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The Mediating Role of User Satisfaction in the Relationship Between Information Systems Service Quality and Individual Performance in Malang University-Level e-Learning

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Abstract

This research investigates the multifaceted landscape of online education for students of higher education within Malang City, Indonesia. In today's digital learning era, the quality of Information System Service in online educational platforms stands as a critical factor. This study extends its scope beyond a straightforward examination of the direct relationship between Information Systems Service Quality and User Satisfaction by introducing Individual Performance as the final dependent variable, rendering User Satisfaction to be a mediating variable. Through meticulous quantitative analysis employing SmartPLS 3.0, this study unravels the fact that User Satisfaction emerges as a complement partial mediating agent, positively influencing the association between Information Systems Service Quality and Individual Performance for higher education students in Malang. This underscores the role of contented students in amplifying the positive effects of Information Systems Service Quality on their academic achievements. Beyond contributing to the comprehension of online education, this research holds substantial implications for educational institutions and policymakers. It underscores the necessity of adopting a comprehensive approach that intertwines Information Systems Service Quality and Student Satisfaction to foster successful and satisfied online learners, not only in Malang City but also in broader contexts.

Keywords: *E-learning, Individual Performance, Information Systems, Information Systems Service Quality, User Satisfaction*

INTRODUCTION

In recent years, the landscape of education in Indonesia has undergone a profound transformation, largely driven by the emergence of e-learning. This transformation has been accelerated and further emphasized by the global COVID-19 pandemic. E-learning has not only become a necessity during these challenging times but has also shown its potential to continue transforming education in Indonesia even after the pandemic subsides. The usage of e-learning in Indonesia has seen significant growth in recent years. As of 2022, it was reported that there were approximately 20 million users of online learning platforms in Indonesia. This number is projected to increase further, with a market forecast suggesting a growth rate of 8.49 percent from 2023 to 2026, resulting in a market volume of US$596.20 million in 2026 (Siahaan, 2023). Additionally, a study brief by UNICEF mentions that in 2020, over 74 percent of the Indonesian population, which translates to roughly 197 million people, had access to digital learning (UNICEF, 2021). E-Learning platform has become a critical platform for students and educators to connect and engage in uninterrupted learning activities although there are still challenges faced by students and lecturers in adapting to it (Aini et al., 2020).

In Malang, a city chockful of universities both state-owned and privately-owned, there are currently 330.000 university students (Humas UMM, 2022) who also have access to e-learning education, a mode of education that has become the norm after the Covid-19 pandemics. Even though the pandemic itself has died down, e-learning is proven to be a learning method that is here to stay (HR Asia, 2020). Thus, a more accurate measurement of e-learning success must be made and not only should it be

satisfactory for the students as users, but also be beneficial to the student's academic performance.

In this research, we examine three critical variables pertaining to the efficacy of university-level e-learning: Information Systems Service Quality (referred to as "X"), User Satisfaction (termed "Y1"), and Individual Performance (designated as "Y2"). The X variable, Information Systems Service Quality, holds a central role in e-learning systems. Giatman et al. (2020) emphasize its significance, as it directly impacts user experience and system effectiveness. User Satisfaction (Y1) is a pivotal metric for evaluating e-learning success. Arfan et al. (2021) investigated factors such as e-learning attitude, quality, and flexibility, highlighting its central role in effectiveness. Assessing Individual Performance (Y2) is crucial in determining overall e-learning success. Laksana (2020) studied students' perceptions, underscoring the importance of individual performance in evaluating e-learning initiatives.

Most other research about e-Learning in Indonesia were done by examining only User Satisfaction (Alamsyah et al., 2023; Idkhan & Idris, 2023; Marlina et al., 2021; Pangarso & Setyorini, 2023) or Student Performance (Mukhibat & Effendi, 2023; Purba et al., 2023; Turmuzi & Lu'luilmaknun, 2023). The uniqueness of this research lies in its focus on elucidating the relationship of Information Systems Service Quality on both User Satisfaction, and Individual Performance within the e-learning landscape of Indonesian universities especially in Malang City. By emphasizing the significance of individual performance as a critical metric alongside user satisfaction, this study aims to provide a comprehensive understanding of e-learning success beyond immediate satisfaction metrics. This approach goes beyond prior studies that may have primarily focused on satisfaction without delving into the broader impact on academic outcomes. In summary, this research fills a crucial gap by examining not only individual academic performance but also how user satisfaction plays an important role to enhance Information Systems Service Quality in influencing individual academic performance, offering a nuanced perspective on e-learning effectiveness in Indonesian higher education. This unique approach contributes to the growing body of knowledge on e-learning's impact and can inform more targeted strategies to enhance educational outcomes in the digital era as per the necessity mentioned in UNICEF's 2021 study brief on digital learning in Indonesia.

LITERATURE REVIEW

The grand theory underpinning this research is the Delone and McLean Information Systems Success Model (DeLone & McLean, 1992; DeLone & McLean, 2003; DeLone & McLean, 2016). This model is a widely recognized framework used to evaluate and understand the success of information systems, particularly in the context of service quality and its impact on user satisfaction and organizational outcomes. The specific theory of service quality used within the Delone and McLean framework is closely related to the SERVQUAL model, originally developed by marketing academics (Parasuraman et al., 1985) to assess service quality in a broader context. The SERVQUAL model adapted within the Delone and McLean Information Systems Success Model serves as a robust theoretical foundation for this research, enabling a structured and comprehensive assessment of Information Systems Service Quality and its impact on user satisfaction and individual performance in the e-learning domain.

Information Systems Service Quality (ISQ)

The Service Quality of Information System assesses the responsiveness, reliability, and assurance of the support services associated with the information system which means that good Information Systems Service Quality ensures prompt issue resolution and user assistance (Dangaiso et al., 2022). Researchers such as Aldholay et al. (2018) had discovered that Information Systems Service Quality has significantly positive impact on Individual Performance. Furthermore, other researchers such as Pham et al. (2018) and Riandi et al. (2021) also found out that high Information Systems Service Quality positively correlates with user satisfaction which means that satisfying experience leads to greater user loyalty, trust, and a willingness to engage with the system.

User Satisfaction

User satisfaction in e-learning encompasses contentment, engagement, and overall positive experiences among learners using online educational resources (Dangaiso et al., 2022). Studies like the ones done by Lee & Jeon (2020) has demonstrate a positive link between user satisfaction and individual performance in e-learning environments. When learners are satisfied with the online learning platform, they are more likely to be motivated, engaged, and successful in their studies.

Individual Performance

Bazargan's 2021 research defines individual performance in e-learning as outcomes achieved in an online educational environment, including academic achievements, skill acquisition, knowledge retention, and competence. Evaluating individual performance is crucial in gauging e-learning success.

Hypothesis

According to the Delone and McLean model, Information Systems Service Quality (ISQ) directly influences individual performance within e-learning. This relationship is grounded in the notion that high-quality information systems facilitate easier access to

resources, timely support, and effective communication, thereby enhancing students' ability to achieve academic outcomes (Pitt et al., 1995). Aldholay et al. (2020) and Li & Shang (2020) support this hypothesis by demonstrating the positive impact of ISQ on individual performance through improved system reliability, responsiveness, and assurance.

H_1: Information systems service quality significantly affects individual performance

Within the Delone and McLean framework, Information Systems Service Quality directly contributes to user satisfaction by meeting or exceeding user expectations across dimensions such as reliability, responsiveness, assurance, empathy, and tangibles (Pitt et al., 1995). This relationship is further supported by Dangaiso et al. (2022) and Pham et al. (2018), who highlight the positive correlation between ISQ and user satisfaction in e-learning environments.

H_2: Information systems service quality significantly impacts user satisfaction

User satisfaction, a key component of the Delone and McLean model, plays a critical role in shaping individual performance in e-learning. Satisfied users are more likely to engage actively, persist with learning tasks, and ultimately achieve better academic outcomes (Zeithaml et al., 1996). Lee & Jeon (2020) study reinforces this relationship by showing that higher user satisfaction leads to improved individual performance.

H_3: User satisfaction significantly affects individual performance

In the Delone and McLean model, user satisfaction serves as a pathway through which the quality of information systems impacts academic outcomes (Pitt et al., 1995). (Riandi et al., 2021) support this mediation effect while Aldholay et al. (2018) provided empirical evidence about this, suggesting that enhancing ISQ can indirectly improve individual performance by boosting user satisfaction.

H_4: User satisfaction acts as a significant mediating variable in the relationship between information systems service quality and individual performance

For a more comprehensive depiction of the interplay between these variables, please refer to Figure 1.

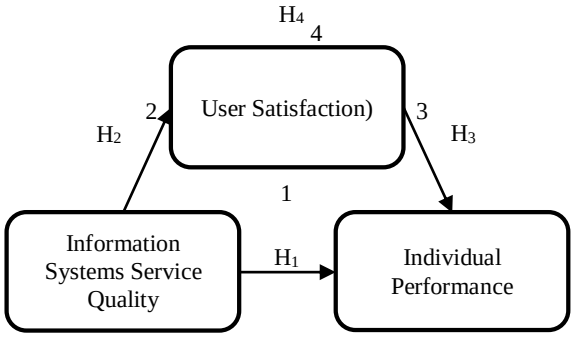

Figure 1. Conceptual Model of this research
Source: Part of conceptual model proposed by Aldholay et al., (2018); Dangaiso et al., (2022); Lee & Jeon (2020); Li & Shang, (2020); Pham et al., (2018); Riandi et al., (2021); Zeithaml et al., (1996)

METHODS

This study employs a quantitative and explanatory research design to examine the relationships among e-learning Information Systems Service Quality (X), user satisfaction (Y1), and individual performance (Y2). Information Systems Service Quality (X) is the independent variable, while Individual Performance (Y2) is the dependent variable and user satisfaction (Y1) is the proposed mediating variable between the two. The research aims to explore how Information Systems Service Quality influences user satisfaction and subsequently affects individual performance within the context of university-level e-learning in Malang. Online questionnaire is used to collect data. The list of related variables, indicators, and questions in the Table 1.

Table 1. Variables, Indicators, and Questions

Variable	Indicator	Question
Information System Service Quality (X) (Aldholay et al., 2020)	Responsiveness	Learning Information System quickly responds to user requests (students)
		The response given by the Learning Information System is accurate (according to request)
	Functionality	Learning Information Systems have featured that user (students) need
		Learning Information Systems have functions required by users (students)
		The Learning Information System feature works well
		Learning Information System functions work well
	Interactivity	Learning Information Systems provide two-way communication facilities
		Interactivity in Learning Information Systems provides a sense of comfort / closeness between students and lecturers
		Interactivity in Learning Information Systems provides a sense of comfort / closeness

Variable	Indicator	Question
		between students and fellow students
User Satisfaction (Y_1) (Aldholay et al., 2020; Chopra et al., 2019)	Satisfaction with Learning	Students are satisfied with the Learning Information System
	Information systems	Learning Information Systems are interesting to use
		Learning Information Systems are not boring when used
	Fulfilment of expectations	Learning Information Systems meet student needs as an e-Learning system
		Learning Information Systems provide useful content
	Interest of continuous usage	Learning Information Systems are feasible to continue to be used after the Covid-19 pandemic
Student Individual Performance (Y_2) (Aldholay et al., 2020)	Performance improvements	Learning Information Systems facilitate the student learning process
		Learning Information System simplifies the process of collecting student assignments
	Increased effectiveness	Learning becomes more effective with the existence of Learning Information Systems
		Students feel more excited about learning through Learning Information Systems
		Learning Information Systems make students more responsible in carrying out assignments
	Time Saving	Learning Information Systems save students time searching for learning materials
		Learning Information Systems save students time in collecting assignments
	Increased knowledge	Learning Information Systems help broaden students' horizons
		Learning Information Systems help fulfill students' curiosity about new knowledge

The population is University students using e-learning in Malang, East Java, Indonesia, numbering 330.000 students (Humas UMM, 2022). Simple random sampling method is used, specifically by assigning research assistants to spread the online questionnaires through online groups related to university students for both private as well as public universities in Malang city. This resulted in total number of samples reaching 424 respondents, higher than the minimum 400 respondents based on the calculation using Slovin Formula (Tejada et al., 2012). The analytical method used is partial least squares path modeling which is analysed using SmartPLS 3.0 as the analytical tool.

RESULTS AND DISCUSSION

Construct Reliability and Validity

The results of the study showed that the measurement model had good validity and reliability. The Cronbach's alpha values for all three constructs (Information Systems Service Quality, User Satisfaction, and Individual Performance) were above 0.7, which indicates good internal consistency reliability. Almost all of the question items have outer loading of above 0.7, except for one of the questions used to measure Individual Performance which has outer loading below 0.7 (0.678), however the AVE values for all three constructs were above 0.5, which in the end indicates good convergent validity. The goodness-of-fit (GoF) value for the model was 0.603, which indicates that the model fits the data to a moderate extent.

Table 2. Construct Reliability and Validity

	Cron-bach's Alpha	R^2 Ad-justed	Com-posite Reli-ability	Average Variance Extracted (AVE)
X- IS Service Quality	0.918	-	0.932	0.604
Y1- User Satisfaction	0.891	0.561	0.917	0.647
Y2- Individual Performance	0.905	0.638	0.922	0.57

$$GoF = \sqrt{Average(R^2 \text{ Adjusted}) \times \text{Average(AVE)}} = 0.603$$

Hypothesis Testing and Discussion

Table 3. Hypotheses Test

Hypo-theses	Path	Coef-ficient	P-Values	Remark
H_1	ISQ→IP	0.381	0.000	Sig
H_2	ISQ→US	0.827	0.000	Sig
H_3	US→IP	0.521	0.000	Sig
H_4	ISQ→US→IP	0.431	0.000	Sig

The research results above show that Information Systems Service Quality (ISQ) has a significant positive effect on both User Satisfaction (US) and Individual Performance (IP) while US to IP is also significant as all of the P-Values are lower than 0.001. The path coefficients provide insights into the strength of the relationships: the coefficient from ISQ to US (0.827) indicates a strong positive influence of Information Systems Service Quality on User Satisfaction, the coefficient from US to IP (0.521) signifies a substantial positive impact of User Satisfaction on Individual Performance, the direct effect from ISQ to IP (0.381) suggests a significant but slightly weaker influence of Information Systems Service Quality on Individual Performance when not mediated by User Satisfaction. The indirect effect of ISQ on IP through US (0.431) is notably higher than the direct effect (0.381). This implies that a substantial portion of the influence of Information Systems Service Quality on Individual Performance operates through the mediation of User Satisfaction.

In other words, the study found that ISQ has a direct effect on IP, as well as a stronger indirect effect on IP through US. This means that ISQ influences IP in two ways: (1) directly, and (2) indirectly through US. The direct effect is the effect of ISQ on IP that is

not mediated by US. The indirect effect is the effect of ISQ on IP that is mediated by US.

The fact that the indirect effect of ISQ on IP through US is statistically significant suggests that US plays an important role in mediating the relationship between ISQ and IP. This means that US is a complementary partial mediator of the relationship between ISQ and IP as both direct as well as indirect relationship are all statistically significant positive ones. The higher magnitude of the indirect effect suggests that improving User Satisfaction might be a more efficient strategy for enhancing Individual Performance compared to solely focusing on enhancing Information Systems Service Quality.

This is a good example of how mediation can be used to understand the complex relationships between variables. By examining the direct and indirect effects of ISQ on IP, we can gain a better understanding of the role that US plays in mediating this relationship.

Conclusion

The results of this research indicate that Information Systems Service Quality significantly impacts Individual Performance within university-level e-learning systems, exerting both direct and indirect influence through User Satisfaction. To enhance individual performance, e-learning providers at the university level should prioritize the enhancement of Information Systems Service Quality and User Satisfaction. This is particularly crucial for institutions situated in Malang, East Java, Indonesia, the specific location of this investigation.

Furthermore, this study holds practical implications. Firstly, university-level e-learning institutions should concentrate their efforts on elevating Information Systems Service Quality. Achieving this entails enhancing the e-learning platform's quality, providing superior customer support, and delivering more pertinent and captivating educational content.

Second, it might be more efficient for university-level e-learning systems providers to put more focus on improving user satisfaction in order to improve individual performance. This can be done by making the e-learning platform easy to use, providing opportunities for students to interact with each other and with instructors, and offering timely and informative feedback.

Thirdly, it is imperative for providers of university-level e-learning systems to acknowledge the pivotal role of user satisfaction in mediating the connection between Information Systems Service Quality and individual performance. This implies that enhancing user satisfaction has the potential to enhance individual performance, regardless of the constancy of Information Systems Service Quality.

This study has several limitations. First, the study was conducted in a single city, Malang, East Java, Indonesia. It is possible that the findings may not be generalizable to other cities outside East Java with different cultures or slightly different educational systems capabilities. Second, the study used a self-report survey, which is subject to biases such as social desirability bias. Third, the study was cross-sectional, so it cannot establish causal relationships between variables.

Future research should address the limitations of this study by conducting longitudinal studies (at least) in multiple cities across different region of Indonesia using a variety of data collection methods to be able to capture a more holistic image of e-learning implementation in Indonesia. Future research should also investigate the causal relationships between Information Systems Service Quality, User Satisfaction, and Individual Performance.

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