



Teachers' Perceptions of the Use of Learning Management Systems in Improving Teaching Effectiveness

Juliati Koesrini^{1*}, Robertus Heru Setyo Suhartono², Muhammad Arafah³

¹Institut Teknologi Sains dan Kesehatan RS. dr. Soepraoen Malang, Indonesia

²Universitas Semarang, Indonesia

³Universitas Puangrimaggalatung, Indonesia

Corresponding Author: Juliati Koesrini, juliatikoesrini@itsk-soepraoen.ac.id

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ABSTRACT

This study analyzes teachers' perceptions of Learning Management System (LMS) use in enhancing teaching effectiveness, focusing on its impact on learning planning, implementation, and evaluation. Using a mixed-methods sequential explanatory design, the research involved a quantitative survey of 150 teachers from Malang, Semarang, and South Sulawesi, followed by in-depth interviews with 15 teachers. Quantitative data were examined using descriptive and comparative analyses, while qualitative data were analyzed thematically. The findings show that most teachers view LMS positively, particularly for material access and student interaction, though challenges remain in digital literacy and infrastructure. Institutional support and training are key to optimizing LMS use. The study concludes that positive teacher perceptions significantly enhance teaching effectiveness, offering theoretical insights into technology adoption in education and practical recommendations for sustainable LMS integration in schools.

INTRODUCTION

In the digital era and post-COVID-19 pandemic, the use of Learning Management Systems (LMS) platforms is becoming increasingly widespread as a means to support online learning and blended learning. Education policies in various countries, including Indonesia, are encouraging the adoption of LMS as part of the digital transformation in education (Usman et al., 2023). In Indonesia, challenges related to infrastructure, device availability, and digital literacy of teachers in remote areas remain significant obstacles to the optimal use of educational technology (Maulana Akbar & Gustaf Wijaya, 2024). Statistics also show that the digital access gap between regions (Java vs. outside Java) still affects the quality of digital learning, including in the effective use of LMS systems (Framework for Monitoring the Spatiotemporal Distribution and Clustering of the Digital Society Index of Indonesia, 2024). The urgency of this research arises because although LMS has been adopted in many schools, it is not clear to what extent teachers' perceptions of LMS use contribute to the effectiveness of teaching in real terms in various local contexts.

Several international studies have examined teachers' perceptions of LMS and learning effectiveness. For example, a study (Salas-Rueda & Alvarado-Zamorano, 2024) investigated teachers' perceptions during the pandemic in Mexico, finding that the use of LMS had a positive impact on student motivation and participation. (Htin Kyaw Lin, 2025) examined the satisfaction of lecturers at private universities in Myanmar with LMS, showing that technical support and system quality have a significant effect on the perception of usability and ease of use. However, many of the studies focused on higher education or specific periods such as emergency learning, yet to explicitly compare the perceptions of teachers across different regions in Indonesia, especially at the secondary and primary school levels. In addition, research on the influence of teachers' perceptions on teaching effectiveness covering aspects of planning, implementation, and evaluation of learning in a multi-location context is still limited.

Furthermore, a literature study on digital literacy in villages or remote areas of Indonesia shows that the digital literacy of the community, including teachers, is generally higher in aspects of digital culture and ethics, but lower in terms of technical skills (Maulana Akbar & Gustaf Wijaya, 2024). This shows the potential that technical factors such as digital competence and infrastructure support can be important mediators in the relationship between LMS perception and teaching effectiveness. Research by Harahap et al., (2025) also shows that adequate infrastructure and teacher training are important strategies in addressing digital education access gaps in remote areas. Thus, there is a gap in the literature related to how teachers' perceptions in various regions in Indonesia are influenced or influenced by local conditions (infrastructure, training, school culture), as well as the extent to which these perceptions correlate with indicators of teaching effectiveness.

In particular, quantitative research with a survey approach is widely used to measure teacher perception, but it is poorly supported by qualitative data that reveal teachers' narratives or experiences in real contexts, especially in schools

outside urban centers. For example, studies on teachers in Mexico (Salas-Rueda & Alvarado-Zamorano, 2024) and studies in Myanmar (Htin Kyaw Lin, 2025) showed positive results but also identified barriers such as lack of training and technical support. However, the study did not always compare between regions with different conditions such as urban areas vs outside the city, or Java vs outside Java. Similarly, there is little Indonesian research that focuses on teachers' perceptions of LMS, and is often limited to one region or specific level of education.

By paying attention to these gaps, this study aims to analyze teachers' perceptions of the use of Learning Management Systems (LMS) in an effort to improve teaching effectiveness in three different regions in Indonesia (Malang, Semarang, and South Sulawesi). The focus of the analysis includes how teachers assess the influence of LMS on aspects of learning planning, implementation of the teaching and learning process, and learning evaluation, as well as local factors such as technological infrastructure, digital literacy, and school institutional support that moderates these perceptions.

This research will make a theoretical contribution by expanding the framework of understanding of the relationship between teachers' perceptions of LMS and teaching effectiveness, taking into account mediating variables such as infrastructure and teacher training, in a highly varied Indonesian context. In practical terms, the results obtained are expected to be the basis for educational policy recommendations and school strategies for the development of LMS that is more responsive to the local context, improving teacher training, and improving infrastructure so that the use of LMS is not only a substitute but also a tool that improves the quality and effectiveness of learning.

LITERATURE REVIEW

The Role of Learning Management Systems in Education

The use of Learning Management Systems (LMS) has become an integral part of the digital transformation of education, especially since the COVID-19 pandemic has encouraged the acceleration of technology integration in the learning process. LMS is seen as able to support the flexibility, accessibility, and effectiveness of learning by providing an integrated platform for planning, implementing, and evaluating teaching and learning activities (Alshammari, 2022). This system not only facilitates the management of materials, but also allows for wider asynchronous and synchronous interactions between teachers and students, thereby improving the quality of the learning experience (Rahman et al., 2023).

Teachers' Perceptions of the Use of Learning Management System

Teacher perception is a crucial factor in determining the success of educational technology adoption. Research shows that teachers who have a positive perception of LMS tend to be more motivated to integrate it into teaching practice (Susanti & Firman, 2021). Factors that affect this perception include ease of use, institutional support, availability of infrastructure, and digital literacy competencies (Mokoena, 2023). In addition, previous experience in using

technology also affects teachers' readiness to accept and optimize LMS (Zhao & Weng, 2022).

Learning Management System and Teaching Effectiveness

Teaching effectiveness is often measured through teachers' ability to design learning, manage interactions with students, and conduct comprehensive evaluations. The use of LMS has been proven to increase such effectiveness by providing automation features, tracking student progress, and faster feedback (Chou & Shen, 2021). Studies in some high schools show that LMS helps teachers save time in administration and allows them to focus on the pedagogical aspect (Anderson et al., 2022). Thus, the use of LMS has significant implications for improving the quality of learning.

Obstacles and Challenges in the Implementation of a Learning Management System

Despite its great potential, the use of LMS still faces a number of obstacles. Some teachers report difficulties due to limited digital skills, lack of training, and uneven technological infrastructure, especially in areas with limited internet access (Kamal & Kassim, 2021). In addition, resistance to pedagogical changes is also a challenge, where some teachers are still more comfortable using traditional methods compared to digital-based technology (Mutiarani, 2022). This barrier shows the need for more targeted policy support and training strategies to optimize the use of LMS.

Institutional Support and Teacher Professional Development

The success of LMS implementation is not only determined by the perception of teachers, but also by the support of educational institutions. Research shows that schools that provide ongoing training, technical support, and incentives for teachers have higher rates of LMS adoption (Nguyen & Huynh, 2023). In addition, technology-based professional development programs have been proven to be able to improve teachers' competence in integrating LMS pedagogically, not just administratively (Peterson, 2021). Thus, the synergy between teacher perception and institutional support is a key factor in the success of using LMS in education.

METHODOLOGY

Types and Approaches to Research

This study uses a mixed methods approach with a sequential explanatory design, which combines quantitative and qualitative analysis sequentially. The first stage is in the form of collecting quantitative data through a survey, then followed by qualitative interviews to deepen the findings. This design was chosen because it is suitable for exploring subjective teacher perceptions while analyzing the relationship with teaching effectiveness in a more measurable way (Creswell & Plano Clark, 2021). The mixed approach is also considered to be able to provide a more comprehensive picture of the phenomenon of using Learning Management Systems in the context of education (Gupta & Awasthy, 2022).

Population and Sampling Techniques

The research population is all secondary school teachers who use the Learning Management System in three regions, namely Malang, Semarang, and South Sulawesi. The sampling technique used is non-probability with a purposive sampling approach, because the researcher targets participants who have direct experience in the use of the Learning Management System. The number of survey respondents was set at 150 teachers with a proportional distribution in each region, while 15 in-depth interview participants were selected based on the variety of teaching experience and the intensity of the use of the Learning Management System. This selection was made so that the data obtained reflected the diversity of teachers' perceptions (Etikan & Bala, 2021).

Data Collection Techniques

Quantitative data was collected using a five-point Likert scale-based questionnaire, which contained items regarding teachers' perceptions of ease of use, usability, institutional support, and its impact on teaching effectiveness. Some items are adapted from instruments that have been validated in previous research on the adoption of educational technology (Alshammari, 2022; Chou & Shen, 2021). Qualitative data were obtained through semi-structured interviews with question guides that focused on the teacher's experience in integrating the Learning Management System, the obstacles faced, and the strategies implemented. The validity of the instrument was tested through expert judgment, while the reliability of the questionnaire was analyzed using Cronbach's Alpha with a minimum value of 0.70 as an indicator of internal consistency (Tavakol & Wetzell, 2020).

Research Procedure

The research begins with the preparation stage in the form of preparing instruments, testing the validity of the content, and coordinating with schools for licensing. The next stage is the distribution of questionnaires to respondents through online platforms and the collection of results within three weeks. Once the quantitative data was collected, the researcher conducted an initial analysis to identify common patterns, which then became the basis for the preparation of the interview guide. Interviews were conducted online and face-to-face according to the participants' conditions, with recording and transcription to ensure the accuracy of the data. The entire research process follows the principles of research ethics, including informed consent, data confidentiality, and the right of participants to stop participation at any time (Bryman, 2021).

Data Analysis Techniques

Quantitative data were analyzed using descriptive and inferential statistics with the help of the Statistical Package for the Social Sciences software version 26. Descriptive analysis was used to describe the teacher's perception in general, while the comparative test between regions was carried out with variance analysis. For qualitative data, the analysis was carried out with a thematic approach using NVivo 12 software, through open, axial, and selective

coding stages to identify key patterns and themes in the teacher's narrative (Clarke & Braun, 2021). The integration of quantitative and qualitative results is carried out at the final interpretation stage to gain a deeper and more comprehensive understanding of teachers' perceptions of the use of the Learning Management System in improving teaching effectiveness (Mertens, 2020).

RESEARCH RESULT

Teachers' Perception of the Use of Learning Management System

The survey results show that the majority of teachers have a positive perception of the use of the Learning Management System (LMS) in supporting the learning process. Out of a total of 150 respondents, as many as 72% stated that LMS makes it easier for them to access and organize learning materials more systematically. Teachers admit that the features of uploading documents, creating digital modules, and managing schedules in the LMS help them save time and make it easier to distribute materials to students, both in online and face-to-face learning. These findings are in line with previous findings that emphasize that LMS can strengthen the role of teachers in managing learning resources effectively and efficiently.

In addition to the aspect of preparing materials, 68% of respondents assessed that LMS contributes positively to improving interaction with students. The online discussion feature, question and answer forum, and providing feedback through the LMS platform are considered to provide a wider space for participation for students, especially those who tend to be passive in face-to-face classes. Teachers also report that LMS-based interactions allow for more flexible communication because they are not limited to formal lesson hours. This has an impact on increasing student involvement and provides opportunities for teachers to provide more personalized mentoring.

Although the majority of teachers have a positive perception, there are still a number of respondents who face obstacles in the use of LMS. As many as 18.0% of teachers admitted to experiencing technical difficulties when operating certain features, such as creating interactive quizzes, setting up automatic assessments, and utilizing multimedia integration features. This difficulty is generally experienced by teachers who have limited digital literacy or are not used to using learning technology intensively. Meanwhile, 10% of respondents stated that the use of LMS did not have much effect on their performance in teaching, especially for teachers who preferred conventional methods because they were considered more suitable for school conditions or student characteristics. In more detail, the distribution of respondents' answers can be seen in the following table.

Table 1. Teachers' Perceptions of LMS Use

Perception Indicators	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
LMS makes it easy to access materials	45%	27%	15%	9%	4%
LMS improves interaction	39%	29%	22%	7%	3%

Perception Indicators	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
The LMS supports learning evaluation	41%	31%	18%	7%	3%

The table shows that in the indicator "LMS facilitates access to materials," most respondents (72% of the total agreed and strongly agreed) assessed that LMS features were able to speed up the distribution of materials and reduce dependence on print media. On the indicator "LMS improves interaction," 68% of respondents said they agreed or strongly agreed, indicating that digital platforms are able to strengthen communication between teachers and students. Meanwhile, in the indicator "LMS supports learning evaluation," as many as 72% of teachers believe that the use of LMS-based evaluation features, such as online quizzes and automated assessments, makes it easier to monitor student progress. Thus, these findings confirm that in general, teachers have a positive perception of the use of LMS, both in terms of providing materials, learning interactions, and evaluations.

Teaching Effectiveness through the Use of Learning Management System

The results of the research analysis show that the use of Learning Management System (LMS) contributes significantly to increasing the effectiveness of teacher teaching. Survey data shows that 73% of respondents feel higher efficiency in learning planning. This can be seen from the use of LMS features such as academic calendars, the preparation of digital modules, and task management systems that allow teachers to design learning more systematically. With the support of technology, the planning process that previously took a long time can be carried out faster and more structured, thereby reducing the administrative burden on teachers while increasing the focus on pedagogical aspects.

In addition, 69% of teachers reported that LMS makes it easier for them to conduct online classes. Video conferencing features, discussion forums, and collaborative spaces provide a more flexible alternative to interacting with students. Teachers can manage classes synchronously or asynchronously, so student engagement can be monitored continuously. In the context of distance learning or blended learning, this convenience is essential to ensure that the learning process is not only formal, but also interactive and adaptive to the needs of students.

Furthermore, 64% of respondents emphasized increasing the speed of providing feedback as one of the main advantages of an LMS. Through automated quiz features, rubric-based assessment, and comment columns, teachers can provide faster, more precise, and personalized responses to students. Prompt feedback has been shown to increase students' motivation to learn as well as help them understand their strengths and weaknesses in the learning process. Thus, LMS not only accelerates the administrative aspects of

evaluation, but also plays a role in supporting student development-oriented learning strategies.

The results of the variance analysis test (ANOVA) strengthened the descriptive findings by showing significant differences between regions ($p < 0.05$). Teachers in the Semarang area reported a higher level of effectiveness in using LMS than in Malang and South Sulawesi. The average score of teacher effectiveness in Semarang reached 4.3 (scale 1–5), while in Malang it was 4.0, and in South Sulawesi it was 3.8. This difference can be explained by the variation in infrastructure support, local education policies, and the digital readiness of teachers in each region. Semarang, which has relatively better internet facilities and more intensive technology training programs, provides greater opportunities for teachers to maximize LMS features in the teaching process.

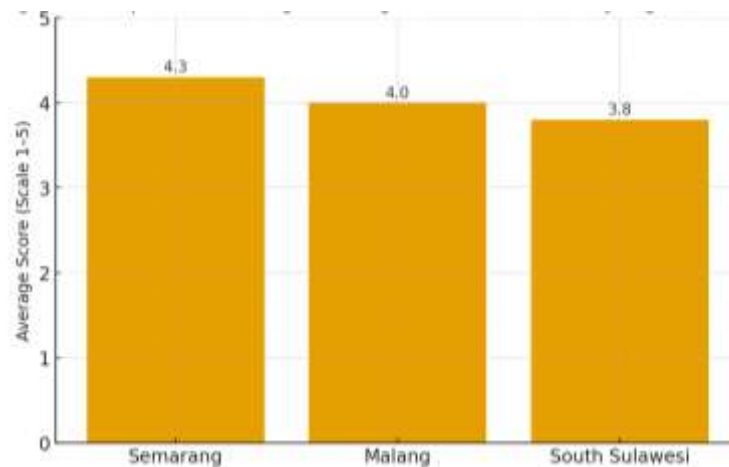


Figure 1. Comparison of Average Teaching Effectiveness Scores by Region (Scale 1–5: Semarang = 4.3; Malang = 4.0; South Sulawesi = 3.8)

Figure 1 illustrates a comparison of the average teaching effectiveness score by region. It can be seen that teachers in Semarang consistently report higher scores than the other two regions. These findings show that the success of LMS implementation is greatly influenced by contextual factors such as technological readiness, institutional support, and learning culture that is adaptive to digital innovation. Thus, while LMS has great potential in improving teaching effectiveness, its utilization still depends on supportive local conditions.

Barriers in the Use of Learning Management Systems

In addition to a number of positive findings related to the perception and effectiveness of the use of the Learning Management System (LMS), this study identifies various obstacles faced by teachers in its implementation. Of the 150 respondents, as many as 35% admitted to facing limited technological infrastructure, especially unstable or limited internet access in the South Sulawesi region. This problem makes it difficult for some teachers to upload learning materials, monitor student work online, or interact through forum and video conferencing features. This condition shows that the potential of LMS cannot be fully utilized without adequate infrastructure support, so the quality and effectiveness of teaching can be affected.

In addition to infrastructure factors, around 29% of teachers stated that lack of technical training is a major obstacle to using LMS optimally. Teachers who don't get intensive training tend to only take advantage of basic features, such as uploading documents or creating simple quizzes, without optimizing for automatic evaluation features, multimedia integration, or student data analysis. Age factors and teaching experience also affect barriers to using LMS. The results of the analysis showed that teachers with more than 20 years of experience tended to have lower perception scores than younger teachers or teachers with less than 10 years of experience. Older groups of teachers generally take longer to adapt to LMS features and tend to feel less confident in utilizing digital technology intensively. This shows that there is a digital competency gap between generations of teachers that can affect the effectiveness of LMS implementation.

In addition to technical and demographic constraints, the study also found cultural factors and personal attitudes that influence the use of LMS. Some teachers still show resistance to pedagogical changes and feel more comfortable with traditional methods, especially when dealing with students who are not yet familiar with digital-based learning. Around 15% of respondents revealed that they need additional motivation and support from colleagues and institutions to optimize LMS in the teaching process.

Overall, these barriers show that the success of using an LMS is determined not only by positive perception or availability of features, but also by infrastructure support, ongoing training, teachers' digital readiness, and a learning culture that is adaptive to technological innovation. Understanding these barriers is important to design appropriate intervention strategies, such as providing regular training, improving the quality of the internet network, and assisting the use of LMS so that its use can be maximized in all research areas.

Qualitative Findings from In-Depth Interviews

The results of in-depth interviews with 15 teachers provide a richer and more detailed perspective on the perception and experience of using the Learning Management System (LMS) in the learning process. In general, teachers think that LMS helps them design more structured, planned, and transparent learning. Some teachers stated that this platform makes it easier to prepare syllabus, distribute materials, and set assignment schedules, thereby reducing the administrative burden and allowing them to focus on the pedagogical aspect. One of the teachers said, "*With LMS, I can prepare learning materials much more neatly and all students can access them whenever they need them*" (interview, K01, June 10, 2025).

In addition to the ease of planning, teachers also emphasized the flexibility of the LMS in providing assessment and evaluation of learning. Automated quizzes, online assignments, and feedback columns allow teachers to provide faster and more accurate responses to students. Another teacher revealed, "*Now I can immediately give grades and comments on students' assignments without having to wait for the next face-to-face meeting*" (interview, K04, June 12, 2025). This shows

that LMS plays an important role in speeding up the evaluation process and increasing student engagement.

The findings also show that institutional support is an important factor in the effectiveness of LMS use. Teachers who receive intensive training and technical guidance feel better able to optimize all the features of the LMS. On the other hand, teachers who lack this support tend to only take advantage of basic functions. One of the teachers emphasized, *"The training from the school really helped me understand the various features of the LMS, otherwise I would only use the simplest"* (interview, K07, June 15, 2025).

In addition to technical support, teachers' motivation and personal readiness factors also affect the perception of the LMS. Teachers who have more technology experience and an open attitude towards digital innovation show higher perception scores. One teacher stated, *"At first I was a bit hesitant because I wasn't used to it, but after trying it for a few weeks, I felt that the LMS really helped me teach more efficiently"* (interview, Q02, June 11, 2025).

The obstacles faced by teachers were also revealed in interviews. Some teachers highlight technical and infrastructure barriers, such as slow internet networks or limited devices. Another teacher emphasized the importance of peer mentoring to adapt teaching methods to LMS. One of the respondents said, *"Sometimes the internet breaks in the middle of online classes, so I have to be ready for alternatives, this is very challenging, especially in remote areas"* (interview, K05, June 13, 2025).

Some teachers emphasize that the use of LMS not only impacts administrative efficiency, but also affects creativity and innovation in learning. Teachers who took advantage of multimedia features, video integration, and discussion forums reported increased student participation. One of the informants said, *"I can make online learning videos and discussions, students become more active and enjoy learning"* (interview, K09, June 16, 2025).

In terms of overall perception, teachers consider that LMS helps them adapt learning methods according to students' needs, especially in the era of distance learning and blended learning. Another teacher added, *"With an LMS, I can tailor the material to the students' abilities and provide additional exercises according to their needs"* (interview, Q03, June 11, 2025). Some teachers suggested the need for stronger integration of school policies and systemic support so that the LMS can be used to its full potential. One of the teachers said, *"Schools should provide regular training and supporting facilities so that all teachers can optimally use LMS"* (interview, K08, June 15, 2025). These findings confirm that teachers' positive perceptions of LMS are not only influenced by personal factors, but also by the work environment, institutional support, and readiness of technological infrastructure. Overall, these qualitative results reinforce the quantitative findings, showing that LMS has a strategic role in improving teacher teaching effectiveness, but its implementation remains dependent on technical support, training, and readiness of teachers and institutions.

DISCUSSION

The results of the study show that the majority of teachers have a positive perception of the use of Learning Management System (LMS) in supporting the learning process. As many as 72% of teachers consider that LMS makes it easier

for them to access and organize learning materials more systematically. The features of uploading documents, creating digital modules, and managing schedules allow teachers to save time and improve the efficiency of distributing materials to students, both in online and face-to-face learning. These results are consistent with previous research that emphasizes that LMS plays a role in strengthening teachers' ability to manage learning resources effectively and efficiently (Supiani et al., 2024). In addition, 68% of teachers consider that LMS contributes positively to improving interaction with students. The online discussion feature, Q&A forum, and feedback through the LMS provide a wider space for participation, especially for students who tend to be passive in face-to-face classes. LMS-based interactions also allow for more flexible communication as they are not limited to formal lesson hours, so student engagement increases and teachers can provide more personalized mentoring.

The use of LMS has also been shown to increase teaching effectiveness. As many as 73% of teachers report higher efficiency in learning planning, with the use of academic calendar features, digital modules, and structured assignment management. 69% of teachers state that LMS facilitates online classes, allowing them to manage synchronous and asynchronous interactions with students. In addition, 64% of teachers acknowledged an increase in the speed of giving feedback, which supports a faster and more personalized strategy for developing students' competencies. The results of the ANOVA test showed significant differences between regions, with teachers in Semarang reporting higher effectiveness in LMS use than in Malang and South Sulawesi. This difference is likely influenced by infrastructure readiness, local policy support, and more intensive technology training in Semarang (Ali et al., 2024).

While the overall findings were positive, the study also identified barriers that affect the utilization of LMS. As many as 35% of teachers face limited infrastructure, especially unstable internet access in the South Sulawesi region, thus limiting teachers' ability to upload materials, monitor assignments, or facilitate online interactions. Additionally, 29% of teachers highlight a lack of technical training, which leaves them using only basic LMS features. Age and experience factors also play a role, with teachers with more than 20 years of experience tending to have lower perceptions than younger teachers, indicating a digital competency gap between generations of teachers. Some teachers also emphasize resistance to pedagogical change, feeling more comfortable with conventional methods, so additional motivation and institutional support are needed for the LMS to be optimized. These findings are in line with previous research that emphasizes that the success of LMS implementation is influenced not only by positive perceptions of teachers but also by infrastructure factors, training, and systemic support (Almahdi & Alenezi, 2023; Chen et al., 2021).

Qualitative findings from in-depth interviews with 15 teachers reinforce the quantitative results and add insight into teachers' real-life experiences using the LMS. The teacher stated that the LMS makes it easier to prepare the syllabus, set the task schedule, and distribute the material, so that the administrative burden is reduced and the pedagogical focus increases. Teachers also emphasize the flexibility of LMS in providing quick assessments and feedback to students.

Institutional support in the form of ongoing training and technical guidance is proving to be important for teachers to be able to optimize all LMS features, while teachers who lack support tend to use basic functions. Motivation factors, personal readiness, and teachers' technology experience also affect the perception and effectiveness of using LMS. Some teachers also emphasize that LMS can increase creativity in learning, for example with the use of multimedia, video integration, and discussion forums, so that student participation increases. In addition, teachers highlight the need for stronger integration of school policies and systemic support so that the LMS can be utilized to its fullest. Overall, these qualitative findings confirm that LMS has a strategic role in improving teaching effectiveness, but its implementation is highly dependent on teacher readiness, institutional support, and the availability of technological infrastructure.

This research makes an important contribution to the development of education, especially in the context of the use of technology to improve teaching effectiveness. The results of the study confirm that LMS not only facilitates the preparation of materials and learning evaluation, but also strengthens teacher-student interaction and encourages more adaptive and participatory learning. The study also highlights the factors that support and inhibit the implementation of LMS, which are the basis for recommendations for educational institutions to provide regular training, infrastructure improvements, and policy support so that the LMS can be used optimally. These findings can serve as a reference for further research assessing the long-term impact of LMS use on student learning outcomes as well as teachers' pedagogical practices.

CONCLUSION AND RECOMMENDATION

This study shows that teachers' perceptions of the use of Learning Management System (LMS) play a significant role in increasing teaching effectiveness. The majority of teachers consider that LMS facilitates access and preparation of learning materials, strengthens interaction with students, and supports learning evaluation in a more structured and efficient manner. The use of LMS features has been shown to improve learning planning, online classroom implementation, and accelerate feedback, while qualitative findings confirm that institutional support, ongoing training, and teacher readiness are key factors in optimizing LMS utilization.

In addition to the positive findings, the study also identified obstacles that affect the implementation of LMS, such as limited infrastructure, differences in digital literacy between teachers, and resistance to pedagogical changes. The results of the research make a theoretical contribution to the development of an educational technology adoption model and practically serve as a basis for recommendations for schools to improve teacher training, technical support, and strategic policies in LMS integration. Overall, teachers' positive perceptions of LMS have been proven to support increasing teaching effectiveness while encouraging more adaptive and sustainable digital education practices.

ADVANCED RESEARCH

Future research could explore how teachers' perceptions of Learning Management System (LMS) usage evolve over time and how these perceptions influence student engagement and learning outcomes. Longitudinal or mixed-method studies could provide deeper insights into the relationship between digital literacy, pedagogical adaptation, and technology acceptance. Comparative studies between schools with varying levels of infrastructure and institutional support would also help identify critical success factors for effective LMS implementation.

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