Service Dimension for Information System in Higher Education Field

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ABSTRACT

Presently, information system is increasingly important to support many fields such as business and education. The implementation of good information system also becomes attention improving customer satisfaction. One of some tools to analyze customer satisfaction is SERVQUAL. However, five service dimensions formulated by SERVQUAL are not always able to cover all of service attribute in some different case such as in information system field. Based on this phenomenon, it indicates that adjustment of types and number of dimension are extremely needed in special case. Information system field has different service attribute uniquely used in service performance assessment. In addition, there is also different service dimension between information system for education and for business. However, there are few researches focusing on determining service dimension of information system for higher education field, which become attention in assessing service performance. The importance of types and number of dimension results SERVQUAL evaluation. The scope of this research is determining service dimension for information system in higher education field. This research will be conducted by survey. In detail, the respondent in this research will be user of information system such as lecturer, student and management of education institution. They are stratified based on their accessibility and interest. Collected data of service attribute from this survey will be analyzed by factor analysis. The output of this analysis is service dimension.

Key words:
Service dimension, service quality, information system, SERVQUAL

1. INTRODUCTION

Today, service activities are regarded as increasingly important for running the business [1] [2] [3] [4]. Adding service to product can influence customer satisfaction. A kind of service that can be provided by management is the implementation of information system in business system [5]. Business process will be more relatively effective and efficient by using information system. However, the effort to improve customer satisfaction by using information system should be evaluated in order it is able to understand customers' wants and needs. It is very important to understand service given to customers that is meeting with their wants and needs to establish customers' loyalty and to pursue potential customers. This is supported by empirical study that mention qualified service can increase customer satisfaction, then customer satisfaction will build customer loyalty and customer loyalty will give profitability to company [6]. One of some tools to analyze whether service given can meet customers' wants and needs is SERVQUAL. By using SERVQUAL, the performance of service given is evaluated from gap between customers' expectation and customers' perception. Those services given can be grouped into several dimensions based on the equality of function and of impact in satisfaction improvement. There are five dimensions formulated in SERVQUAL that become general model to accommodate much kind of services given. They are tangible, responsiveness, reliability, assurance, and empathy. However, five service dimensions formulated by SERVQUAL are not always able to cover all of service attribute in some different case. Based on this phenomenon, it indicates that adjustment of types and number of dimension are extremely needed in special case. The benefit of this adjustment is to avoid the misleading in understanding and in interpretation of the performance of

certain service dimensions due to categorize inappropriate service attribute to certain service dimension. This adjustment had been conducted several times in previous research [7].

Based on background above, the objective of this research is to investigate the suitable service dimension for information system in higher education field. As the fact of the powerful of technology, education field also depends on information system to conduct their activities. Information system in education is like the basic needs and it expedites learning process. However, there are few researches focusing on determining service dimension of information system for education fields, which become attention in assessing service performance. The importance of types and number of dimension results SERVQUAL evaluation. Generally, the benefit of this research is able to improve users' satisfaction by using wise service dimensions. The scope of this research is determining service dimension for information system in higher education field. This research will be conducted by methode of survey.

2. SERVICE DIMENSIONS IN SERVQUAL

Over the years management literature has proposed many concepts and instruments concerning how to measure the service quality. Some of them are service quality (SERVQUAL), and quality function deployment (QFD). QFD is commonly used in SEE methodology to translate voice of customer in first phase into technical design in third phase. The use of QFD in process design is straightforward. However, good service delivery is a successful strategy to serve customer. Thus, knowing the gap between customer's expectation and customer's experience is important. QFD cannot record the gap. There are several gaps in service field which consists of following gaps: customers' expectation versus their understanding by manager; managers' perception of customers' expectation versus service specifications; service specification versus fulfillment; information about service versus service that is actually provided; and customers' expectations versus service provided.

Reference [8] mentioned that to evaluate service, SERVQUAL divide attributes of service into five dimensions which consist of follows:

1. **Tangibles** : The appearance of physical facilities, equipment, personnel and communications material.
2. **Reliability** : The ability to perform the promised service dependably and accurately.
3. **Responsiveness** : The willingness to help customers and provide prompt service.
4. **Assurance** : The knowledge and courtesy of employees and their ability to convey trust and confidence.
5. **Empathy** : The caring, individualized attention the firm provides its customers.

In most cases of SERQUAL, five service dimensions above become general model to evaluate and improve service given. Whereas in some other cases, there are several services those have not been able to be covered by those five dimensions mentioned before. In addition, customer or user is very sensitive to service given selection. Thus, mistake in classifying service attributes into dimension will give bias assessment and misleading interpretation to service performance itself [7]. Obviously, service dimension will influence the assessment of service quality. Service quality of a specific service dimension is defined as the attitude of the customers' perceptions towards the specific service dimension according to their experience of uses at a specific time [9].

In fact, adjustment of the number and the kind of service dimensions is previously done in several researches. Reference [7] gave the chronologies as follow:

Table 2.1: The Chronologies of Service Dimension Development

Year	Proposer	Component/ Dimension	Additional Information
1982	Lehtinen	• Interactive Quality • Physical Quality • Corporate Quality	

Table 2.1: The Chronologies of Service Dimension Development (Cont.)

Year	Proposer	Component/ Dimension	Additional Information
1984	Gronroos	• Structure-Technical Quality • Functional Quality • Reputational Quality	
1988	Leblanc and Nguyen	• Corporate Image • Internal Organization • Physical Support of The Service Producing System • Staff/ Customer interaction • The Level of Customer Satisfaction	
1988	Parasuraman, Zeithml and Berry	• Tangibles • Reliability • Responsiveness • Assurance • Empathy	Eventually led to the development of SERQUAL
1988	Garvin	• Performance • Features • Conformance • Reliability • Durability • Service • Response • Aesthetics • Reputation	
1989	Hedvall and Paltschik	• Willingness • Ability to Serve	
1994	Oliver and Rust	• Functional Quality • Technical Quality • Environment Quality	

The other example given for service dimension adjustment is adjustment of SERVQUAL's five dimension in airlines industry. In airlines industry, SERVQUAL's five dimensions are difficult to apply to airlines. This is because the SERVQUAL instrument does not address other important aspects of airline service such as in-flight meals, frequent flyer programs, seat space and legroom [10]. In addition, reference [10] also showed that they adjusted the SERVQUAL's service dimension became three dimensions. Those three dimensions are as follows

- Dimension 1: Reliability and Customer Service
- Dimension 2: Convenience and Accessibility
- Dimension 3: In-flight Service

Regarding the benefits of SERVQUAL itself, reference [11] summarized the benefits of SERQUAL as follows:

1. It is useful in understanding the opinion of customers regarding a service delivery, for example perception, expectation, and satisfaction.
2. The model alerts management to consider expectations and perceptions.
3. The gaps among different people, and at different time periods regarding expectation and perceptions can be identified,
4. It is useful in identifying specific areas of weaknesses and dissatisfaction.
5. It helps prioritize areas of service weakness to focus effort on.

6. It provides benchmarking analysis for organizations in the same service sector.
7. It can work as a basis for gathering customer requirements to explore further quality improvement analysis.

3. SERVICE ATTRIBUTES FOR INFORMATION SYSTEM IN HIGHER EDUCATION FIELD

Presently, organizations continue to increase spending on information technology (IT). The impacts of IT are often indirect and influenced by human, organizational, and environmental factors; therefore, measurement of information systems (IS) success is both complex and illusive [12]. Nevertheless, measurement of information system success related to users' satisfaction is extremely needed.

Users' satisfaction has close relationship with service quality. The determination of service quality is considered as a comparison process between an expected level of service and the service perceived by the user. The relationship between service quality and users' satisfaction is showed by reference [13] as follows:

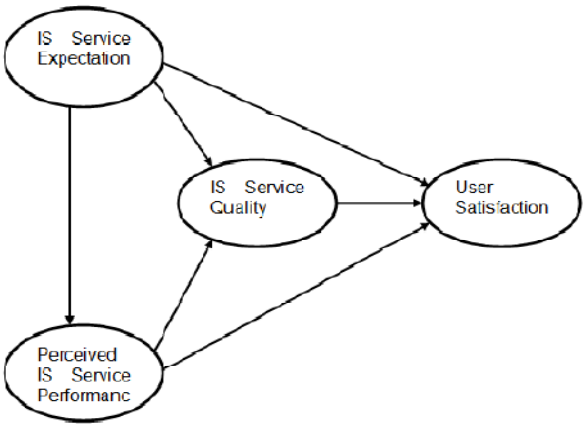

Figure 1: Users' Satisfaction Determination

In order, the measurement of success of users' satisfaction will not be misleading and bias, service dimension determination becomes something crucial [12]. Service dimension is group of some service attributes those have the same function and impact to satisfaction improvement. So that classifying of certain service attributes into inappropriate dimension will cause misleading in interpretation of performance of service dimension itself. Service attributes can be generated by several ways such as based on ISO as a fulfillment of basic requirement standard, based on the same previous research and based on voice of customer as service development indicator. Generally, service attributes used as key of success measurement in information system are as follows:

Table 3.1: Service Attributes for Information System

No	Service Attribute	Reference
1	Ease of using system	Research
2	Ease of learning system	Research
3	System accuracy	Research
6	Flexibility of system	Research
7	Sophistication of system	Research
8	Integration	ISO, Research

Table 3.1: Service Attributes for Information System (cont.)

No	Service Attribute	Reference
9	Customization of system	Research
10	Consistency of network connection	Research
11	Availability of information	Research
12	Usability of information	Research
13	Understandability of information	Research
14	Relevancy of information	Research
15	Format of information/documents	Research
16	Conciseness of information	Research
17	Individual learning impact	Research
18	Individual awareness impact	Research
19	Individual decision effectiveness impact	Research
20	Individual productivity impact	Research
21	Organizational cost impact	Research
22	Overall productivity impact	Research
23	Improved outcomes impact	Research
24	Ease of accessibility	Voice of Customer
25	Speed of access and operation	Voice of Customer
26	Communication media provision	Voice of Customer
27	Quota of downloading and uploading file	Voice of Customer
28	Green information system	Voice of Customer
29	Protection from virus, spam, worm and so forth	Voice of Customer
30	Broadcasting of latest information (news, advertisement, announcement, so forth)	Voice of Customer
31	Supporting vision organization	Voice of Customer
32	Information security policy	ISO, Voice of Customer
33	Management commitment to information security	ISO
34	Confidentiality agreement	ISO
35	Independent review of information security	ISO
36	Information classification guideline	ISO

Table 3.1: Service Attributes for Information System (cont.)

No	Service Attribute	Reference
37	Information labeling and handling	ISO
38	Network control and maintenance	ISO
39	On line transaction	ISO
40	Protection of log information	ISO
41	Clock synchronization	ISO
42	Privilege management	ISO
43	User password management	ISO
44	Review of user access right	ISO

Based on service attributes list above, some service attributes cannot be fitted into tangible, reliability, assurance, responsiveness and empathy. Service attributes mentioned above are service attributes which are commonly used either for information system either in business field or education field. Whereas, there are differences in both business field and education field, especially higher education field. The differences are fundamentally associated with the goal of using information system. So that, it needs to be adapted to use service attributes mentioned before for information system in higher education field. Here are several additional service attributes for information system in higher education field.

Table 3.2: Additional Service Attributes for Information System in Higher Education

No	Service Attribute	Reference
1	E-learning	Voice of Customer
2	On line-class	Voice of Customer
3	On line-examination	Voice of Customer
4	Cloud computing	Voice of Customer
5	Automatic examination mark calculation	Voice of Customer
6	Restricted web that is visited	Voice of Customer
7	Ease of registration	Voice of Customer
8	WIFI availability	Voice of Customer
9	Ease of device setting	Voice of Customer
10	Quota of cloud computing	Voice of Customer
11	Filtering plagiarism	Voice of Customer
12	Concern to copyright (software, ebook, research, journal and so forth)	Voice of Customer
13	Supporting for student presence, lecturer presence and employee presence	Voice of Customer
14	Paperless data back up	ISO, Voice of Customer
15	Durability of storing file to cloud computing	Voice of Customer

4. DETERMINING SERVICE DIMENSION FOR INFORMATION SYSTEM IN HIGHER EDUCATION FIELD

4.1 Questionnaire Design and Sample

Data collecting is conducted by distributing questionnaire to respondents that is defined before. The respondent in this research will be user of information system such as lecturer, student and management of education institution. They are stratified based on their accessibility and interest. The given questionnaire contains service attributes list for information system in higher education. Those service attributes are generated as method explained before. Respondents are asked to determine the importance level of those service attributes. Importance level of service is filled based on respondent's expectation toward the importance of certain service. This study adapted the SERVQUAL scale to the specific context of aviation by generating additional quality related measures or items other than the ones already included in the SERVQUAL instrument. This study will change the measurement items and the dimensions to develop a more appropriate scale for measuring service quality of information system in higher education.

4.2 Factor Analysis

In this study, factor analysis is used to determine the service dimension based on the importance level of service attributes which have been assessed by respondent. Factor analysis is a method for investigating whether a number of variables of interest Y_1, Y_2,…, Y_l, are linearly related to a smaller number of unobservable factors F_1, F_2,…, F_k. Variable of Y_i in this study refers to service attribute and Factor of F_j in this study refers to service dimension.

4.3 Reliability of Measures

The next step after getting the new service dimension from factor analysis is the reliability test of the new service dimension itself. Reliability test is used to know the internal consistensi of service dimension and to know whether the service dimension is able to be credible measurement tools in service evaluation. The first step to do reliability test is establishing the hypothesis as follows: H0: questionnaire is reliable; Ha: questionnaire is not reliable. Decision is taken by comparing Cronbach's alpha and R-value from table. Cronbach's alpha was used to assess internal consistency.

5. ANALYSIS

Based on service attribute generation on Table 3.1 and Table 3.2, at glance it can be analyzed that there are some service attributes uncovered by 5 SERVQUAL service dimension. This is probably caused that there are two different respon variable in information system field which have the same importance level in user assessment. Both the variables are related to either system quality or information quality alone. So that, both of the variables should be separately analyzed because they are not the same. In the other hand, analysis conducted by 5 SERVQUAL service dimension is general and tending to system quality in delivering service. Before grouping the attribute by using factor analysis, at glace the attributes on Table 3.1 and Table 3.2 can form dimensions based on D&M model as follows: (1) system quality is the desirable characteristics of an information system, (2) information quality is the desirable characteristics of the system outputs, (3) security is dimension protecting some either information or data, (4) Education support is dimension supporting activities for educational purpose, (5) Assurance is the knowledge and courtesy of employees and their ability to convey trust and confidence, (6) Empathy is the caring, individualized attention the firm provides its customers.

Based on service dimensions above, dimension of information quality, security and education support are uncovered by 5 SERVQUAL service dimensions. In fact, dimension of responsiveness, assurance and reliability in SERVQUAL can be covered by either system quality or information quality. There is interesting point about assurance here. Assurance in SERVQUAL is intended to guarantee and certainty of service given to user meeting with promised service to user. In the other hand, assurance in information system field is more intended to guarantee of confidential of either data or information up-loaded to information system. Both of that guarantees are surely different. Therefore, service dimension of security is needed in service evaluation for information system. However, service dimension of

tangible and empathy still occur in both of 5 SERVQUAL service dimensions and service dimensions above. This probably shows that tangible and empathy are service dimensions always attracting user's attention and assessment. This dimension looks like being favorite dimension for user so that it is always well provided by provider. It is probably caused by recognition of senses. While empathy is dimension covering service attribute that supports making customer intimacy. Actually service dimensions having formed above can be used for service evaluation not only in information system for higher education field but also in general information system by removing service dimension of education support. Service dimension of education support can be only used in information system for higher education because the function of implementing information system in both of them are different. The implementation of information system in education field must be based on the great value of education and it is not profit or business oriented as the main goal, so there are some service attributes used to limit and support the utilization of information system for educational purpose such as online class, concern to copyright, issue of plagiarism and so forth.

6. CONCLUSION

Service attributes for many kind of field are not exactly the same, so that the different field will have different service dimensions too. Based on service attributes which are in line with ISO 27001 and generating idea from voice of customer, service dimensions for information system in higher education field must be unique dimensions. It is because SERVQUAL's five dimension are not exactly fit with and cannot cover all of the available service attributes. The adjustment of service dimension was also done time by time. That adjustment could be done by using factor analysis.

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