Original Research

Academic Information Systems and User Satisfaction with e-ServQual and WebQual 4.0 Approach Method

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Abstract

Academic information systems (AIS) at universities provide convenience to students in online campus administrative activities. Universitas Muhammadiyah Gombong (UNIMUGO) has an academic information system. The realization of quality academic and administrative services is one of the university's efforts in building and developing AIS. This study uses e-ServQual and WebQual 4.0 methods to determine the quality of AIS services. This study aims to determine the impact of AIS quality on user satisfaction by comparing E-Servqual and Webqual 4.0. The respondents' data were analyzed by linear regression. The study's findings indicate which method is best for assessing the service quality of the AIS system, as well as additional recommendations for Universitas Muhammadiyah Gombong to assess the success of the existing AIS system. Questionnaires were distributed to 100 students by Google Forms. Data analysis utilizes multiple linear regressions to determine the level of influence between the independent variables (e-Servqual and WebQual 4.0) and the dependent variable (user satisfaction). The research results from hypotheses H1 and H2 equally state that the quality of the AIS system has a positive and significant effect on user satisfaction. Analyzing the e-ServQual results showed that the AIS system was of medium quality, while the WebQual 4.0 method was of excellent quality. The results of data analysis on the e-ServQual method showed that the independent variable could affect user satisfaction by 66.1% and 33.9% influenced by other variables. The WebQual 4.0 method showed that the independent variable could affect user satisfaction by 85.1% and 14.9% influenced by other variables.

Keywords: Academic Information System, User Satisfaction, Electronic Service Quality, Web

Quality, ServQual, WebQual, Universitas Muhammadiyah Gombong.

Introduction

In this era, we are unaware that information technology is continually growing (Melati & Haryanti, 2021) and has a role in human life and daily activities (Efendi, Mahjudin & Soelistya, 2021). The academic information system is the growth of information technology in a university or a college. Many colleges in various countries have used information systems and built up academic information systems (AIS). It was built to give convenience (Purwanto & Deden Hedin, 2020) to academia when they access administration online, providing all information and everything they need about academic information everywhere via the internet (Dzihni, Andreswari & Hasibuan, 2019).

AIS implementation in colleges is hoped to respond rapidly, effectively, and efficiently to the needs and problems of calculating academic data (Reza, Sunardi & Herman, 2022) if the problem of academics be overcome immediately (Mulyapradana, Hakim, Anjarini & Elshifa, 2021) and indirectly, users will be satisfied (Novanto, Siregar & Hidayat, 2019) with service offered. The quality of the information system influences the users' satisfaction (Muda, Waty, Roesli & Nuradi, 2020; Daryanto, 2022). Since they provide excellent academic service and administration, AIS in the college must be evaluated and planned. (Sultono, Seminar & Erizal, 2016; Arikunto Suharsimi, 2010). Therefore, those require a quality analysis of AIS to improve the expected quality of service (Gata & Oryza Gilang, 2017).

Service quality is needed as a method to measure the service provided and the service level when it is used. This study analyzed the AIS web-based service in Universitas Muhammadiyah Gombong (UNIMUGO) using e-ServQual and WebQual. Why does AIS need to be explored? This study aims to evaluate the performance of the implemented AIS system and determine its alignment with user needs. And why should we use these two methods? Because the two methods are used equally to evaluate information systems.

e-ServQual is a new version of service quality (ServQual). e-ServQual was developed to evaluate service systems on the Internet (Parasuraman, Zeithaml & Malhotra, 2005). There are seven measurement dimensions of e-ServQual: efficiency, reliability, fulfillment, privacy, responsiveness, compensation, and contact *(Zavareh, Ariff, Jusoh, Zakuan, Bahari & Ashourian, 2012). At the same time,* WebQual is a website quality measurement method (Barnes & Vidgen, 2002). The last version of WebQual, WebQual 4.0, was released. It has three dimensions: usability quality, information quality, and service interaction quality (Josua Tarigan, 2008).

This study used the structured questionnaire in which e-ServQual and WebQual 4.0 were inside, after which a variable was added to measure the whole information system (Barnes & Vidgen, 2002). Adding variables on the system aimed at knowing the system service quality of AIS based on user satisfaction, so both the dependent and independent variables are related simultaneously. The dependent variable consists of e-ServQual and WebQual 4.0 dimensions. While independent variable is all things, the user used as user satisfaction. These variables were analyzed by linear regression analysis to determine the relationship between both variables (Etemadi & Khashei, 2021; Weisberg, 2014).

The previous researcher analyzed web-based service quality using an e-ServQual questionnaire and analyzed it using linear regression analysis. The results indicate that only efficiency and online service quality in the e-service system are desirable. Managerial implications are represented (Nemati, Gazor, Mirashrafi & Ameleh, 2012). Another research

analyzed the website quality and user satisfaction in a language center of Universitas Mulawarman using a WebQual 4.0 questionnaire, and all data were analyzed to determine the correlation of variables. The result showed that usability, information, and service interaction quality were strongly related to user satisfaction (64.2%), and another aspect was influenced by the control variable (35.8%). One variable was usability quality, which had a high correlation coefficient affecting user satisfaction (Firdaus, Puspitasari & Budiman, 2019).

This study possessed novelty in methodology knowledge, comparing e-ServQual and WebQual 4.0 and then comparing its results using linear regression. Before this study was conducted, no research compared e-ServQual and WebQual 4.0. The researcher analyzed user satisfaction among those who used AIS at Universitas Muhammadiyah Gombong. The purpose of this study was to find out the academic information system quality toward user satisfaction with e-ServQual (Lee, Jang & Cho, 2013; Ariff, Yun, Zakuan & Jusoh, 2012) and WebQual 4.0 methods (Ichsandrya & Suryani, 2021; Nurhadi, Yunita, Mukhayaroh & Sahirudin, 2019) based on user perception. Therefore, the result of this study can determine the best method to detect the service quality of academic information systems based on user satisfaction (Hadji & Degoulet, 2016). The researcher hopes that the results of this study can positively contribute to Universitas Muhammadiyah Gombong and serve as a reference to evaluate AIS usage.

Scope of research problem:
   a) Respondents were active students at Universitas Muhammadiyah Gombong.
   b) Examining the service quality of the AIS system at Universitas Muhammadiyah Gombong's Faculty of Health Sciences.

According to observations and interviews conducted by a researcher with an IT specialist, the AIS system at Universitas Muhammadiyah Gombong still has flaws in its use, specifically that AIS users find it unappealing, unresponsive, and slow to load. Some feature functions, such as forgotten password services, final assignment services, and graduation services, do not work correctly. It is hoped that AIS users will want a better and more up-to-date AIS display that is easy to use, has fast loading, and that other not yet operational features will be available soon.

This research is motivated to evaluate the quality of AIS services at the Muhammadiyah University of Gombong. Based on the deficiency conditions described above, it is, therefore, necessary to evaluate the implementation of the AIS system because a quality information system affects user satisfaction.

Literature Review

Electronic Service Quality (e-ServQual) (Parasuraman et al., 2005)) was the latest version of Service Quality (ServQual) (DeLone & McLean, 2003; Firdous & Farooqi, 2019). ErvQual focused on service quality of Information Systems (IS), while e-ServQual was created to evaluate internet network service (Tjiptono & Chandra, 2016). E-ServQual was defined as the extension of a site's abilities for online shopping, purchasing, and distributing goods effectively and efficiently (Parasuraman et al., 2005). Based on Parasuraman et al. (2005), seven measurement variables are used in the e-ServQual method (Ulkhaq, Rabbani, Rachmania, Wibowo & Ard, 2019). However, this study used five of seven variables only of ServQual. They were efficiency, ease, and speed in accessing the systems; Reliability: all thing technique function is available to work and clearly; Responsiveness, having a fast response in the systems;

Fulfillment, all transactions can be completed as users' expectation; Contact, customer service is available, and it could be contacted by phone or online support system (Parasuraman et al., 2005).

WebQual is a method or measurement technique of website quality based on user perception (Barnes & Vidgen, 2002). Webqual has been developed and completed with composing and question choice. The latest Webqual version (4.0) keeps using three variables: usability quality, information quality, and interaction service quality (Barnes & Vidgen, 2002; Frisdiantara, Qamar, Ardian & Rahman, 2020). An overall variable is used to measure the entire information system evaluation. Based on user perception, the overall variable was taken to know system service quality. Independent variables come from e-ServQual and WebQual 4.0. Variables while dependent variable all items were used as user satisfaction. Figure 1 shows two methods: e-ServQual and WebQual 4.0 added a variable overall as user satisfaction.

Figure 1: Concept of e-ServQual and WebQual 4.0

Multiple linear regression is a statistical technique involving two or more independent variables. Multiple linear regression analysis predicts whether an association exists between the independent and dependent variables (Weisberg, 2014) (Ghozali, 2018). At bellowed is a formula (1) of multiple linear regression:

$$Y = a + b_1X_1 + b_1X_2 \qquad (1)$$

Explanation:

Y is the regression model, a is constant, and b is coefficient regression.

Regression analysis is an analytical method investigating the relationship between two variables, namely the dependent and independent variables. Linear regression analysis was carried out in previous studies (Kurniawan & Shahab, 2020), where this research was conducted in Indonesia on users of accounting information system applications. The results of this study indicate that the quality of information systems and the quality of information have a positive effect on information system user satisfaction. The previous research was conducted by DeLone and McLean (1992), and the results were shown by Seddon (1997).

Another study conducted by Iranto (2012) was carried out at the regional PT. PLN (Persero) in 2012.Central Java and DIY used linear regression analysis, and the results of this study showed that system quality has a positive effect on information system user satisfaction. In addition, his research shows that the quality of information has a significant positive effect on information system users' satisfaction. The results of this study support the results of

previous research conducted by Seddon and Kiew (1996) and the results of research by McGill, Hobbs and Klobas (1998). Because they based their analysis on the statement above, many studies used linear regression to analyze the effect of systems on user satisfaction, both were tested simultaneously and partially, and the results showed significant results.

Based on the description above, this research tries to find out which method is better, e-Servqual and WebQual 4.0, for evaluating the quality of AIS services using multiple linear regression. So, after determining which method is best, this method can be used to make recommendations to the Universitas Muhammadiyah Gombong.

Materials and Methods

This study used the descriptive technique with a quantitative approach. The following are the research steps. Figure 2 shows the steps of this research. The case study is a data collection method that includes questionnaire distribution, personal data of respondents, support data, literature, references from research articles or journals, and the internet.
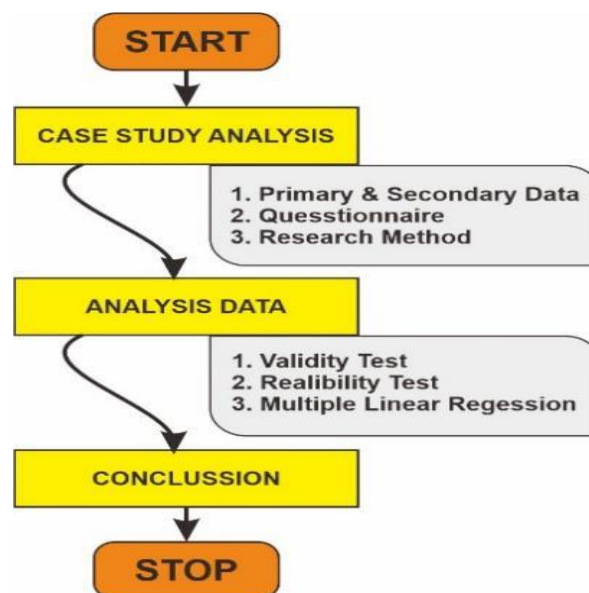

Figure 2: The steps of the research process

Method study determination is conducted after getting the data from respondents. This study used e-ServQual and WebQual 4.0, with additional modifications to fulfill the purpose of this study, which is to determine the service quality level based on user satisfaction. It included other variables (overall) in the research questionnaire (Barnes & Vidgen, 2002). The research questionnaire was made with Google Forms and distributed online. The questionnaire was based on e-ServQual and WebQual 4.0, and a variable (overall) was added. It provided five answer options with a Likert scale: 1. Very dissatisfied; 2. Not satisfied; 3. Neutral; 4. Satisfied; and 5.Very satisfied (Nemoto, & Beglar, 2014). Table 1 shows that the research questionnaire is divided into five dimensions of eServQual, three dimensions of WebQual, and an overall variable as user satisfaction assessment.

Table 1
Questionnaire statements

Metode	Dimensi	Statement
E-ServQual	*E-ServQual: efficiency*	E-1 AIS is easy for me to access wherever and whenever E-2 AIS can provide services to me. E-3 AIS has an attractive appearance. E-4 AIS has never had a problem or error. E-5 AIS is easy for me to operate. E-6 AIS is easy for me to leave
	E-ServQual: Reliability	R-1 The features of the AIS system are very complete. R-2 The AIS administrator is prepared to receive complaints from me or other users. R-3 I can access AIS for 24 hours and the server is not down so I can't access the AIS system. R-4 If there is a problem with the AIS system, the AIS admin immediately acts quickly to take care of it. R-5 Information requested by me or another user can be quickly provided/displayed by the AIS system.
	E-ServQual: Responsiveness	RS-1 AIS provides accurate information according to my or other users' wishes. RS-2 Complaints or problems from users can be resolved by the superuser quickly. RS-3 There is handling from the AIS superuser/admin in handling complaints from users/users. RS-4 AIS superuser response speed in processing services. RS-5 When the AIS system has a problem, the administrator provides information or notification to the user.
	E-ServQual: Fulfillment	F-1 The AIS system can provide information according to the student's wishes without errors. F-2 With AIS, the lecture process becomes easier. F-3 AIS Admin in the administrative process, according to the specified time.
	E-ServQual: Contact	C-1 There is an AIS admin phone number shared with students to make it easier for students to contact AIS admins if needed. C-2 To facilitate interaction between students and the AIS admin, there are social media such as Whatsapp, Facebook, or Twitter C-3 Has a service to communicate directly with campus IT if there are problems or complaints
WebQual 4.0	*WebQual 4.0: Usability Quality*	U-1 *User easy to learn to operate AIS* U-2 *User interaction with the AIS system is clear and easy to understand* U-3 AIS easy to navigate U-4 AIS easy to use U-5 AIS has an attractive appearance U-6 Design according to AIS type U-7 *AIS contains competency values* U-8 AIS creates a positive experience
	WebQual 4.0:	I-1 AIS provides accurate information

Metode	Dimensi	Statement
	Information Quality	I-2 AIS provides reliable information I-3 AIS provides timely information I-4 AIS provides relevant information I-5 AIS provides easy-to-understand information I-6 AIS provides detailed information I-7 AIS presents information in the right format
	WebQual 4.0: Service Interaction Quality	IS-1 AIS has a good reputation IS-2 Users feel safe when making transactions IS-3. Users feel safe about personal information IS-4 AIS provides room for personalization IS-5 AIS provides space for community IS-6 AIS makes it easy to communicate with organizations IS-7 Users feel confident that the service received is as promised
Additional	Overall / User Satisfaction	*OV-1 Overall AIS system assessment*

After the respondents' data were obtained, they were analyzed by multiple linear regression techniques, and before that, the researcher used both validity and reliability. AIS system needs quality assessment to be called excellent or ordinary quality. The researcher arranged respondents' scores from the R square of multiple linear regression analysis to decide the system level. If a score (of 0% - 55%) means that AIS is at an ordinary level, 56%–75% means that it is at a medium level, and (76%–100%) means AIS which is using having an excellent level (Suharsimi, 2013). Hypothesis testing was conducted after data analysis; these steps used F-test procedures. Figure 3 shows that the first hypothesis of e-ServQual is:

H₁: There is a very strong positive correlation between efficiency, reliability, responsiveness, fulfillment, contact and user satisfaction

While the second hypothesis of WebQual 4.0 is as follows:

H₂: There is a very strong positive correlation between usability quality, information quality, interaction service quality, and user satisfaction
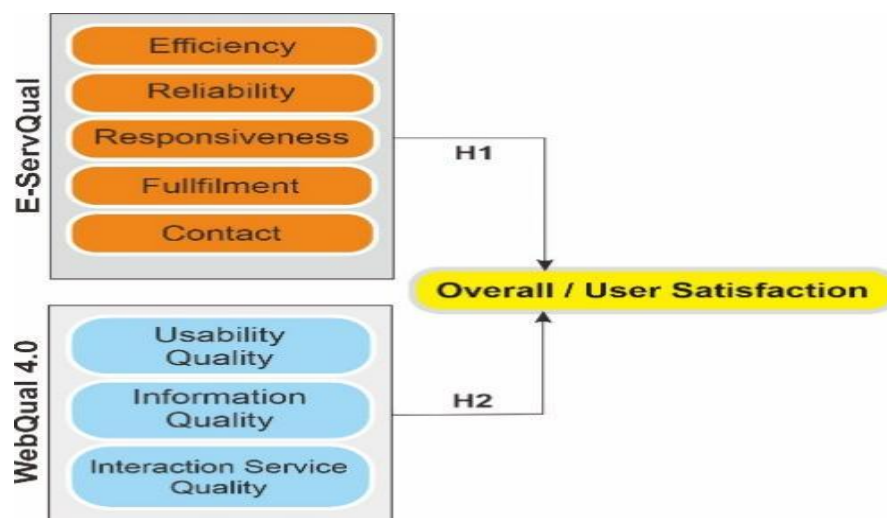

Figure 3: Research hypothesis

User satisfaction influences the intention and actual use of an information system. User satisfaction is a success factor for developing and implementing information systems. Delone and McLean (1992), as cited in Iranto, 2011, said that the higher the quality of the information, the greater the user satisfaction. Schaup, Bélanger and Fan (2009) argue that system quality and information are the core elements for predicting information system user satisfaction.

In this study, we conducted four types of analyses: instrument quality testing, correlation analysis, hypothesis testing, and evaluation of the AIS that has been running. Instrument quality testing was performed to determine whether or not the instrument was valid, as well as the consistency of the instruments used. Correlation analysis aims to determine how the correlation coefficient's value relates to the relationship between the independent variables and the dependent variable. While hypothesis testing is carried out to test whether there is a relationship between the independent variables and the dependent variable. Testing the statistical hypothesis is carried out by the F test. F-test to determine the effect of the independent variables jointly on the dependent variable (simultaneously). The way to measure this significance is to compare the value of Fcount with Ftable. If the Fcount value is greater than the F-table value at a significance level of 5%, it can be concluded that the independent variable significantly affects the dependent variable and vice versa. The subsequent analysis will improve the method or questionnaire selected for each dimension by looking at the average respondent value for each question.

Result

The population in this study was all students in the 2018–2021 academic year, totaling 1.234 people. The sample size used in this study used the Slovin formula with an error rate of 0.1. As a result, the sample size calculated from the obtained population was 95 people. The authors believe that 95 respondents from the total population was a small sample size, so the researcher included some students in this study to increase the total sample size to 100 respondents. A hundred students of Universitas Muhammadiyah Gombong were joined as the respondents in this study. They completed the questionnaires with forty-five statements about e-Servqual (twenty-two statements) and WebQual 4.0 (twenty-two) and added a question overall. Data analysis comprised validity and reliability tests, multiple linear regression analyses, and hypothesis testing. The analysis process was conducted to compare both the e-Servqual and WebQual methods.

Table 2 shows the validity test results from e-ServQual and WebQual 4.0 questions using statistical software (SPSS 23 version). Test validity is the degree to which each question accurately measures what it is supposed to measure (Ghozali, 2018).

Table 2
Test validity of each question on e-ServQual and WebQual 4.0

Item	Perception *e-Servqual*			Item	Perceptioan *WebQual 4.0*		
	r hitung	r table	Status		r hitung	r table	Status
E-1	0.836	0.1654	valid	U-1	0.912	0.1654	valid
E-2	0.853	0.1654	valid	U-2	0.933	0.1654	valid
E-3	0.843	0.1654	valid	U-3	0.877	0.1654	valid
E-4	0.839	0.1654	valid	U-4	0.89	0.1654	valid
E-5	0.929	0.1654	valid	U-5	0.869	0.1654	valid

Item	Perception *e-Servqual*			Item	Perceptioan *WebQual 4.0*		
	r hitung	r table	Status		r hitung	r table	Status
E-6	0.902	0.1654	valid	U-6	0.864	0.1654	valid
R-1	0.879	0.1654	valid	U-7	0.91	0.1654	valid
R-2	0.863	0.1654	valid	U-8	0.896	0.1654	valid
R-3	0.868	0.1654	valid	I-1	0.912	0.1654	valid
R-4	0.895	0.1654	valid	I-2	0.922	0.1654	valid
R-5	0.896	0.1654	valid	I-3	0.907	0.1654	valid
RS-1	0.923	0.1654	valid	I-4	0.895	0.1654	valid
RS-2	0.867	0.1654	valid	I-5	0.941	0.1654	valid
RS-3	0.912	0.1654	valid	I-6	0.911	0.1654	valid
RS-4	0.885	0.1654	valid	I-7	0.908	0.1654	valid
RS-5	0.862	0.1654	valid	IS-1	0.923	0.1654	valid
F-1	0.937	0.1654	valid	IS-2	0.909	0.1654	valid
F-2	0.885	0.1654	valid	IS-3	0.887	0.1654	valid
F-3	0.891	0.1654	valid	IS-4	0.897	0.1654	valid
C-1	0.858	0.1654	valid	IS-5	0.868	0.1654	valid
C-2	0.810	0.1654	valid	IS-6	0.869	0.1654	valid
C-3	0.875	0.1654	valid	IS-7	0.914	0.1654	valid
				O-1	0.887	0.1654	valid

Based on validity test results in Table 2, all questions are a hundred questions (N=100), and r count ≥ r table (0.1654), all questions have a positive value or valid (100%) (Ghozali, 2018).

Table 3 shows the test reliability on e-ServQual and WebQual 4.0, conducted by the SPSS application. Test reliability refers to the extent to which a test measures without error, and if it is reused, the result is consistent (Ghozali, 2018).

Table 3
Test reliability on the statement of e-ServQual and WebQual 4.0

Perception Level	Cronbach's Alpha	Description
E-ServQual	0.986	Reliable
WebQual 4.0	0.989	Reliable

Table 3 (N=100) shows that Cronbach's alpha values of e-ServQual and WebQual 4.0 were 0.986 and 0.989 respectively. Both numbers of *Cronbach's Alpha* got more than 0.70, meaning all items on e-ServQual and WebQual statements are reliable (Ghozali, 2018).

After all questions and statements were valid and reliable, the data obtained were analyzed using multiple linear regression analysis, and these results are shown in Table 4 and Table 5.

Table 4

The result of multiple linear regression on the e-ServQual variable

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.458	0.230		1.988	0.050
E(X1)	0.794	0.216	0.702	3.679	0.000
R(X2)	-0.743	0.244	-0.658	-3.041	0.003
RS(X3)	0.333	0.206	0.301	1.615	0.110
F(X4)	0.405	0.187	0.392	2.158	0.033
C(X5)	0.086	0.153	0.077	0.562	0.576

Table 4 shows the output of multiple linear regression analysis on the e-ServQual method. Based on the result, below depicts the regression output for variables (1):

$$Y = 0.458 + 0.794X1 - 0.743X2 + 0.333X3 + 0.405X4 + 0.086\ X5$$

The constant value is 0.458, as shown by the regression output above. That value is user satisfaction (Y) when service quality (X) is zero value (0) or at the same time when user satisfaction is not influenced by service quality. Next, if there is an increase in the efficiency variable, it raises the user satisfaction level to 0.794 in the system; if there is increasing in the reliability variable (X2), it will decrease the user satisfaction level to 0.743 in the system; if happed increasing is on responsiveness variable (X3), so it will increase user satisfaction value of 0.333 to the systems; every increase in value on fulfillment variable (X4) make the user satisfaction increasing of 0.405 on the system; if the contact variable increase (X5), it will raise the user satisfaction of 0.086 on the system.

Table 5

The analysis result of multiple linear regression on the WebQual 4.0 variable

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.067	.155		-.430	.668
UQ(X1)	.200	.132	.172	1.511	.134
IQ(X2)	-.094	.132	-.086	-.709	.480
ISQ(X3)	.934	.095	.847	9.811	.000

Table 5 shows the regression output on the WebQual 4.0 method. Based on that result, the equation bellowed:

$$Y = -0.067 + 0.200X1 - 0.094X2 + 0.934X3$$

It could be looked at that the Constanta value is -0.067 when user satisfaction (Y) with service quality is 0 (zero), or at the time, user satisfaction was not influenced by service quality. Each increased number of usability quality variables (X1) will increase user satisfaction by 0.200 in the system; but otherwise, if there were an increase in information quality variable (X2), it would decrease the level of user satisfaction in the system (0.094); likewise, if there was increased on interaction service quality variable, so the overall variable experienced increasing on the system (0.934).

Furthermore, one can look at the number of determination coefficients in Table 6 to know the correlation between the independent and dependent variables.

Table 6
The result of determination coefficients in e-ServQual and WebQual 4.0

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1. *e-ServQual*	0.813	0.661	0.643	0.508
2. *WebQual 4.0*	0.923	0.851	0.847	0.333

Table 6 shows that the e-ServQual has an r correlation value of 0.813, and the r squared value (determination coefficient) was 0.661 (66.1%). That result shows that the dependent variable (Y) or user satisfaction was able to affect the independent variable (E(X1), R(X2), RS(X3), F(X4), and C(X5)) with some 66.1%; another variable, such as user satisfaction variable was influenced by confounding variables (33.9%); there was a strong correlation between dependent and independent variables (0.80-1.000).

Meanwhile, WebQual 4.0 has an r correlation value of 0.923 and an r squared value (determination coefficient) of 0.851 (85.1%). This means that the independent (Y) or user satisfaction was influenced by dependent variables like (U(X1), I(X2), IS(X3) or 85.1%; user satisfaction was also affected by confounding variables (14.9%); the correlation between independent and dependent variable has a strong correlation (0.80-1.000). This study utilized hypothesis testing to determine the correlation between independent and dependent variables and used the F Test.

F Test

Table 7 shows the results of the F test on the e-ServQual variable; the number of independent variables (k) was five, and N = 100. It means that the table F value was obtained from the calculations F (k; N-k), F (5; 100-5), and F (5; 95), and the F table value was 2.31.

Table 7
The result of the F Test on the e-ServQual variable

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	47.175	5	9.435	36.625	.000[b]
Residual	24.215	94	.258		
Total	71.390	99			

The results of H1 in the research of the e-ServQual variable were accepted because the variables efficiency, reliability, responsiveness, fulfillment, and contact had a positive and significant simultaneous to the user satisfaction variable, which was the calculated F value in Table 7 (36.625) which it was greater than the F table value (2.31) and significance value (Sig.) was of 0.000 which it was smaller than 0.05.

Table 8 shows the results of the F test on WebQual 4.0 as follows: the number of independent variables (k) was 3, N=100. The F table value was obtained from the following calculations: F (k; N-k), F (3; 100-3), and F (3; 97). The F table value was 2.70. H2 of the WebQual 4.0 variable was accepted because the variables usability quality, information quality, and interaction service quality had a positive and significant simultaneous effect on the user

satisfaction variable. The F count value in Table 8 was 183.167, greater than the F table value (2.70), and the significance value (Sig.) was 0.000, meaning smaller than 0.05.

Table 8
The result of the F test on the WebQual 4.0 variable

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	60.773	3	20.258	183.167	.000[b]
Residual	10.617	96	.111		
Total	71.390	99			

Quality Classification Results

After the data analysis, the researcher entered the research results to be classified against the system's quality. Figure 4 shows the results of the AIS quality classification in this study.

Based on Figure 4, the results of the analysis using multiple linear regression on the e-ServQual method showed the medium-level classification where the R Square value (coefficient of determination) in Table 6 was 0.661 (66.1%) in the range between 56%-75%, it stated in the quality in medium level. While the results on the WebQual 4.0 method showed that the quality was at an excellent level, where the value of R Square (coefficient of determination) in Table 6 was 0.851 (85.1%), the range score between 76%-100% declared excellent quality.
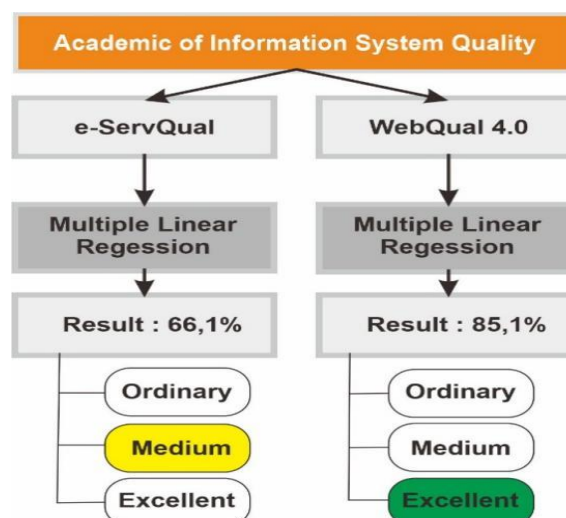

Figure 4: AIS classification results

Discussion

The evaluation of Academic Information Systems (AIS) has been conducted periodically to maintain the service quality according to what the user wants. If the users are satisfied when they are using AIS, it means that the systems have a good quality level. Universitas Muhammadiyah Gombong implements AIS, which is hoped to give good-quality academic and administrative service. This study applied the e-ServQual and Webqual 4.0 methods to know the levels of AIS quality based on the users. Using more than one method, the researcher wants to know the best method to measure AIS service quality in the university.

Both methods were analyzed by linear multiple regression, and the different methods were examined. Based on the percentage of the five variables of the e-ServQual method, it was found

to be 66,1%, and the three variables of the WebQual 4.0 method were 85.1%. These numbers described a simultaneous correlation to user satisfaction and showed that the percentage of the e-ServQual method was smaller than the WebQual 4.0 method.

Quality system qualification used the e-ServQual method, and AIS had moderate quality. However, if using the WebQual 4.0 method, AIS had excellent quality. Though the research hypothesis result had a strong effect simultaneously on user satisfaction. However, it will be a different result from the AIS classification. The e-SerQual method explained that efficiency, reliability, responsiveness, fulfillment, and contact strongly correlated with user satisfaction. Other research with the different methods found that the Language Center of Universitas Mulawarman used WebQual 4.0, which simultaneously had a strong correlation with user satisfaction with a percentage of 64.2% (Firdaus, Puspitasari & Budiman, 2019), which means that the system was of moderate quality. Based on the result of linear regression of the questionnaire in this study to measure the service quality of AIS, WebQual 4.0 method was better than the e-ServQual method because existing variables on WebQual 4.0 had an impact on user satisfaction if compared to the e-SerQual method.

Based on the result of linear regression, it was concluded that the best method to measure AIS's service quality was the Webqual 4.0 method. Because the variables of the Webqual 4.0 method have influenced user satisfaction more than the e-ServQual method. These findings have the same result in another study by Voss, which shows that the WebQual 4.0 method has advantages when used to measure web quality (Tsikriktsis, 2002). If viewed from the developer information, E-ServQual is the latest version to evaluate a web service, and the previous version, Servqual (Tjiptono & Chandra, 2016).

Meanwhile, WebQual has been developed by the developer to measure information systems. It shows us that WebQual is a powerful tool to assess the quality of information systems, especially websites. Josua Tarigan (2008) said that WebQual has experienced enhancing software development till the 4.0 version, and WebQual did not focus on information systems only. However, it can also determine the level of website quality from the oldest to the latest version (Josua Tarigan, 2008). WebQual 4.0 has three dimensions: usability, information, and interaction service. These dimensions are strengthened each other when used to assess the information systems.

The statements above stated that WebQual 4.0 can analyze academic information systems (AIS) well. The researcher hopes these findings can be used as a reference to develop and improve future academic information systems (AIS).

The e-ServQual and WebQual methods have very strong correlation values based on multiple linear regression analyses. The correlation coefficient in the e-ServQual method was 0.813 (81.3%), and the correlation coefficient in the WebQual 4.0 method was 0.923 (92.3%). The coefficient value was in the range of 0.800–0.100, meaning there was a very strong influence between the quality of the AIS system and user satisfaction. However, there were differences in several aspects, as seen in Table 9.

Table 9

Comparison of the use of the e-ServQual and WebQual 4.0 methods for measuring AIS quality

o	Item	Comparison	
		E-ServQual	WebQual 4.0
	Dimension	Dimensions measured: efficiency, reliability, responsiveness, fulfillment, contact	Dimensions measured: usability quality, information quality, interaction service quality
	Analysis	The value of AIS quality affects user satisfaction by 66.1%, meaning that AIS quality is in the moderate classification.	The value of AIS quality affects user satisfaction by 85.1%. AIS quality is a good classification.
	Dimension fix	The quality of AIS is in the moderate classification, so more variables on the dimensions require improvement.	The quality of AIS is good, so fewer variables on the dimensions require improvement.

(Source: Data 2022)

Based on the description above, the WebQual 4.0 method is good for AIS classification. Therefore, this study used the WebQual 4.0 method for future AIS improvements.

The next step in AIS improvement is to improve the dimensions by looking at the average value of the respondents for each question posed through the WebQual 4.0 questionnaire. The value of each question on each dimension on Webqual 4.0 and the number of respondents are presented in Table 10.

Table 10

The question item's result value

No	questions	average	criteria
WebQual 4.0: Usability Quality			
1.1	U1	3,38	good
1.2	U2	3,33	good
1.3	U3	3,21	enough
1.4	U4	3,35	good
1.5	U5	3,21	enough
1.6	U6	3,22	enough
1.7	U7	3,31	good
1.8	U8	3,33	good
WebQual 4.0: Information Quality			
2.1	I1	3,29	enough
2.2	I2	3,27	enough
2.3	I3	3,24	enough
2.4	I4	3,28	enough
2.5	I5	3,34	good
2.6	I6	3,29	enough
2.7	I7	3,29	enough
WebQual 4.0: Service Interaction Quality			
3.1	SI1	3,35	good
3.2	SI2	3,27	enough
3.3	SI3	3,31	good

No	questions	average	criteria
3.4	SI4	3,23	enough
3.5	SI5	3,14	enough
3.6	SI6	3,15	enough
4.7	SI7	3,23	enough

Based on Table 11 above, the average value is obtained from the results of the distribution questionnaire. It is known that several questions within each dimension contain a numerical value of 3.4 or higher, indicating that you are satisfied, but some values still need attention because it is at a value below 3.4 means that you are satisfied but could do better.

Table 11
Interval Score

Interval	Kriteria
4,2 - 5,0	Satisfaction
3,4 - 4,1	Good
2,6 - 3,3	Enough
1,8 - 2,5	Not Good
1,0 - 1,7	Poor

(Source: Data 2022)

Many things need to be fixed, as seen in Table 12.

Table 12
Recommendation

No	Dimention	Fix
1	*Usability Quality:* Particularly in navigation, display, and system design.	a. Complete blueprint design as a guideline for the IT team (especially programmers) in making applications. b. Rearrange the navigation system. c. Software upgrade and the latest software version d. Redesigned for a more responsive display e. Design according to AIS type
2	*Information Quality:* The accuracy of information, the timeliness of information, the details of information, and the presentation of appropriate information	The system requires an update to ensure the quality, reliability, timeliness, relevance, and detail of the data and the appropriate format.
3	*Service Interaction Quality: (*On the data security side, there is room for personalization, and the services received are appropriate)	a. Perform system integration b. Create a Data Sensitivity Level classification. c. Using data encryption d. Using a Layered Authentication Process.

Conclusion

This study concludes that in the e-ServQual method, the quality of AIS was at the medium level (66.1%) on user satisfaction, while other variables outside of this study influenced the

remaining 33.9%. Meanwhile, in the WebQual 4.0 method, the quality of AIS was at an excellent level (85.1%) on user satisfaction. Then, 14.9% were influenced by other variables outside this study.

This study also obtained the correlation coefficient value, where the e-ServQual method's value was 0.813 (81.3%), and the correlation coefficient in the WebQual 4.0 method was 0.923 (92.3%). If the reader looks at the correlation strength level between variables, the e-ServQual and WebQual 4.0 methods' correlation value was very strong because the coefficient value was in the range of 0.80–0.100. This means there was a very strong influence between the quality of the AIS system and user satisfaction.

Hypothesis testing results found that e-SerQual and WeQual 4.0 methods were accepted, which means all variables had a positive correlation and were significant simultaneously on user satisfaction. After conducting several tests, the hypotheses proposed in this study, H_1 and H_2, can be confirmed.

The quality of the information system was assessed by e-ServQual, which consists of five dimensions: efficiency, reliability, responsiveness, fulfillment, and contact. The results of the first hypothesis test indicated that e-ServQual influenced user satisfaction positively and significantly. This suggests that user satisfaction depends on the quality of the information system.

The second hypothesis test showed that user satisfaction was positively and significantly influenced by WebQual 4.0, which evaluates the quality of the information system based on three criteria: usability quality, information quality, and interaction service quality. This means that user satisfaction increased as the information system quality improved. It can be concluded that the statements of hypotheses H_1 and H_2 equally state that the quality of the AIS system has a positive and significant effect on user satisfaction.

According to DeLone & McLean (1992), Utomo, Ardianto and Sisharini (2017) explained that service quality is related to the services provided by information system developers and that user satisfaction is determined by the user's response to system output information (DeLone & McLean, 2003). The quality of information, systems, and services influences user satisfaction. Furthermore, all of that will also affect the net benefits of the network. DeLone and McLean's success model is highly effective when applied to various information systems research, including information systems in education.

According to Delone and Mclean (1992) and Ritonga and Yanto, 2013 assumed that system quality and information quality, individually and together, affected user satisfaction and its use. Use and user satisfaction become reciprocally interrelated and are considered to have a direct impact, impacting this individual and the organization. User satisfaction measures The quality of a computer system is reflected in its ownership (Guimaraes, Yoon & O'Neal, 1997). If the system's quality provides good information, the users will be satisfied.

The results of this study follow the results of previous studies, such as those of Utomo, Ardianto and Sisharini (2017), and Ritonga and Yanto (2013), and Noorina (2019), which prove that the quality of information systems has a positive and significant effect on user satisfaction with information systems.

Recommendation

- Future researchers are expected to use different variables or add more variables to measure the impact of academic information systems on user satisfaction because this study

showed that other variables influenced AIS user satisfaction.

- Increase the number of respondents because, with more and more respondents, the research will increase the validity of the results.

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