ASSESSING THE IMPACT OF SYSTEM QUALITY AND INFORMATION QUALITY ON USER SATISFACTION WITH LEARNING TECHNOLOGY AT MARSUDIRINI FOUNDATION, YOGYAKARTA

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Abstract: *In this comprehensive study, the Marsudirini Foundation in Yogyakarta is examined for the impact of its IT infrastructure on user satisfaction within an educational context, particularly during the transformative era of Industry 4.0 and the COVID-19 pandemic. Utilizing the DeLone and McLean Information Systems Success Model, the research aims to empirically investigate the correlation between system technicalities, information content, and user satisfaction, further offering actionable improvements for the foundation. The mixed-methods approach combines quantitative data from structured questionnaires with qualitative insights from interviews and focus group discussions. The study anticipates providing a robust assessment of the foundation's IT efficacy, enhancing strategies for IT infrastructure, and contributing to the academic discourse on IT in education. Key hypotheses posit that system quality and information quality have significant, positive effects on user satisfaction. The research underscores the critical role of high-quality, reliable information systems in improving user performance and satisfaction, advocating for continuous improvements and strategic initiatives like redesigning the Learning Management System (LMS) and developing Standard Operating Procedures (SOP) for educators.*

Keywords: *User Satisfaction; Information Systems Quality; Educational Technology Management.*

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Introduction

In the context of modern education, marked by the advancement of digital technology and the unforeseen challenges of the COVID-19 pandemic, the Marsudirini Foundation in Yogyakarta stands at a crossroads. This institution, rooted in the progress and excellence of education, grapples with the crucial question of how the quality of system infrastructure and information output affects the satisfaction of its users—educators and students engaged in daily academic activities. This research affirms that in the Industry 4.0 era, characterized by advanced technological fusion, it is imperative to examine the direct impact of IT investments on educational experiences and outcomes.

This study, drawing inspiration from the seminal work of Arvanitis et al., (2016), highlights the potential of IT investments to yield cost savings and quality enhancements. Its goal is to bridge the gap between theoretical promises and practical user satisfaction in an educational setting. The study will employ the DeLone and McLean Information Systems Success Model as its conceptual framework, scrutinizing the system and information quality dimensions in relation to user satisfaction. This model, refined and expanded since its introduction in 2003 (DeLone & McLean, 2003), provides a robust framework for dissecting the multifaceted nature of IT system effectiveness.

Allioui & Mourdi, (2023), identifies three main forces encompassing science, the application of technology as a form of knowledge application, and information. Information technology, in this context, refers to the container involving all technical devices used to manipulate and process data. Within the IT concept, various aspects are associated with information processing and handling, which, according to Priastini, (2022), enable the measurement of the quality of IT used in accounting information systems. These aspects include computer systems, remote processing networks, data storage, and file processing methods.

The DeLone & McLean (2003) indicates that information system success can be influenced by system quality, information quality, service quality, user satisfaction, user interest, and net benefits. The success of this model's implementation in an organization can be measured through user satisfaction with the information system, confirmed through user responses to the use of the information system within the organization. This emphasizes the importance of measuring the quality of a system, the quality of information, and the quality of service received.

Information Systems, as described by James A. Hall in Saputro et al., (2015) and (Bachmid, (2016), represent the combination of physical and non-physical components that are interconnected harmoniously, with the purpose of managing data into valuable information for users. Information system quality, according to Fitriati et al., (2020) and (DeLone & McLean, 2003), includes the quality of the hardware and software components within the information system. Information quality is defined as information that possesses a level of accuracy, timeliness, and relevance to an organization's needs, serving as a benchmark for assessing the quality of the information system's output.

User satisfaction with information systems, according to DeLone & McLean, (2003), Yakubu & Dasuki, (2018) and Adeyemi & Issa, (2020) is the subjective and not absolute response or feedback from the use of information systems by users, concerning how high or low the level of user satisfaction is with the information system. This underscores the importance of meeting individual expectations to enhance user satisfaction.

This research has two main objectives: first, to conduct a rigorous empirical investigation into the correlation and causal relationships between the technical features of the system and the content of information it delivers, and the perceived user satisfaction among the foundation's constituents. Second, the study aims to provide actionable recommendations to improve the alignment between IT services and user needs. A critical examination of the literature, including studies by Saputro et al., (2015) and Alam & Mezbah-ul-Islam, (2023) will inform the analysis, ensuring a comprehensive understanding of the interactions between IT system quality, service quality, and their cumulative effects on user satisfaction.

In conducting this study, there is a fundamental assumption that the Marsudirini Foundation's commitment to educational excellence is closely linked to its ability to integrate and optimize IT in its pedagogic and administrative functions. Disruptions in technology, such as those experienced during routine LMS maintenance, can significantly impede this integration, highlighting the need for a strategic approach to IT management in the educational environment.

The anticipated outcomes of this research are multifold. It aims to provide the Marsudirini Foundation with a detailed diagnosis of its current IT efficacy, a tailored set of strategies to improve the resilience and responsiveness of its IT infrastructure, and a roadmap for continuous improvement in user satisfaction. Moreover, the study strives to contribute to the academic discourse on IT in education, offering empirical evidence and theoretical refinements that will appeal to academic audiences and practitioners. By achieving these objectives, the research not only supports the mission of the Marsudirini Foundation but also enriches the broader educational community's understanding of how to navigate and leverage IT complexity to enhance.

DeLone & McLean, (2003) posited that system quality significantly influences user satisfaction and the interest in usage. According to the DeLone and McLean success model, system and service quality can be used as indicators to measure the technical level, while information quality is utilized to gauge the semantic level. User usage interest, user satisfaction, and net benefits are employed to measure effectiveness success. In the research conducted by Park et al., (2006), it was found that system quality positively impacts the benefits obtained and user satisfaction. These benefits then influence the increase in user satisfaction and the interest of users in the information system. Further, in the study by Saputro et al., (2015), it was discovered that higher quality of the information system used leads to increased user satisfaction and interest in the accounting software application. From these studies, it can be concluded that high system quality results in increased user satisfaction with the system, thereby inclining users to reuse he system.

Hypothesis 1: System quality has a positive and significant effect on user satisfaction with the information system.

The desire of information system users is not limited to the quality of the information system but also extends to the quality of the information obtained. If the provided information is highly accurate, timely, complete, and relevant, then the users of the information system will feel satisfied, and the intensity of system usage will increase. Ritchi et al., (2020) stated that information is beneficial if it relates to the decision-making purposes for which it is intended. Information also becomes valuable when users can understand and utilize it. Research by (Isnaeningsih et al., (2021) indicated that information quality affects user satisfaction with the

system. From these statements, it is inferred that users will utilize beneficial information, which is information that can be understood and used for decision-making. Users have their own perceptions of the quality of the information received, and if they consider the information to be of high quality, they will benefit from and trust it. If users feel that the quality of information produced by the system is usable and easy to understand, they will be satisfied with the information obtained.

Hypothesis 2: Information quality has a positive and significant effect on user satisfaction with the information system.

Research Model
Below is the research model used to answer the questions in this study, where three variables are utilized. The independent variables in this research are System Quality and Information Quality, while the dependent variable is user satisfaction.
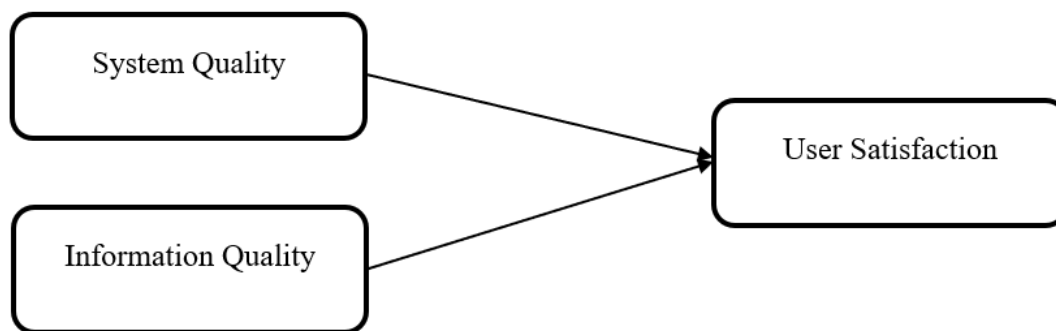
Research Methods
The research methodology for investigating the intersection of IT infrastructure quality, information quality, service quality, user satisfaction, and net benefits at the Marsudirini Foundation in Yogyakarta will implement an explanatory sequential mixed methods design as outlined by Creswell, (2007) This approach begins with the collection of quantitative data followed by qualitative data to explore the quantitative results in further detail.

The quantitative phase will utilize a structured questionnaire developed from the DeLone and McLean Information Systems Success Model, which will be validated through a pilot study and assessed for reliability using Cronbach's alpha. The sample will be drawn from the population of all stakeholders of the Marsudirini Foundation, including educators and students, using a stratified random sampling technique to ensure representation across different strata such as faculty, administration, and students. The collected data will be analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM), as recommended by Abdillah et al., (2020). This will involve hypothesis testing within the structural model, evaluating the model using R^2 for the dependent variables, and assessing the significance of the relationships between constructs using path coefficients or t-values.

Following the quantitative analysis, the qualitative phase will commence with semi-structured interviews and focus group discussions designed to delve deeper into the quantitative findings. The development of the interview guides will be informed by the literature review and the initial quantitative results, aiming to gather rich, descriptive data. The qualitative data will then be subjected to thematic analysis, where it will be coded and categorized to identify emerging themes that can explain or expand upon the quantitative results.

By employing this mixed-methods approach, the research aims to provide a comprehensive understanding of the research problem. The sequential nature of the methodology ensures that the qualitative data builds upon the quantitative findings, thus offering a detailed diagnosis of the current IT efficacy and a set of actionable recommendations to the Marsudirini Foundation for improving its IT infrastructure and services for enhanced user satisfaction. The anticipated outcomes will contribute to both the practical needs of the Foundation and the scholarly discourse on IT in education, highlighting the role of IT in enhancing educational experiences in an increasingly connected world.

Results And Discussion

Instrument Testing Methods

Convergent validity can be assessed by considering indicators such as factor loadings and the average variance extracted (AVE). Factor loading values greater than 0.7 and AVE values greater than 0.5 indicate that the requirements for structural validity are met. However, in some cases, it is considered acceptable to retain measurement indicators with loadings ranging from 0.40 to 0.70 within a measurement model.

Table 1: Outlier Indicator Table

	Information Quality	System Quality	User Satisfaction
KI 1	0.795		
KI 2	0.857		
KI 3	0.642		
KI 4	0.770		
KI 5	0.747		
KI 6	0.783		
KS 1		0.666	
KS 3		0.546	
KS 4		0.549	
KS 5		0.582	
KS 6		0.679	
TK 1			0.670
TK 3			0.648
TK 4			0.625
TK 6			0.658
TK 7			0.800

Source: Researcher's Processed Data
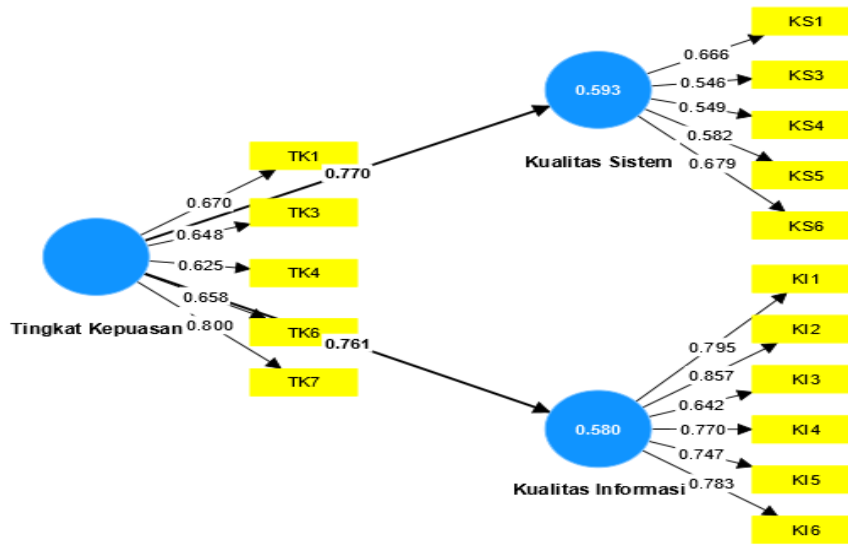
Combined Loadings and Cross-loadings Test

Table 2: Reliability Test (Construct Reliability and Validity)

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Information Quality	0.860	0.869	0.896	0.591
System Quality	0.569	0.578	0.743	0.512
User Satisfaction	0.711	0.721	0.813	0.566

Source: Researcher's Processed Data

The above table indicates that the Average Variance Extracted (AVE) values have met the criteria of exceeding 0.5, thus confirming the validity of the survey we have conducted. Composite Reliability and Cronbach's alpha are employed as the basis for evaluating reliability values. The research questionnaire tool meets the standards of reliability testing based on estimates from SmartPLS 4.0. The VIF values of the full collinear research model in this study do not present any collinearity issues with vertical, horizontal, or common method biases, as the VIF values are less than 3.3 (Sholihin & Dwi Ratmono, 2013).

Relationship Analysis

Subsequently, the t-test stage is conducted. This test is carried out to determine whether the independent variables have a significant partial effect on the dependent variables.

Table 3: T-test

	(O)	(M)	(STDEV)	(|O/STDEV|)	(Pvalues)
User Satisfaction > Information Quality	0.761	0.766	0.048	15.803	0.000
User Satisfaction > System Quality	0.770	0.766	0.049	15.852	0.000

Source: Researcher's Processed Data

This study examines how aspects within the DeLone and McLean model influence satisfaction levels regarding the use of academic service systems. Two hypotheses were proposed. Significance is indicated by a P-value of less than 0.01 at the 1% level, a P-value of less than 0.05 at the 5% level, and a P-value of less than 0.10 at the 10% level. Below is a summary of the results from the SmartPLS 4.0 calculations:

Table 4: Summary Test

		P-values	**Result**
H1	Kualitas Sistem □ Tingkat Kepuasan	<0.05	Suported
H2	Kualitas Informasi □ Tingkat Kepuasan	<0.05	Suported

Source: Researcher's Processed Data

A profound understanding of the quality of academic information systems and its impact on user satisfaction is crucial for educational institutions. Research by Gurendrawati et al., (2022) and Suroso & Yuliati, (2020) has underscored the significance of the quality of information and systems in enhancing user satisfaction. High-quality information—measured by the accuracy, completeness, relevance, and timeliness of the data provided—has a proven direct impact on the productivity of user performance. Reliable information empowers users, specifically students and faculty, to make accurate and strategic decisions within their academic realms.

Furthermore, the study by Park et al., (2020) adds another dimension to this discourse by showing that system quality—including technical aspects like reliability, security, response speed, and user interaction ease—has a positive influence on the benefits perceived by users, and consequently, their satisfaction. An effectively functioning system not only minimizes barriers in the learning process but also amplifies user engagement by enabling accessibility and flexibility in education.

For the Marsudirini Foundation Yogyakarta, the importance of this is exemplified through the adept implementation of a Learning Management System (LMS). Providing a platform that facilitates swift and accurate information exchange and supports smooth interaction between students and learning content, the LMS becomes crucial in fostering a satisfying educational environment. Therefore, to elevate and sustain user satisfaction, the Marsudirini Foundation Yogyakarta must continuously monitor and enhance the quality of their LMS.

Consistent with these findings, continuous improvements to IT infrastructure, user interfaces, and the content provided should be a priority. Such investments are expected to pay off not only in the form of elevated user satisfaction but also in increased academic productivity. Moreover, by conducting a thorough SWOT analysis, the Marsudirini Foundation Yogyakarta can identify potential improvement areas and develop strategies to address weaknesses, capitalize on strengths, and avoid threats to the current system.

Table 5: SWOT Analysis

Internal Factor				
Code	**Strength**	**Weight**	**Rating**	**Total**
S1	The Learning Management System can efficiently meet all your needs	0.10	8	0.80
S2	The Learning Management System effectively meets students' needs related to the teaching and learning process	0.15	9	1.35
S3	The Learning Management System is user-friendly and very easy to access	0.15	9	1.35
S4	The Learning Management System can save time when students want to look for lecture materials	0.10	8	0.80
	Total Strength Weight Calculation	0.50		4.30
Code	Weakness	Weight	Rating	Total
W1	The Learning Management System is complicated in terms of display and could be designed more simply	0.20	8	1.60
W2	The Learning Management System often takes a long time to respond	0.30	9	2.70
	Total Weakness Weight Calculation	0.50		4.30

External Factor				
Code	Opportunities	Weight	Rating	Total
O1	Currently, students and educators are becoming more aware of technological advancements.	0.20	8	1.60
O2	Atma Jaya University Yogyakarta will provide rewards (ATMA Rewards) for students and educators who make the most of the online course site.	0.30	9	2.70
	Total Opportunities Weight Calculation	0.50		4.30
Code	Threats	Weight	Rating	Total
T1	The Learning Management System may be replaced by other platforms that are easier to use.	0.50	3	1.50

Source: Researcher's Processed Data

Table 6: General Electric Matrix

			6	3	0
Internal Factor					
			Strong	Average	Weak
External Factor	Opportunity	9	1. Growth (Vertical Growth)	2. Growth (Horizontal Growth)	3. Retrenchment (Turnaround Strategy)
	Average	6	4. Stability (Pause on Proceed with Caution)	5a. Growth (Horizontal Integration)	6. Retrenchment (Captive Company Strategy)
				5b. Stability (No Change Profit Strategy)	

	Threats	3	7. Diversification (Concentric Diversification)	8. Diversification (Conglomerate Unrelated)	9. Retrenchment (Liquidation)

The SWOT analysis indicates that the Marsudirini Foundation Yogyakarta is currently positioned in the stability quadrant, with a directive to 'pause and proceed with caution'. This suggests that the foundation is effectively utilizing its academic service system, yet there is room for optimization to fully harness its potential. To enhance the efficacy and user experience of the academic services provided, the foundation can adopt several strategic initiatives.

Firstly, addressing the weaknesses identified, the Marsudirini Foundation Yogyakarta could undertake a redesign of the Learning Management System (LMS) interface. The goal would be to create a more organized and intuitive user interface that can streamline navigation and simplify the process of accessing educational materials. By restructuring the LMS layout, the foundation can minimize cognitive load and improve the overall user satisfaction for both students and faculty.

Secondly, the development of a Standard Operating Procedure (SOP) tailored for educators using the LMS is recommended. This SOP would provide a consistent framework for course delivery, establishing clear guidelines and best practices for integrating digital resources into the curriculum. It should focus on optimizing the pedagogical approach within the LMS environment, ensuring that educators are fully equipped to leverage the platform's features to enhance student engagement and learning outcomes.

Through these strategic measures, the Marsudirini Foundation Yogyakarta can not only strengthen the current stability of its academic service system but also create a foundation for continuous improvement. Such proactive initiatives will be critical in maintaining the relevance and effectiveness of the foundation's educational offerings in a rapidly evolving academic landscape.

Conclusion

Marsudirini Foundation in Yogyakarta is actively engaged in addressing the challenges and opportunities presented by the integration of IT systems within the educational framework. In an era where digital technology is essential, and the disruptive impact of the COVID-19 pandemic has accelerated the need for robust online learning environments, the Foundation recognizes the crucial role of system infrastructure and information quality in influencing the satisfaction levels of its stakeholders, namely educators and students.

The research is inspired by the work of Arvanitis and Loukis, and aims to investigate the real-world effectiveness of IT investments in education. By employing the DeLone and McLean Information Systems Success Model, the study scrutinizes the direct relationship between system and information quality and user satisfaction. This model serves as the conceptual backbone for the analysis, enabling a thorough examination of the intricacies of IT system effectiveness.

The study posits two hypotheses: the first suggests a positive correlation between system quality and user satisfaction, while the second links information quality to user satisfaction. These hypotheses are grounded in the idea that users' satisfaction is a multifaceted construct influenced by the technical reliability, security, and usability of the system, as well as the accuracy, timeliness, and relevance of the information it provides.

Key findings from the research point to the fact that quality IT systems are not merely about the technical capabilities but also about how these systems meet the informational needs of the users. In other words, a high-quality IT system is one that delivers information that is not only accurate and timely but also contextually relevant and complete, thus aiding users in making informed decisions.

For the Marsudirini Foundation, these findings underscore the importance of a Learning Management System (LMS) that is not only technically sound but also user-friendly and rich in content quality. The study suggests that the Foundation's LMS should be a central focus for improvement. By refining the LMS, the Foundation can provide a platform that supports effective communication, enhances learning experiences, and meets educational objectives more fully.

The research further recommends a strategic approach to IT management within the Foundation. This includes conducting a SWOT analysis to identify areas of strength and potential growth, as well as areas that require strategic intervention. The anticipated outcome of this research is to provide the Foundation with a clear understanding of how its IT services are currently performing and to offer a set of tailored strategies for improvement. These strategies are aimed at not only increasing the resilience and responsiveness of the IT infrastructure but also ensuring that the system aligns with and supports the pedagogical goals of the Foundation.

In conclusion, the study aims to contribute both to the operational success of the Marsudirini Foundation and to the broader academic discourse. By identifying key factors that impact user satisfaction with IT systems in education, the research offers insights into how educational institutions can navigate the complexities of IT and use it to enhance educational outcomes and user satisfaction.

References

Abdillah, W., Hartono, J., & Usman Berto. (2020). Konsep dan Aplikasi Structural Equation Modeling Berbasis Varian Dalam Penelitian Bisnis (2nd ed.). UPP STIM YKPN.

Adeyemi, I. O., & Issa, A. O. (2020). Integrating Information System Success Model (ISSM) And Technology Acceptance Model (TAM): Proposing Students' Satisfaction with University Web Portal Model. Record and Library Journal, 6(1), 69. https://doi.org/10.20473/rlj.v6-i1.2020.69-79

Alam, M. J., & Mezbah-ul-Islam, M. (2023). Impact of service quality on user satisfaction in public university libraries of Bangladesh using structural equation modeling. Performance Measurement and Metrics, 24(1), 12–30. https://doi.org/10.1108/PMM-06-2021-0033

Allioui, H., & Mourdi, Y. (2023). Exploring the Full Potentials of IoT for Better Financial Growth and Stability: A Comprehensive Survey. In Sensors (Vol. 23, Issue 19). Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/s23198015

Arvanitis, S., Loukis, E. N., & Diamantopoulou, V. (2016). Are ICT, Workplace Organization, and Human Capital Relevant for Innovation? A Comparative Swiss/Greek Study. International Journal of the Economics of Business, 23(3), 319–349. https://doi.org/10.1080/13571516.2016.1186385

Bachmid. (2016). The Effect of Accounting Information System Quality on Accounting Information Quality. www.iiste.org

Creswell, J. W., & Creswell, J. W. (2007). Qualitative inquiry & research design : choosing among five approaches. Sage Publications.

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. Journal of Management Information Systems, 19(4), 9–30. https://doi.org/10.1080/07421222.2003.11045748

Fitriati, A., Cinintya Pratama, B., & Anggoro, S. (2020). STUDY OF DELONE-MCLEAN INFORMATION SYSTEM SUCCESS MODEL: THE RELATIONSHIP BETWEEN SYSTEM QUALITY AND INFORMATION QUALITY STUDY OF DELONE-MCLEAN INFORMATION SYSTEM SUCCESS MODEL: THE RELATIONSHIP BETWEEN SYSTEM QUALITY AND INFORMATION QUALITY AZMI FITRIATI, 2 NAELATI TUBASTUVI, 3 BIMA CININTYA PRATAMA. Article in Journal of Theoretical and Applied Information Technology, 15, 3. https://www.researchgate.net/publication/339363457

Gurendrawati, E., Sasmi, A. A., Ulupui, I. G. K. A., Murdayanti, Y., Anwar, C., & Wahyuningsih, I. T. (2022). The DeLone and McLean Model on User Satisfaction of Academic Service Systems. Jurnal Pendidikan Ekonomi Dan Bisnis (JPEB), 10(1), 87–99. https://doi.org/10.21009/jpeb.010.1.8

Isnaeningsih, H. N., Fitriati, A., Pujiharto, P., & Astuti, H. J. (2021). The influence Quality of information, Sistem Quality and Service Quality on Satisfaction and User Performace. Jurnal Manajemen Bisnis, 12(2), Layouting. https://doi.org/10.18196/mb.v12i2.11185

Park, C.-H., Sds, S., & Young-Gul Kim, K. (2020). The Effect of Information Satisfaction and Relational Benefit on Consumers' Online Shopping Site Commitments. In Journal of Electronic Commerce in Organizations (Vol. 4, Issue 1). http://www.idea-group.com

Priastini, (2022). PENGARUH TEKNOLOGI INFORMASI, KUALITAS INFORMASI, KENYAMANAN FISIK, KEMAMPUAN TEKNIK PEMAKAIAN SISTEM INFORMASI, PERCEIVED USEFULNESS TERHADAP EFEKTIVITAS SISTEM INFORMASI AKUNTANSI BERBASIS KOMPUTER PADA KOPERASI DI KECAMATAN MENGWI

Ritchi, H., Evayanti, N. F., & Sari, Y. (n.d.). A STUDY ON INFORMATION SYSTEMS SUCCESS: EXAMINING USER SATISFACTION OF ACCOUNTING INFORMATION SYSTEM (A Study on whole City/Regency Governments of West Java Province) (Vol. 24, Issue 1).

Saputro, P. H., Djoko Budiyanto, A., & Santoso, A. J. (2015). Model Delone and Mclean untuk Mengukur Kesuksesan E-government Kota Pekalongan. Scientific Journal of Informatics, 2(1). http://journal.unnes.ac.id/nju/index.php/sji

Sholihin, M., & Dwi Ratmono. (2013). Analisis SEM-PLS Dengan WarpPLS . Penerbit Andi.

Suroso, A. I., & Yuliati, L. N. (2020). Evaluation Of E-Learning Implementation In The University Using Delone And McLean Success Model. Journal of Applied Management (JAM), 18(2), 345–352. https://doi.org/10.21776/ub.jam.2020.018.02.15

Yakubu, M. N., & Dasuki, S. I. (2018). Assessing eLearning systems success In Nigeria: An application of the Delone And Mclean information systems success model. Journal of Information Technology Education: Research, 17, 183–203. https://doi.org/10.28945/4077