

## Modeling the Academic Administration Services of Universitas Islam Negeri Alauddin Makassar

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### Abstract

This study discussed modeling the students' satisfaction toward academic administration services at UIN Alauddin Makassar. This study aimed to determine the model of the students' satisfaction toward academic services at the service center of UIN Alauddin Makassar and to know what service dimensions were significantly affecting the students of UIN Alauddin Makassar. To achieve those objectives, binary logistic regression analysis was used in this study because the response variable was a binary variable with two categories, satisfied and not satisfied. The results of data analysis were obtained from the model as follow:  $\ln\left(\frac{\pi(x_1)}{1-\pi(x_1)}\right) = 0,570 + 0,282 \text{ Tangibles} - 0,167 \text{ Reliability}$ . Based on the regression equation, it indicated that the independent variables or service dimensions that significantly influenced service satisfaction of academic administration were tangible ( $X_1$ ) with a regression coefficient of 0.282 or 28.2% and reliability ( $X_2$ ) with a coefficient regression -0.167 or 16.7%.

**Keywords:** Satisfaction, Services, Binary Logistic Regression

### 1. Introduction

The development of technology as it is now demanding the educational institution to provide standards in improving the quality of services. Quality of service is a necessity that must be improved by a department or faculty as a service provider so that it can gain trust and give comfort for its users for the smooth process of academic activities. Service quality refers to the students' assessments toward the cores of academic services, namely the service provider itself or the whole service organization, where the students expect excellent service.

The current higher education system is faced with various challenges both in the development of science and technology, globalization and competition with other educational institutions. Therefore, improvements need to be made in management, customer orientation, and application of quality management. Management is a demand to survive and to compete in the future. One important step that must be done is knowing how the students' satisfaction toward the academic services of each service unit in UIN Alauddin Makassar. Without this initial step, it is very difficult to make further improvement efforts. Therefore, it is very important to conduct research relates to the students' satisfaction. The service dimensions mentioned are tangible, reliability, responsiveness, assurance, and empathy.

Related to the background above, the students' feedback regarding academic services is very important. This feedback is an evaluation and consideration in providing services oriented to the satisfaction of the students as service users at UIN Alauddin Makassar. Thus, service units can improve the service quality provided to the students.

Based on the results of research conducted by Nurul Wulandari (2016) in one of the faculties at UIN Alauddin Makassar, it was found that only one of five service dimensions gave significant satisfaction to the students. Moreover, they often complain about the services at UIN Alauddin Makassar, so it was considered important to examine every service unit.

The students' satisfaction with academic administration service consisted of two possibilities, whether the students were satisfied or not satisfied with the academic services at UIN Alauddin Makassar. To model the effect of each service dimension on the students' satisfaction which consisted of two categories (satisfied or unsatisfied), the method considered most appropriate was binary logistic regression analysis. This analysis was used because the response variable was a categorical variable consisting of only two categories. This research focused on forming a model of students' satisfaction toward academic administration in the service center of UIN Alauddin Makassar and knowing what service dimensions significantly affected the students' satisfaction of UIN Alauddin Makassar.

Service quality is the level of excellence that is expected to fulfill the desires of service users. There are two factors that affect service quality, namely perceived service and expected service. The satisfaction of academic service is influenced by the quality of service i.e tangible, empathy, reliability, responsiveness, and assurance. If the services received by the students are as expected, the quality of service is perceived as good or satisfying. If the service received by them exceeds the expectation, the service quality is an ideal quality (excellent service). Conversely, if the service quality provided is lower than the expectation, it is considered poor or unsatisfying. Thus, whether the service is good or not to the students depends on the service provider of UIN Alauddin Makassar to fulfill the expectations of the users (students) consistently.

According to Parasuraman in Lupiyoadi (2006: 182), service qualities are: (1) Tangibles or physical evidence are the company's capability to show its existence to external parties. tangibles and services provided include the capability of the company's physical facilities and infrastructure and the condition of the environment. (2) Reliability is the company's capability to provide services as promised accurately and reliably. (3) Responsiveness is a willingness to help and provide fast and appropriate service to customers, by delivering clear information. (4) Assurance is the knowledge, the courtesy, and the ability of employees to grow customers' trust in the company. It consists of several components including communication, credibility, security, competence, and politeness. (5) Empathy is giving sincere and special attention to customers by trying to understand their desires. For example, companies must know the customers' specific desires of the product's physical form or service and also its proper distribution. The word satisfaction comes from Latin "satis" which means enough, good, adequate and "facio" which means doing or making. Satisfaction can be interpreted as an effort to fulfill or make something good enough

The explanation of logistic regression is part of statistical models which are called generalized linear models. Based on independent variables, logistic regression is divided into two characteristics i.e simple logistic regression (only has one independent variable) and multiple logistic regression (having more than one independent variable). Whereas, logistic regression based on the dependent variable is divided into two categories namely binary logistic regression (its variable is dichotomous or it has only two categories) and multinomial logistic regression (it has more than two categories or polytomous).

Logistic regression is one of the mathematical model approaches used to analyze the relationship of one or several predictor variables (independent) with a dichotomous/binary response variable (dependent). In logistic regression, if the response variable consists of two categories, for example,  $Y = 1$  which means the results obtained are "successful" and  $Y = 0$  which means the results obtained are "failed", the binary logistic regression will be used.

In general, the logistic regression probability model involving several independent variables  $x$  can be formulated as follows

$$\pi(x_i) = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k}}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k}} \quad (1)$$

The symbol  $k$  is the number of independent variables and  $\pi(x_i)$  is the possibility of satisfied or unsatisfied perception. The function of  $\pi(x)$  is non-linear which means logit transformation is necessary to obtain a linear function so that the relation between the dependent variable ( $y$ ) and the independent variable ( $x$ ) can be seen. The logit model of  $\pi(x)$  is expressed as  $g(x)$ , as follow:

$$g(x) = \ln\left(\frac{\pi(x)}{1 - \pi(x)}\right) \quad (2)$$

General logistic regression model after being substituted with a logit model of  $\pi(x)$  is obtained:

$$\text{Logit } \pi(x_i) = \ln\left(\frac{\pi(x)}{1-\pi(x)}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \tag{3}$$

The parameter significance test of independent variables was carried out to find out whether the estimated parameters obtained has a significant effect on the model or not, and how much each parameter influence the model. Testing the model parameters is done both simultaneously and partially

Fittest is used to examine whether or not a model fits the data, the observed values are equal or close as expected in the model. The model used must suit or according to the Goodness of Fit (GoF). A model is categorized properly to the GoF if there is a fit between the data in the model and the observed data. In logistic regression, the method to test the feasibility of the model is measured by chi-square value using Hosmer and Lemeshow test. This test is looking the goodness of fit value as measured by the chi-square value at a significant level of 5%.

P-value is the smallest probability value of a hypothesis test so that the observed statistical value is still meaningful. P-value can also be interpreted as the possibility of making an error if  $H_0$  is rejected. In general, the p-value is compared with a certain significance level ( $\alpha$ ), usually 0.05 or 5%. The level of  $\alpha$  is assumed as the probability of making an error conclusion by rejecting  $H_0$ .

**2. Methodologi**

The population of this study was all the students whose status as registered or active at UIN Alauddin Makassar. The sampling technique used was proportional stratified sampling which the samples were taken proportionally from each faculty of UIN Alauddin Makassar.

$$\begin{aligned} n &= \frac{N}{1 + (N \times e^2)} \\ &= \frac{20212}{1 + (20212 \times 0,05^2)} \\ &= 392.24 = 392 \text{ students} \end{aligned}$$

The sample was determined using the Slovin method. The population of this research consisted of 20.212 students.

Based on the dimensions of service quality, the variables of this study could be seen in table 1:

Table 1. Research variables of service dimensions

Research Variables	
X <sub>1</sub>	Tangible
X <sub>2</sub>	Reliability
X <sub>3</sub>	Responsiveness
X <sub>4</sub>	Empathy
X <sub>5</sub>	Assurance

The procedures of this research were: (1) Making a questionnaire. (2) Testing the validity and reliability of the questionnaire. (3) Transforming ordinal data to interval data. (3) Modeling binary logistic regression: (a) Tabulating the results of the questionnaire; (b) Testing the significance of parameters simultaneously by using the G-test to find out whether the independent variables affect the model; (c) Testing the significance of parameters partially by using a Wald test to find out the parameter coefficients that have a specific effect on the model; (d) Conducting statistical tests by using binary logistic regression analysis with the general model; (e) Testing the feasibility of the binary logistic regression model examined by the chi-square value using Hosmer and Lemeshow test by looking at the goodness of fit value measured also by the chi-square value.

**3. Results**

The students of UIN Alauddin Makassar were the respondents of this study. They were chosen from each class who had experiences of services both in the study program level or at the faculty level. The service centers of UIN Alauddin Makassar were divided into two levels, service centers in faculty and

study program/department. The percentage of both services could be seen as shown in the following figure 1:

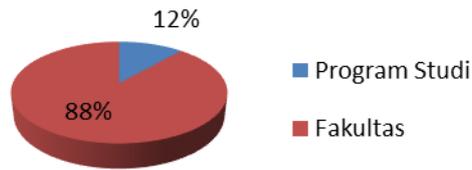


Figure 1. The percentage of academic services in faculty and study program levels

Based on figure 1, it described that 88% of academic administration services of UIN Alauddin Makassar were provided at Faculty level and only 12% in Study Program.

Based on the classification levels of the students' satisfaction toward the academic administration services of UIN Alauddin Makassar, it could be seen in the following figure 2.

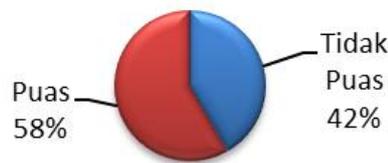


Figure 2. Percentage of the students' satisfaction toward academic administration services

Simultaneous tests were carried out to determine the significance of model parameters overall. This test could be done by the G-test as the following hypothesis:

$H_0: \beta_1 = \beta_2 = \dots = \beta_5 = 0$  (There was no influence between the independent variables and the dependent variables).

$H_1$ : At least one  $\beta_j \neq 0$  with  $j = 1, 2, \dots, 5$  (There was influence between the independent variable toward the dependent variable).

$H_0$  was rejected if  $G \geq \chi^2_{(\alpha, v)}$ . To see the level of data variation, Cox & Snell R Square was used as showed in table 2:

Table 2. Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	512,828 <sup>a</sup>	0,063	0,084

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than 0,001

The result obtained in table 2 was 512.282 as ratio value, Chi-square table value = 11.07 with  $\alpha = 0.05$  and  $df = 5$ . It assumed that,  $G \geq \chi^2_{(\alpha, v)}$  was  $512.282 \geq 11.07$  so that  $H_0$  was rejected. It meant that there was at least one independent variable that influenced simultaneously the dependent variable in  $\alpha = 0.05$ . Table 2 indicated that the determinant coefficient ( $R^2$ ) of logistic regression was 0.084 which meant the contribution of the independent variable to the dependent variable was 8.4%.

Another way could be seen in the Omnibus Test of Model Coefficients in Table 3:

Table 3. Simultaneous Test

Omnibus Test of Model Coefficients

		Chi-Square	df	Sig.
Step 1	Step	25,639	5	0
	Block	25,639	5	0

	Model	25,639	5	0
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The hypothesis tested for model compatibility was:

$H_0$  = Hypothesized model fits the data;

$H_1$  = Hypothesized model does not fit the data.

The fittest of the model could be seen in the Hosmer and Lemeshow Test in Table 4:

Table 4. Fit Test

Step	Chi-Square	df	Sig.
1	76,288	8	0,000

Based on table 4, the value of  $\chi^2_{test} = 76.288$  and  $\chi^2_{(8;0.05)} = 15.51$  or  $p\text{-value} = 0.000 < \alpha = 0.05$  which indicated  $H_0$  was not rejected or it could be interpreted that the model was suitable or fit. However, there was a possibility that not all variables in the model were significant even though overall showed simultaneously significant. Thus, significant variables were chosen partially as the following hypotheses:

$H_0 = \beta_j = 0$  with  $j = 1, 2, 3, 4, 5$ . (The variable was not significant);

$H_1 = \beta_j \neq 0$  with  $j = 1, 2, 3, 4, 5$  (The variable was significant).

Using the criteria test which interpreted  $H_0$  was rejected if  $|W| > Z_{\alpha/2}$  or  $P\text{-Value} < \alpha = 0.05$ . The test statistic values were described in table 5:

Table. 5 Significant Variables in Model

Variables in the Equation

		B	S.E	Wald	df	Sig.	Exp(B)
Step 1 <sup>a</sup>	X1	0,282	0,081	12,169	1	0	1,326
	X2	-0,167	0,061	7,558	1	0,006	0,864
	X3	-0,065	0,067	0,932	1	0,334	0,937
	X4	0,326	0,202	2,617	1	0,106	1,386
	X5	-0,032	0,058	0,299	1	0,584	0,969
	Constant	0,57	0,454	1,578	1	0,209	1,769

a. Variable(s) entered on step 1: X1, X2, X3, X4, X5.

Based on table 5, it described that the p-value of each variable was not entirely significant. From this table, the data showed that the variables  $X_1$  and  $X_2$  with the same p-value were 0.000. Because of the  $p\text{-value} < \alpha = 0.05$ , it can be concluded that  $H_0$  was rejected or both of these variables were significant, while the variables  $X_3$ ,  $X_4$ , and  $X_5$  with p-values respectively were 0.334, 0.106, and 0.584. The result indicated that the three variables had  $p\text{-value} > \alpha = 0.05$  which meant fail to reject  $H_0$  or all three variables were not statistically significant.

Based on table 5, it was found that there were only 2 significant independent variables, namely  $X_1$  (Tangible) and  $X_2$  (Reliability). The value of each regression coefficient as described in Table 6 as follow:

Table 6. Regression Coefficient

Parameter	Regression Coefficient
$\beta_0$ (Constant)	0.570
$\beta_1$ ( $X_1 = \text{Tangible}$ )	0.282
$\beta_2$ ( $X_2 = \text{Realibility}$ )	-0.167

Based on table 6, the best model that could illustrate the relation between the two variables and the students' satisfaction toward academic administration services (Y) described as follow:

$$\pi(x_i) = \frac{e^{0.570+0.282X_1-0.167X_2}}{1 + e^{0.570+0.282X_1-0.167X_2}}$$

By substituting the coefficient values of each variable, the model was obtained as follow:

$$\pi(x_i) = (1 - \pi(x_i))e^{0.570+0.282X_1-0.167X_2}$$

$$\left(\frac{\pi(x_i)}{1-\pi(x_i)}\right) = e^{0.570+0.282X_1-0.167X_2}$$

The function  $\pi(x_i)$  above was nonlinear so that logit transformation was necessary to obtain a linear function.

$$\ln\left(\frac{\pi(x_i)}{1-\pi(x_i)}\right) = e^{0.570+0.282X_1-0.167X_2}$$

Based on the results of the research which was conducted to examine the students' satisfaction toward the academic services of UIN Alauddin Makassar, it was found that the majority of services of UIN Alauddin Makassar were provided in the Faculty level compared to services in the Study Program level with a ratio of 88% at the faculty and 12% at the study program.

The variables tested in this study were tangible ( $X_1$ ), reliability ( $X_2$ ), responsiveness ( $X_3$ ), assurance ( $X_4$ ) and empathy ( $X_5$ ). Based on the results found indicated that overall  $X_1$ ,  $X_2$ ,  $X_3$ ,  $X_4$ , and  $X_5$  significantly contributed toward the students' satisfaction, the value was 8.4% with a predictive value of 70.5%.

Based on the results of the partial analysis, it was found the parameter estimated values for the binary logistic regression equation. There was a constant value of 0.550 in the logistical model. In addition, the equation showed the coefficient of each independent variable from the regression model.

Based on the best binary logistic regression model mentioned, it could be interpreted that the students' satisfaction toward the academic services of UIN Alauddin Makassar was influenced by tangible ( $X_1$ ) and reliability ( $X_2$ ). The improvement of each tangible service dimension increased 0.282 or 28.2% of the students' satisfaction, and each improvement of reliability service dimensions decreased 0.167 or 16.7% of the students' satisfaction of academic administration services at UIN Alauddin Makassar.

Based on data analysis, it was gained Odds Ratio value as described as follow:

Table 7. The Contribution of Variabel X to Y

Variable	Exp(B)
X <sub>1</sub>	1.326
X <sub>2</sub>	0.846
X <sub>3</sub>	0.9837
X <sub>4</sub>	1.386
X <sub>5</sub>	0.969
Constant	1.769

Based on all findings of this study, the initial binary logistic regression model showed the coefficient value of tangible ( $X_1$ ) and reliability ( $X_2$ ) had a positive and significant effect on the students' satisfaction (Y). Whereas the variable responsiveness ( $X_3$ ), assurance ( $X_4$ ), and empathy ( $X_5$ ) had no effect and were not significant to the students' satisfaction (Y).

Based on the research explanation and the regression model obtained, it could be concluded that the most influenced variables of the students' satisfaction toward academic administration services of UIN Alauddin Makassar were tangible ( $X_1$ ) and reliability ( $X_2$ ).

#### 4. Conclusion

Based on the findings and results of this research, it could be concluded that, by using the binary logistic regression, the best model was obtained that described the relation of tangible ( $X_1$ ) and reliability ( $X_2$ ) variables toward the students' satisfaction of UIN Alauddin Makassar ( $Y$ ). The model was the following:  $\ln\left(\frac{\pi(x_i)}{1-\pi(x_i)}\right) = e^{0.570+0.282X_1-0.167X_2}$  or  $g(x) = 0.570 + 0.282X_1 - 0.167X_2$ . Based on the regression equation, the independent variables or service dimensions that had a positive and significant effect on the students' satisfaction were tangible variable ( $X_1$ ) with a regression coefficient of 0.282 or 28.2% and a reliability variable ( $X_2$ ) with a regression coefficient of -0.167 or 16.7%.

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