

# SERVICE QUALITY AS THE CRITICAL DIMENSION OF LEARNING MANAGEMENT SYSTEM QUALITY IN EDUCATION SERVICE PROVIDER: EVIDENCE FROM INDONESIA

Dwi Putri Ayuningtyas<sup>1</sup>, Nur Budi Mulyono<sup>2</sup>

<sup>1</sup> School of Business and Management, Institut Teknologi Bandung

<sup>2</sup> School of Business and Management, Institut Teknologi Bandung

E-mail: <sup>1)</sup> [dwiputri.ayuningtyas13@gmail.com](mailto:dwiputri.ayuningtyas13@gmail.com) , <sup>2)</sup> [nurbudi@itb.ac.id](mailto:nurbudi@itb.ac.id)

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## Abstract

The issue of digitalization of education has led to the increased dependency on Information Systems (IS), especially Learning Management Systems (LMS), to provide continuity of learning after the COVID-19 pandemic situation. At Edulab, as a large learning service provider in Indonesia, LMS works as a central of learning provision, evaluation, communication, and academic tracking. Despite the strategic role, there are still frequent problems like unreliable access, incomplete evaluation, flawed data, and deteriorated performance when the system is at its peak usage, and it interferes with the learning processes and lowers the level of user confidence.

This paper discusses the effect of LMS quality on service delivery, satisfaction among users and effectiveness of the entire platform at the institution. It is being analyzed in terms of the DeLone and McLean Information System Success Model, which is being supplemented by the Technology-Organization-Environment (TOE) framework. The mixed method was used, which integrated a survey of 1,081 users of the LMS who were estimated through Structural Equation Modeling (SEM) and a semi-structured interview with key stakeholders of the management. The results suggest that system, information, and service quality are very powerful predictors of user satisfaction with service quality coming out as the most significant factor in LMS effectiveness in service-oriented institutions of learning.

**Keywords:** Education Technology, Information System Quality, Learning Management System, User Satisfaction

## 1. INTRODUCTION

The educational services have demonstrated a wider shift to digital transformation following the COVID-19 pandemic scenario where the Information Systems (IS) have been critical in automating academic and operational operations and assisting in real-time accessible data, analysis, and decision-making. IS supports more than administrative efficiency, it supports pedagogical innovation through personalized learning pathways,

adaptive feedback mechanisms, and data-driven student support, positioning technology as a strategic asset in educational service delivery (Cazorla et al., 2022; Ishii & Tamaki, 2009).

The increased nature of technology has enhanced the strategic importance of LMS in schools. LMS facilitates the flexibility of learning through the accessibility of the learning resources and the ability to use real-time data to detect the problems with the learning early enough, provide personalized feedback, and track the progress of the students (Suryanarayana et al., 2024). At the organizational level, previous research indicates that successful digital transformation enhances the resilience of the institution through matching internal capabilities, technological infrastructure, and service quality outputs. One of the indicators is the use of integrated digital platforms and data-driven decision-making, which is deemed significant in sustaining the quality of education in uncertainty conditions and disruption, as evidenced by institutions of higher learning in South Asia (Gull et al., 2023).

LMS plays a very important role in the education sector as it facilitates education as well as management. It assists in managing, organizing, and delivering courses and providing the teachers with opportunities to plan, monitor, and evaluate learning. The engagement of LMS and the ability to control their work also provide a teacher with more freedom in learning. LMS is a course delivery system as well as a teaching tool, which enhances motivation, satisfaction, and learning experience at schools (Balkaya and Akkucuk, 2021).

Although the strategic prospects exist, the deployment of the IS, especially LMS in Edulab still finds some difficulties related to the reliability, accessibility and performance of the systems. System errors, slow response times, and poor access to learning materials are technical disruptions that may have an adverse effect on user experience and satisfaction, weakening trust in institutional services. In service-oriented educational institutions, such reliability problems can worsen the perceived quality of the service and negatively affect attitudes to the long-term engagement of the user in the institution (Edulab). This paper places Edulab, the non-formal education institution in Indonesia, a large-scale education service provider operating in various cities in Indonesia as an empirical setting to investigate the effect of quality in the implementation of IS on the service user perceptions and the service delivery outcome within the education service industry.

To systematically examine these issues, this study adopts an integrated framework based on the DeLone and McLean IS Success Model (DNM) and the Technology–Organization–Environment (TOE) framework. DNM provides a multidimensional lens for evaluating IS success through system quality, information quality, service quality, user satisfaction, and individual and organizational impacts (DeLone & McLean, 2003; Rulinawaty et al., 2024).

However, although DNM can measure the performance of an LMS and provide value, it is not reliable to fully clarify the situational circumstances under which the implementation of a system occurs. This is supplemented by the TOE framework as it takes into

consideration the technological potential, organizational preparedness and environmental forces that influence system adoption and usage within Edulab. This composite view is particularly applicable to the case of non-formal education providers in Indonesia where digital systems must perform under the complicated organizational frameworks, high-user demands, and high competition levels.

## 2. RESEARCH METHOD

A mixed-methods research design was employed to guide data collection, analysis, and interpretation. Mixed-methods research balances quantitative and qualitative methods to allow an in-depth comprehension of the mechanisms of the effects of the LMS on service delivery and performance through an educational service organization. This design facilitates the analysis of the quantifiable relationships of variables and the real user experiences and contextual aspects that develop system effectiveness.

IS evaluation studies require mixed-method research, through triangulation, of numerical results with qualitative ones, which makes the validity and richness of interpretations more effective (Castro et al., 2010). In this study, quantitative techniques were employed to determine the effects of IS on performance and user satisfaction, and quantitative techniques were employed to examine the perceptions of the stakeholders, the challenges encountered in the implementation process, and the context of the organization.

Surveys were employed to do quantitative assessments of system quality, information quality, service quality, user satisfaction, and perceived benefits. interviews were used to learn more about user experiences, organizational support and contextual issues that were associated with the LMS implementation. The proportion-based sampling formula put forward by Israel (1992) was used to calculate the sample size of the survey used in this study based on the 95 percent of confidence level and 5 percent margin of error. Since the system has around 6,000 users, the sample should have been at least 375 respondents, as this was the estimated population.

Quantitative data were analyzed using descriptive statistics to summarize trends and distributions, followed by Structural Equation Modelling (SEM) to test the measurement and structural relationships among variables. SEM was adopted to simultaneously assess measurement validity and causal relationships within multidimensional models (Tarka, 2017).

The thematic analysis was the method of qualitative data analysis that was used according to the approach of Braun and Clarke (2006). The transcripts of interviews were coded and incorporated in corresponding themes according to technological, organizational and environmental aspect of TOE framework. An analytical framework will allow generating a clear and systematic understanding of the combination of internal capabilities,

managerial support, and external pressures to affect the effectiveness of LMS (Nazir et al., 2025; Satyro et al., 2024).

By integrating quantitative and qualitative findings, the study provides a comprehensive evaluation of IS implementation at the institution and presents evidence-based insights into the factors that shape LMS performance and service quality in the education service industry.

### 3. RESULTS AND DISCUSSION

This study explores the relationship between IS quality dimensions and user satisfaction, and their effects on the individual and organizational level within an educational service context. A total of 1,081 survey responses from LMS users at the institution were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM), complemented by qualitative analysis from semi-structured interviews with key organizational stakeholders.

#### 3.1 Quantitative Analysis

PLS-SEM was used to test the measurement model in order to assess reliability and validity of all the constructs. The results of factor loading indicate that all the indicators of system quality, information quality, service quality, user satisfaction, individual impact, and organizational impact are above the recommended levels of 0.70 which is to say that there are strong relationships between the observed indicators and their respective latent constructs. This means that the constructs are reliably and validly measured and hence the analysis can be furthered to the structural model to test the relationships between variables.

**Table 1** Summary of Constructs, Indicators, Codes, and Loading Factors

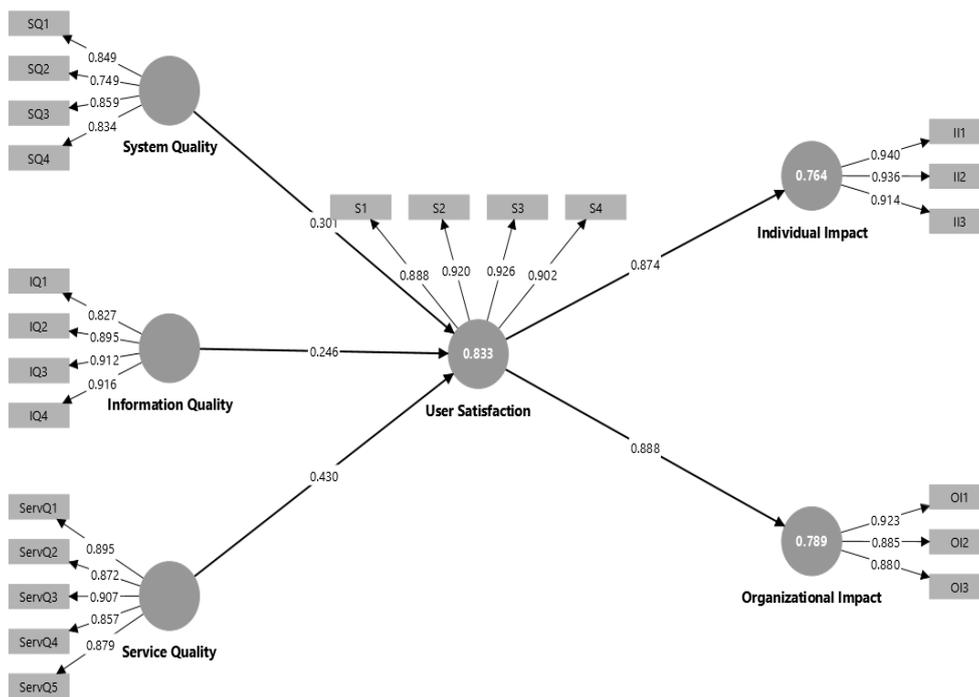
Variables	Indicators	Code	Loading Factor
System Quality	Edulab LMS is easy to use	SQ1	0.849
	Edulab LMS rarely to have trouble	SQ2	0.749
	Access to the LMS is always smooth and quickly	SQ3	0.859
	The LMS menu layout is attractive and easy to understand	SQ4	0.834
Information Quality	The information provided is accurate	IQ 1	0.827
	The required information available on time	IQ 2	0.895
	The displayed contents are relevant for users	IQ3	0.912

	The provided reports are easy to understand	IQ4	0.916
Service Quality	The system usage guidelines are clear and easy to follow	ServQ1	0.895
	Technical support team is responsive to solve troubles	ServQ2	0.872
	Support staff assists professionally	ServQ3	0.907
	Edulab provides training and socialization of LMS usage	ServQ4	0.857
	Management team always support LMS usage continuously	ServQ5	0.879
Individual impact	The available features are relevant to users needs	II1	0.940
	The information in LMS help users gain knowledge and improve performance	II2	0.936
	myEdulab ease communication between students, teachers, and parents	II3	0.914
Organizational Impact	LMS makes learning process more effective and efficient	OI1	0.923
	The system training is clear and useful	OI2	0.885
	Edulab's LMS is competitive with LMS from other competitors	OI3	0.880
Satisfaction	Users are satisfied with system performance	S1	0.888
	Users are satisfied with information that is provided in Edulab LMS	S2	0.920
	Users are satisfied with LMS service	S3	0.926
	The system meets users' expectation	S4	0.902

**Source:** *Data Processed, 2026*

Structural model results reveal that System Quality, Information Quality, and Service Quality all have positive and significant effects on User Satisfaction. Among these, Service Quality emerged as the strongest predictor of User Satisfaction ( $\beta = 0.430$ ,  $p < 0.001$ ), followed by System Quality ( $\beta = 0.301$ ,  $p < 0.001$ ) and Information Quality ( $\beta = 0.246$ ,  $p < 0.001$ ). These findings support prior IS success research, which emphasizes that user satisfaction is shaped not only by technical performance and information accuracy but also by the quality of support services surrounding the system. The standardized beta coefficient

( $\beta$ ) is used to demonstrate the strength and direction of the relationship between each independent variable with the dependent variable; the larger is the  $\beta$  coefficient, the more the variable influences User Satisfaction. In the meantime, the p-value represents the statistical significance of a particular relationship, which is the likelihood that the observed effect can have been achieved due to randomness. This p-value of below 0.001, implies that the association is very significant, with very strong evidence to prove that the effect is not incidental.



PLS-SEM Diagram

User Satisfaction, in its turn, showed a very high impact on both Individual Impact (0.874,  $p < 0.001$ ) and Organizational Impact (0.888,  $p < 0.001$ ). The outcome confirms that the mediating value of satisfaction is observed in the DeLone and McLean IS Success Model, meaning that positive user experiences are converted into enhanced personal performance and extended organizational performance. The dominance of Service Quality shows how human and organizational support in the application of educational IS is crucial. Since the service-oriented business model of Edulab is characterized by personalized tutoring, close mentoring, and frequent contact between students, teachers, and the staff, a user can be very sensitive to the responsiveness, the clarity of guidance, and continuous support. Thus, the more visible and immediate aspects of the services tend to be more immediate and affecting than the functionality of the system or information content.

### 3.2 Qualitative Analysis

Qualitative analysis structured using the Technology–Organization–Environment (TOE) framework, provides deeper explanation for the quantitative results. Regarding the technological side, interviewees consistently highlighted system instability, performance issues during peak usage, and limited feature maturity as major challenges. These technical weaknesses disrupt critical academic activities such as assessments and try-outs, reducing trust in the LMS as a fully reliable platform.

On the organizational perspective, a lack of feature awareness, and a lack of issue-reporting mechanism became the key obstacles. Numerous users were not guided properly to use the LMS, and there was a lack of effective communication channels between the branches and the ICT functionality which resulted in the reactive issue-solving instead of systematic enhancement. These organizational weaknesses contribute to the reasons why the quality of service, which is mainly provided through human response, is compensative in maintaining satisfaction.

In the environmental aspect, the increase in user expectations and competitive force plays a key role in influencing the LMS perceptions. The users benchmark the LMS against the commercial digital systems and competitor systems that provide better performance and advanced analytics. Although this puts strain on the improvement of technology, it also heightens the significance of ensuring high service support in relation to keeping expectations high in the process of system development.

The qualitative findings suggest that the success of the LMS depends on more than just the technology itself. System problems and limited training mean that users rely heavily on support from staff, while high expectations and competition make good service even more important. This helps explain why service quality has the strongest influence on user satisfaction in the quantitative analysis.

### 3.3 Discussion

This research demonstrates that the success of Learning Management Systems (LMS) in education service institutions is to be understood as a service-dominant phenomenon rather than only a technological phenomenon. Although the conventional approach to implementing IS involves ensuring the stability of the system and its interface, as well as data accuracy, the present study indicates that these factors are inadequate to achieve a meaningful success of the system in service-intensive educational setting.

The superiority of Service Quality means that the adoption and further usage of the LMS strongly relies on the effectiveness with which the institution accommodates the users prior, throughout, and following the contact with the system. System failure or ability constraints to provide feedback on time are bound to happen in organizations like Edulab where students, teachers, and parents must engage regularly with one another. And it is not

the absence of problems that gives the user satisfaction but the speed, clarity and professionalism which the issues are resolved. This does not put the strategic focus on developing a perfect system but a responsive service ecosystem of the system.

The strong mediating effect of User Satisfaction suggests that investments in technology create value only when users adopt the system both intellectually and emotionally. Strong service support, training, and communication build trust and comfort, encouraging continued use and deeper engagement even when technical quality is not optimal. Furthermore, service quality can partially compensate for technological limitations in institutions with limited budgets, legacy systems, or rapid digital change.

In another hand, Environmental forces that are apparent in the TOE analysis, specifically the increasing user expectations and the threat shown by newer and more sophisticated digital platforms, imply that the success of LMS is considered through a market-based service image, rather than the internal IT images. Service responsiveness, quality of communication, and support reliability fall under this category of differentiators and are sometimes even more noticeable than features of the system.

#### **4. CONCLUSION**

This study examined how the quality of Information Systems (IS), particularly Learning Management Systems (LMS), influences user satisfaction and subsequent individual and organizational impacts within a non-formal education service context. By integrating the DeLone and McLean IS Success Model (DNM) with the Technology–Organization–Environment (TOE) framework, the study provides a comprehensive view of both system performance and the contextual conditions that shape LMS effectiveness.

In the quantitative findings, quality of systems, quality of information and quality of services have a substantial influence on users' satisfaction with services quality being the most powerful determinant. It was also established that the user satisfaction at a high level mediates the relationship between the quality of IS and individual and organization impacts, and the presence of positive user experience is critical in terms of transferring technological investment into valuable educational and organizational outcomes. These results prove the model of DNM and emphasize the key place of satisfaction in IS success in the education field. These results can also be explained by the qualitative results that indicate that technological constraints, including system instability and lack of feature maturity, in combination with organizational gaps in training and communication, have the effect of making users greater reliant on human support. Meanwhile, the growing demands of the user and competition in the education market precondition the growth of the responsive and reliable service significance. This background is the reason why, at this stage, service quality will dominate in the formation of user satisfaction although the technical and information quality are not optimal yet.

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