

Analysis of School Digitalization Based on LMS at SMA Negeri Sungai Rotan

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Abstrak

Studi ini bertujuan untuk menganalisis implementasi digitalisasi sekolah berbasis Learning Management System (LMS) di SMA Negeri Sungai Rotan. Digitalisasi sekolah adalah upaya untuk mengubah pembelajaran tradisional menjadi lingkungan pembelajaran berbasis teknologi yang efektif dan efisien. Penelitian ini menggunakan pendekatan kualitatif dengan metode deskriptif, melibatkan kepala sekolah, guru, dan siswa sebagai informan. Data dikumpulkan melalui wawancara, observasi, dan dokumentasi. Hasilnya menunjukkan bahwa implementasi LMS di SMA Negeri Sungai Rotan telah dilakukan secara efektif, ditandai dengan peningkatan efektivitas pembelajaran, penguatan interaksi guru-siswa, dan pembentukan budaya pembelajaran digital. Namun, pelaksanaan masih menghadapi beberapa tantangan, seperti keterbatasan kompetensi digital di antara beberapa guru dan infrastruktur pendukung yang tidak memadai. Secara keseluruhan, keberhasilan LMS mampu meningkatkan kualitas dan fleksibilitas pendidikan di lingkungan sekolah.

Kata kunci: Digitalisasi sekolah, Sistem Manajemen Pembelajaran, pembelajaran digital, SMA Negeri Sungai Rotan

Abstract

This study aims to analyze the implementation of school digitalization based on the Learning Management System (LMS) at SMA Negeri Sungai Rotan. School digitalization is an effort to transform traditional learning into an effective and efficient technology-based learning environment. This research employs a qualitative approach with a descriptive method, involving the principal, teachers, and students as informants. Data were collected through interviews, observations, and documentation. The results indicate that the implementation of the LMS at SMA Negeri Sungai Rotan has been carried out effectively, marked by an increase in learning effectiveness, the strengthening of teacher-student interaction, and the fostering of a digital learning culture. However, the implementation still faces several challenges, such as limited digital competence among some teachers and insufficient supporting infrastructure. Overall, the success of the LMS is capable of enhancing the quality and flexibility of education within the school environment.

Keywords: School digitalization, Learning Management System, digital learning, SMA Negeri Sungai Rotan

1. INTRODUCTION

The rapid development of information and communication technology (ICT) in the Industrial Revolution 4.0 era has brought significant changes in various aspects of life, including education. This transformation demands a shift from conventional instructional methods to digitally integrated learning environments that emphasize flexibility, accessibility, and innovation (Bond et al., 2021; Selwyn, 2022). Consequently, educational institutions are required to adapt their pedagogical practices to align with technological advancements and the needs of 21st-century learners. One concrete form of educational digitalization is the adoption of the Learning Management System (LMS), which supports structured and technology-mediated instruction.

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The Indonesian government, through the Ministry of Education, Culture, Research, and Technology, has actively promoted school digitalization as part of the national education transformation agenda through programs such as *Merdeka Belajar*. This initiative emphasizes digital integration to enhance learning quality, equity, and access (Kemdikbudristek, 2022). The LMS becomes the primary platform that facilitates the management of materials, assessment, and interaction between teachers and students online. According to Ellis (2020), the LMS serves as a fundamental tool to store, deliver, and manage learning materials online. In addition, recent studies highlight that LMS platforms support collaborative learning, monitoring of student progress, and data-driven instructional decision-making (Almaiah et al., 2020; Turnbull et al., 2021).

SMA Negeri Sungai Rotan is one school that has adopted the LMS-based learning system to create a flexible, interactive, and adaptive learning environment. The use of LMS has been proven to provide students with the opportunity for self-paced learning (Edelhauser & Lupu-Dima, 2020; Fauzi, 2022), which supports the individualization of the learning process (Edouard et al., 2010; Ejdys & Kozłowska, 2021). Furthermore, LMS implementation can enhance student engagement and digital literacy when effectively integrated into classroom practices (Bond et al., 2021; Martín-García et al., 2022).

However, the implementation of school digitalization is not free from various challenges, such as limited technology infrastructure, readiness of human resources (HR), and adaptation to the evolving digital learning culture. Research indicates that technological readiness, institutional support, and teacher professional competence significantly influence successful LMS implementation (Almaiah et al., 2020; Turnbull et al., 2021). Limited digital competence among teachers, for instance, can be a major obstacle, as discussed by Anggraini and Handayani (2022). Additionally, resistance to change and inadequate digital training may hinder optimal LMS utilization (Selwyn, 2022). Therefore, this research is necessary to comprehensively analyze how the LMS-based school digitalization is implemented at SMA Negeri Sungai Rotan, evaluate its effectiveness, and identify the inhibiting and supporting factors in its application.

2. METHOD

This research uses a qualitative approach with a descriptive method. The qualitative approach was chosen to gain an in-depth understanding of the school digitalization implementation process, rather than merely measuring quantitative outcomes. Qualitative research enables researchers to explore participants' perspectives, experiences, and social contexts holistically (Creswell & Poth, 2021; Merriam & Tisdell, 2022). This approach is particularly relevant for examining digital transformation in schools, as it captures complex interactions between technology, policy, and human behavior (Denzin & Lincoln, 2023).

The research informants include the principal, teachers (as facilitators), and students (as end-users). The total number of informants was adjusted to obtain rich data (saturated data). Data saturation is achieved when additional interviews no longer provide new information or themes (Guest et al., 2020; Hennink et al., 2020). This principle ensures the credibility and adequacy of qualitative findings.

2.1 Data Collection Techniques

Data were collected through three main techniques, allowing methodological triangulation to enhance data validity (Flick, 2022).

a) In-depth Interviews:

In-depth interviews were conducted to explore the perceptions, experiences, and challenges faced by the principal, teachers, and students. Semi-structured interviews allow flexibility while maintaining focus on research objectives (Merriam & Tisdell, 2022).

b) Observation:

Observation was conducted in classrooms and computer labs to directly examine the hybrid learning process and the use of the LMS. Observational data help researchers understand actual practices and interactions in natural settings (Flick, 2022).

c) Documentation:

Documentation includes the analysis of school policy documents, LMS usage guidelines, and data on student learning outcomes on the digital platform. Document analysis strengthens contextual understanding and provides supporting evidence for interview findings (Bowen, 2020).

2.2 Data Analysis Technique

Qualitative data analysis was performed through data reduction, data presentation, and conclusion drawing. This interactive model of analysis enables systematic organization and interpretation of findings (Miles et al., 2020). The researcher compared field findings with theoretical concepts related to LMS (Sari & Nugroho, 2021) and digital learning models (Munir, 2021) to obtain valid interpretations. In addition, thematic analysis was applied to identify recurring patterns and themes across participants' responses (Braun & Clarke, 2021), ensuring analytical rigor and transparency in interpreting the data.

3. RESULT AND DISCUSSION

3.1 LMS Implementation and Effectiveness

The LMS implementation at SMA Negeri Sungai Rotan was carried out in three phases: planning, execution, and evaluation. A structured implementation process is essential to ensure that digital transformation aligns with institutional goals and instructional needs (Almaiah et al., 2020). In the execution phase, learning utilized a hybrid learning model, a combination of face-to-face and online learning. Hybrid or blended learning models are widely recognized as effective approaches that integrate the strengths of conventional and digital instruction (Hrastinski, 2021; Rasheed et al., 2020). Teachers used the LMS to upload materials, assign tasks and quizzes, and facilitate online discussion forums, enabling more organized and trackable learning activities (Turnbull et al., 2021).

The results show that the LMS proved to be effective in improving the quality of learning and classroom management efficiency. The LMS functions as a system that facilitates the management, delivery, and evaluation of learning, which aligns with Ellis's (2020) findings. Additionally, LMS platforms enhance monitoring of student progress and provide data that support instructional decision-making (Almaiah et al., 2020). The use of LMS enables flexible learning, where students can access materials and learn independently according to their own pace and time. This flexibility is one of the main advantages of e-learning supported by Alvi (2021) and Simanullang and Rajagukguk (2020). Furthermore, flexibility and accessibility in digital learning environments have been shown to increase student engagement and learning autonomy (Bond et al., 2021).

3.2. Supporting and Inhibiting Factors

The success of school digitalization is highly dependent on the synergy between human resources, technology, and policy. Effective digital transformation requires institutional readiness, technological infrastructure, and supportive leadership (Selwyn, 2022).

a. Supporting Factors

- 1) **Leadership Support:** The principal's support in the form of clear policies, provision of facilities, and adequate budget allocation is a primary key. Strong instructional leadership significantly influences successful technology integration in schools (Kemdikbudristek, 2022; Almaiah et al., 2020).
- 2) **Readiness of Most Teachers:** The majority of teachers showed readiness and enthusiasm in using the LMS (Lisnani & Putri, 2020; Nakamura et al., 2017b), acting as effective digital learning facilitators. Teacher readiness and positive attitudes toward technology are critical determinants of successful LMS adoption (Rasheed et al., 2020).
- 3) **Student Enthusiasm:** Students showed high enthusiasm for using interactive and adaptive digital media. Student readiness in terms of digital literacy is crucial for LMS success (Putra & Yuliana, 2022). Studies also indicate that students with higher digital competence adapt more easily to online and hybrid learning environments (Bond et al., 2021).

b. Inhibiting Factors

- 1) **Limited Digital Competence of Teachers:** A small number of teachers still face adaptation challenges, especially in designing interactive learning content and optimally utilizing complex LMS features. This highlights the need for continuous professional development and structured digital training programs (Rahayu et al., 2024; Hrastinski, 2021).
- 2) **Infrastructure and Network Limitations:** The unequal availability of technology devices and internet network constraints in some areas, especially for students learning from home, remain serious challenges. This issue is also raised in Saadati et al.'s (2021) research regarding LMS implementation in developing countries. Infrastructure readiness and equitable internet access remain major barriers to sustainable digital education implementation (Almaiah et al., 2020; Selwyn, 2022).

The findings indicate that the implementation of the Learning Management System (LMS) at SMA Negeri Sungai Rotan has been carried out through a systematic process consisting of planning, execution, and evaluation stages. The use of a hybrid learning model demonstrates the school's effort to integrate conventional classroom learning with digital platforms in order to improve learning flexibility and efficiency. Through the LMS, teachers are able to organize learning materials, assignments, quizzes, and discussion forums in a more structured manner, while also enabling better monitoring of student learning progress. These results confirm that the LMS plays a significant role in improving learning management and supporting more organized instructional processes.

However, the effectiveness of LMS implementation is influenced by several supporting and inhibiting factors. Leadership support from the principal contributes significantly to the success of digital learning initiatives by providing policies, infrastructure, and financial resources needed for implementation. Teacher readiness and positive attitudes toward technology also strengthen the adoption of the LMS in daily learning practices. In addition, students' enthusiasm and digital literacy facilitate their adaptation to digital learning environments.

Despite these positive developments, several challenges remain. Some teachers still experience difficulties in maximizing LMS features and designing interactive digital learning materials. Infrastructure limitations and uneven internet access also affect the effectiveness of online learning activities, particularly for students accessing the system from home. These

findings suggest that successful digital transformation in education requires not only technological platforms but also continuous teacher training, adequate infrastructure, and institutional commitment to sustain digital learning practices.

4. CONCLUSION

This study concludes that the implementation of the Learning Management System at SMA Negeri Sungai Rotan has been effective in supporting hybrid learning and improving the organization and management of teaching and learning activities. The LMS provides flexible access to learning materials, enhances student engagement, and enables teachers to monitor learning progress more systematically. The success of LMS implementation is supported by strong leadership, teacher readiness, and positive student responses. However, several challenges remain, particularly related to the limited digital competence of some teachers and infrastructure constraints such as internet connectivity and device availability. These findings imply that schools need to strengthen continuous professional development programs for teachers, improve digital infrastructure, and develop institutional policies that support sustainable digital learning environments. Future research could examine LMS implementation across multiple schools or educational levels to compare digital learning practices, as well as investigate the relationship between LMS utilization, teacher digital competence, and student learning outcomes using broader methodological approaches.

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