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2018 5th International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2018)

16-18 October 2018, Malang, Indonesia

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2018 5th International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2018)

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Foreword from General Chair EECSI 2018

Foreword General Chair

In the name of Allah, the Most Beneficent, the Most Merciful.
Welcome to the 2018 5th International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2018) in Malang, Indonesia.

The 5th EECSI 2018 is themed "Toward the Next Generation of Technology". This conference provides academicians, researchers, professionals, and students from various engineering fields and with cross-disciplinary working or interested in the field of Electrical Engineering, Computer Science, and Informatics to share and to present their works and findings to the world.

I would like to express my highly gratitude to all participants for attending, sharing and presenting your ideas and experiences in this interesting conference. Almost 300 papers had been submitted to EECSI 2018. However, the only high quality papers are selected and accepted to be presented in this event. We are also thankful to all the international committee, international reviewers, and steering committee for their valuable support. I would like to give a praise to all partners in publications and sponsorships for their valuable supports, especially for Ministry of Research and Higher Education (Kemenristekdikti) Indonesia.

Organizing a prestigious conference was incredibly challenging and would have been impossible to be held without outstanding committees. Such that, I would like to extend my sincere appreciation to all organizing committees and volunteers from Universitas Muhammadiyah Malang as a host and all colleagues from Universitas Diponegoro, Universitas Ahmad Dahlan, Universitas Sriwijaya, Universitas Islam Sultan Agung, Universitas Gadjah Mada, Universitas Budi Luhur, Universiti Teknologi Malaysia, and IAES Indonesia Section for providing me with much needed support, advice, and assistance on all aspects of the conference. A special thanks also for lEEE Indonesia Section for their contribution as technical co-sponsorship of the conference. We do hope that this event will encourage the collaboration among us now and in the future.

We wish you all find opportunity to get rewarding technical program, intellectual inspiration, renew friendships and forge innovation, and that everyone enjoys Malang.

Assoc. Prof. DR. Tole Sutikno
General Chair EECSI 2018

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Foreword from IAES Indonesia Section

Bismillahirrohmannirrahim,
In the name of Allah Al Mighty, The Most Gracious, The Most Merciful

We are pleased to welcome our colleagues in the International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2018) in Malang, City of Heritage on October 16-18th, 2018.

It must be said proudly that the EECSI has been rolled out for five times since it was firstly initiated on year 2014 in Yogyakarta. Our colleagues all over the world supporting by many tops universities have successfully organized the conference to become the prestigious international annual event in Indonesia.

A highest appreciation is addressed to The Ministry of Research, Technology and Higher Education (Kemenristekdikti) Republic of Indonesia for a worthy technical and financial support during the conference and special thanks for IEEE Indonesia Section for the technical co-sponsorship for this prominent occasion. We do hope that this event will strengthen the collaboration among us now and in the future.

This year, the achievement in this conference is due to valuable contributions from our colleagues from Universitas Muhammadiyah Malang supporting by Universitas Diponegoro, Universitas Ahmad Dahlan, Universitas Sriwijaya, Universitas Islam Sultan Agung, Universitas Gadjah Mada, Universitas Budi Luhur and Universiti Teknologi Malaysia. I would like to express my sincere gratitude and appreciation for all partners, friends, Organizing committee, reviewers, keynote speakers, and participants who have made this event as great as today.

I would also like to extend my gratitude to Rector of Universitas Muhammadiyah Malang who friendly becomes a main host for this great conference. We optimist many following collaborative works will be carried out among us and all participants.

I hope you all had a nice time at the conference where all of you are able to learn something new, renewed and created new networks and at the same time have some fun in Malang City during the conference and Mount Bromo during the cultural tour.

Thank you.

Assoc. Prof. Mochammad Facta, Ph.D
IAES – Indonesia Chapter

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Foreword from Rector of Universitas Muhammadiyah Malang

The advent of the next generation of technology, renown as Technology 4.0, is unavoidably incessant. This so-called technology has offered a new horizon in various aspects of man-beings' lives. To be particular in the fields of electrical engineering, electronics, computer science, computer engineering, and informatics, Technology 4.0 plays its potent role to underpin the future advancement of technology for the coming generations. Scientific forum titled as the 2018 5th International Conference on Electrical Engineering, Computer Science, and Informatics (EECSI 2018) hosted by University of Muhammadiyah Malang in collaboration with a number of universities is the manifestation of continuous effort to aim for the ever-changing technology.

Hereby, I would like to congratulate the Faculty of Engineering, University of Muhammadiyah Malang for their effort in organizing the 2018 5th International Conference on Electrical Engineering, Computer Science, and Informatics (EECSI 2018). I appreciate all co-organizers such as Universitas Diponegoro, Universitas Ahmad Dahlan, Universitas Sriwijaya, Universitas Islam Sultan Agung, Universitas Budi Luhur, and Universiti Teknologi Malaysia for their support in this mutual collaboration. Without the full and valuable supports from the international committee, international reviewers, and steering committee, this international conference remains a detached discourse without high commitment to conduct.

The expression of my high gratitude is devoted to the Ministry of Research, Technology, and Higher Education (Kemenristekdikti) Republic of Indonesia, IEEE Indonesia Section, and IAES Indonesia Section for their support to this event as the sponsors and technical co-sponsorship, respectively. Expectantly, this would be the initial and continual collaboration in the future.

To all speakers, presenters, and participants, thank you for participating and welcome to this conference. The success of this conference owes so much on your participation and contribution in promoting the knowledge, information, and robust creativity. To end with, this conference expectedly becomes an arena to build mutual ties among the academicians, researchers, industries, and society.

All the best to EECSI 2018

Dr. H. Fauzan, M.Pd.
Rector
Universitas Muhammadiyah Malang - Indonesia

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A Measurement Framework for Analyze The Influence of Service Quality and Website Quality on User Satisfaction (Case Study: An IT Service in Jember University)

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Abstract — **The information system is a set tools to present information that has been managed well in order to make it easy and useful for its users. One indicator of the successful implementation of information system is how the end-user satisfaction. User satisfaction can be measured using user satisfaction methods. This study aims to develop a measurement framework to measure the user satisfaction of IT services. The measurement framework will be developed using 3 (three) basic theories such as Servqual by Parasuraman, Webqual by Barnes and Vidgen, and Information System Succes Model (ISSM) by DeLone and McLean. The model will be applied to a case study that an IT Service called Sistem Informasi Terintegrasi (SISTER) of the Jember University. This measurements using 100 respondents are students as SISTER's users and will be tested using t testing and GAP analysis. Based on the measurement results, the variable service quality has no significant influence on user satisfaction, and another variable is website quality has a significant influence on user satisfaction. Based on GAP analysis, it's found that the average gap value for service quality variable is -1.12, website quality is -1.00, and user satisfaction is -1.00. It means, the service quality that represents the tangible components, reliability, responsiveness, assurance, and emphaty of SISTER's provider according the students perceptions are still not good. In the future, SISTER's provider need to improve the quality of measurement items of indicators of reliability, responsiveness, assurance, and emphaty if they want to increase the user satisfaction of SISTER.**

Keywords— measurement framework; user satisfaction; service quality; website quality; servqual; webqual.

I. INTRODUCTION

Nowadays, information technology (IT) experienced a very significant development. One of the advancements is the presence of the internet. Internet make the people easy to search, exchange, and share information through various online media and device. According to data from Internet World Stats in 2017 [1], Indonesia is the country with the third most internet users in Asia after China and India. Based on these reports, in the end of 2017 recorded the internet users in Indonesia reached 143.260.000, where the population of Indonesia's people is 266.764.980. It means, among 53.7% people is active to using the internet daily [1].

One of the utilization of IT in education is the existence of information system to support academic activities at universities or others educational institutions. The information system is a set tools to present information that has been managed well in order to make it easy and useful for its users [2]. According to Doll & Torkzadeh (1988) [3], one indicator of the successful implementation of information system is how the end-user satisfaction. User satisfaction can be measured using user satisfaction methods. There are many methods that can be used to measure user satisfaction of an IT service such as End-User Computing Satisfaction (EUCS), Information System Success Model (ISSM) by DeLone and McLean, Servqual, Webqual and others.

Generally, service quality involves a comparison of expectations with performance perceived of a service [4]. Service quality is a measure of how well the service level delivered matches customer expectations. Delivering quality service means conforming to customer expectations on a consistent basis [5]. Servqual is a model of service quality measurement by Parasuraman (1988) which consists of 5 (five) dimensions including: tangibles, reliability, responsiveness, assurance, and emphaty [6]. Servqual is widely used by companies to measure the customer satisfaction of the quality of service.

Webqual is a method for measuring the website quality developed by Barnes and Vidgen in 2000 [7]. Webqual is a development product of Servqual that is widely used for measuring the quality of service. While, Webqual is only can be applied for measure the quality of a website or information system or application. According to Barnes and Vidgen (2000) [7], webqual consists 3 (three) dimensions

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including usability, information quality, and service interaction.

According to Parasuraman (1988) [6], the quality of a service can be defined as an overall assessment of the service and generally accepted as overall customer satisfaction. Based on these definitions, it can be conclude the quality of service is an assessment of the ability of service provider to meet the customer expectations. If the customer expectations is greater than the performance of a service provider, it will happen to customer dissatisfaction [8].

The quality of IT services depends on the value that IT service brings to the business of both the IT service provider and its customers, but most IT service providers still do not measure IT services quality in detail [9][10]. Many studies IT service quality measurement that focus is still partial for example, only focus on quality of service or its providers, and there is also focus on measureing the quality of website only.

Based on the above research background, this study aims to develop a measurement framework to measure the user satisfaction of IT services. The measurement framework will be developed using 3 (three) basic theories such as Servqual by Parasuraman [6][11], Webqual by Barnes and Vidgen [7][12], and Information System Succes Model (ISSM) by DeLone and McLean [14]. Furthermore, the model will be applied to a case study that an IT Service called Sistem Informasi Terintegrasi (SISTER) of the Jember University. This measurements using 100 respondents are students as SISTER's users and will be tested using t testing and GAP analysis. The t-test was conducted to determine the variable or dimension that significantly influence on user satisfaction, while tha GAP analysis is used to determine the level of gap between user expectations and the performance perceived of IT services.

II. THEORITICAL BACKGROUND

A. *Servqual*

Servqual was first designed by Parasuraaman, Zeithaml, and Berry (1988) to measure the service quality at the expectation and perceived performance, with the level of service quality determined as the difference score between the expectation and performance perceived [6][11]. The Servqual method consists of 5 dimensions, including [6]:

1. Tangibles
   Tangibles dimension represents physycal fascilities, adequate equipment and staff ability from service provider.
2. Reliability
   Reliability dimension represents service provider's capabilities to provide the promised services with immediately, accurate, and reliable.
3. Responsiveness
   Responsiveness dimension represents the wish of the staff to help customers, and provide solutions with responsiveness
4. Assurance
   Assurance dimension represents the knowledge , capability, and trustworthiness by the staff, free of the dangers or risk.
5. Emphaty
   Emphaty dimension represents awareness and good communication by the staff, personalized attention, and understanding what the customer needs.

B. *Webqual*

Webqual is a development of the Servqual method. This method is used to measure the quality of website [7]. Webqual has undergone changes and developments from Webqual 1.0 and now is Webqual 4.0 [7]

Webqual 1.0 consists 4 dimensions: usefulness, easy of use, entertainment, and interaction. Webqual 2.0 expands the interaction aspects by adjusting the quality of the service, which is divided into three dimensions: quality of website, quality of information and quality of service interaction. Webqual 3.0 improves the existing deficiencies in Webqual 1.0, and Webqual 2.0 by setting 3 dimensions: usability, information quality and quality of service interaction. The latest verqion, Webqual 4.0 is based on three areas of research: quality of information (from website), interaction quality and usability (from human computer interaction). Barnes and Vidgen (2003) defines the dimensions of Webqual 4.0 as follows:

a. Usability
   Usability represents user perception of the quality associated with website architecture such as interface, ease of use and navigation.
b. Information Quality
   Information quality represents user perception of the quality of the content or website information such as the accuracy of the information, format, relevance, and worth it or not information is displayed.
c. Service Interaction
   Service interaction represents the ability to provide a sense of security when transacting, having a good reputation, having confidence in providing personal information, providing data and information security confidence and good comunication between user and website administrator or helpdesk.

III. METHOD

A. *Conceptual Framework*

As described above, this study aims to develop a measurement framework to measure the level of user satisfaction of IT service users based on service quality perceived and website quality perceived. The measurement framework will be developed using 3 (three) basic theories such as Servqual by Parasuraman [6][11], Webqual by Barnes and Vidgen [7][12], and Information System Succes Model (ISSM) by DeLone and McLean [14] which will be

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combined into a measurement framework. Measurement framework is illustrated as shown in figure 1. There are three variables in the framework are: (1) Service Quality (X1) and (2) website Quality (X2) as independent variable, and (3) User Satisfaction (Y) as Dependent Variable.

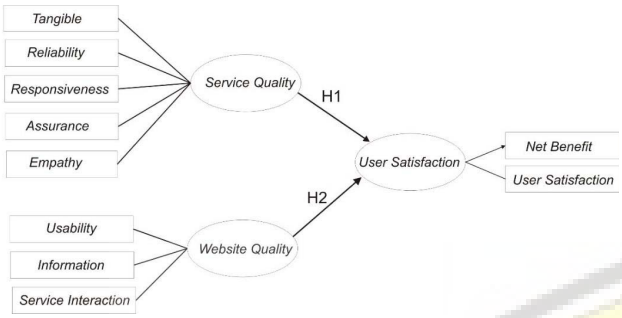

Fig 1. Measurement Framework

Base on the measurement framework, we identified the several hypotheses will be tested on this research. That hypotheses are:

H1. Service quality had significantly influence on user satisfaction

H2. Website quality had significantly influence on user satisfaction.

B. Variables and The Operational Definition of Research

The operational definition is a definition that provide that provides an explanation of variables in a measurable form [13]. Based on figure 1, variables, indicators and definition and the reference will be explained in table 1.

Table 1. Operational Definition of Research

Variable	Indicator	Definition	Source
Service Quality	Tangibles	Tangibles represents physycal fascilities, adequate equipment and staff ability from service provider.	[6][15]
	Reliability	Reliability dimension represents service provider's capabilities to provide the promised services with immediately, accurate, and reliable.	[6][15]
	Responsiveness	Responsiveness dimension represents the wish of the staff to help customers, and provide solutions with responsiveness	[6][15]
	Assurance	represents the knowledge , capability, and trustworthiness by the staff, free of the dangers or risk.	[6][15]
	Emphaty	represents awareness and good communication by the staff, personalized attention, and understanding what the customer needs	[6][15]
Website Quality	Usability	User perception of the quality associated with website architecture such as interface, ease of use and navigation.	[7][16]
	Information Quality	User perception of the quality of the content or website information such as the accuracy of the information, format, relevance, and worth it or not information is displayed.	[7][16]
	Service Interaction	The ability to provide a sense of security when transacting, having a good reputation, having confidence in providing personal information, providing data and information security confidence and good comunication between user and website administrator or helpdesk.	[7][16]
User Satisfaction	User Satisfaction	User satisfaction when using information system	[14]
	Net Benefit	Benefits perceived by users during using information system	[14]

C. Data Collection

We collect data using a closed questionnaire based on the operational definition table that has been created. We used Non Probability Sampling technique for choosing the sample. Non Probability Sampling does not provide the same opportunity for each element of population to be selected as a sample [17]. A total of 154 students from Jember University which consists 15 faculties became the sample. Sampling is very appropriate beside representing all faculties, the students are also as users of SISTER (Sistem Informasi Terintegrasi) IT service. We distributed the questionnaires by visiting all faculties to meet students. The questionnaire uses likert scale with scale ranges as in table 2.

Table 2. Likert scale of The Questionnaire

Value	Description
1	Very Poor
2	Poor
3	Good
4	Very Good

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D. Data Analysis Method

After the questionnaire data collected, then the next step is to analyze the data. In this study, we used linear regression method and GAP analysis. Linear regression is used to determine the dimensions or variables of IT services that have significant influence on user satisfaction of IT services. While GAP analysis is to determine the level of gap between user expectation to IT service with actual perceived. The steps of linear regression are:

1. Validity and Reliability Test
   Validity and reliability testing of the instruments needs to ensure that the instrument used is valid and reliable. Validity testing used comparison of pearson correlation value with r table value. While reliability testing using the cronbach's alpha value > 0.6.
2. T Test
   T test is used to partially test the relationship between each independent variables to the dependent variable. T test is often reffered as a hypothezed test, because the results of t test are used to answer the hypothesis has been built. An independent variable had significant influence on dependent variable if the significant (Sig.) value < 0.05.

IV. Results and Discussion

A. Sample Data

Based on the results of data collection, 154 respondents were obtained. 154 respondents consisting of all faculties in Jember University. Faculty of Computer Science and Faculty of Teacher Training and education become the two faculty with the most respondents which is 24 students or 16% of total sample.

B. Linear Regression Analysis

1. Validity and Reliability Testing

Validity testing using pearson correlation coefficient, dimana comparing the value of pearson correlation with r table value obtained from r table. Number of samples (N) = 154, then degree of freedom (df) = N-2 = 152. Based on r table, diketahui jika df = 152, and significance level (2-tailed) 0.05, then r table value = 0.1330. If the item pearson correlation's value is greater than 0.1330 then it is valid. Hasil lengkap uji validitas dapat dilihat pada tabel 3.

Table 3. Validity Testing Results

Dimension	Item / Indicator	Pearson-Correlation Value	r Table Value	Result
rvice Quality (X1)	Tangible	0.691	0.1330	VALID
	Reliability	0.839	0.1330	VALID
	Responsiveness	0.841	0.1330	VALID
	Assurance	0.722	0.1330	VALID
	Emphaty	0.799	0.1330	VALID
bsite Quality (X2)	Usability	0.752	0.1330	VALID
	Information Quality	0.839	0.1330	VALID
	Service Interaction	0.807	0.1330	VALID
User Satisfaction (Y)	User Satisfaction	0.876	0.1330	VALID
	Net Benefits	0.845	0.1330	VALID

Reliability testing aims to test whether the question items in instruments have been reliable and feasible to be a mesauring tool. A variable to be reliable if the cronbach's alpha value > 0.6. Reliability test results for all three variables are described in table 4.

Table 4. Reliability Testing Results

Dimension	Cronbach Alpha's Value	Result
Service Quality (X1)	0.798	RELIABLE
Website Quality (X2)	0.826	RELIABLE
User Satisfaction (Y)	0.872	RELIABLE

2. T Test

T test is used to measure the influence of independent variables partially to the dependent variable. According to Sugiyono (2015) [17], terms of an independent variable significantly affects to the dependent variable when:

1. T value > t table value or significant value (Sig.) < 0.05, then the variable had significant influence on the dependent variable.
2. T value < t table value or significant value (Sig.) > 0.05, then the variable had no significant influence on the dependent variable.

Table 5. T Test Results

Dimension	t value	t Table (df = N-3 = 151) α = 0.05	Sig.	Result	Hypothezed Result
Service Quality (X1)	0.615	1.655	.539	Significant	Rejected
Website Quality (X2)	8.655	1.655	.000	Significant	Accepted

Based on t test results on table 5, we know that from 2 variables tested, only one variable is Website Quality (X2) had a significant influence on user satisfaction. It can be seen from t value of X2 > t table value, and Sig value of X2 < 0.05. It means, based on students perceived as IT service user, they assume that the website quality factor is very influential on their satisfaction when using SISTER. When the Jember University as SISTER's provider improve website quality of SISTER consisting usability, information quality, and service interaction it also increases user satisfaction. Otherwise, if the quality of SISTER's website has decreased, the level of user satisfaction also decreased. Based on table 5, then from the two hypotheses tested only hypotheses 2 (H2) is accepted, and hypotheses 1 (H1) is rejected.

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C. GAP Analysis

GAP analysis to calculate the gap value between expectations and perceived about the overall quality of SISTER. Expectations value is obtained from the maximum value of the measurement instrument, where the maximum value is 4. Perceived value is obtained from the average value of respondents perceptions of each indicator. Gap calculations are performed on each variable. The results of GAP analysis can be seen in table 6.

Table 6. GAP Analysis Results

Dimension	Indicator	Value		GAP
		Perceived	Expectations	
Service Quality	Tangible	3.03	4	-0.97
	Reliability	2.90	4	-1.10
	Responsiveness	2.79	4	-1.21
	Assurance	2.92	4	-1.08
	Emphaty	2.75	4	-1.25
	Service Quality (Mean)	2.88	4	-1.12
Website Quality	Usability	3.04	4	-0.96
	Information Quality	3.00	4	-1.00
	Service Interaction	2.97	4	-1.03
	Website Quality (Mean)	3.00	4	-1.00
User Satisfaction	User Satisfaction	2.91	4	-1.09
	Net Benefits	3.08	4	-0.92
	User Satisfaction (Mean)	3.00	4	-1.00

Based on the results of GAP analysis above, the gap value of service quality dimension is -1.12. It means, the average student perception of SISTER service quality is about 2.88 of 4. A GAP analysis results are said to good if the gap value is not more than -1. Thus, based on this results, it can be concluded that the average students has a poor perception on the service quality of SISTER. From the 5 (five) service quality indicators, onlye one indicator that good judgement is tangible where gap value is less than -1. In the future, SISTER's provider need to improve the quality of measurement items of indicators of reliability, responsiveness, assurance, and emphaty if they want to increase the user satisfaction of SISTER.

For the website quality dimension, the gap value is -1.00. It means, that the average students has perceptions of the website quality of SISTER around 3.00. Thus, we can concluded that the average students has a good perception about the website quality of SISTER. From the 3 (three) website quality indicators, all indicators have average GAP is -1.00. It means, currently the user perception on the website quality of SISTER is good enough. But, in the future needs to be improved to be able to reduce the gap value even to 0, where the expectations and perceptions of the quality of website is equal.

For the user satisfaction dimension, the average gap value is -1.00. It means that the average students has perceptions of satisfaction of SISTER is around 3.00. Thus, based on GAP analysis, it can be concluded that the average students was satisfied overall against SISTER's service.

V. Conclusion

This study resulted in a measurement framework to measure the level of user satisfaction of an IT services by taking a case study is SISTER service of Jember University. The measurement framework developed consists of three dimensions: (1) Service Quality refers to the Servqual method, (2) Website Quality refers to the Webqual method, aand (3) User Satisfaction refers to the Information System Success Model (ISSM) by DeLone and McLean.

That framework is implemented to measure the user satisfaction of SISTER's users. Based on that framework, then proposed 2 hypotheses for this study. Hypotheses 1 is *Service quality had significantly influence on user satisfaction,* hypotheses 2 is *Website quality had significantly influence on user satisfaction*. Based on the measurement results, the variable service quality has no significant influence on user satisfaction, so hypotheses 1 was rejected. Another variable is website quality has a significant influence on user satisfaction, so hypotheses 2 was accepted.

In addition, this study is also calculates gap to determine the quality of SISTER based on comparison of user's perception and user's expectations. Based on GAP analysis, it's found that the average gap value for service quality variable is -1.12, website quality is -1.00, and user satisfaction is -1.00. It means, the service quality that represents the tangible components, reliability, responsiveness, assurance, and emphaty of SISTER's provider according the students perceptions are still not good. In the future, SISTER's provider need to improve the quality of measurement items of indicators of reliability, responsiveness, assurance, and emphaty if they want to increase the user satisfaction of SISTER.

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