ServQual and WebQual 4.0 for usability check academic information system of private university

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Abstract. This study aims to determine the level, correlation, and influence of the usability of academic information system services using the ServQual and WebQual 4.0 methods. The research method used is qualitative-qualitative and data collection through a survey verification consisting of 20 statements. The questionnaire statement uses a Likert scale with 100 student respondents as the main users. The sampling technique uses a simple random sampling technique. Then, the data analysis in this study uses path analysis. The results showed that ServQual was at an average score of 2.60, WebQual 4.0 was at an average score of 2.59, and the average score for the User Satisfaction variable was at 2.66. Academic information system improvement will have a major effect on User Satisfaction. This is by the results of the verification analysis which shows that ServQual (X1) and WebQual 4.0 (X2) have a positive effect simultaneously on User Satisfaction (Y), with a total effect of 0.688 or 68.8%. External influence of 0.312 or 31.2%. Thus, the academic information system in small and medium-scale private universities needs to be improved on the WebQual 4.0 variable and can be added by ServQual improvements, and ServQual improvements can also be done without including WebQual 4.0.

1. Introduction

The information has become a necessity in the management process, both in business organizations and in government organizations (information-based society). The speed of information obtained by the organization will make every decision more quickly adapt to existing changes [1]. To obtain fast and accurate information, both from a decision perspective and from a service perspective, many organizations have made information systems their most vital investment [2]. Information systems are the main weapon for organizations to achieve organizational goals [1]. Therefore, the development of information technology governance will produce a reliable information system [3]. By carrying out information system governance, organizations can improve the quality of information system services, reduce risk, improve performance, and reduce information system service costs.

The current globalization in the world of education requires universities to be able to manage information well so that the information needs of each interested party can be fulfilled quickly and precisely. One of the information systems in higher education is an academic information system. This is the basis for higher education to use the Academic Information System to obtain accurate information and optimize services to students.
The academic information system is one of the tools that is needed to support academic activities and services at private university. When the implementation process of a system has been completed, the next stage is to carry out the evaluation process, so that we can know the success rate of the system implementation process. By conducting an evaluation process of the campus academic information system, it will be able to generate recommendations that can be used as a means to improve the quality of the system in the future [4]. So far, in developing academic information system services, Private university has generally paid less attention to the user reusability factor. Usability refers to the level of effectiveness, efficiency, and satisfaction of a product that has been used by users of the product so that its objectives in a certain context can be achieved [4]. In this regard, the measurement of the quality of academic information system services uses the ServQual instrument. This is based on the statement that reusability and quality influence each other [5]. While the use of the WebQual 4.0 instrument [2] aims to evaluate user perceptions of the suitability of the website to student needs.

This paper describes a simple evaluation of the quality of the academic information system at private universities that are classified as small and medium universities. The problems found in private universities are mostly in the form of information systems that are still simple, operators that are not optimal, and others [6]. This is because universities have experienced a decrease in income caused by the Covid-19 pandemic [7]. Thus, inadequate income results in the development of an academic information system that is visible or just a formality [8].

Usability is a measure of the level of user satisfaction in accessing the functionality of an information system effectively, efficiently, and satisfying users to achieve certain goals [9]. To measure the level of reusability, information systems, dimensions of user satisfaction, and net benefits are used [4,10]. According to Idayati et al. [11], service quality in determining user satisfaction is measured by the TERRA dimension consisting of tangible, empathy, reliability, responsiveness, and assurance [12,13]. The WebQual 4.0 method is measured using three core dimensions that represent the quality of a website, namely usability, Information Quality, Service Interaction Quality [2,14].

2. Methods
This study uses the ServQual and WebQual 4.0 approaches to measure the level of reusability of academic information systems in a number of private universities with a questionnaire form of measurement. The questionnaire consisted of 20 statements distributed to 100 respondents who were selected based on the random sampling technique. The scale used to measure the data is the Likert scale [15,16], with criteria strongly agree (5), agree (4), quite agree (3), disagree (2), and strongly disagree (1).

Then the data were analyzed using descriptive analysis techniques and verification. Descriptive analysis techniques are used to describe the respondent's assessment of ServQual, WebQual 4.0, and User Satisfaction about the current state of the academic information system. The average score obtained is interpreted by interpreting criteria, namely the range between 4.2 - 5.0 very good, 3.4 - 4.1 good, 2.6 - 3.3 good enough, 1.8 - 2.5 less good, and the range 1.0 - 1.7 is very poor [17].

Then carried out verification analysis using path analysis to determine the effect of ServQual (X1) and WebQual 4.0 (X2) on User satisfaction (Y) in using academic information systems, either partially or simultaneously. By using the structural equation: $Y = \rho_{yx_1}X_1 + \rho_{yx_2}X_2 + \epsilon$. 

3. Results and discussion

3.1. Descriptive analysis
The results of the research on the ServQual (X1), WebQual 4.0 (X2), and User Satisfaction (Y)) variables were carried out by calculating the results of each variable supporting statement, the following results were obtained:
Table 1. The percentage and the average respondent.

| Variable              | Scale (Percentage) | Total | Mean/Category |
|-----------------------|--------------------|-------|---------------|
| ServQual (X1)         | 12 17 71,6         | 100   | 2,60 (Good Enough) |
| WebQual 4.0 (X2)      | 12.8 15.8 71.3     | 100   | 2.59 (Good Enough) |
| User Satisfaction (Y) | 11 12.5 76.5       | 100   | 2.66 (Good Enough) |

From the table 1, the results of the descriptive analysis obtained an average value of ServQual with a total average of 2.60, so that overall respondents appreciated ServQual which had run in a fairly good category. The WebQual 4.0 variable obtained an average of 2.59, which means that respondents rated the WebQual that has been running in a fairly good category. Furthermore, User Satisfaction also shows that the respondent's assessment is in a fairly good category with an average value of 2.66.

3.2. Verification analysis
The calculation of the correlation coefficient using the Pearson Product Moment correlation analysis was conducted to determine how strong the relationship between several independent variables under study. The calculation of the correlation coefficient uses the SPSS program, with the following results;

Table 2. Correlations.

|       | SQ               | WQ               |
|-------|------------------|------------------|
| SQ    | Pearson Correlation 1 | .489             |
|       | Sig. (2-tailed) .000 |                 |
| N     | 100              | 100              |
| WQ    | Pearson Correlation .489 | 1              |
|       | Sig. (2-tailed) .000 |                 |
| N     | 100              | 100              |

In the table 2 above, relationship between the ServQual variable (X1) and WebQual 4.0 (X2) obtained a value of 0.489 so that when consulted with the r-value interpretation table (correlation), it has a moderate and unidirectional level of relationship because the value is positive, meaning that if ServQual increases by one unit, it is followed with an increase in the amount of WebQual 4.0 of 0.489 units.

Table 3. Coefficients.

| Model | Unstandardized Coefficients | Standardized Coefficients | t     | Sig. |
|-------|----------------------------|---------------------------|-------|------|
|       | B | Std. Error | Beta |       |     |
| 1 (Constant) | -.589 | .779 | -.755 | .452 |
| SQ   | .224 | .031 | .470 | 7.225 | .000 |
| WQ   | .347 | .046 | .492 | 7.570 | .000 |

The table 3 above illustrates the results of the path calculation, that variable X1 has a path coefficient of 0.470 and Variable X2 has a path coefficient of 0.492. The results of the path analysis for the ServQual and WebQual 4.0 variables on usability can be explained in the figure below:
Figure 1. Analysis of ServQual and WebQual 4.0 to user satisfaction.

Based on the figure 1 above, the following path equation is obtained:

\[ Y = 0.470 X_1 + 0.492 X_2 + \epsilon \]

The magnitude of the influence of each independent variable on the dependent variable, both a direct effect and indirect effect, can be seen in the following table:

| Variable | Direct Effect | Indirect Effect | Total effect |
|----------|---------------|----------------|--------------|
| X₁ (ServQual) | (0.470)^2 = 0.220 | 0.470 x 0.489 x 0.492 = 0.113 | 0.333 |
| X₂ (WebQual 4.0) | (0.492)^2 = 0.242 | 0.492 x 0.489 x 0.470 = 0.113 | 0.355 |
| Total | | | 0.688 |

The calculation in the table 4. above is following the SPSS results as follows:

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|----|----------|------------------|--------------------------|
| 1     | .830 | .688    | .682             | 1.10707                  |
| a. Predictors: (Constant), WQ, SQ |

Based on the table 4 and 5 above, it can be seen that the ServQual variable (X₁) has a direct effect of 0.220 or 22.0 %, the indirect effect through its relationship with WebQual 4.0 (X₂) is 0.113 or 11.3 %, so the total effect is 33.3 %. Meanwhile, the variable WebQual 4.0 (X₂) has a direct effect of 0.242 or 24.2 %, the indirect effect through its relationship with ServQual (X₁) is 11.3 %, so the total effect is 35.5 or 35.5 %. The result of the calculation of the coefficient of determination (R squared) which is expressed in percentage describes the contribution of all independent variables, namely ServQual (X₁) and WebQual 4.0 (X₂) in determining the variation of User Satisfaction (Y), which is 0.688 or 68.8 %. Meanwhile, other factors that were not studied and also influenced usability were shown by the value of PyЄ = 0.312, or 31.2 %.

4. Conclusion
The results of research on descriptive analysis, ServQual, WebQual 4.0, and User Satisfaction show that the respondents' assessment is in a fairly good category. The relationship between the ServQual variable (X₁) and WebQual 4.0 (X₂) has a moderate and unidirectional relationship because the value is positive. Meanwhile, the results of the verification analysis show that the ServQual variable (X₁) has a direct effect of 22.0%, the indirect effect through its relationship with WebQual 4.0 (X₂) is 11.3%, so that the total effect is 33.3%. WebQual 4.0 (X₂) has a direct effect of 24.2%, the indirect effect through its relationship with ServQual (X₁) is 11.3%, so the total effect is 35.5%. Simultaneously, ServQual (X₁)
and WebQual 4.0 (X2) affect User Satisfaction (Y) by 0.688 or 68.8%. Meanwhile, other factors that were not studied and also influenced usability were shown by the value of PyЄ = 0.312 or 31.2%.

So, to increase the reusability of academic information systems in private universities, it is necessary to prioritize the WebQual 4.0 variable and it can be fixed without being followed by ServQual improvements, and ServQual improvements can also be done without including WebQual 4.0.

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