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Implementation of *Total Quality Management* (TQM) Based on Ecotheology for *School Sustainability*

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Abstract

This study aims to analyze the implementation of ecotheology-based Total Quality Management (TQM) in supporting school sustainability and examine the role of educational leadership in encouraging the success of its implementation. The research uses a mixed methods approach with a sequential explanatory design that combines quantitative and qualitative data. Quantitative data was obtained through the distribution of questionnaires to educators and education personnel, while qualitative data was obtained through interviews, observations, and documentation. Quantitative data analysis was carried out using SmartPLS to test the validity, reliability, and relationship between variables, while qualitative data was analyzed through data reduction, data presentation, and conclusion drawn. The results of the study showed that Total Quality Management (TQM) had a positive and significant effect on the sustainability of schools with a T-statistic value of 4.103 and P-values of 0.000. In addition, ecotheology also has a positive and significant effect on school sustainability with a T-statistic value of 4.118 and a P-value of <0.001. The R-square value of 0.696 indicates that the combination of TQM and ecotheology is able to explain 69.6% of the variation in school sustainability. The findings of the study show that the integration of quality management with ecological and spiritual values is able to improve a sustainable school culture, environmental awareness of school residents, and the effectiveness of educational governance. This research provides the implication that the application of ecotheology-based TQM can be an innovative strategy in building quality and sustainability-oriented education.

Keywords: Total Quality Management; Ecotheology; School Sustainability; Education Quality Management; Continuous Education.

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Introduction

Educational institutions today face increasingly complex challenges due to the development of globalization, digital transformation, and increasing demands for sustainable quality of education. Schools are not only required to produce graduates who excel academically, but also to be able to build social and ecological awareness of students. In this context, educational institutions need an effective, adaptive, and sustainability-oriented management system in order to be able to respond to various changes that occur in society.

One of the widely used approaches to improve the quality of education is Total Quality Management (TQM). TQM is a management approach that emphasizes continuous improvement, customer satisfaction, involvement of all members of the organization, and strengthening the overall quality culture. In the world of education, the implementation of TQM has been proven to be able to improve the effectiveness of school management, the quality of learning, the professionalism of teachers, and the efficiency of governance of educational institutions. Research shows that the implementation of TQM contributes significantly to improving organizational performance through strengthening a culture of quality, participatory leadership, and continuous evaluation (Argaricha, 2025).

In addition to the quality management factor, educational leadership is also an important element in the success of school management. Visionary and transformational leadership is able to create an organizational culture that is innovative and responsive to change. According to (Fauzi, 2025) Educational leadership has a significant influence on improving the quality of educational organizations through effective supervision and strengthening a collaborative work culture. Meanwhile, (Pamuji & Aditya, 2026) explained that modern education leadership needs to be directed at strengthening organizational sustainability so that educational institutions are able to survive in the midst of global challenges.

On the other hand, increasing environmental damage and the global ecological crisis require the world of education to contribute to building people's ecological awareness. One relevant approach is ecotheology. Ecotheology is a concept that integrates spiritual values and human responsibility for the environment. In the perspective of Islamic education, humans are seen as caliphs who have the obligation to maintain the balance of nature and environmental sustainability. Therefore, schools not only function as a place for knowledge transfer, but also as a means of forming the ecological character of students (Ilmiah et al., 2025).

The integration between TQM and ecotheology is an interesting approach in supporting school sustainability. School sustainability does not only include physical and environmental aspects, but also includes organizational culture, educational policies, and the participation of all school residents in maintaining the sustainability of educational institutions. However, research on the implementation of ecotheology-based TQM in the context of school sustainability is still relatively limited. Most previous research has focused more on TQM from a managerial perspective and improving organizational performance, while the integration of ecological and spiritual values has not been studied in depth (Imansyah et al., 2026).

Based on this background, this study aims to analyze the implementation of ecotheology-based Total Quality Management (TQM) in supporting school sustainability and examine the influence of TQM and ecotheology on school sustainability.

Methods

This study uses a mixed methods approach with a sequential explanatory design, which combines quantitative and qualitative methods gradually. The quantitative approach is used to test the relationship between variables through statistical analysis, while the qualitative approach is used to deepen the understanding of the implementation of ecotheology-based TQM in school sustainability.

Research Design

The first stage of the research was carried out through a quantitative survey using a questionnaire distributed to respondents. The second stage was carried out through in-depth interviews, observations, and documentation to strengthen the interpretation of quantitative results.

Participants and Sampling

The research participants consisted of school principals, teachers, education staff, and school managers involved in the implementation of school sustainability programs. The number of respondents at the quantitative stage was 120 respondents who were selected using the purposive sampling technique. Meanwhile, at the qualitative stage, 10 main informants were selected consisting of school principals, vice principals, teachers, and school environment program managers.

Data Collection Instruments

The quantitative research instrument is in the form of a questionnaire with a five-point Likert scale that measures three main variables, namely Total Quality Management (TQM), ecology, and school sustainability. The TQM variables are measured through indicators of continuous improvement, school community involvement, focus on quality, and quality leadership. Ecotheology variables are measured through indicators of ecological awareness, environmental spiritual values, and environmental care behavior. School sustainability variables are measured through aspects of school culture, environmental management, and sustainability of educational programs.

Qualitative data were obtained through semi-structured interviews, observations of school activities, and documentation of environmental programs. Triangulation techniques are used to ensure the validity and credibility of research data.

Data Analysis

Quantitative data analysis was carried out using the SmartPLS 4.0 application through outer model and inner model testing. The outer model is used to test the validity and reliability of the indicator through the outer loading and Average Variance Extracted (AVE) values. Meanwhile, the inner model is used to test the influence between variables through path coefficients, T-statistics, and P-values.

Qualitative data analysis is carried out through the stages of data reduction, data presentation, and conclusion drawn. The results of the qualitative analysis are used to strengthen the interpretation of quantitative data so that a more comprehensive understanding is obtained regarding the implementation of ecotheology-based TQM.

Result and Discussion

Result

Table 1. Validity Test Results (Outer Loadings)

Variabel	Indicator Code	Outer Loading	AVE	Description
Total Quality Management X1	X1_1	0.775	0.585	Valid
	X1_2	0.736	0. 585	Valid
	X1_3	0.842	0. 585	Valid
	X1_4	0.766	0.585	Valid
	X1_5	0. 725	0.585	Valid
Ecotheology X2	X2_1	0.749	0.656	Valid
	X2_2	0.740	0.656	Valid
	X2_3	0.749	0.656	Valid
	X2_4	0.778	0.656	Valid
	X2_5	0.793	0.656	Valid
	X2_6	0.778	0.656	Valid
Sustainability and	Y1	0.764	0.593	Valid
	Y2	0.760	0.593	Valid
	Y3	0.855	0.593	Valid
	Y4	0.838	0.593	Valid
	Y5	0.828	0.593	Valid

Source: Processed Primary Data (2026)

In the Total Quality Management (X1) variable, there are five indicators (X1_1 to X1_5) with outer loading values ranging from 0.725 to 0.842. These values show that the entire indicator has a strong contribution to reflecting the X1 variable, as they are all above the general limit of 0.7. In addition, an AVE value of 0.585 indicates that this variable is able to explain more than 50% of the variance of the indicator. Thus, all indicators in this variable are declared valid.

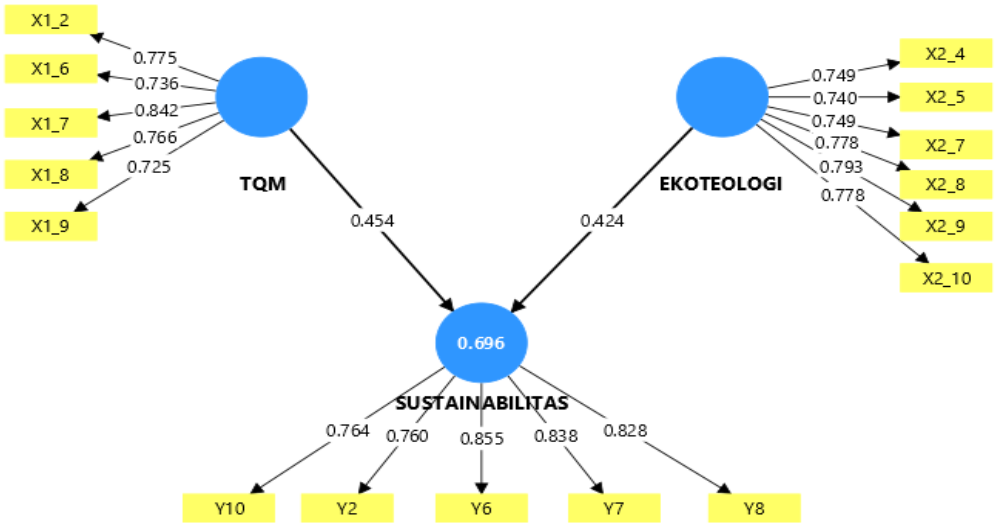
Furthermore, the Ecotheology variable (X2) was measured by six indicators (X2_1 to X2_6) with an outer loading value between 0.740 to 0.793. This range shows good consistency in measuring Ecotheology constructs. An AVE value of 0.656 also indicates a high degree of convergent validity, as it exceeds the threshold of 0.5. Therefore, all indicators in this variable are also declared valid.

Then, the Sustainability (Y) variable has five indicators (Y1 to Y5) with an outer loading value ranging from 0.760 to 0.855. These values show that these indicators are very representative

in measuring the Sustainability variable. The AVE value of 0.593 further strengthens that this variable has a good ability to explain the variance of the indicator. All indicators in this variable are also declared valid.

Overall, the three variables in the table showed good results in the convergent validity test. This is shown by the outer loading value which is mostly above 0.7 and the AVE value which is overall exceeding 0.5. Thus, it can be concluded that all indicators used in this study are valid.

Figure 1. Structural Model Estimation Results (PLS Algorithm)



Source: SmartPLS Data Analysis Results (2026)

The SmartPLS graph shows the results of the analysis of structural models (inner model) and measurement models (outer model) involving three main constructs, namely TQM (Total Quality Management), Ecotheology, and Sustainability.

In terms of the structural model (inner model), it can be seen that the TQM variable has an influence on Sustainability with a path coefficient of 0.454. This shows that the better the implementation of TQM, the more sustainable it will be. Meanwhile, Ecotheology also affects Sustainability with a coefficient value of 0.424, which means that the effect is also positive and quite strong, although slightly smaller than TQM.

The R-square (R^2) value of 0.696 in the Sustainability variable shows that the combination of the TQM and Ecotheology variables is able to explain about 69.6% of the Sustainability variation, while the remaining 30.4% is explained by other factors outside the model. This value is relatively strong, so the model has good clear power.

In terms of the measurement model (outer model), all indicators in each variable have an outer loading value above 0.7 (or close), such as:

1. TQM (0,725 – 0,842)
2. Ecotheology (0.740 – 0.793)
3. Sustainability (0.760 – 0.855)

This shows that all indicators have good convergent validity, meaning that they are able to represent their constructs strongly.

Overall, the results of this SmartPLS can be interpreted as:

1. TQM and Ecotheology both have a positive effect on Sustainability.
2. TQM has a slightly greater influence than Ecotheology.
3. The model has strong explanatory ability (high R^2).
4. All indicators are valid and suitable for use in the analysis.

Table 2 Hypothesis Testing Result *(Path Conffficients)*

Hipotesis	Relationship Pathay	T-Statistics	P-Values	Verdict
H1	Ecotheology - Sustainability	4.118	<. 001	Supported
H2	TQM - Sustainability	4.103	0.00	Supported

The results of hypothesis testing were based on **the value of path coefficients**, which showed the strength and significance of the relationship between variables in the research model.

The test results for the first hypothesis (H1) showed that the relationship between **Ecotheology** and **Sustainability** had a T-statistical value of 4.118 with a P-value of less than 0.001. Statistical T-values greater than the critical limit (generally 1.96) as well as very small P-values indicate that this relationship is statistically significant. Thus, the first hypothesis is stated to be supported, which means that Ecotheology has a positive and significant effect on Sustainability.

Furthermore, in the second hypothesis (H2), the relationship between **TQM (Total Quality Management)** and **Sustainability** has a T-statistical value of 4.103 with a P-value of 0.00. These results also show high significance because the T-values are well above the threshold and the P-values are very small. Therefore, the second hypothesis is also stated to be supported, which means that TQM has a positive and significant influence on Sustainability.

Overall, the two hypotheses in this study are proven to be significant and supported by data. This shows that both Ecotheology and TQM have an important role in increasing Sustainability.

Discussion

The results of the study show that Total Quality Management (TQM) has a positive and significant influence on the sustainability of schools. These findings indicate that the application of the principles of continuous improvement, the involvement of all school residents, and a quality culture are able to strengthen the sustainability of educational institutions. Schools that consistently implement TQM tend to have more effective governance, a conducive learning environment, and an evaluation system that is oriented towards continuous quality improvement.

The findings of this study are in line with the TQM theory put forward by Deming that organizational quality can be improved through continuous improvement and the involvement of all members of the organization. The results of this study also support the research of Mesiono et al. (2024) who stated that the implementation of TQM is able to increase the effectiveness of educational organizations and school quality culture.

In addition, the results of the study show that ecotheology has a positive effect on school sustainability. This shows that integrating spiritual values and ecological awareness in education can increase school residents' concern for the environment. The implementation of ecotheology can be seen through various school activities such as waste management,

environmental greening, energy saving, and habituation of environmentally friendly behavior.

In the perspective of Islamic education, ecotheology places humans as caliphs who are responsible for preserving nature. Therefore, the application of ecotheology in the school environment not only forms ecological awareness, but also strengthens the moral and spiritual values of students. These findings are in line with research on environment-based education that shows that the integration of ecological values in education is able to shape sustainable school cultures.

The R-square value of 0.696 indicates that the combination of TQM and ecotheology has a strong contribution in explaining the sustainability of schools. This means that the success of school sustainability is not only influenced by managerial aspects, but also by strengthening the spiritual values and ecological awareness of school residents.

However, this research still has limitations. The research was only carried out in the scope of certain schools so that the results of the research could not be generalized widely. In addition, this study only uses two independent variables, namely TQM and ecotheology, so there are still other factors that can affect the sustainability of schools such as leadership, organizational culture, and government policy support.

Conclusion

The results of the study show that the implementation of Total Quality Management (TQM) combined with an ecotheology approach has a positive and significant influence on the sustainability of schools. The implementation of TQM principles, such as sustainable quality improvement, the involvement of all school residents, and strengthening the quality culture, has been proven to be able to increase the effectiveness of education management and create a more sustainable school environment. In addition, the application of ecotheology values also increases ecological awareness, concern for the environment, and the formation of students' spiritual character in preserving nature.

Based on the results of the analysis, the TQM and ecotheology variables were simultaneously able to explain 69.6% of the variation in school sustainability. This shows that the sustainability of schools is not only influenced by management aspects, but also by the strengthening of spiritual values and environmental awareness in school culture.

Thus, the application of ecotheology-based TQM can be used as an innovative strategy in realizing quality education, character, and oriented towards environmental sustainability. However, this study still has limitations because it is only conducted in a specific school and uses two main variables. Therefore, further research is recommended to expand the scope of research and add other variables, such as leadership, organizational culture, and education policy support.

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