

The Assessment of Building Facilities Reliability of Islamic Boarding School in Sidogiri Pasuruan

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Abstract. The Islamic boarding school in Sidogiri Pasuruan East Java develops Islamic religious education which is very important for the improvement of Indonesian human resources. This Islamic boarding school has several supporting facilities to support the implementation of teaching and learning activities for its santri (students). This study aims to assess the reliability of the building facilities of Islamic Boarding Schools in Sidogiri Pasuruan by considering the user perceptions, namely ustads (teachers) and santri (students). The object of the research is the main room of the mosque, which is also used as a classroom as a place for learning activities. The data collection tool of user perception is a questionnaire with five variables of building facilities reliability consisting of aesthetic, material, structure, utility, and environment. The data analysis (processing) method used is multiple linear regression analysis. The results show that the average level of user satisfaction with the five factors of building facilities reliability is required. The five variables show the significant effect on the building facilities reliability. The utility variable shows the most significant effect among the four other variables. The regression model obtained can be used to assess the reliability of the building facilities for Islamic boarding school in Sidogiri Pasuruan, East Java.

1. Introduction

The school education institutions have important role in improving the quality of Indonesian human resources. The Islamic boarding school in Sidogiri Pasuruan East Java is one type of school institution that develops Islamic religious education. At this time many modern Islamic boarding schools that combine Islamic religious education with general knowledge. This Islamic boarding school has several supporting facilities to support the implementation of teaching and learning activities for its santri (students). This study aims to assess the reliability of the building facilities of Islamic Boarding Schools in Sidogiri Pasuruan by considering the user perceptions, namely ustads (teachers) and santri (students). The object of the research is the main room of the mosque, which is also used as a classroom as a place for learning activities. Some of the previous studies that have become references and comparisons for this research are those conducted by Yuli et. al (2011) [1] was related to how an early exposure to common space in a boarding school can affect user behavior. Yuli's paper is a result from research series of boarding schools that have a long-term goal to find a shared space model based on local cultural aspects in the context of teaching at the Islamic education system of the actual (pure). The specific goal of her research is aimed to provide the standard of facilities development in Islamic boarding schools

that is able to accommodate the time and to eliminate the incidence of deviant behavior of the students who are educated within and the anticipation to the radical movements implicated in the lodge. Komalasari (2014) [2] conducted a research about Green Building assessment based on energy efficiency and conservation. She obtained research results that variables such as Energy Efficiency Measure, Natural and artificial Lighting, Ventilation, Climate Change Impact, Vertical transportation, and Air condition system. Sedayu (2016) [3] concerned the performance evaluation of Islamic boarding school buildings by referring to the principles of green building. Sedayu conducted this evaluation by considering the voice of user. The voice of user determines the performance factors of the Islamic boarding school in the existing conditions so that it can be improved. Abate et. al (2016) [4] discussed the design of data collection instruments or tools that can facilitate the inclusion of blind students in school building evaluations. Principles of Universal Design (UD) are the basis of the development of these tools. The goal of the study is to enable the inclusion of disabled persons in field research in Architecture and Design through the application of appropriate investigation tools. Emami et. al. (2016) [5] conducted study included four modules of extraction and transportation of raw material to the manufacturing site, production of the construction materials, and transport to the building site, as described in the standard EN 15804. The total environmental effects of the school building in terms of global warming potential, ozone depletion potential, human toxicity, acidification, and eutrophication were calculated. Heydaripour (2017) [6] conducted his study to establish a framework to improve spatial organization of modern Iranian high density vertical development housing through investigating on the apartment layout in the contemporary apartments of Iran from privacy perspectives. In this regard, to reach the aim through qualitative approach and case study strategy, this value of the Iranian traditional housing was investigated. Adriansyah (2017) [7] generated health requirements boarding school environment basically consists of a few things such as construction and general sanitary conditions, basic sanitation facilities, food management, and so on. With good environmental health, health risks and other risks will be avoided. Almost 80% of disease in the boarding school due to the health condition of the environment. Good conditions will also improve the aesthetics of the boarding school. His research was analytic study that held observationally with cross sectional design and used quantitative approach. The other study conducted by Sedayu and Mangkoedihardjo (2018) [8] was the modeling of service quality for housing procurement projects with the principle of green building. His research analyzes the factors that refer to the principles of green building in the procurement of housing projects to be environmentally friendly by reducing the level of damage to the environment. Sedayu (2019) [9] conducted study aims to determine the effect level of variable maintenance of Islamic Senior High School building. The method is used to know the effect level by using Structural Equation Modeling (SEM). The research variables include structural and architectural components as exogenous manifest variable, maintenance quality as moderator variable, and construction reliability as endogenous manifest variable. The result of analysis shows that structural and architectural components variables have positive effect to maintenance quality.

2. Method

2.1. The determination of research variables

The determination of research variables are conducted from previous studies and preliminary surveys at the study site. The research variables are the reliability factors of the Islamic boarding school building. The research instrument was in the form of a questionnaire distributed and answered by a number of respondents. The research respondents were Islamic boarding school users who knew the physical development of Islamic boarding school building facilities, namely ustads (teachers) and santri (students). The measurement scale of this research instrument is the level of user requirement and satisfaction with the reliability of the building facilities described in Table 1. The level of user requirement is used in the preliminary survey to determine research variables, while the level of user satisfaction is used in the continuation survey for data collection analysis. The validity and reliability test of research instruments conducted in trials distributed to 30 respondents. A research instrument has a strong correlation if the correlation value is above 0,6 [10]. At the correlation test stage, Pearson's product moment correlation is used, which is a formula that calculates the correlation coefficient of each item with a total score. The reliability tests are carried out to determine the level of accuracy, stability,

or consistency of research instruments in expressing certain symptoms of a group of individuals, even though they are carried out at different times. The reliability tests are carried out on statements that are strongly correlated by testing Internal Consistency using the coefficient of consistency (Alpha Cronbach). A research instrument is called reliable if the Cronbach Alpha value is greater than 0,6. Determination of the number of respondents using the Slovin formula [11] which obtained the total population of users as research respondents as many as 300 people.

Table 1. The measurement scale of research instruments

Variable	User Requirement	User Satisfaction
Measurement Scale	1 = not required	1 = not satisfactory
	2 = less required	2 = less satisfactory
	3 = quite required	3 = quite satisfactory
	4 = required	4 = satisfactory n
	5 = very required	5 = very satisfactory

2.2. Multiple linear regression analysis

Multiple Linear Regression is used to determine the effect between research variables on the building reliability in Islamic boarding school. This analysis also produced a model to evaluate the building reliability of Islamic boarding school. The building reliability of Islamic boarding school is measured from the level of user satisfaction. Multiple linear regression requires a test requirement called Classical Assumption Test that includes Normality, Linearity of Regression Lines, Multicollinearity, Autocorrelation, Heteroscedasticity, and Partial Effect [12]. This stage of analysis uses computer program for statistic which is SPSS 20. This research consists of 5 independent variables and one dependent variable. Figure 1 is the relationship of 5 independent variables to one dependent variable. Multiple regression models developed with the following functions:

$$Y = a_1X_1 + a_2X_2 + + a_nX_n + e \tag{1}$$

With definition that Y =Dependent variable; a_0 = Intercept; a_1, a_2, a_3 =Independent coefficient; X_1 = Independent variable 1; X_2 = Independent variable 2; X_n = Independent variable at n

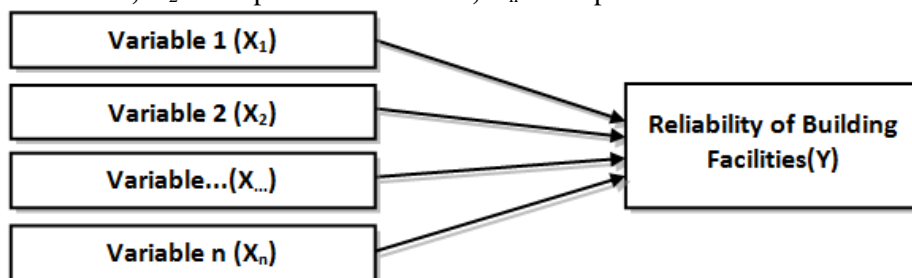


Figure 1. The relationship of 5 independent variables to one dependent variable

3. Results and Discussion

3.1. Results of Determination of Research Variables

The research variables are the reliability factors of the building facilities in Islamic boarding school arranged in the instrument as a tool to collect research data. The reliability factors are obtained through the stage of previous studies and surveys at the research location. The results of determining the reliability factor of building facilities that become research variables by considering the level of user requirement are shown in Table 2. The five reliability factors include Aesthetics, Material, Structure, Utility, and Environment. Table 2 describes that the factor of building utilities support building services and functions with adequate systems and availability (X_4) becomes the highest ranking of reliability factor in the mean value of the user requirement level of 4,128. The factor of building materials of architectural and structural component that have reliable performance and support safety, aesthetic, and comfort (X_2) are the factor with the lowest mean level of user requirement with a mean value of 3,875.

Table 2. Classification of reliability factors

Notation	The Reliability Factors	Mean	Ranking
X ₁	Aesthetic in buildings and outside space both in visual appearance and architectural design meaning	3,924	4
X ₂	Building materials of architectural and structural component that have reliable performance and support safety, aesthetic, and comfort	3,875	5
X ₃	Reliable building structure, ensuring the user safety and comfort of both physical and psychological aspects	3,941	3
X ₄	Building utilities support building services and functions with adequate systems and availability	4,128	1
X ₅	Environmentally friendly by harmonious and integrity cohesion between the building to the environment around	4,093	2

3.2. Results of Validity and Relativity Test

The results of the validity test of the instrument with a scale measuring the level of user satisfaction with the reliability of building facilities in Islamic boarding school indicate that the correlation value of all question items is greater than 0,6 ($> 0,6$), so the research instrument is declared valid. The results of the reliability test explained that the research instrument had a Cronbach Alpha value of 0,932, which means it was greater than 0,6, so the research instrument was declared reliable. The research instruments are valid and reliable that can be used for data collection in the purposes of research analysis.

3.3. Results of Multiple Linear Regression Analysis

3.3.1. Regression models for the building facilities reliability of Islamic boarding school

A regression analysis aims to analyze a set of variables to the regression line. Testing in regression analysis aims to determine the level of significance of the defined regression line. A step to Perform a regression analysis using the SPSS program will produce several statistical numbers that can be displayed simultaneously, including the value of the coefficient F, the Durbin-Watson coefficient, the coefficient of significance (P value) and many other statistical quantities, depending on the outcome settings . The equation of the multiple regression line is stated as follows:

$$Y = a + a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5 + e \quad (2)$$

With definition that Y = Reliability of Building Facilities, X₁ = Aesthetic, X₂ = Material, X₃ = Structure, X₄ = Utility, and X₅ = Environment.

A multiple linear regression analysis is carried out several stages to find the relationship between the independent variables to the dependent variable. According to Sudarmanto (2005) [12] in conducting a test of the significance of the regression coefficient of each independent variables that is processed using SPSS 20 can be done by using the t-coefficient. If the t-coefficient is used as a measurement, then the coefficient must be compared with the t-table value for the alpha level = 0,05 (5% error level or 95% confidence level) with the appropriate dk for the two-tailed test.

Table 3. Results of multiple linear regression analysis

Variables	Unstandardized	t-count	t-table	Significance
(constant)	4,921			
Aesthetic (X ₁)	2,807	3,049	1,508	t-count > t-table (significant)
Material (X ₂)	1,972	2,736	(dk = 50	t-count > t-table (significant)
Structure (X ₃)	3,405	3,451	and alpha	t-count > t-table (significant)
Utility (X ₄)	4,128	3,627	= 5%)	t-count > t-table (significant)
Environment (X ₅)	3,996	3,554		t-count > t-table (significant)
R	= 0,954			
R-Square	= 0,910			
α	= 0,05			

Definition : - Total data (respondent) = 300
- Dependent variable (Y)

Table 3 shows the results of the analysis that the effect of the five factors of building facility reliability is represented by $X_1 = \text{Aesthetics}$, $X_2 = \text{Material}$, $X_3 = \text{Structure}$, $X_4 = \text{Utility}$, $X_5 = \text{Environment}$, generate the value of R-Square = 0,954. This R-Square value indicates that variations in the reliability of building facilities in Islamic boarding school can be explained by the regression equation obtained that is equal to 91,0% while the remaining 9,0% is explained by other factors outside the model equation. The R-value of 0,954 means that the effect of the five factors of building facility reliability is very strong. The analysis process produce a regression model as follows,

$$Y = 4,921 + 2,807X_1 + 1,972X_2 + 3,405X_3 + 4,128X_4 + 3,996X_5 \quad (2)$$

3.3.2. Normality Test

The results of the analysis that tested the level of normality obtained by Kolmogorov-Smirnov Test Z showed that each variable has an Asymp. Sig. 2 tailed > from the alpha level of 0,05, meaning that research data sourced from users as respondents come from normally distributed populations.

3.3.3. Linearity Test

The linearity test to determine the linearity of a regression model using the significance coefficient of deviation from linearity, if the coefficient of significance > alpha level 0,05 (with an error level of 5% and a confidence level of 95%). The analysis shows that the significance value > 0,05 for the five factors of reliability of building facilities in the regression line model is linear.

3.3.4. Multicollinearity Test

The calculation results in multicollinearity test show that the significance value is greater than the alpha level of 0,05, so it can be concluded that among the independent variables in the regression line model multicollinearity does not occur.

3.3.5. Autocorrelation Test

The results of the analysis for this test obtained a Durbin-Watson value of 1,964. This value is stated to be close to two value, so it can be concluded that there was no autocorrelation between the observational data in this study.

3.3.6. Heteroscedasticity Test

The results of calculations for the five research variables have a significance value greater than the alpha level set (0,05), so there is no heteroscedasticity among the five research variables.

3.3.7. Partial Effect Test

The results of partial effect show that the five research variables consisting of five reliability factors have a very strong effect on the reliability of building facilities in the Islamic boarding school which the results of t-count > t-table.

4. Conclusion

The Islamic boarding school in Sidogiri Pasuruan East Java is an Islamic educational institution that is highly determined and effected by the building supporting facilities to support the learning activities. The results obtained five factors of reliability including Aesthetics, Material, Structure, Utility, and Environment. The analysis of the level of user requirement for the reliability factor of building facilities in the Islamic boarding school generate the factor of Building utilities support building services and functions with adequate systems and availability (X_4) becomes the highest ranking of reliability factor in the mean value of the user requirement level. Factor of building materials of architectural and structural component that have reliable performance and support safety, aesthetic, and comfort (X_2) are

the factor with the lowest mean level of user requirement with a mean value. The results of the analysis also show the effect of the five factors of building facility reliability is represented by $X_1 =$ Aesthetics, $X_2 =$ Material, $X_3 =$ Structure, $X_4 =$ Utility, $X_5 =$ Environment, generate the value of R-Square = 0,954. This R-Square value indicates that variations in the reliability of building facilities in Islamic boarding school can be explained by the regression equation obtained that is equal to 91,0% while the remaining 9,0% is explained by other factors outside the model equation. The R-value of 0,954 means that the effect of the five factors of building facility reliability is very strong. The analysis process produce a regression model as follows $Y = 4,921 + 2,807X_1 + 1,972X_2 + 3,405X_3 + 4,128X_4 + 3,996X_5$. The analysis also generate a regression model is that met the requirements of the Classical Assumption Test that includes Normality, Linearity of Regression Lines, Multicollinearity, Autocorrelation, Heteroscedasticity, and Partial Effect. The resulting regression model can be used to assess the reliability of building facilities in the Islamic boarding school. The manager of the Islamic Boarding School in Sidogiri Pasuruan can evaluate to increase the level of reliability of the building facilities, especially the classrooms in the form of a mosque as a place of learning.

5. References

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