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SATISFACTION TOWARD LEARNING MANAGEMENT SYSTEM: EXTENDED SCALE OF EDUCATIONAL SYSTEM QUALITY

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ABSTRACT

Introduction: Consideration of educational system quality in the context of the learning management system has increased during the pandemic period. An inconsistent finding concerning the influence of educational system quality on satisfaction has been identified. To fill this gap in the existing literature, this study aims to extend the educational system quality scale and examine its influence on students' satisfaction.
Methods: Based on an intensive literature review step, device flexibility was proposed as an extended indicator. To validate and examine the proposed hypothesis, this study employed the quantitative method of PLS-SEM. Data were collected from 90 students who actively used learning management systems.
Results: Our findings showed that device flexibility is valid and reliable as an educational system quality indicator. Besides, our proposed hypothesis is also confirmed. Through the structural model assessment, the influence of educational system quality on students' satisfaction is found to be significant.
Conclusion and suggestion: Device flexibility has been proven as an educational system quality indicator. In order to maintain students' satisfaction, system developers are suggested to keep improving learning management system applications, primarily on smartphone devices.

INTRODUCTION

The Learning Management System (abbreviated as LMS) has been widely used in many higher education institutions (Alkhateeb & Abdalla, 2021; Hassanzadeh et al., 2012; Navimipour & Zareie, 2015). According to Kompas (2023), SEVIMA, the most popular LMS in Indonesia, has been implemented in 800 higher education institutions with more than

three million active users. That condition has been directed by several factors, including distance learning necessity, flexibility, and accessibility (Luo et al., 2017; Mushtaha et al., 2022). Rapid advancement of information technology and internet usage is also present in supporting the implementation of LMS (Aboagye et al., 2020; Adzovie & Jibril, 2022; Al Mulhem, 2020). During the pandemic period, most students have no choice but to conduct an offline learning process. LMS, in the pandemic situation, has been implemented to learn, interact with lectures, and complete assignments (Camilleri & Camilleri, 2022).

System quality is one of the determinant factors that lead to students' satisfaction with using LMS (Dangaiso et al., 2022; Lee & Jeon, 2020). Essential studies by (Al-Fraihat et al., 2020; Hassanzadeh et al., 2012) have proposed a specific construct related to system quality. Educational System Quality (abbreviated as ESQ) has been developed to represent the research topic, especially for information systems in higher education. In recent studies, ESQ has stolen the spotlight from many scholars as a determinant factor of students' satisfaction (Al Mulhem, 2020; Al-Fraihat et al., 2020; Alkhateeb & Abdalla, 2021; Almaiah & Alismaiel, 2019; Pham et al., 2019). However, the results of those studies show inconsistent findings that become interesting to be discussed further. Al-Fraihat et al. (2020) failed to prove the significance of ESQ's influence on students' satisfaction. Meanwhile, other studies come out with the opposite result.

Based on the identified research gap, this study evaluates ESQ measurement and examines its impact on students' satisfaction. We propose device flexibility as an extended indicator in the ESQ construct. Technology advancement and the pandemic situation have led to alternative media for effective learning activities (Crawford et al., 2020; Shehzadi et al., 2020; Zhang et al., 2020). Today, LMS has been developed into smartphone apps to provide convenience for users. Finally, this study contributes valuable insights for system developers to evaluate their system apps. Theoretically, an extended indicator provides alternatives for applying the ESQ construct in future works.

LITERATURE REVIEW

DeLone and McLean model raises the concern for system quality, particularly in the information system (IS) study (Dangaiso et al., 2022; Hassanzadeh et al., 2012). The model was revised in 2003, containing several quality dimensions such as information quality, system quality, and service quality. DeLone and McLean have positioned those quality dimensions as the determinant aspects of IS users' behavior (Lee & Jeon, 2020; Mohammadi, 2015). Over time, the implementation of the DeLone and McLean model in the higher education context needs to be adjusted. Therefore, the ESQ construct was suggested by (Hassanzadeh et al., 2012) for gaining model representation in higher education.

The existence of ESQ in an LMS can be identified within several indicators, such as interactivity, learning diversity, and evaluation features (Hassanzadeh et al., 2012; Pham et al., 2019). Interactivity in a learning system is the degree to which students and lecturers can interact with each other. Learning diversity in this context refers to the availability of learning materials in various formats to facilitate different student necessities. Diversified learning materials are crucial in increasing the effectiveness of learning processes. The last one, evaluation features, refers to the system's capabilities to facilitate assignments and assessments in the learning process.

This study proposes device flexibility as an ESQ indicator based on the following reasons. First, the adoption of the ESQ construct in previous studies has not considered alternative access from various devices besides personal computers. Meanwhile, LMS has been designed to be accessible through smartphone devices. Second, in the post-pandemic period, LMS is utilized to support blended learning activities (Prasad et al., 2018; Zhang et al., 2020). Students can take the learning activities independently through their personal devices. Blended learning becomes easy to implement, mainly through smartphone apps. In conclusion, the selection of that proposed quality indicator has considered relevant aspects in the higher education context (Almaiah & Alismaiel, 2019).

Hypothesis Development

Students' satisfaction becomes an important thing, especially for higher education institutions. Today, students have been considered as customers who must get the best services (Lee, 2010; Pham et al., 2019). Therefore, it is essential to assess their satisfaction while using LMS as a learning support system. ESQ becomes a determinant of students' satisfaction in the context of LMS usage. Social interaction in LMS emerges as the dominant ESQ indicator in increasing satisfaction amid LMS users (Almaiah & Alismaiel, 2019; Pham et al., 2019; Xing et al., 2015). Several LMS features such as discussion rooms, instant messengers, and chat provide positive experiences during the learning process. Moreover, the significant influence of system quality on student satisfaction has been confirmed by (Al Mulhem, 2020; Alkhateeb & Abdalla, 2021; Almaiah & Alismaiel, 2019; Dangaiso et al., 2022; Pham et al., 2019). Thus, the following hypothesis is proposed:

H1. Educational system quality positively influences the students' satisfaction

RESEARCH METHODS

Data Analysis

This study aims to validate device flexibility as an additional indicator and examine the proposed hypothesis. Partial least squares structural equation modeling (abbreviated as PLS-SEM) was utilized to accomplish those objectives. PLS-SEM is a multivariate-based technique and is appropriate for exploratory studies (Hair et al., 2019; Sarstedt et al., 2017). PLS-SEM consists of two main stages, namely reflective model assessment and

structural model assessment. A reflective model assessment was conducted to validate our research indicators. Meanwhile, the structural model assessment was needed to examine the proposed hypothesis.

Measurement Scale

Related to indicators in this study, we pointed to the previous literature with the consideration of higher education context. ESQ is described as system quality conforming to features and convenience that facilitate the learning process (Hassanzadeh et al., 2012; Pham et al., 2019). We employed four indicators to assess the ESQ construct, three of which were interactivity, learning diversity, and evaluation features (Almaiah & Alismaiel, 2019; Hassanzadeh et al., 2012; Pham et al., 2019). The last dimension was the proposed indicator to be validated, namely device flexibility. Meanwhile, the students' satisfaction refers to a perception of their experience in using LMS (Hassanzadeh et al., 2012). Three indicators were used to measure students' satisfaction, including enjoyable experience, educational needs, and overall satisfaction (Al-Fraihat et al., 2020; Hassanzadeh et al., 2012). All indicators in this study were presented based on a 10-point Likert scale.

Table 1. Reflective model assessment results

Construct (Indicator)	Loading	Cronbach's Alpha	Composite Reliability
Educational system quality		0.706	0.820
- LMS provides interactivity facilities such as chat, discussion forums, etc.	0.764		
- LMS provides different learning materials such as video, powerpoint, e-book, etc.	0.690		
- LMS provides evaluation features such as weekly assignments and quizzes.	0.711		
- LMS can be accessed via personal devices such as tablets and smartphones.	0.749		
Student satisfaction		0.788	0.874
- Using LMS in my learning activity is an enjoyable experience.	0.902		
- LMS satisfies my educational necessities such as presence, the assignment, discussion, etc.	0.762		
- Overall, I am pleased with the experience of using LMS during my study.	0.839		

Source: Processed data (2023)

Data Collection

Using the purposive sampling method, the students were involved as participants in this study. This kind of sampling is suitable for exploratory research design (Taherdoost, 2016). Purposive sampling allows researchers to gather essential information through a

pre-determined particular setting. The sample requirement refers to students who have used LMS, at least for the past year. Data were gathered using the online questionnaire distributed at the Business Administration Department Politeknik Negeri Madiun. Our online questionnaire was carried out in mid-March 2023. A total of 90 completed responses were obtained and considered valid for further analysis. The total number of respondents has met the minimum sample requirement by referring to the "ten times rule" (Richter et al., 2016). At least, the minimum sample required is ten times the maximum number of structural paths directed at a latent construct. In this study, there is only one path in the structural model.

RESULT AND ANALYSIS

Of the total of our respondents, about 88% were female and the remaining 12% were male. About 73% of them were categorized as second-year students and 27% were third-year students. The first stage in this study verified the reliability and validity of each indicator through the reflective model assessment. As shown in Table 1, Cronbach's Alpha (CA) and Composite Reliability (CR) for each latent construct fulfilled the cut-off value. We used the suggested cut-off value by (Hair et al., 2017) and it should be higher than 0.70. Those sufficient CA and CR values also indicated that internal reliability has been achieved. Validity assessment consists of convergent validity and discriminant validity (Hair et al., 2017). To assess convergent validity, we used an indicator loading value (should be higher than 0.50). As shown in Table 1, we found all indicator loading ranging from 0.69 to 0.90. Meanwhile, discriminant validity was evaluated based on the HTMT ratio. Hair et al. (2017) suggested that the HTMT ratio between latent constructs did not exceed 0.85. Due to the HTMT ratio being identified at 0.56, the discriminant validity has been achieved.

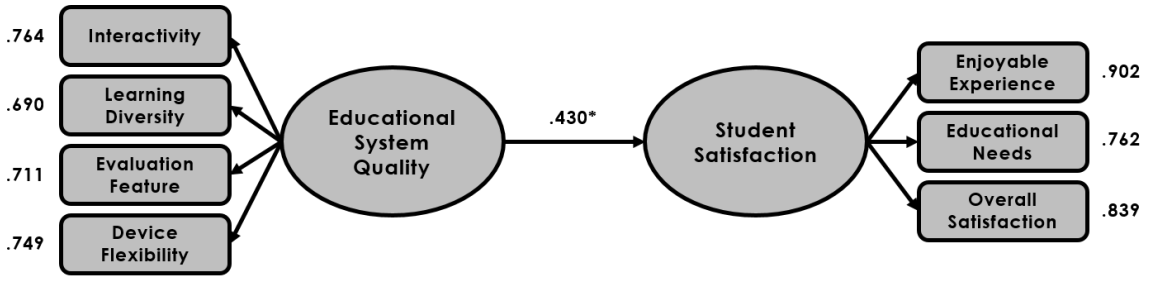

Figure 1. PLS-SEM model

Source: Processed data (2023)

To evaluate our proposed hypothesis, the structural model assessment was conducted with a bootstrapping procedure. This procedure provided a path coefficient in the structural model (see Figure 1). Conforming to (Hair et al., 2017), the significance of the path coefficient was examined using the resulting t-value. As described in Table 2, ESQ has a positive and significant influence on students' satisfaction (t-value > 2.57).

Additionally, the structural model has met predictive relevance since the resulting Q^2 value is greater than zero (Hair et al., 2017).

Table 2. Reflective model assessment results

Hypothesis (Path)	β	t-value	Q^2	Decision
ESQ → Student satisfaction	0.430	5.241	0.113	Accepted

Source: Processed data (2023)

Device Flexibility as an Extended Indicator

Based on the results of the first stage analysis, device flexibility has been identified as a valid and reliable indicator for ESQ. It stands out as the essential finding related to the objectives of this study. Enriching knowledge from previous studies (Al Mulhem, 2020; Al-Fraihat et al., 2020; Hassanzadeh et al., 2012), our findings clarify the important role of device flexibility. The reasonable justification for our finding related to students' necessity in terms of simplicity and mobility. Smartphone technology allows the use of several apps simultaneously on one device (Chou & Chou, 2019). This kind of device is also easy to carry and does not require much space as notebooks. Due to the above reasons, smartphones become the choicest device for supporting learning processes (Mella-Norambuena et al., 2021).

ESQ Influence on Student Satisfaction

This study was conducted based on an inconsistent finding regarding ESQ influence on students' satisfaction. Contrary to the previous work by (Al-Fraihat et al., 2020), this study confirms the significant influence of ESQ on students' satisfaction. This result is also consistent with other previous works by (Al Mulhem, 2020; Alkhateeb & Abdalla, 2021; Almaiah & Alismaiel, 2019; Pham et al., 2019). Hereafter, this study has found interactivity as the most dominant indicator for the ESQ construct. Satisfaction in terms of operating LMS is largely due to the system's capability to facilitate interaction among users (Alkhateeb & Abdalla, 2021; Asad et al., 2021; Daultani et al., 2021). Easier to interact means a greater chance of satisfying users.

CONCLUSION

This study has made a valuable contribution to the existing literature, especially by pinpointing device flexibility as an extended indicator for ESQ. Besides, our results also reveal a significant influence of ESQ on students' satisfaction. As an implication, LMS developers should continue improving their smartphone-based apps. Features that deliver interaction among users should be evaluated periodically to comply with their needs.

Through flexibility and fulfillment of interactivity aspects, it will be the driving force for students' satisfaction.

Although this study provides a new understanding regarding ESQ measurement, two limitations should be considered. First, respondents in this study were limited to only Business Administration students. To gain generalization, we suggest that future studies should involve other students from different backgrounds. Second, related to the inconsistent influence of ESQ on students' satisfaction. We suggest consideration of moderating factors such as gender, study background, and length of use.

REFERENCES

Aboagye, E., Yawson, J. A., & Appiah, K. N. (2020). COVID-19 and E-Learning: The Challenges of Students in Tertiary Institutions. Social Education Research, 1–8. https://doi.org/10.37256/ser.212021422

Adzovie, D. E., & Jibril, A. B. (2022). Assessment of the effects of the Covid-19 pandemic on the prospects of e-learning in higher learning institutions: The mediating role of academic innovativeness and technological growth. Cogent Education, 9(1), 2041222. https://doi.org/10.1080/2331186X.2022.2041222

Al Mulhem, A. (2020). Investigating the effects of quality factors and organizational factors on university students' satisfaction with e-learning system quality. Cogent Education, 7(1), 1787004. https://doi.org/10.1080/2331186X.2020.1787004

Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating E-learning systems success: An empirical study. Computers in Human Behavior, 102, 67–86. https://doi.org/10.1016/j.chb.2019.08.004

Alkhateeb, M. A., & Abdalla, R. A. (2021). Factors Influencing Student Satisfaction Towards Using Learning Management System Moodle: International Journal of Information and Communication Technology Education, 17(1), 138–153. https://doi.org/10.4018/IJICTE.2021010109

Almaiah, M. A., & Alismaiel, O. A. (2019). Examination of factors influencing the use of mobile learning system: An empirical study. Education and Information Technologies, 24(1), 885–909. https://doi.org/10.1007/s10639-018-9810-7

Asad, M. M., Hussain, N., Wadho, M., Khand, Z. H., & Churi, P. P. (2021). Integration of e-learning technologies for interactive teaching and learning process: An empirical study on higher education institutes of Pakistan. Journal of Applied Research in Higher Education, 13(3), 649–663. https://doi.org/10.1108/JARHE-04-2020-0103

Camilleri, M. A., & Camilleri, A. C. (2022). The Acceptance of Learning Management Systems and Video Conferencing Technologies: Lessons Learned from COVID-19. Technology, Knowledge and Learning, 27(4), 1311–1333. https://doi.org/10.1007/s10758-021-09561-y

Chou, H. L., & Chou, C. (2019). A quantitative analysis of factors related to Taiwanese teenagers' smartphone addiction tendency using a random sample of parent-child dyads. Computers in Human Behavior, 99, 335–344. https://doi.org/10.1016/j.chb.2019.05.032

Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, G., Burton, R., Magni, P., & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. Journal of Applied Learning & Teaching, 3(1). https://doi.org/10.37074/jalt.2020.3.1.7

Dangaiso, P., Makudza, F., & Hogo, H. (2022). Modeling perceived e-learning service quality, student satisfaction and loyalty. A higher education perspective. Cogent Education, 9(1), 2145805. https://doi.org/10.1080/2331186X.2022.2145805

Daultani, Y., Goswami, M., Kumar, A., & Pratap, S. (2021). Perceived outcomes of e-learning: Identifying key attributes affecting user satisfaction in higher education institutes. Measuring Business Excellence, 25(2), 216–229. https://doi.org/10.1108/MBE-07-2020-0110

Hair, J. F., Hult, T. M., Ringle, C. M., & Sarstedt, M. (2017). A primer on partial least squares structural equation modeling (2nd ed.). Sage.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hassanzadeh, A., Kanaani, F., & Elahi, S. (2012). A model for measuring e-learning systems success in universities. Expert Systems with Applications, 39(12), 10959–10966. https://doi.org/10.1016/j.eswa.2012.03.028

Kompas.com. (2023). Aptisi Sevima Kolaborasi Atasi Kesenjangan Digital Perguruan Tinggi. https://lestari.kompas.com/read/2023/07/05/070000486

Lee, E.-Y., & Jeon, Y. J. J. (2020). The Difference of User Satisfaction and Net Benefit of a Mobile Learning Management System According to Self-Directed Learning: An Investigation of Cyber University Students in Hospitality. Sustainability, 12(7), 2672. https://doi.org/10.3390/su12072672

Lee, J. W. (2010). Online support service quality, online learning acceptance, and student satisfaction. The Internet and Higher Education, 13(4), 277–283. https://doi.org/10.1016/j.iheduc.2010.08.002

Luo, T., Murray, A., & Crompton, H. (2017). Designing Authentic Learning Activities to Train Pre-Service Teachers About Teaching Online. The International Review of Research in Open and Distributed Learning, 18(7). https://doi.org/10.19173/irrodl.v18i7.3037

Mella-Norambuena, J., Cobo-Rendon, R., Lobos, K., Sáez-Delgado, F., & Maldonado-Trapp, A. (2021). Smartphone Use among Undergraduate STEM Students during COVID-19: An Opportunity for Higher Education? Education Sciences, 11(8), 417. https://doi.org/10.3390/educsci11080417

Mohammadi, H. (2015). Investigating users' perspectives on e-learning: An integration of TAM and IS success model. Computers in Human Behavior, 45, 359–374. https://doi.org/10.1016/j.chb.2014.07.044

Mushtaha, E., Abu Dabous, S., Alsyouf, I., Ahmed, A., & Raafat Abdraboh, N. (2022). The challenges and opportunities of online learning and teaching at engineering and

theoretical colleges during the pandemic. Ain Shams Engineering Journal, 13(6), 101770. https://doi.org/10.1016/j.asej.2022.101770

Navimipour, N. J., & Zareie, B. (2015). A model for assessing the impact of e-learning systems on employees' satisfaction. Computers in Human Behavior, 53, 475–485. https://doi.org/10.1016/j.chb.2015.07.026

Pham, L., Limbu, Y. B., Bui, T. K., Nguyen, H. T., & Pham, H. T. (2019). Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam. International Journal of Educational Technology in Higher Education, 16(1), 7. https://doi.org/10.1186/s41239-019-0136-3

Prasad, P. W. C., Maag, A., Redestowicz, M., & Hoe, L. S. (2018). Unfamiliar technology: Reaction of international students to blended learning. Computers & Education, 122, 92–103. https://doi.org/10.1016/j.compedu.2018.03.016

Richter, N. F., Sinkovics, R. R., Ringle, C. M., & Schlägel, C. (2016). A critical look at the use of SEM in international business research. International Marketing Review, 33(3), 376–404. https://doi.org/10.1108/IMR-04-2014-0148

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Partial Least Squares Structural Equation Modeling. In C. Homburg, M. Klarmann, & A. Vomberg (Eds.), Handbook of Market Research (pp. 1–40). Springer International Publishing. https://doi.org/10.1007/978-3-319-05542-8_15-1

Shehzadi, S., Nisar, Q. A., Hussain, M. S., Basheer, M. F., Hameed, W. U., & Chaudhry, N. I. (2021). The role of digital learning toward students' satisfaction and university brand image at educational institutes of Pakistan: A post-effect of COVID-19. Asian Education and Development Studies, 10(2), 276–294. https://doi.org/10.1108/AEDS-04-2020-0063

Taherdoost, H. (2016). Sampling Methods in Research Methodology. International Journal of Academic Research in Management, 5(2), 18–27.

Xing, W., Kim, S. M., & Goggins, S. (2015). Modeling Performance in Asynchronous CSCL: An Exploration of Social Ability, Collective Efficacy and Social Interaction. CSCL 2015 Proceedings.

Zhang, Z., Cao, T., Shu, J., & Liu, H. (2020). Identifying key factors affecting college students' adoption of the e-learning system in mandatory blended learning environments. Interactive Learning Environments, 30(8), 1388–1401. https://doi.org/10.1080/10494820.2020.1723113