğlu et al., 2020; Koh et al., 2025).

The next stage is training and socialization. At this stage, lecturers are provided with intensive training on the use of various LMS features relevant to mathematics learning, such as uploading learning materials, creating quizzes and assignments, and interacting with students. The training is conducted through both face-to-face and online sessions accompanied by hands-on practice and system usage tutorials. Furthermore, students also receive training on how to access learning materials, complete assignments, utilize discussion forums, and submit assignments online through the LMS. In addition to technical training, socialization activities are also conducted for lecturers and students regarding the benefits of LMS usage in improving learning quality in order to foster active participation among all users in utilizing the system.

The implementation and monitoring stage constitutes the next phase of the program. At this stage, the LMS is integrated into daily learning activities through the uploading of course materials, conducting quizzes, assigning tasks, and various learning activities that can be accessed by students flexibly anytime and anywhere (Krishnan et al., 2022; Nguyen, 2023; Tran & Meacheam, 2020). Lecturers also utilize the LMS to provide feedback on assignments and students' assessment results, making the learning process more interactive and measurable (Ahmadi et al., 2023; Al-Mamary, 2022;

Padgett et al., 2021). During the implementation process, monitoring and supervision are conducted regularly to ensure that the LMS is optimally utilized by both lecturers and students, while also identifying any technical issues that may arise during implementation.

The final stage is evaluation and adjustment. Evaluations are conducted periodically to assess the effectiveness of LMS utilization in supporting mathematics learning through surveys administered to lecturers and students. This evaluation aims to identify the strengths, weaknesses, and challenges encountered in LMS usage during the learning process. Based on the evaluation results, adjustments and improvements are made both technically and pedagogically to enhance the quality of LMS implementation. Through these stages, it is expected that a more effective, efficient, flexible, and interactive learning system will be established within the Mathematics Education Study Program at Universitas PGRI Silampari, thereby continuously improving the quality of learning.

### **C. Results and Discussion**

This section provides a detailed discussion of the outcomes achieved from the community service activities conducted within the Mathematics Education Study Program at Universitas PGRI Silampari, particularly concerning the implementation of the Learning Management System (LMS) in mathematics instruction. The primary objective of these activities was to address issues related to limited accessibility to learning and to enhance the digital skills of lecturers and students in using LMS-based educational technologies.

Before the implementation of the program, an analysis and mapping of the existing infrastructure at the university were conducted. The results of this stage indicated that the university already possesses adequate facilities for LMS implementation; however, deficiencies were identified in the digital literacy of both lecturers and students. An initial survey revealed that 65% of lecturers and 50% of students were not yet familiar with the optimal use of the LMS. Consequently, the

subsequent stage focused on intensive training to enhance LMS usage skills.

The training was conducted in two separate sessions: one for lecturers and another for students. The lecturers' training focused on uploading materials, creating quizzes, and providing feedback through the LMS. Meanwhile, the students' training concentrated on using the LMS to access materials, submit assignments, and participate in discussion forums.



**Figure 1: Lecturer Training**

This training successfully enhanced lecturers' understanding of the potential of the LMS in supporting the learning process. By the end of the session, 92% of lecturers reported feeling more confident in using the LMS for instructional activities.



**Figure 2: Student Training**

The training for students yielded very encouraging results. A total of 90% of students reported an increased understanding of LMS usage, and they found it easier to access course materials online.

After the training, the LMS began to be implemented in mathematics learning. Lecture materials, assignments, and quizzes can be accessed by students anytime and anywhere. Lecturers use the LMS to provide additional explanations through discussion forums and to give direct feedback on students' assignments.

**Table 1: Improvement in Accessibility of Lecture Materials Before and After LMS Implementation**

Aspect	Before LMS	After LMS
Material Accessibility	Limited to face-to-face meetings	Can be accessed anytime and anywhere
Lecturer–Student Interaction	Limited during lectures	More intensive interaction through discussion forums
Assignment Submission	Manually in class	Assignments can be uploaded directly through the LMS

The results of LMS implementation also recorded a significant improvement in the management of assignments and quizzes. Lecturers reported that using the LMS made it easier for them to manage student assignments more efficiently and provide feedback more quickly.

The evaluation of LMS usage was conducted through surveys of lecturers and students. Based on the survey results, 92% of lecturers felt that the LMS helped them manage their classes more effectively, while 90% of students stated that the LMS made it easier for them to learn independently.

Before the community service activities were conducted, Universitas PGRI Silampari showed that mathematics learning was still heavily reliant on conventional methods, with limited access to materials and restricted interaction between lecturers and students. However, after the community service activities, there was a significant

change. The use of the LMS has increased learning flexibility, allowing students to access materials anytime and anywhere, and making it easier for lecturers to provide feedback.

In addition, the introduction of this technology also enhanced the digital skills of both lecturers and students. Before the training, only 50% of lecturers felt comfortable using technology in teaching, whereas after the training, 85% of lecturers reported an improvement in their digital skills.

From the entire series of community service activities, it can be concluded that the implementation of the LMS in the Mathematics Education Study Program at Universitas PGRI Silampari successfully addressed most of the existing problems, particularly those related to material accessibility and interaction in learning. The program also had a positive impact on improving the digital skills of both lecturers and students, which ultimately contributed to the enhancement of learning quality.

#### **D. Conclusion**

Based on the results of the implementation of the community service activities within the Mathematics Education Study Program at Universitas PGRI Silampari, it can be concluded that the implementation of the *Learning Management System* (LMS) had a positive impact on improving the quality of learning. This program successfully addressed the main challenges previously encountered, particularly the limited accessibility to learning materials, the low intensity of interaction between lecturers and students, and the suboptimal utilization of digital technology in the learning process. Through the implementation of the LMS, lecture materials, assignments, and quizzes could be accessed flexibly anytime and anywhere, making the learning process more effective and efficient.

In addition to improving learning accessibility, the program also succeeded in enhancing the digital competencies of lecturers and students in utilizing LMS-based learning technologies. The training results indicated an improvement in lecturers' understanding and confidence in using the LMS, with 92% of lecturers stating that they

were more prepared to integrate the LMS into instructional activities. On the other hand, approximately 90% of students experienced improved understanding of LMS usage, making it easier for them to access materials, submit assignments, and participate in discussion forums. These improvements indicate that the training and mentoring activities implemented were effective in strengthening the digital literacy of the academic community.

Overall, the implementation of the LMS in the Mathematics Education Study Program at Universitas PGRI Silampari proved to be effective in enhancing learning flexibility, classroom management effectiveness, and the quality of academic interaction between lecturers and students. The program also made a significant contribution to strengthening digital transformation within the higher education environment and can serve as a model for technology-based learning development to support the continuous improvement of educational quality.

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