The Effect of System Quality, Information Quality and Service Quality on Benefits Through User Satisfaction (Case study: iSantri Application)

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Abstract: **This study aims to collect the information needed to build a conceptual model that will be used to measure the success of the iSantri application that has been implemented at Ma'had Aly Salafiyah Syafi'iyah. The methodology used in this research is a literature study conducted by comparing several literacy sources from scientific journals, books and expert opinions used as reinforcement in supporting the findings in the research. Understanding the comparison between variables and the relationship between variables is a more in-depth study to find the variables that will be used in this study. The conclusion of this study is a conceptual model that implements user satisfaction as a variable mediating the relationship between system quality, information quality and service quality to the benefits of using the iSantri application. Furthermore, in future related research, you can refer to this conceptual model in its implementation.**

Keywords: **system quality, information quality, service quality, user satisfaction, e-learning.**

1. Introduction

Technological developments in the digital era, as it is today, which is growing faster and faster over time, directly have an impact on increasing the use of technology which is getting higher. Information technology is expected to be useful to assist activities and support decision making so that it can bring success to the activities carried out [1].

The development of libraries, which initially only stored knowledge sheets, is currently developing in digital libraries not only storing, managing, and providing services, but these digital libraries can interact in cyberspace to simply greet, comment, and exchange ideas. A digital library is a concept that uses the internet and information technology in library management to store, manage and provide services to the public [2]. A digital library is a system consisting of hardware and software, electronic collections, management staff, users, organizations, work mechanisms, and services by utilizing various types of information technology. [3]-[5].

Libraries as one of the learning resource organizations that store, manage and provide services for library materials, both books and non-books, to the special community and the general public. In the course of library development from simple to modern, it does not escape the touch of technology for the development of a modern library because today's society is digitally literate. In Law No. 43. of 2007, it is explained that a library is an institution that collects printed and recorded knowledge, manages it in a special way to meet the intellectual needs of library users through various ways of knowledge interaction.

Currently the use of information systems has increased very rapidly, the speed of information is very much needed to support activities, especially during the Covid-19 pandemic [6], [7]. Likewise with competent libraries today, where libraries are also required to be closer to readers. Therefore, a digital library is presented with the hope that it will make it easier to find references for teaching materials to support learning in Islamic boarding school-based tertiary institutions called MSDC (MahaSantri Digital Center).

The iSantri application is a digital library where the application can be downloaded and read via smartphones, laptops and computers. Apart from being a digital library, the iSantri application is also designed to function like social media where users can interact, share, socialize and also exchange ideas with users of the iSantri application. such as commenting or other activities. In the course of the process of making a digital library, it is not spared from users who will use a digital library application so that from the beginning there must have been a thought about user satisfaction for digital library applications, namely the iSantri application, user satisfaction is a benchmark for a digital application that is easy to use and can operate properly , an application is closely related to information systems to find out how to work and how to use the application [5].

Based on the phenomenon and previous research that has been done, the researcher is interested in conducting research on evaluating user satisfaction of digital libraries in the form of

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the iSantri application because a digital library has the potential to use it a lot, like other digital libraries that make it easy to search books digitally.

2. Methodology

This research is a literature study, for a literature study the researcher takes from the results of research that has been conducted in the past related to the success of information systems and the variables used to measure it. The literature study used to compare the relationship between variables was carried out by Yusof, M. M., & Yusuff, A. Y. A. (2013) [8]–[10], Utomo, L. T., Ardianto, Y. T., & Sisharini, N. (2017) [11], Sopalatu, H., Hidayatullah, S., & Respati, H. (2021) [12], Perwira, R. I. (2016) [13], Kutlu, B., & Alkaya, A. (2015) [14], Krisbiantoro, D., Suyanto, M., & Taufiqluthfi, E. (2015) [15], Hidayatullah, S., Khouroh, U., Windhyastiti, I., Patalo, R. G., & Waris, A. (2020) [7], Purnomo et al. (2022) [6]. Other references from both journals and books are also used to support research. The comparative analysis method is used to compare between articles in order to find suitable variables to be used in designing a conceptual model.

In this study a questionnaire will be distributed which is a tool for collecting data that aims to find out the opinions of respondents, the data is obtained from research samples in accordance with the specified amount.

3. Literature Study

In 1992 that the success of an information system is measured by evaluating system quality, information quality, and then related to use, namely user satisfaction which will have an impact on influencing the organization, the passage of time Delone and Mclean (2003) updating the model that initially proposed information quality, system quality, and service quality affect user satisfaction which will have an impact on net benefits.

Information systems contain information about specific people, places, and things within an organization or in the environment around it. Data information that has been formed into a format that is meaningful and useful to humans. Instead, data is a collection of rows of facts that represent events that occurred in an organization or in the physical environment before being processed into a format that people understand and use.

In previous research, Annisa Asri Imana explained in her research results that service quality, information quality and system quality have a positive impact on user satisfaction and user satisfaction has a positive impact on net results [16], [17].

In line with research conducted by [18], [19], explains that the quality of the system has a positive effect on user satisfaction [20]. Purnomo's research in 2022 tries to explain the

different results that system quality has no positive effect on user satisfaction [6]. Sopalatu's research explains that system quality has a positive effect on user satisfaction [12]. Whereas user satisfaction in Hidayatullah's research in 2020 has a positive effect on benefits [7]. Wahyudi and Sopalatu used user satisfaction as a meditator to examine the relationship between system quality and information quality on benefits [12], [21].

Finally, other researchers examined the relationship between system quality and service quality on benefits [14], [22]. The result is that system quality and information quality do not have a positive effect on benefits. Table 1 below shows several variables from previous research that are used to measure the success of information systems.

Based on the literature study described above, the conceptual model that will be proposed in this study includes five variables, namely: system quality, information quality, service quality, user satisfaction and benefits.

A. System Quality

System quality means that the system is easily accessible, able to answer problems and serve the timely needs of users, meeting user expectations [14]. System quality is a measure of the extent to which system users feel that a particular system is comfortable to use, easy to understand, learn and relate to, and fun [23]. Measuring the quality of a system is usually related to measuring the reliability of the features inherent in the system itself, including system performance and the system interface and user interface.

Ease of use is referred to as a system performance characteristic [24]. These characteristics are also related to a system that is easy to use, easy to understand and easy to learn. Next is related to flexibility, namely the ability of the system to respond effectively to changing situations [25]. Some important things in using the system are saving time, reducing redundancy and increasing productivity [26]. Therefore, timeliness can also be used as one of the aspects that affect the quality of the system. System quality is a measure of the processing of the information system itself [27].

B. Information Quality

Information quality measures the output quality of the information system [28], [29]. Information quality is a function that concerns the value of the information output generated by the system [30], [31]. It can be concluded that the quality of information is a measurement that focuses on the output produced by the system, as well as the output value for the user.

Measuring the quality of information can be done in three ways, namely: Information must have certain accuracy, information must not arrive late and information must have appropriate benefits. [32], [33]. Information quality measurement relates to information that can be generated by the

Table 1
Variables used in measuring the success of information systems

Annisa Asri Imana (2021)	Lengkong (2021)	Krisbiantoro (2021)	Ade Mubarok (2020)	Shafira (2020)
System Quality	Kegunaan	System Quality	System Quality	Service Quality
Information Quality	Ease of Use	Information Quality	Information Quality	Nilai Keuntungan
Service Quality	Ease of Use	Service Quality	Service Quality	User Satisfaction
User Satisfaction	User Satisfaction	System Usage	User Satisfaction	
		User Satisfaction		

system, including transactions and reporting.

C. Service Quality

Service quality in higher education can be interpreted as the difference between students' expectations and experiences in higher education [34], [35]. Service quality relates to the overall support provided by information system service providers, both services provided by internal and external parties of the organization. In terms of achieving educational goals, service quality can improve learning services through online media [36], [37]. This becomes in strengthening the competitive advantage by adding something unique to increase user satisfaction [38].

D. System Usage

The success of a system depends heavily on the acceptance and use of individuals, from measurements of acceptance and use can explain the level of satisfaction from using the system and have a direct impact on increasing the productivity of an organization [39], [40]. The use of the system has a close relationship with who uses it, the level of use, including in terms of training, knowledge, expectations and attitudes of recipients [15], [41].

After understanding the definition of using the system according to experts, it can be concluded that the use of the system is a component that evaluates the system by conducting an overall evaluation based on the user's experience in using the information system.

E. User Satisfaction

In several studies on the evaluation of information systems, user satisfaction is widely used as the main indicator in measuring the success of information systems, especially in the world of education [26]. This can be measured in terms of user experience, functionality and usability [42], [26]. With a high level of user satisfaction, it will be beneficial to users and service providers [7], [40].

F. Benefit

Benefits are a balance between positive and negative impacts seen from the user's side, the greater the positive impact felt, the implementation of the system can be said to be successful [43]. Benefits can support increased decision making, increased productivity, increased sales, reduced costs, increased profits, market efficiency, consumer welfare, job creation and economic development [44].

Benefits can be used to show the positive or negative impact of information system performance [23], [7]. In the information system success model proposed by DeLone & McLean, benefits are grouped into two dimensions, namely individual impact and organizational impact. [45], [46]. With the benefits arising from the use of information systems, it can directly support productivity, effectiveness and decision making.
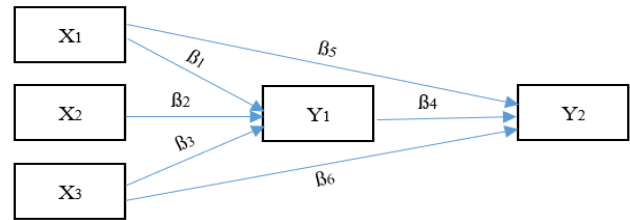

Fig. 1. Research conceptual model

4. Result

A total of 118 respondents have filled out the research questionnaire which has been circulated online. The results of the analysis based on the research hypothesis were obtained from the results of the Structural Equation Model (SEM) analysis using the SmartPLS software as follows:

A. Outer Model (Measurement Models)

Outer model or measurement model to assess the validity and reliability of the model through the algorithm iteration process. There are two validity tests in PLS, namely convergent validity and discriminant validity. There are also two reliability tests in PLS, namely Cronbach's alpha assessment and composite reliability. In the following, we will explain further about the measurement of the outer model (measurement model) in the results of this study.

B. Convergent Validity (Validitas Konvergen)

Convergent validity of the measurement model with reflexive indicators is assessed based on the correlation between the item score or component score and the construct score calculated by PLS. Convergent validity consists of 3 parameters, namely Loading factor, Average Variance Extraced (AVE) and Communality. For research in the early stages of developing a measurement scale, the loading factor value is between 0.50 and 0.60 [47]. The loading factor value is said to be high if it correlates more than 0.70 with the construct you

Table 2
Outer loading (Mean, STDEV, T-Statistic)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Y1.2.1 <- Y1	0.815	0.814	0.045	17.942	**0.000**
Y1.2.2 <- Y1	0.844	0.845	0.034	24.469	**0.000**
Y1.3.1 <- Y1	0.742	0.740	0.054	13.665	**0.000**
Y1.3.2 <- Y1	0.873	0.874	0.023	38.443	**0.000**
Y1.4.1 <- Y1	0.796	0.796	0.049	16.371	**0.000**
Y1.4.2 <- Y1	0.848	0.849	0.033	25.565	**0.000**
Y2.1.1 <- Y2	0.743	0.747	0.051	14.592	**0.000**
Y2.1.2 <- Y2	0.878	0.879	0.021	42.721	**0.000**
Y2.2.1 <- Y2	0.786	0.784	0.052	15.244	**0.000**
Y2.2.2 <- Y2	0.846	0.848	0.036	23.824	**0.000**
Y2.3.1 <- Y2	0.761	0.758	0.055	13.722	**0.000**
Y2.3.2 <- Y2	0.716	0.720	0.052	13.765	**0.000**
X1.1.1 <- X1	0.832	0.835	0.033	25.073	**0.000**

want to measure. It is known that all indicators in this study have a loading factor greater than 0.50 so that no indicators are discarded and declared valid. The results of the loading factor for each indicator can be seen in table 2 in the Original Sample column.

The Average Variance Extraced (AVE) in the Partial Least Square (PLS) is determined to be above 0.50 to state that the variables used in this study are valid. The AVE value can be seen in table 3.

Table 3
Nilai Average Variance Extracted (AVE)

Variable	AVE
X1	0.588
X2	0.610
X3	0.659
Y1	0.667
Y2	0.625

C. Discriminant Validity

Discriminant validity of the measurement model with reflective indicators is assessed based on the cross loading of measurements with constructs. Cross loading is useful for assessing a construct as having adequate discriminant validity by comparing the correlation of indicators of a construct with the correlation of these indicators with other constructs. If the indicator correlation has a higher value compared to the correlation of the indicator to other constructs, this indicates that the construct has high discriminant validity [48]. Discriminant validity can also be determined by the cross-loading value in one variable of more than 0.7.

D. Reliability Test

The PLS model reliability test consists of two assessments, namely Cronbach's alpha assessment and composite reliability. The reliability of a construct or variable can be determined by looking at Cronbach's alpha value and composite reliability values between 0.60 and 0.70, while more than 0.70 is considered better. [49]. Based on the results of calculations with the SmartPLS software, it was found that all research variables had Cronbach's alpha values and composite reliability which was more than 0.60 so that it could be concluded that each research variable was reliable.

E. Hypothesis Test

Based on the test results in table 4 it is known that the coefficient of direct influence of system quality and information quality has a significant influence on benefits. Meanwhile, in the indirect effect, there are variables of system quality, service

quality and information quality on benefits through user satisfaction which have a significant influence.
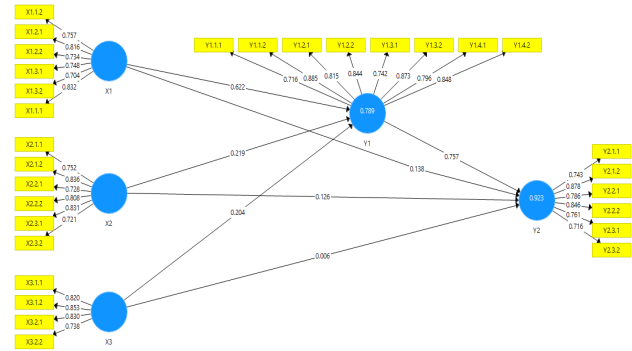

Fig. 2. Diagram jalur hasil pengujian hipotesis

5. Discussions

A. Effect of system quality on net benefits

System quality has a positive effect on system use with a path coefficient value of 0.138 and a p-value of 0.011 (p-value <0.05) and a t-count value of 2.544 (t-count> 1.96) so the test can be said to be significant, so that H0 is rejected. This shows that if the quality of the system is further improved, it will also increase the net benefits felt by users in the iSantri application.

B. Effect of information quality on net benefits

Information quality has a positive effect on system use with a path coefficient value of 0.126 and a p-value of 0.002 (p-value <0.05) and a t-count value of 3.086 (t-count> 1.96) so the test can be said to be significant, so that H0 is rejected. This shows that if the quality of information is further improved, it will also increase the net benefits felt by users in the iSantri application.

C. Effect of service quality on net benefits

Service quality has a positive effect on the use of the system with a path coefficient value of 0.006 and a p-value of 0.853 (p-value <0.05) and a t-count value of 0.185 (t-count> 1.96) so the test can be said to be no significant, so H0 is rejected. This shows that if the quality of service is further improved, the use of the iSantri application will also increase.

D. Effect of system quality on user satisfaction

System quality has a positive effect on benefits with a path coefficient value of 0.622 and a p-value of 0.000 (p-value <0.05) and a t-count value of 5.647 (t-count> 1.96) so the test can be said to be significant, so that H0 is rejected. This shows that if the quality of the system is further improved, it will also

Table 4
Hypothesis testing results

No.	Relationship between variables			Path Coefficient	p-value	t-count	Information
1	System Quality (X1)	Net Benefit (Y2)		0,138	0,011	2,544	Significant
2	Information Quality (X2)	Net Benefit (Y2)		0,126	0,002	3,086	Significant
3	Quality of Service (X3)	Net Benefit (Y2)		0,006	0,853	0,185	**Tidak Signifikan**
4	System Quality (X1)	User Satisfaction (Y1)		0,622	0,000	5,647	Significant
5	Information Quality (X2)	User Satisfaction (Y1)		0,219	0,008	2,664	Significant
6	Quality of Service (X3)	User Satisfaction (Y1)		0,204	0,034	2,121	Significant
7	User Satisfaction (Y1)	Net Benefit (Y2)		0,757	0,000	10,169	Significant
8	System Quality (X1)	User Satisfaction (Y1)	Net Benefit (Y2)	0,471	0,000	4,300	Significant
9	Information Quality (X2)	User Satisfaction (Y1)	Net Benefit (Y2)	0,166	0,008	2,655	Significant
10	Quality of Service (X3)	User Satisfaction (Y1)	Net Benefit (Y2)	0,154	0,033	2,138	Significant

increase user satisfaction from the iSantri application.

E. Effect of information quality on user satisfaction

Information quality has a positive effect on benefits with a path coefficient value of 0.219 and a p-value of 0.008 (p-value <0.05) and a t-count value of 2.664 (t-count> 1.96) so the test can be said to be significant, so that H0 is rejected. This shows that if the quality of information is further improved, it will also increase user satisfaction from the iSantri application.

F. Effect of service quality on user satisfaction

Service quality has a positive effect on benefits with a path coefficient value of 0.204 and a p-value of 0.034 (p-value <0.05) and a t-count value of 2.121 (t-count> 1.96) so the test can be said to be significant, so that H0 is rejected. This shows that if the quality of service is further improved, it will also increase user satisfaction from the iSantri application.

G. Effect of user satisfaction on net benefits

The use of the system has a positive effect on benefits with a path coefficient value of 0.757 and a p-value of 0.000 (p-value <0.05) and a t-count value of 2.121 (t-count> 1.96) so the test can be said to be significant, so that H0 is rejected. This shows that if user satisfaction increases, the net benefits that can be felt from the iSantri application also increase.

H. Effect of system quality on net benefits through user satisfaction

System quality has a positive effect on benefits through system use with a path coefficient value of 0.471 and a p-value of 0.000 (p-value <0.05) and a t-count value of 4.3 (t-count > 1.96) so test can be said to be significant, so H0 is rejected. This shows that if the quality of the system is getting improved then pengguna dari aplikasi iSantri juga meningkat dan pengguna can feel the net benefits of the iSantri application.

I. Effect of information quality on net benefits through user satisfaction

Information quality has a positive effect on benefits through the use of the system with a path coefficient value of 0.166 and a p-value of 0.008 (p-value <0.05) and a t-count value of 2.655 (t-count > 1.96) so the test can be is said to be insignificant, so H0 is accepted. This shows that if the quality of information is further improved, user satisfaction increases and is followed by net benefits felt by users of the iSantri application.

J. Effect of service quality on net benefits through user satisfaction

Service quality has a positive effect on benefits through the use of the system with a path coefficient value of 0.154 and a p-value of 0.033 (p-value <0.05) and a t-count value of 2.138 (t-count > 1.96) so the test can is said to be significant, so H0 is rejected. This shows that if the quality of service is further improved, user satisfaction will increase and this will be followed by the net benefits felt by users of the iSantri application.

6. Conclusion

From the results of the analysis and discussion, it can be concluded that the variables of system quality, information quality and service quality have a significant influence on user satisfaction. Slightly different results are shown when the service quality variable is tested directly on the benefits variable, service quality has no significant effect on benefits. While the system quality and information quality variables have a significant influence on benefits.

The same results were shown when the user satisfaction variable was used as a mediating variable. System quality, information quality and service quality have a significant influence on benefits through user satisfaction.

In this study it was found that system quality, information quality and service quality have a direct effect on user satisfaction. This indicates that user satisfaction is closely related to system quality, information quality and service quality. Users feel the impact on satisfaction after running the iSantri system. The same results are also shown when user satisfaction is a mediating variable between system quality and benefits. Thus, it can be concluded that there is a very close relationship between system quality, information quality and service quality to the perceived benefits of users through the variable between user satisfaction. This means that with an increase in system quality, information quality and service quality can affect user satisfaction so that it also has an impact on the benefits felt by system users.

Furthermore, what can be suggested in this study is that apart from needing to pay attention to the development and benefits of existing systems, another thing that needs to be considered is the balance in system management. [50]-[52] and innovation from a leader in systems development [53], [54] and need to pay attention to the performance of system managers not only the work of the system [55]-[57].

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